West Winch Housing Access Road

Outline Construction Environmental Management Plan

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1 Introduction

1.1 Background

1.1.1 Norfolk County Council working in partnership with the Borough Council of Kings Lynn and West Norfolk (BCKLWN) (hereafter referred to as 'the Applicant') are proposing to submit a planning application for the West Winch Housing Access Road (hereafter referred to as 'the Proposed Scheme'). The Proposed Scheme is located between the A47 (northern extent) and the A10 (southern extent), crossing several agricultural land parcels and will provide a link between the A47, to the north, and A10, to the south.

1.1.2 The environmental management of the construction works associated with the Scheme shall be delivered through the Construction Environmental Management Plan (CEMP). This Outline CEMP forms the basis of the Principal Contractor's (the 'Contractor') CEMP and describes how construction activities should be undertaken and managed in accordance with:

- Design Manual for Roads and Bridges (DMRB), Volume 11, Section 2, Part 5, titles 'Assessment and Management of Environmental Effects';
- DMRB, Volume 11, Section 2, Part 6, titled 'Reporting of Environmental Impact Assessments; and
- LA 120 Environmental management plans (formerly IAN 183/16 (W) Environmental Management Plan) Revision 1.

1.1.3 The Contractor shall be responsible for reviewing the environmental requirements in this Outline CEMP, developing the construction methodology in light of those requirements, and updating the Outline CEMP in greater detail prior to construction commencing. Once this exercise has been completed the document is then referred to as the Contractor's CEMP. The Contractor will be responsible for safeguarding the environment and for mitigating the effects of the construction works (the 'works') by implementing

general environmental requirement of the CEMP. The Contractor will regularly review and update the CEMP and incorporate it into the Contractor's Quality Management System (QMS) and/or Environmental Management System (EMS).

1.2 Scheme location and description

1.2.1 The Proposed Scheme is located within land to the east of West Winch village, approximately 2 kilometres (km) south of the centre of Kings Lynn, Norfolk. The Proposed Scheme is located between the A47 (northern extent) and the A10 (southern extent), crossing a number of agricultural land parcels. The location is identified in Figure 1-1: Site Location Plan and described further in Chapter 2: The Existing Site.

1.2.2 The planning application will seek permission for development of:

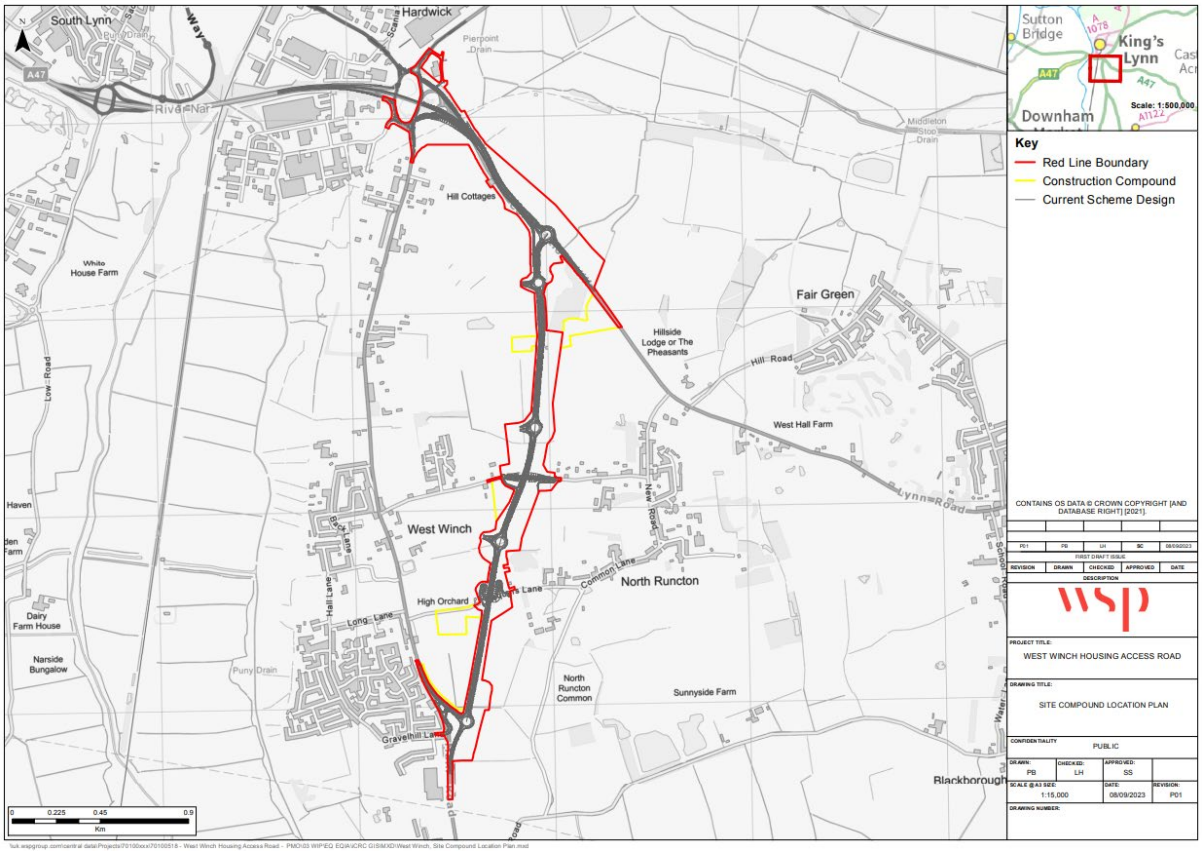
- A 3.5km long carriageway to the east of West Winch connecting the A47 with the existing A10, providing access to proposed housing development;
- Modifications to the existing Hardwick Interchange and dualling of the existing A47 between Hardwick Interchange and the housing access road;
- The housing access road will be predominantly single carriageway, with a short section of dual carriageway on the approach to the A47 and feature a total of five roundabouts including;
  - A partially signalised roundabout junction where the housing access road meets the A47;
  - A roundabout on the housing access road providing access to the Hardwick Green (i.e. Hopkins Homes) planned development, plus two roundabout junctions to accommodate connections to further housing development;

  - A roundabout at the southern end of the housing access road, providing a connection to the existing A10 with new signalised crossings nearby;

- Treatment of local roads severed by the housing access road including an overbridge at Rectory Lane to accommodate road and bridleway users, and closure of Chequers Lane where it crosses the scheme with an at-grade signalised crossing, to maintain east to west access;
- Modifications to the existing A10 to improve safety and support its repurposing as a local traffic route;
- Construction of drainage features, including basins, and associated maintenance access tracks;
- Landscaping, and connections for non-motorised users;
- Utility diversions, including National Grid gas mains;
- Demolition of Hill Cottages on A47 Constitution Hill; and
- Temporary use of land during construction for working areas, haul routes, site compounds, and storage.

1.2.3 A comprehensive description is provided in Chapter 3 of the Environmental Statement 'Description of the Proposed Scheme' (document reference: 3.03.00).

Figure 1-1 – Site compound location plan



1.3 Purpose and Content

1.3.1 The document is an Outline CEMP and provides an overarching framework for the environmental management during the construction works.

1.3.2 The Outline CEMP provides the following:

- A summary of the construction effects at sensitive receptors identified in Environmental Statement and the associated appendices;
- Mitigation measures to reduce construction effects at sensitive receptors, as identified in the Environmental Statement and the associated appendices;
- Ecological Management Plan (**Appendix F**); and
- Recommendations of further works, such as monitoring, to be undertaken prior to/ during the works.

1.3.3 This document will set a framework for the contractor to produce a detailed CEMP. The Detailed CEMP will be a 'live document' and shall be subject to a regular review and update by the Contractor prior to and during construction activities (refer to Table A-1, **Appendix A).** Each section will be reviewed and updated as necessary, and an electronic version of the updated CEMP circulated to the Contractor's Project Manager (see **Appendix A**). Updates to the CEMP must be incorporated into the Contractor's QMS and/or EMS.

1.3.4 Other requirements to be completed by the Contractor are as follows:

- A register or legal requirements, training undertaken and completion of site monitoring sheets (**Appendix A** Table A-2);
- An Environmental Aspects and Impacts Register (**Appendix B**);
- A Register or Consents, Undertakings and Assurances (**Appendix C**);
- Emergency Contact details for the works (**Appendix D**);
- Register the construction site under the Considerate Constructors Scheme; and
- Comply with the Considerate Constructors Schemes' Code of Considerate Practice in providing the works.

1.3.5 The Environmental Aspects and Impacts Register ('the Register') in **Appendix B** is a record of all sensitive environmental features that have the potential to be affected by the works. The Register also includes information on how these features will be affected and the control measures required to mitigate any potential impacts (see **Appendix B**).

1.3.6 A draft register of consents, undertaking and assurances, including a suggested list of specific environmental licenses, consents and applicable permits shall be completed by the Contractor (see **Appendix C**).

1.3.7 The emergency contact details for the works shall be clearly displayed at the site where the public can see them (see **Appendix D**).

1.3.8 All documentation in relation to the environmental management of the works shall be maintained by the Contractor and made available to the Project Manager.

1.3.9 The performance of the Contractor's CEMP in meeting environmental objectives and targets, mitigating environmental effects and in achieving effective environmental management shall be subject to review by the Project Manager (refer to **Appendix A**) every two months.

2 Scheme Construction

2.1 Anticipated Construction Programme

2.1.1 It is currently anticipated that construction will commence in 2025 and is expected to be completed in late 2027. Site clearance and establishment of compounds is assumed to occur before the end of March 2025.

2.1.2 The peak period of construction is assumed to be the first main earthworks season when about 70-80% of earthwork volume is assumed to be shifted to/from site. The remaining 20-30% of imported fill and arisings are assumed to be transported on or off site in the second earthworks season. The optimum time of year for earthworks is expected to be April to September.

2.1.3 Demolition of two dwellings at Hill Cottages on Constitution Hill will be required.

2.1.4 The key construction works are likely to be divided into four broadly sequential activities:

- Site clearance and foundations;
- Utilities Diversions;
- Major infrastructure; and,
- Landscaping and minor infrastructure.

2.2 Construction Methodology

2.2.1 The Construction work is currently due to commence in 2025 and continue until the road opening in late 2027. The key construction activities are summarised sequentially below (although there is likely to be some overlap between each stage / individual processes):

- **Enabling Works**. This will focus on logistics including compound set up, establishing haul roads, fence removal and installation of temporary fencing.
- **Site Clearance.** This will entail removal of existing fencing, vegetation clearance and topsoil stripping.
- **Utility Diversion.** This will entail the diversion of utilities required to construct the scheme including the diversion and upgrade of two gas main feeder pipes.
- **Earthworks.** Pre-earthwork drainage installation, bulk earthworks, stockpile maintenance and logistics
- **Structures (overbridge, underpass extension and culverts).** Area preparation and temporary works platform installation, piling, steel and concrete works, structural fills and beams and deck installation.
- **Drainage and Ancillary Works.** Installation of longitudinal drainage (carrier drains, filter drains, swales), constructing Infiltration basins, service lighting ducts.
- **Pavement.** Caping and subbase construction, base, binder and surface course.
- **Finishing Works.** Installing vehicle restraints system, signage, lighting, road markings and boundary fencing.
- **Landscaping.** Topsoil laying, seeding and tree planting.
- **Stockpile and Material Management.**

2.2.2 As part of the iterative development of the detailed CEMP, as the design is progressed and as construction commences, the Contractor will be responsible for providing further details.

2.3 Construction Compounds

2.3.1 There will be four site compounds as illustrated in **Figure 3-1 General arrangement plan**, two of which would be main site compounds - one at the north end of the WWHAR alignment and the other at the southern junction with A10, where the majority of welfare, car parking and site offices will be located. In addition two satellite compounds will be located at Hardwick Roundabout and at the rectory Lane bridge for layout and storage of materials.

2.4 Construction Traffic

2.4.1 In advance of appointment of a main contractor to provide early guidance on construction, the Environmental Statement has been prepared on the basis of an assumed construction methodology which is expected to offer a feasible scenario that could be undertaken. However, the detail of the full Construction Environmental Management Plan will be worked up during the determination period of the planning application.

2.4.2 The majority of the Proposed Scheme (WWHAR road element) can be constructed offline through open countryside in a predominantly rural area to help minimise disruption.

2.4.3 The only online roundabout is to be located at the interface between WWHAR and A47. This will need to be constructed with traffic management in place to allow shuttle working whilst the carriageway is reduced to single lane working at times.

2.4.4 The WWHAR link from A47 to A10 is assumed to be constructed to base course prior to the A47 dualling works and Hardwick roundabout works. The WWHAR alignment itself can be used as an internal haul road for import of

construction materials and export of arisings and waste with minimal construction traffic impact on West Winch village.

2.4.5 The peak period of construction is assumed to be the first main earthworks season when about 70-80% of earthwork volume is assumed to be shifted to/from site. The remaining 20-30% of imported fill and arisings are assumed to be transported on or off site in the second earthworks season. The optimum time of year for earthworks is expected to be April to September.

2.4.6 There will be traffic disruption whilst the Constitution Hill roundabout is being removed and new slip roads installed. It is anticipated that the existing roundabout could be converted temporarily to a signalised 'T' junction whilst the roundabout. Twelve weekend closures of the A47 will be required for the slip road works at Hardwick Roundabout.

2.4.7 As a worst-case scenario, all staff working at the site and all LGV movements are assumed to travel to site between 7am and 9am on a typical weekday during the peak construction phase and depart from the site between 4pm and 6pm. All HGV movements are assumed to be spread evenly across the site working hours covering a 10 hour day. HGV routes will be restricted to designated HGV suitable routes including A10, A47, A17, A1 and A149.

2.4.8 A small number (4-6) escorted abnormal loads (due to length or width exceeding the standard legal articulated vehicle parameters) would be required for the delivery of bridge components at Rectory Lane. Where possible these will be carried out during times of low traffic movement on the surrounding highway network.

2.4.9 For imported materials to supply the capping layer materials, a potential local supplier has been identified close to the site located at Middleton (about 3km east of West Winch). Their typical vehicle types for transporting capping material are assumed to be 20 Tonnes per vehicle as standard loads. The associated vehicle movements will be routed via A47 and East Winch Road (to the east of West Winch) to access Middleton Aggregates.

2.4.10 Other imported materials during the peak construction period are assumed to be imported from Grantham via A47, A17 and A1 to the west.

2.4.11 There is also a licenced recycling company at Middleton, where exported material can also be disposed of. Vehicle movements to and from Middleton are expected to have a standard maximum load capacity of 20T assumed. The associated vehicle movements will be routed via A47 and East Winch Road (to the east of West Winch) to access Middleton Aggregates.

3 Project Team

3.1 Construction Team

3.1.1 To fulfil the aims of the Outline CEMP and to ensure that all the environmental commitments for the construction works are met, it is important to ensure that the roles of all staff are clearly set out, and that prior to, and throughout the works, they are made aware of the environmental sensitivities and commitments that are required to be adhered to. Roles include:

- Project Manager; and
- Site Manager.

3.1.2 The Contractor shall be responsible for safeguarding the environment and for mitigating the effects of the Scheme and its construction throughout the works in line with the contractual requirements.

3.1.3 Following the appointment of the Contractor for the works it will be the Site Manager's responsibility to maintain and update the Outline CEMP and to produce the Contractor's CEMP. The Contractor's CEMP will meet the applicable requirements of BS EN ISO14001. The Contractor's CEMP will set out the Contractor's roles and responsibilities, together with appropriate control measures, training and briefing procedures, risk assessments, stakeholder engagement and monitoring systems to be employed during planning and constructing the works for all relevant topic areas.

3.1.4 As part of the Contractor's CEMP, the Contractor will be required to plan the works in advance to ensure that measures to reduce environmental effects are integrated into the construction methods. The CEMP will cover all the activities undertaken by the Contractor. The Contractor will also be required to coordinate with relevant parties whose actions may affect the works. This will be documented in the CEMP, as appropriate.

3.2 Environmental team requirements

3.2.1 This section provides further details on the roles and responsibilities of all key members of the Contractor's project environmental team. It is anticipated that for the Proposed Scheme the following would be included:

- Project Manager;
- Site Manager;
- Environmental Manager;
- Environmental Clerk of Works;
- Ecological Clerk of Works;
- Project Arboriculturalist; and
- Public Liaison Officer.

Project Manager

3.2.2 The roles below will report to the Project Manager.

Site Manager

3.2.3 The Project Manager will appoint a Site Manager to manage the day-to-day activities on the construction site.

Environmental Manager

3.2.4 The Environmental Manager will be involved in the management of construction phases of the works. They will ensure the work takes place within the parameters as set out in the CEMP. The Environmental Manager shall

have a minimum of ten years' experience in the environmental aspects of construction for highway/road projects.

3.2.5 They shall be responsible for:

- Developing the CEMP, on-going review and update of the CEMP and relevant procedures;
- Ensuring that all environmental standards and commitments are adhered to;
- Assist the Site Manager with carrying out environmental inductions and training;
- Monitoring compliance of construction activities within the CEMP;
- Conducting inspections and reporting non-compliances to the Site Manager and Project Manager;
- Liaising with the Contractor's management and operatives on all matters of the environment;
- Monthly site inspections and issue of a monthly report of the on-going environmental activities until completion;
- Working to ensure commitments made during the design phase are carried through to construction;
- Working with the Ecological Clerk of Works to produce the Ecological Management Plan (EMP), including root protection zones and no-go areas;
- Ensuring that all necessary works included within the CEMP are suitably catered for in the construction programme;
- Undertaking quarterly environmental audits throughout the works;
- Attending formal contract progress meetings and third-party interest groups as required;

- Immediate reporting of non-compliances and alerting the Environment Agency in the event of an incident;
- Sharing information with the WSCC Environment Team; and
- Reporting to the Site Manager.

Environmental Clerk of Works

3.2.6 The Environmental Clerk of Works shall have a minimum of five years' experience in the environmental aspects of construction. They will have at least two years' recent experience as an Environmental Clerk of Works, preferably on UK highway schemes.

3.2.7 They shall be responsible for:

- Recording and reporting all environmental works;
- Maintenance of related records;
- Regular site inspections (minimum weekly);
- Attendance at any environmental incidents on site; and
- Reporting to the Environmental Manager.

Ecological Clerk of Works

3.2.8 The Ecological Clerk of Works shall be experienced in ecological assessment for highway/road projects, with recent experience on UK projects.

3.2.9 They shall be responsible for:

- Working with the Environmental Manager to produce the Ecological Management Plan (**Appendix F**) within the CEMP before construction.

Project Arboriculturalist

3.2.10 The Project Arboriculturalist shall be responsible for:

- Interpreting tree protection requirements, advising on their implementation and providing technical review of any amendments to agreed details;

- Supervision of sensitive works in the vicinity of retained trees;
- Advising team with respect to specimens subject to Tree Preservation Orders, protection measures and monitoring requirements;
- Observing works in the vicinity of trees to be retained and maintaining records;
- Alerting the Environmental Manager with regard to stopping work where there is the potential for retained trees to be damaged, or where works represent a previously unidentified risk to retained trees; and
- Providing input into the Ecological Management Plan (**Appendix F**), work method statements and pruning schedule.

Public Liaison Officer

3.2.11 The Contractor will appoint a Public Liaison Officer (PLO) to carry out liaison duties with the public and others and will develop and maintain the Communication Plan for the Scheme. The PLO will be responsible for maintaining a register of community consultation including list of complaints and actions. This is to be made available to the local authority on request.

3.2.12 The PLO will be responsible for informing stakeholders of the works and programme and advising in the event of upcoming works with the potential for noise disturbance.

3.3 Roles and Responsibilities

3.3.1 **Table 3-1** outlines key environmental roles and responsibilities:

Table 3-1 – Environmental roles and responsibilities

Activity	Responsible Person
Ensure resources are made available to carry out environmental responsibilities.	Project Manager
The performance of the Contractor's CEMP in meeting environmental objectives and targets, mitigating environmental effects and in achieving effective environmental management shall be subject to review (refer to Appendix A) every two months.	Project Manager
Ensure measures detailed in the CEMP are carried out.	Site Manager
Produce the CEMP	Environmental Manager
Review the CEMP	Project Manager/Site Manager/Environmental Manager
Carry out Environmental Induction Training on site (as part of the overall site induction)	Site Manager/Environmental Manager
Ensuring that all environmental standards and commitments are adhered to	Environmental Manager
Carrying out site specific environmental training	Environmental Manager/Ecological Clerk of Works
Carrying out monthly site environmental inspections	Environmental Manager
Carrying out weekly site environmental inspections	Environmental Clerk of Works
Carrying out quarterly environmental audits	Environmental Manager
Carrying out Waste Management Duties on site	Environmental Manager
Carrying out regular site environmental checks	Environmental Manager

Activity	Responsible Person
Ensuring Risk Assessments/Method Statements (RAMS) take into account environmental aspects and risks on site	Site Manager/Environmental Manager
Arboriculture monitoring, supervision of sensitive works and maintaining record of events	Project Arboriculturalist
Review/Provide environmental input RAMS	Environmental Manager
Identify requirements for/inputting into/co-ordinating specific environmental RAMS for the works	Environmental Manager
Producing specific environmental RAMS	Environment Team Specialists
Ensure client instructions are implemented	NEC Project Manager
Carrying out Emergency Procedures	Site Manager
Investigate Environmental Incidents	Environmental Manager
Liaison with the Environment Agency	Environmental Manager/Public Liaison Officer
Liaison with other interested parties/statutory bodies	Environmental Manager/Public Liaison Officer
Arboriculture Monitoring	Project Arboriculturist
Vegetation clearance ecological monitoring	Ecological Clerk of Works

4 General Procedures

4.1 Specific Proposals

4.1.1 Specific proposals for the operation, phasing, timing and sequencing of works shall be developed by the Contractor and the Environmental Manager. These procedures will need to remain flexible and be adapted throughout the works as necessary to accommodate changing needs and circumstances.

4.2 Environmental Accidents and Emergencies

4.2.1 In the event of an accidental release of hazardous materials, information regarding those materials, spill contaminated materials and spill response equipment shall be clearly stated on site. A procedure for a general response to incidents shall be included in the Contractor's Health and Safety Plan, stating the chain of command and standby operatives, and clearly advised to all staff.

4.2.2 A register of all nearby residential properties, downstream abstractors and other sensitive receptors that could be affected by an environmental incident shall be compiled and maintained by the Contractor/PLO.

4.2.3 The local community must be informed about the environmental incident at the time if felt necessary by the Contractor.

4.2.4 If a serious accident occurs, the media and local community shall be issued with a fact sheet about the environmental incident, and the action taken by the Contractor to remedy the situation. This will be undertaken in accordance with the accepted Project's Communication Plan.

4.2.5 Details for the requirements for spill kits are as follows:

- Spill kits are to be held on site at all times;
- Spill kits with instructions will be sited in areas of high risk and in close proximity to material storage areas;
- All staff will be trained in the use of spill kits and the correct disposal of used spill control material;
- Used spill kit equipment will be disposed of a hazardous waste; and
- Spill kits will be maintained and periodically inspected.

4.2.6 Environmental incidents shall be recorded by the Contractor including:

- Nature of spill/leak/incident;
- Time/date;

- Exact location;
- Type of material released;
- Actions taken to prevent contamination;
- Individuals reported to; and
- Lessons learnt.

4.2.7 Lessons learnt shall be fed back to site staff through safety and environment briefings and used the Contractor's Environmental Manager to amend procedures and update the CEMP accordingly.

4.2.8 Emergency procedures shall be tested monthly by the Environmental Manager. Examples of procedures should include:

- The names and 24-hour contact details of all emergency response personnel and emergency services;
- The procedures for reporting and documenting an emergency incident;
- Personnel responsibilities during an emergency incident; and
- The location of on-site information on hazardous materials and spill containment materials.

4.3 External Communication

4.3.1 External communication on site would typically include:

- Communication with interested third parties;
- Addressing complaints from members of the public; and
- Communication with the media.

4.3.2 Regulator engagement, as required, will take place with interested third parties including statutory and non-statutory bodies. Where required RAMS would be submitted to third parties for their review/approval.

4.3.3 The PLO will carry out liaison duties with the public and others, will maintain the contact register and will develop the Communication Plan for the Scheme.

4.3.4 Contact details of the PLO will be made publicly available and advertised clearly. The PLO will maintain a register of queries and complaints from the public which will inform the day-to-day construction activities if necessary. The PLO will inform the Site Manager as and when complaints are received, at which point appropriate responses/mitigation shall be delivered to address the query/complaint. These arrangements will be detailed in the Communication Plan. The Contractor will need to register the site with the Considerate Constructors Scheme and this will be detailed in the Communication Plan, along with any Code of Construction Practice.

4.3.5 The Contractor through the PLO will provide regular updates to the general public on the progress of the works and changes to traffic management layouts. Methods of communication include WSCC internet pages, the distribution of leaflets and other means as agreed with the WSCC's Client Lead. The Contractor will obtain WSCC Client Lead's approval for all information to be published.

4.3.6 Contact details will be provided in the CEMP and updated on a regular basis. These contact details will be displayed on the site notice board. A template for the Contact List is provided in Appendix D.

4.4 Risk Assessments

4.4.1 All activities undertaken on site shall be subject to a risk assessment. Risk assessments will be undertaken by trained staff following an approved procedure which will:

- Identify the significant environmental and Health & Safety impacts that can be anticipated;
- Assess the risk from the impacts;
- Identify the control measures to be taken and re-calculate the risk;

- Report where an inappropriate level of residual risk is identified so that action can be taken through design changes, re-scheduling of work or alternative methods of working in order to reduce the risk to an acceptable level;
- The results of risk assessments, and their residual risks are only considered acceptable if; the severity of outcome is reduced to the lowest practical level; the number of risk exposures are minimised; all reasonably practical measures have been taken and the residual risk rating is reduced to a minimum; and
- The findings of the risk assessment and in particular the necessary controls will be explained to all operatives before the commencement of the relevant tasks using an instruction format agreed with the Environmental Manager.

4.5 Method Statements

4.5.1 Implementation Method Statements shall be completed by the Contractor and/or subcontractor by trained staff or other appropriate experienced personnel, in consultation with specialists. Their production shall include a review of the environmental/Health & Safety risk and commitments, so that appropriate controls measures are developed and included within the construction process.

4.5.2 Method Statements will be reviewed by the Site Manager and NEC Project Manager and, where necessary, by an appropriate environmental specialist. Where appropriate, method statements will be submitted to the regulator authorities (Environment Agency, Natural England, an Environmental Health Officer and Emergency Planning Officer etc.) as required.

4.5.3 Method Statements must contain as a minimum:

- Location of the activity and access/egress arrangements;
- Work to be undertaken and methods of construction;

- Plant and materials to be used;
- Labour and supervision requirements;
- Health, safety and environmental considerations; and
- Permit or consent requirements.

4.6 Environmental and Social Targets

4.6.1 To help achieve and maintain high levels of environmental and social performance for the construction of the Scheme, specific targets have been set and are listed below in order of priority:

- Ensure no pollution incidents occur;
- Ensure no enforcement actions occur;
- Ensure waste is managed as high-up the waste hierarchy as is practicable; and
- Ensure all environmental mitigation is implemented and monitored where appropriate.

4.6.2 The achievement of these targets should be reported in the Environmental Site Monitoring process.

4.7 Environmental Instruction, Awareness Information and Training

4.7.1 The raising of environmental awareness is viewed as a crucial element of the CEMP. All Contractor's site staff must undergo environmental awareness training, initially by way of the pre-start induction process. This would identify the key environmental sensitivities and mitigation, including individual responsibilities for checking and reporting (e.g. presence of suspected archaeology etc.). A project specific training plan that identifies the competency requirements for all personnel allocated with environmental responsibilities must be produced and must be contained within the CEMP. A record of training shall be required to be maintained by the Contractor, with all site personnel undergoing a pre-start induction training course and aspect-

specific toolbox talks on the environmental issues related to the works and the CEMP.

4.7.2 Training for all personnel identified in the training plan will be completed before commencement of the associated construction activities (see section 1.1 and Appendix A). The Contractor shall ensure that all personnel engaged in activities that may have an impact on the environment are competent to carry out their duties or, where necessary, arrange for suitable training to be undertaken. It will be the responsibility of the Site Manager to ensure the training record is completed (see Appendix A).

4.8 Public engagement

4.8.1 As outlined earlier, the Contractor's PLO shall be responsible for community engagement during the construction period. The following tasks are likely to be required:

- Establish a framework for managing communications with local residents;
- Letter drops to inform local residents of particular construction activities;
- Review all traffic routes to ensure they are kept clean and clear;
- Establishing a point of contact, such as an email/webpage, for community engagement;
- Record any complaints on the site monitoring sheets (see Table A-4, Appendix A) and how they were dealt with; and
- Provide advance notice of work on site and proposed access arrangements.

4.9 Consents, Commitments and Permissions

4.9.1 The Contractor will maintain a schedule of consents or permits, and any associated conditions (see Appendix C), within the CEMP and ensure that

they are appropriately briefed out to on-site personnel. This schedule will provide a record of consents and permissions from Statutory Bodies, other stakeholders and any commitments made to them.

4.10 Legal and Other Requirements

4.10.1 A Register of Legal and Other Requirements will be maintained in the CEMP (Table A-2, Appendix A). This will not be an exhaustive list but will include information relevant to the Scheme.

4.11 Project Environmental Risks

4.11.1 A template for the Register of Environmental Aspects and Impacts has been produced for the Scheme and can be found in Appendix B. This would be further developed by the Contractor in the CEMP as the Scheme design and construction methodology develop.

5 Record of Environmental impacts, Mitigation and Monitoring

5.1.1 The Register of Environmental Actions and Commitments (REAC) summarises the committed mitigation measures within the chapters of the Environmental Statement (ES) and associated appendices. Where relevant, cross-references are provided to the 'Requirements' that will secure the commitments in the DCO/planning conditions. The REAC is a live document, normally reviewed and updated every 6 months or before any significant changes, and as such will be updated as the project progresses in collaboration with the continual development and reviews of the CEMP. A REAC has been developed for this Scheme and is shown in **Table 5-2. Appendix B** Table B-1 provides a template for the Environmental Aspects and Impacts Register. It should be reviewed against the known construction works for a specific area/activity to identify the controls required and along with the REAC, subject to periodic review.

5.1.2 The REAC also aims to ensure the Contractor complies with all relevant legislation for the construction phase of the Scheme. The relevant legislation is inclusive of but not limited to the following:

- Clean Air Act 1993 (as amended);
- Clean Neighbourhoods and Environment Act 2005 (as amended);
- Control of Pollution Act 2001;
- Environment Act 1995 (as amended);
- Environmental Protection Act 1990 (as amended);
- Land Drainage Act 1994;
- Planning and Compulsory Purchase Act 2004 (as amended);
- Protection of Badgers Act 1992 (as amended);
- The Conservation of Habitats and Species Regulations 2010 (as amended);
- The Environmental Permitting (England and Wales) Regulations 2010;
- The Hazardous Waste Regulations 2005 (as amended); and
- The Waste (England and Wales) Regulations 2011.

5.2 Site Inspections

5.2.1 Monthly/Weekly inspections of the site shall be conducted, by the Environmental Manager and Environmental Clerk of Works respectively, to ensure compliance with the CEMP and to minimise the risk of damage to the environment. All environmental incidents shall be reported to the Environmental Manager.

5.2.2 The Environmental Manager shall carry out monthly inspections and complete an assessment of the work's environmental performance measured against environmental standards, relevant legislation and the CEMP objectives. The

Environmental Manager shall produce a monthly report detailing environmental performance and non-compliances.

5.2.3 Document control shall be in accordance with the QMS and copies of all environmental audit reports, consents and licenses shall be maintained by the Environmental Manager. They will be held on site for review at any time.

5.2.4 The Contractor shall be responsible for assigning responsibility, investigating and addressing any non-conformances raised by the inspection within an agreed time frame and ensuring that corrective and preventative actions have been fully closed out.

5.2.5 The Contractor shall be responsible for updating and reviewing the CEMP on a regular basis. This must be recorded in the CEMP review table (see Table A-1 in **Appendix A**).

5.2.6 The CEMP will include details of protocols for submitting Environmental Records to the WSCC Client Lead.

5.2.7 In order to ensure that environmental issues are communicated on site the following environmental training and on-going communication methods will be undertaken. The list, shown in **Table 5-1**, is not exhaustive.

Table 5-1 – Environmental training and communication

Meeting/Briefing/Training	Frequency	Attendees
Safety Health Environmental Progress Meetings	Weekly/Monthly	Those identified with safety, health and environmental responsibilities
Induction Training (which will include environmental aspects)	On first visit to site	All persons attending site (site personnel, sub-contractors, clients, visitors)
Risk Assessment and Method Statement briefings	Every job task	All involved in task

Meeting/Briefing/Training	Frequency	Attendees
Environmental Toolbox Talks (TBT): Environmental TBTs will be carried out appropriate to the construction works being carried out on site at that time	Every job task	All involved in task
Environmental briefings (bulletins, alerts, lessons learnt, results of inspections/audits	As required	As identified for personnel with environmental responsibilities
Job specific training: Institute of Occupational Safety and Health Working with Environmental Responsibilities. Site Waste Management.	As required	As identified for personnel with environmental responsibilities
Project specific information, including the CEMP	As required	Briefed out to all staff and displayed on notice boards

5.2.8 The Contractor shall be required to manage the environmental impacts of all suppliers that provide services in relation to the works.

5.2.9 The environmental stewardship of suppliers working with/for the Contractor shall be managed, monitored and reported through the application of Method Statements.

5.2.10 The Contractor shall co-operate fully with arrangement for auditing suppliers' safety and environmental procedures.

5.2.11 The Contractor's Environmental Manager/Site Manager shall advise the NEC Project Manager on external communication with regulatory bodies, the public, and any other external stakeholders and environmental matters.

5.3 Site waste management

5.3.1 The Contractor shall prepare a Materials Management Plan (MMP) and Site Waste Management Plan (SWMP) for the Proposed Scheme.

5.3.2 The SWMP will set out how different types of waste will be prevented, reduced or reused and recycled in accordance with the waste hierarchy.

5.3.3 The SWMP will include the following:

- Roles and responsibilities
- Types and volumes of waste reused, recycled and landfilled;
- Where the materials and waste have been reused, recycled and landfilled, both on and off site;
- Waste recovery and disposal facilities that will be used and their details of their permits/licences/exemptions, both on and off site;
- Waste recovery and disposal contractors that will be used and details of waste carriers licence;
- Any waste exemptions that are in place in order to enable waste to be reused;
- Waste transfer notes (WTNs) and waste consignment notes to ensure that all waste movements are accompanied by a WTN and that all the requisite information is provided;
- Proposed Scheme performance objectives and targets to ensure they are met;
- Forecasting, recording, monitoring and reviewing waste management on site;
- Facilities for segregation of waste;
- Monitoring requirements including:

- Visual inspection of waste storage areas to ensure they are contained and managed properly;
- Visual inspection of material recycling areas to ensure they are contained and managed properly;
- Check workforce recycling bins and replace when required; and
- Check all waste containers for leaks.

5.3.4 The MMP will be used to monitor the maximum reuse of natural soils and Made Ground. The format of the MMP will be appropriate to the scale of the works and in a format agreed with the Site Manager and Project Manager. The MMP will include:

5.3.5 The MMP forms part of the CL:AIRE code of practice to determine that the materials will not harm human health or pollute the environment and are no longer considered a waste. The MMP will include the following:

- The parties involved;
- Suitability for use criteria;
- Certainty of use;
- Quantity of use;
- Contingency arrangements;
- Tracking and document control; and
- Verification plan.

5.4 Environmental Site Monitoring

5.4.1 The Contractor shall be required to undertake on-site environmental monitoring to ensure high standards of environmental performance are maintained on-site, it is recommended these are undertaken weekly. This will be confirmed with the site environmental monitoring sheets, which must be

completed, and the results reviewed by the Contractor's Environmental Manager and any actions must be completed as a matter of urgency.

5.4.2 The Project Arboriculturist and Ecological Clerk of Works will undertake a programme of monitoring. This may include phone and email contact with the Site Manager, regular site visits and direct monitoring of sensitive works. The frequency of any monitoring will be determined by the intensity and proximity of works to trees and sensitive areas and will be flexible enough to accommodate changes in the scheduling of tasks as they occur on the site.

5.4.3 The monitoring shall involve the following:

- Dust deposition;
- Visual inspection of existing drains and road gullies to ensure no blockages from construction waste and pollution, as well as inspection of new drains if operational during construction;
- Inspection of plant spill kits and re-fuelling areas;
- Inspection of waste management facilities;
- Inspection of all tree and vegetation protection zones;
- Inspection of ecology fencing and any sensitive receptors; and
- Inspection of access roads and public highways to ensure cleanliness.

5.4.4 In addition, daily inspections of the aspects above shall be assigned to a member of the Contractor's team.

5.4.5 The predicted environmental impacts during construction can be viewed in the Environmental Aspects and Impacts Register (template included in Appendix B).

5.4.6 In addition to the above, the Contractor should refer to Highways England's DMRB, CIRIA Environmental Good Practice on Site C741, and Environmental Agency Pollution Prevention Guidance Notes (though no longer current, these continue to provide useful guidance for construction work).

5.5 Ecological Management Plan (Appendix F)

5.5.1 An Outline Ecological Management Plan (EMP) is available in **Appendix F**. The EMP intends to:

- Provide an overview of the baseline ecological information for the Scheme and a surrounding area; and
- Provide a mitigation plan to be implemented during construction and operation, based on the recommendations of baseline ecological assessments and the **Chapter 8 Biodiversity** of the associated Environmental Statement (ES) (WSP 2020b).

5.5.2 The EMP will enable compliance with a relevant nature conservation legislation and planning policy and to avoid the killing/injury of notable and protected species.

Table 5-2 – Register of environmental actions and commitments

Environmental Topic	Potential Impacts	Environmental Action/Mitigation	Construction Monitoring

Air Quality	• Changes in levels of dust and particulates at existing receptors due to on-site construction activities; and
	• Changes in ambient NO_2 PM_{10} and $PM_{2.5}$ concentrations at existing receptors from Non-Road Mobile Machinery (NRMM) and construction traffic.
		• To minimise the risk of adverse impacts during construction from dust, industry best practice measures are to be employed. The measures used will depend on the circumstances but may compromise the following:
		  • Damping down on dry surfaces, in-particular haul roads;
		  • Avoiding/minimising stockpiling of friable materials on-site in open areas;
		  • Locating stockpiles (if necessary) as far away from sensitive receptors as practicable;
		  • Seeding or screening of long-term inactive stockpiles;
		  • On-site speed restrictions to minimise dust entrainment;
		  • Sheeting/covering of lorries carrying potentially dusty materials;
		  • Wheel/chassis cleaning prior to exit onto the public highway;
		  • Requiring all on-site plant to comply with the latest EU emissions standards for non-road mobile machinery; and
		  • Requiring all contractor vehicles to be compliant with a minimum Euro emissions standard, for example Euro VI (6).
			• Monitoring to ensure effective implementation of mitigation measures will be required throughout the construction stage. This will be undertaken by regular visual inspections to record the weather and ground conditions, activities taking place, mitigation measures being applied and any evidence of increased dust deposition and soiling in the area surrounding the works. Daily inspections offsite dust deposition.
			• The frequency of monitoring will be increased when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

Air Quality	• Changes in levels of dust and particulates at existing receptors due to on-site construction activities; and
	• Changes in ambient NO_2 PM_{10} and $PM_{2.5}$ concentrations at existing receptors from Non-Road Mobile Machinery (NRMM) and construction traffic
		• Site Management:
		  • Records of dust and air quality complaints to be maintained by the PLO, including likely causes and mitigation measures to reduce impacts if appropriate;
		  • Keep site perimeter, fences etc. clean;
		  • Visual inspections of offsite dust deposition (daily). This may need to be supplemented by automatic monitoring of PM10 if the risk of impacts increases e.g. during prolonged dry weather;
		  • Any exceptional incidents that cause dust and/or air emissions, either on- or offsite should be recorded, and then the action taken to resolve the situation recorded in the log book.
		  • Consideration must be given to monitoring of dust soiling at nearby residential properties, at locations agreed with the local authority; and
		  • Stabilisation of topsoil material bunds (including use of tackifiers).
			• Monitoring to ensure effective implementation of mitigation measures will be required throughout the construction stage. This will be undertaken by regular visual inspections to record the weather and ground conditions, activities taking place, mitigation measures being applied and any evidence of increased dust deposition and soiling in the area surrounding the works. Daily inspections offsite dust deposition.
			• The frequency of monitoring will be increased when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

Air Quality	• Changes in levels of dust and particulates at existing receptors due to on-site construction activities; and
	• Changes in ambient NO_2 PM_{10} and $PM_{2.5}$ concentrations at existing receptors from Non-Road Mobile Machinery (NRMM) and construction traffic
		• Site Planning:
		  • Consideration of weather conditions, dust generating potential of material to be excavated prior to commencement of works;
		  • Plan site layout to maximise distance from plant/stockpiles etc. to sensitive receptors;
		  • Dusty materials should be removed from site as soon as possible;
		  • Where practicable, erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site; and
		  • If work within 20m of residential properties cannot be avoided, erect solid screens at least as high as Stockpiles.
			• Monitoring to ensure effective implementation of mitigation measures will be required throughout the construction stage. This will be undertaken by regular visual inspections to record the weather and ground conditions, activities taking place, mitigation measures being applied and any evidence of increased dust deposition and soiling in the area surrounding the works. Daily inspections offsite dust deposition.
			• The frequency of monitoring will be increased when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

Air Quality	• Changes in levels of dust and particulates at existing receptors due to on-site construction activities; and
	• Changes in ambient NO_2 PM_{10} and $PM_{2.5}$ concentrations at existing receptors from Non-Road Mobile Machinery (NRMM) and construction traffic
		• Construction Traffic:
		  • Loads entering and leaving the site with dust generating potential should be covered and wheel washing facilities made available;
		  • No idling of vehicles;
		  • Vehicles to comply with site speed limits (15mph on hard surfaces, 10mph on unconsolidated surfaces);
		  • Water assisted sweeping of local roads to be undertaken if material tracked out of site;
		  • Install hard surfacing as soon as practicable on site and ensure that they are maintained in good condition;
		  • Avoid the use of diesel or petrol-powered generators and use mains electricity or battery powered equipment where practicable;
		  • A Construction Traffic Management Plan (CTMP) incorporating construction logistics should be produced to manage the sustainable delivery of goods and materials; and
		  • A Construction Worker Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing) shall be prepared.
			• Monitoring to ensure effective implementation of mitigation measures will be required throughout the construction stage. This will be undertaken by regular visual inspections to record the weather and ground conditions, activities taking place, mitigation measures being applied and any evidence of increased dust deposition and soiling in the area surrounding the works. Daily inspections offsite dust deposition.
			• The frequency of monitoring will be increased when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

Environmental Topic	Potential Impacts	Environmental Action/Mitigation	Construction Monitoring

Air Quality	• Changes in levels of dust and particulates at existing receptors due to on-site construction activities; and
	• Changes in ambient NO_2 PM_{10} and $PM_{2.5}$ concentrations at existing receptors from Non-Road Mobile Machinery (NRMM) and construction traffic
		• Site Activities:
		  • Exposed soils should be protected from winds until sealed or re-vegetated;
		  • Minimise dust generating activities, particularly near residential receptors / sensitive ecosystems during prolonged dry, dusty weather unless damping / other suppressants are used;
		  • Ensure an adequate water supply to site and use water as dust suppressant where applicable;
		  • Ensure equipment suitable for clearing spills etc. is available at all times;
		  • Use covered skips where practicable.
		  • Ensure any site machinery is well maintained and in full working order; and
		  • Sand and aggregates should be stored away from sensitive receptors and screened / shielded. Similarly, concrete batching should take place away from receptors.
			• Monitoring to ensure effective implementation of mitigation measures will be required throughout the construction stage. This will be undertaken by regular visual inspections to record the weather and ground conditions, activities taking place, mitigation measures being applied and any evidence of increased dust deposition and soiling in the area surrounding the works. Daily inspections offsite dust deposition.
			• The frequency of monitoring will be increased when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

Air Quality	• Changes in levels of dust and particulates at existing receptors due to on-site construction activities; and
	• Changes in ambient NO_2 PM_{10} and $PM_{2.5}$ concentrations at existing receptors from Non-Road Mobile Machinery (NRMM) and construction traffic
		• Earthworks:
		  • 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 practicable, only remove the cover in small areas during work and not all at once;
		  • Stockpile surface areas should be minimised (subject to health and safety and visual constraints regarding slope gradients and visual intrusion) to reduce area of surfaces exposed to wind pick-up;
		  • Where practicable, windbreak netting/screening should be positioned around material stockpiles and vehicle loading/unloading areas, as well as exposed excavation and material handling operations, to provide a physical barrier between the site and the surroundings; and
		  • During dry or windy weather, material stockpiles and exposed surfaces should be dampened down using a water spray to minimise the potential for wind pick-up.
			• Monitoring to ensure effective implementation of mitigation measures will be required throughout the construction stage. This will be undertaken by regular visual inspections to record the weather and ground conditions, activities taking place, mitigation measures being applied and any evidence of increased dust deposition and soiling in the area surrounding the works. Daily inspections offsite dust deposition.
			• The frequency of monitoring will be increased when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

Air Quality	• Changes in levels of dust and particulates at existing receptors due to on-site construction activities; and
	• Changes in ambient NO_2 PM_{10} and $PM_{2.5}$ concentrations at existing receptors from Non-Road Mobile Machinery (NRMM) and construction traffic
		• Construction Specific Measures:
		  • Avoid scabbling (roughening of concrete surfaces) if possible; and
		  • 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.
			• Monitoring to ensure effective implementation of mitigation measures will be required throughout the construction stage. This will be undertaken by regular visual inspections to record the weather and ground conditions, activities taking place, mitigation measures being applied and any evidence of increased dust deposition and soiling in the area surrounding the works. Daily inspections offsite dust deposition.
			• The frequency of monitoring will be increased when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

Air Quality	• Changes in levels of dust and particulates at existing receptors due to on-site construction activities; and
	• Changes in ambient NO_2 PM_{10} and $PM_{2.5}$ concentrations at existing receptors from Non-Road Mobile Machinery (NRMM) and construction traffic
		• Track Out specific measures:
		  • Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being in frequent use;
		  • Avoid dry sweeping of large areas; and
		• Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
			• Monitoring to ensure effective implementation of mitigation measures will be required throughout the construction stage. This will be undertaken by regular visual inspections to record the weather and ground conditions, activities taking place, mitigation measures being applied and any evidence of increased dust deposition and soiling in the area surrounding the works. Daily inspections offsite dust deposition.
			• The frequency of monitoring will be increased when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

Environmental Topic	Potential Impacts	Environmental Action/Mitigation	Construction Monitoring
Air Quality	• Changes in levels of dust and particulates at existing receptors due to on-site construction activities; and • Changes in ambient NO_2 PM_{10} and $PM_{2.5}$ concentrations at existing receptors from Non-Road Mobile Machinery (NRMM) and construction traffic	• Traffic management measures will be required during the construction phase and shall be detailed in the CTMP.	• Monitoring to ensure effective implementation of mitigation measures will be required throughout the construction stage. This will be undertaken by regular visual inspections to record the weather and ground conditions, activities taking place, mitigation measures being applied and any evidence of increased dust deposition and soiling in the area surrounding the works. Daily inspections offsite dust deposition. • The frequency of monitoring will be increased when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions
Archaeology and Heritage	• During the construction phase, there could be impacts on buried heritage assets from preliminary site works, road/roundabout construction, alterations to existing roadways and pathways; built heritage.	• Post-determination field evaluation leading to an agreed programme of mitigation may be required. • Stop work procedures will be implemented in the event of asset discovery.	• None required.
Ecology (should be read alongside the Ecological Management Plan in Appendix F)	• <u>Designated Sites</u> • Impacts on designated sites as habitat fragmentation and loss of functionally linked land through site clearance during construction and through noise and visual disturbance during operation • Sheep's Course Wood CWS is located directly adjacent to the Scheme Boundary and one of the proposed temporary works areas for construction traffic. As such there is potential for impacts from dust emissions though track out during construction.	• Due to the proximity of Sheep's Course Wood to construction haul roads and site access, it is considered that additional mitigation measure above industry standard practice will be required. • A Dust Management Plan will be produced and incorporated as discussed below in this column to ensure measures to mitigate dust impacts during construction are adequately assessed and mitigated.	• A post-construction monitoring programme should be carried out during the first five years after construction. This will focus on the establishment of the ecological mitigation measures, including offsite compensation areas, help inform future management and, if necessary, allow for the implementation of remedial measures. • Ecological monitoring surveys are required to assess the efficacy of the mitigation for significant effects stated in Section 9 and confirm the findings of this impact assessment. The monitoring would be secured by planning condition and through the provision of a LEMP. • An aftercare plan will be included as part of the LEMP. The Strategy would provide an auditable record of the mitigation commitments identified and the requirements for regular maintenance. It is anticipated that the following monitoring activities will be required to ensure implemented mitigation is successful.

Environmental Topic	Potential Impacts	Environmental Action/Mitigation	Construction Monitoring
Ecology (should be read alongside the Ecological Management Plan in Appendix F)	Habitats and Botany • Construction of the Scheme and associated construction site and vegetation clearance work is expected to lead to permanent removal of a proportion of habitats within the Scheme boundary. This includes both common and widespread habitats and HPI.	Habitats • Construction compounds are located within lower value habitats such as neutral grassland and arable cropland, as these areas will be easiest to reinstate and have a lower ecological impact. • The Scheme Boundary has been extended to include land for the provision of compensatory habitat. These areas include habitats that will be used to mitigate landscape and visual impacts as well as ecological mitigation. The landscaping within these areas is designed to maximise biodiversity benefits and will include native plant species and will primarily include lowland mixed deciduous woodland. • Indicative landscaping and habitat creation and enhancement proposals for the Proposed Scheme are provided in the current landscape proposals. Proposals for habitat compensation within these plans have been conceived with regard to the impacts on HPI, primarily lowland mixed deciduous woodland and hedgerows. • Woodland habitats have been included within the landscape proposals that have been strategically placed to complement existing woodland outside of the Scheme Boundary. Additional mitigation measures will include the production of a Landscape and Ecological Management Plan (LEMP) and a detailed landscape strategy to be developed at detailed design stage. The focus of these additional measures will be to develop planting strategies that will incorporate ecologically complex woodland and will include areas of woodland containing depressions, wet areas, ponds and wet woodland if possible. Areas of scrub, glades and rides will be incorporated into the planting strategy that will increase the condition of the woodland and provide more diverse woodland habitat for a range of species. • Surface water attenuation features are required throughout the Proposed Scheme and where possible, these will be designed to frequently hold water, rather than drain away. These drainage features will be designed to create wet ponds that will be of benefit to general biodiversity and will increase habitat complexity. The focus of this mitigation will be to incorporate habitats that would qualify as Habitats of Principal Importance and contribute towards loss of these habitats through the Proposed Scheme. • Planting schemes for these new ponds will be developed at detailed design stage, however the use of native plant species of local prevalence will be favoured. • The measures to protect retained habitats throughout construction of the Proposed Scheme will be detailed in the CEMP. The CEMP will include plans showing the location for all fences/barriers to be erected for the purpose of protecting retained habitats. Reference to the relevant procedures, including any special measures, to be implemented in the event of a pollution incident that could affect retained habitats and other Important Ecological Features. The principal contractor will reduce any habitat loss within the land required for the Proposed Scheme by keeping the working area to the minimum required for construction.	• Habitats • Surveys of landscape and habitat creation and mitigation areas should be completed following completions of the construction phase. This would assess the success of habitat mitigation measures and ensure that any remedial management and planting is identified and completed. • Should any ecological mitigation measures be identified as failing by the monitoring exercises, the Ecology Management Plan will be reviewed and remedial works to ensure that the objectives are achieved may be necessary.

Environmental Topic	Potential Impacts	Environmental Action/Mitigation	Construction Monitoring
Ecology (should be read alongside the Ecological Management Plan in Appendix F)	<u>Protected and Notable Species</u> The construction of the Proposed Scheme and associated site and vegetation clearance work is expected to lead to • direct loss of habitats suitable for use by birds for nesting and foraging purposes, by terrestrial invertebrates. Some loss of suitable habitat would be permanent, associated with the built footprint of new infrastructure and lasting for at least the duration of the operational period. This loss could affect the functionality of the remaining areas of suitable habitat type to support this species and will reduce the availability of suitable habitat within the local landscape. • Change in behaviour due to lighting, noise, visual and vibration disturbance during construction. • Damage and destruction of setts within the Scheme Boundary. Impacts upon setts also have the potential to kill or injure Badgers. • Removal of trees with suitability for roosting bats which could affect the local roost resource. • Loss of habitats suitable for use by reptiles for basking, commuting, foraging and hibernating purposes. • Damage and destruction of Great Crested Newts resting places, these activities also risk disturbing, killing and injuring GCNs. • Four confirmed breeding water bodies will be lost, all four are located to the southeast of the Harwick Interchange at the location of the new A47 slip roads and attenuation pond (ponds 2, 3 ,4 and 5 within the Great Crested Newt Survey Report (WSP, 2023o)). • Unmitigated construction activities along the northern boundary of the A47 and the areas southeast of Hardwick Interchange would likely result in the spread of Japanese Knotweed onto third party land. It should also be noted that Japanese Knotweed may also be classified as a controlled waste.	<u>Birds</u> • Additional mitigation pertaining to Barn Owl will be detailed in an Ecological Mitigation Strategy. This document will include measures to mitigate impacts to occupied breeding sites and potential nesting sites during construction. Surveys will also be completed at detailed design stage to inform the mitigation strategy and CEMP. Pre-works checks for nesting barn owl on the occupied breeding sites and potential nest sites directly adjacent to the Proposed Scheme will be undertaken to inform mitigation proposals. • Mitigation will involve the closure of any nest sites outside of the typical breeding period (September to February inclusive) and replacement boxes installed away from the construction area and new road. As this will take place outside of the breeding season (September to February inclusive), it is not envisaged that a licence will be required. • If carried out during the breeding season, vegetation and site clearance could cause the destruction or damage of active nests and any eggs or live young present. The following measures will therefore be implemented: • Any vegetation or trees that do not require clearance to facilitate the Proposed Scheme (including veteran trees) will be retained and protected during construction with appropriate construction fencing. • Vegetation and site clearance will take place between September and February inclusive, i.e., outside the main bird breeding season, wherever practicable. Should it be necessary to remove habitats suitable for breeding birds during the nesting season, these will be subject to a pre-clearance check by an Ecological Clerk of Works with ornithology expertise. • In the event any active nests are found, clearance works will be halted within a minimum distance of 5 m from the nest. This buffer distance will be varied on the advice of the ecologist, dependent on the nature of affected habitats and the species of bird involved. Clearance works will not recommence until any young have fledged and left the nest, with a re-inspection by an ecologist to confirm the absence of active nests. • The proposals for reinstatement and compensatory habitat as set out in the landscape proposals will provide replacement habitat for breeding and wintering birds. The following compensation planting will be provided in detailed design proposals: • New woodland planting throughout the Proposed Scheme. • New and enhanced hedgerows within the Scheme Boundary. • Provision of scrub, glades, ponds and new wet woodland within the Scheme Boundary. • The (management of new landscaped areas within the Proposed Scheme will be detailed within a LEMP. Considerations for managing these habitats optimally for breeding and wintering birds will be incorporated into the management plan, as well as measures to avoid impacts upon these species through management operation.	• Bats • Site surveys of reinstated, created and enhanced habitats on and off-site to assess suitability for foraging and commuting bats should be completed. Monitoring of any bat boxes or roost features installed for mitigation should also be undertaken if required for licensing purposes. • Badger • Monitoring of underpasses and fencing will be carried out to ensure that fencing and underpasses remain effective. This monitoring will use a combination of site visits to check fencing and underpasses for signs of use and condition, as well as camera traps where required to monitor for longer periods of time. • Reptiles • Monitoring of translocated populations and habitat assessments will need to be carried out to ensure that reptile populations remain stable post translocation and to ensure that management interventions are carried out where required.

Environmental Topic	Potential Impacts	Environmental Action/Mitigation	Construction Monitoring
Ecology (should be read alongside the Ecological Management Plan in Appendix F)	<u>Protected and Notable Species</u> The construction of the Proposed Scheme and associated site and vegetation clearance work is expected to lead to • direct loss of habitats suitable for use by birds for nesting and foraging purposes, by terrestrial invertebrates. Some loss of suitable habitat would be permanent, associated with the built footprint of new infrastructure and lasting for at least the duration of the operational period. This loss could affect the functionality of the remaining areas of suitable habitat type to support this species and will reduce the availability of suitable habitat within the local landscape. • Change in behaviour due to lighting, noise, visual and vibration disturbance during construction. • Damage and destruction of setts within the Scheme Boundary. Impacts upon setts also have the potential to kill or injure Badgers. • Removal of trees with suitability for roosting bats which could affect the local roost resource. • Loss of habitats suitable for use by reptiles for basking, commuting, foraging and hibernating purposes. • Damage and destruction of Great Crested Newts resting places, these activities also risk disturbing, killing and injuring GCNs. • Four confirmed breeding water bodies will be lost, all four are located to the southeast of the Harwick Interchange at the location of the new A47 slip roads and attenuation pond (ponds 2, 3 ,4 and 5 within the Great Crested Newt Survey Report (WSP, 2023o)). Unmitigated construction activities along the northern boundary of the A47 and the areas southeast of Hardwick Interchange would likely result in the spread of Japanese Knotweed onto third party land. It should also be noted that Japanese Knotweed may also be classified as a controlled waste.	<u>Terrestrial Invertebrates</u> • Habitat creation throughout the Proposed Scheme includes suitable habitats for a range of terrestrial invertebrate species. The use of nutrient poor substrates for road verges and areas of open grassland will be used to encourage a wider diversity of plant species and habitat for terrestrial invertebrates. • Dead wood features such as log piles will be created from trees that will be lost to the Proposed Scheme. Although this will be of limited benefit to species that are associated with standing deadwood, they will provide habitat for a range of other species. It is proposed that all arisings from tree felling are retained within the Scheme Boundary to be repurposed as habitat features. Woodchip can also be used in areas of new woodland creation. • Provision of deadwood derived from trees lost to the Proposed Scheme will provide some compensation for the loss of deadwood resource. Tree and scrub planting within new woodland adjacent to the Proposed Scheme will also provide some compensation in the long term for these habitat resources, as well as other invertebrates species. The use of flowering scrub species will be incorporated into the planting scheme. • The mitigation measures for terrestrial invertebrates will be secured through the provision of a Landscape and Ecological Management Plan.	• Bats • Site surveys of reinstated, created and enhanced habitats on and off-site to assess suitability for foraging and commuting bats should be completed. Monitoring of any bat boxes or roost features installed for mitigation should also be undertaken if required for licensing purposes. • Badger • Monitoring of underpasses and fencing will be carried out to ensure that fencing and underpasses remain effective. This monitoring will use a combination of site visits to check fencing and underpasses for signs of use and condition, as well as camera traps where required to monitor for longer periods of time. • Reptiles • Monitoring of translocated populations and habitat assessments will need to be carried out to ensure that reptile populations remain stable post translocation and to ensure that management interventions are carried out where required.

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It should also be noted that Japanese Knotweed may also be classified as a controlled waste.	<u>Bats</u> • To inform detailed design and production of the CEMP, updated ground level tree assessments and inspection surveys will be undertaken. These will comprise of a preliminary assessment from ground level of all trees that have the potential to be impacted by the proposed development. This survey will identify all trees with suitability for roosting bats or those that require further aerial or ground level inspection using licenced techniques. The aim of these surveys is to inform the requirement for further presence or likely absence surveys for bat roosts. This information will be used to inform the detailed design, CEMP and the requirement for protected species licences. • At the construction stage, felling of trees with suitability for roosting bats will be preceded by a suitable survey or inspection to ensure no roosts/bats are present, in line with BCT guidelines (BCT, 2023). An updated ground level tree assessment will also be carried out to ensure any additional roost features are identified. Where trees cannot be inspected or surveyed sufficiently before felling, soft felling and dismantling techniques will be employed during the suitable time of year to ensure roost features can be safely brought to the ground and any bats are able to leave roost features overnight. If roosts are identified during pre-felling inspections and surveys, a mitigation licence from Natural England may be required in order to proceed with tree felling or remediation activities. • Replacement roost features will be incorporated in the form of bat boxes and veteranisation of retained trees where appropriate. These replacement roost features will compensate for any loss of roost resource and will also act as rescue bat boxes if required under Natural England mitigation licence. The location, number and type of replacement roost feature will be detailed within the Landscape and Ecological Management Plan. • Habitat features such as hedgerows, lines of trees and woodland will be interrupted by the Proposed Scheme where it intersects these habitats within the landscape. These habitats are typically used by bats to navigate the landscape and construction of the Proposed Scheme will permanently sever these habitats. In order to maintain connectivity for bats throughout the Proposed Scheme, the landscaping proposals include planting of woodland, trees and hedgerows at all habitat features in order to minimise disruption of flight paths for bats through the landscape. Within the landscaping proposals, larger, more mature standard trees will be specified to minimise adverse impacts through habitat severance. Planting of mature standards will ensure that these reinstated habitat features are able to establish faster and reach similar maturity to habitats that are lost through construction. This mature habitat planting will be included to the north of Chequers Lane in order to maintain flight paths across the road and maintain flight height. This will also ensure connectivity is maintained through the residential developments further west of the Proposed Scheme. • The landscaping strategy has been designed to replace existing bat foraging and commuting habitat to be lost to the Proposed Scheme (i.e., hedgerows, tree lines and grassland), and to provide habitat enhancement. • The newly created habitat will provide potentially greater access and foraging habitats around and within the Proposed Scheme for bats, particularly when compared to the existing arable land. The landscape strategy will also provide some mitigation / buffering for increased levels of lighting. The landscaping proposals will be reassessed by an ecologist at detailed design to ensure no adverse effects on the favourable conservation status of the local bat population.	• Bats • Site surveys of reinstated, created and enhanced habitats on and off-site to assess suitability for foraging and commuting bats should be completed. Monitoring of any bat boxes or roost features installed for mitigation should also be undertaken if required for licensing purposes. • Badger • Monitoring of underpasses and fencing will be carried out to ensure that fencing and underpasses remain effective. 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It should also be noted that Japanese Knotweed may also be classified as a controlled waste.	*<u>Visual (Lighting) Disturbance</u>* • Lighting during construction may affect bat roosts as well as foraging and commuting routes resulting in temporary fragmentation and potential impacts upon roosts. This will be most prevalent where compounds are located and may require lighting beyond typical working hours for security. It is considered that the majority of the works will take place during standard working hours and therefore will limit the disturbance to bats foraging / commuting bats from general construction activities. Lighting and position of compounds will be detailed within the CEMP which will determine the appropriate set up of compounds in order to limit light spill onto important bat habitat. Compounds requiring lighting at night will be positioned away from important habitat features for bats, including woodland, trees and boundary habitats such as hedgerows and lines of trees that may be used by bats. No lighting around trees with suitability for roosting bats will be permitted. • Lighting during the construction phase would be designed to satisfy the requirements of the Institute of Lighting Professional's Guidance Note 01/21 'The Reduction of Obtrusive Light' (Institute of Lighting Professionals, 2021), which would limit potential disturbance effects. Construction would also be carried out primarily during daylight hours (during periods where bats are largely inactive). • Any such lighting required will be restricted to, and directed towards, the working areas to prevent any light spill and disturbance /displacement of roosting, foraging and commuting bats in adjacent habitat. Habitats of importance for commuting and foraging bats are considered to be ditches and other water bodies, broadleaved woodland, scattered trees, lines of trees, hedgerows, orchard, scrub and grassland. Night working outside may be permitted following development of the lighting strategy and under supervision of the ECoW. The CEMP and lighting strategy will be conditioned/provided as part of detailed design and will ensure that a 10m dark corridor will be maintained along all potentially important habitats. • The maintenance and monitoring of the required dark corridors during construction will allow bats to continue to forage and commute. Appropriate additional or remedial measures will be employed if necessary following results of monitoring. This is required to maintain the Favourable Conservation Status of the local bat population.	• Bats • Site surveys of reinstated, created and enhanced habitats on and off-site to assess suitability for foraging and commuting bats should be completed. Monitoring of any bat boxes or roost features installed for mitigation should also be undertaken if required for licensing purposes. • Badger • Monitoring of underpasses and fencing will be carried out to ensure that fencing and underpasses remain effective. This monitoring will use a combination of site visits to check fencing and underpasses for signs of use and condition, as well as camera traps where required to monitor for longer periods of time. • Reptiles • Monitoring of translocated populations and habitat assessments will need to be carried out to ensure that reptile populations remain stable post translocation and to ensure that management interventions are carried out where required.

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It should also be noted that Japanese Knotweed may also be classified as a controlled waste.	**Reptiles** • Reptiles have been recorded throughout the Proposed Scheme. Prior to construction activities in areas containing reptiles, mitigation will be necessary to avoid killing or injuring. These measures will include translocation of reptiles from larger, more complex areas of habitat and sensitive habitat clearance, hand searches and destructive searches from smaller areas of habitat containing lower numbers of reptiles. For example, narrow field margins. • These mitigation measures will require a detailed reptile mitigation strategy that will be included within an Ecological Mitigation Strategy for the Proposed Scheme. This will be developed at detailed design stage and mitigation measures will be incorporated into the construction programme to ensure that sufficient time is allocated for translocation and sensitive habitat removal in advance of construction. This will account for seasonal constraints associated with reptile mitigation, which generally can only be carried out between April and October (weather dependant) with summer months becoming suboptimal due to higher temperatures and difficulties finding and capturing reptiles. • The translocation of reptiles will require an offsite receptor area for reptiles to be moved on to. This area will need to be of a sufficient size and habitat suitability for reptiles to be relocated to and will require surveys to ensure that the site does not hold an existing population. Enhancement measure may also be necessary including changes to managements and the creation of foraging, basking and shelter habitats. Translocation of reptiles onto neighbouring suitable habitat to the Proposed Scheme is unlikely to be a suitable option given that most of this habitat will be developed for the adjacent housing developments. Land within the Scheme Boundary is unlikely to be suitable for reptiles given that it will be largely used for construction, including extensive landscaping. • An offsite receptor site will therefore need to be secured, with necessary long-term management and maintenance agreed to ensure that the populations of reptiles will persist post development. This area will need to be subjected to appropriate surveys to ensure that it will be suitable for translocation. • Translocation of reptiles will likely require a minimum trapping effort of 90 days during appropriate weather conditions. This accounts for the complex habitats and size of the areas requiring translocations to be carried out. This can be paired with habitat clearance activities where appropriate to reduce shelter habitat and increase the capture rates. • For smaller areas of habitat containing low number of reptiles such as field margins, sensitive habitat clearance and a short trapping period followed by a destructive search are likely to be appropriate. These measures will be detailed within the reptile mitigation strategy.	• Bats • Site surveys of reinstated, created and enhanced habitats on and off-site to assess suitability for foraging and commuting bats should be completed. Monitoring of any bat boxes or roost features installed for mitigation should also be undertaken if required for licensing purposes. • Badger • Monitoring of underpasses and fencing will be carried out to ensure that fencing and underpasses remain effective. 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Ecology (should be read alongside the Ecological Management Plan in Appendix F)	• Airbourne Pollution from Dust Emissions • Loss of Habitat • Water borne Pollution	• **Designated Sites** • **Dust Suppression Measures** • Dust and air quality management measures will be implemented to limit pollution arising from the transportation and storage of materials. • Covering materials, deliveries or loads entering and leaving the construction site for the purposes of preventing materials and dust spillage. • Vehicles transporting materials within or outside the construction site will not be overloaded. • Stockpiles and mounds will be kept away from sensitive habitats, watercourses and surface drains where reasonably practicable, and sited to take into account the predominant wind direction relative to sensitive receptors. • Stockpiles and mounds will be maintained to avoid material slippage. • Materials stockpiles likely to generate dust will be enclosed or securely sheeted, kept watered or stabilised as appropriate. • Fine dry material will be stored inside buildings or enclosures with measures in place to ensure no escape of material and no overfilling during delivery. • Mixing of large quantities of concrete or bentonite slurries will be undertaken in enclosed or shielded areas, using appropriate techniques and mitigation. • The number of handling operations for materials will be kept to the minimum reasonably practicable. • Materials handling areas will be maintained to constrain dust emissions through the use of measures such as watering facilities to reduce or prevent escape of dust from the site boundaries.	• As mentioned above

Environmental Topic	Potential Impacts	Environmental Action/Mitigation	Construction Monitoring
Ecology (should be read alongside the Ecological Management Plan in Appendix F)	• Airbourne Pollution from Dust Emissions • Loss of Habitat • Water borne Pollution	**Haul Routes** • Haul routes will be provided through the works for use by construction vehicles to access the works. • The surfacing of haul roads should be inspected regularly and maintained appropriately. • Re-use of haul route surfacing materials where the locations of haul routes change during construction. • Provision of areas of hard-standing at site access and egress points to be used by any waiting vehicles. • Methods to clean and suppress dust on haul routes (including watering) and in designated vehicle waiting areas. The frequency of cleaning will be suitable for the purposes of suppressing dust emissions from the site boundaries. • Enforcement of speed limits. • **Excavation and Earthworks Activities** • Topsoil will be stripped as close as reasonably practicable to the period of excavation or other earthworks activities to avoid risks associated with runoff or dust generation. • Drop heights from excavators to vehicles involved in the transport of excavated material will be kept to the reasonably practicable minimum. • Materials will be compacted after deposition, with the exception of topsoil and subsoil on land to be restored for agriculture, landscaping and wildlife habitats. • Soil spreading, seeding, planting or sealing of completed earthworks will be undertaken as soon as reasonably practicable following completion of the earthworks.	• As mentioned above

Environmental Topic	Potential Impacts	Environmental Action/Mitigation	Construction Monitoring

Ecology (should be read alongside the Ecological Management Plan in Appendix F)	• Airbourne Pollution from Dust Emissions
	• Loss of Habitat
	• Water borne Pollution
		• **Protection of Trees**
		• The principal contractor will employ an arboriculture consultant to oversee works relating to the protection of at-risk trees, as noted within the Arboriculture Impact Assessment.
		• Retained trees will be protected in line with the recommendations in BS 5837: Trees in relation to design, demolition and construction.
		• The following measures will be implemented, as appropriate:
		  • Provision of appropriate protective fencing to reduce the risks associated with vehicles passing over root systems or beneath canopies.
		  • Measures to prevent compaction of soils, including undisturbed woodland soils.
		  • Maintenance of vegetation buffer strips.
		  • Selective removal of lower branches to reduce the risk of damage by construction plant and vehicles.
		  • Standard guidance for working within root protection zones, including procedures to follow if significant roots are uncovered during work.
		  • Provision of contractor guidance for working close to retained aged and veteran trees and areas of retained woodland and watching briefs as appropriate.
		  • Maintenance of trees on any highways that are temporarily stopped as a result of the Proposed Scheme works prior to re-opening (e.g. selective branch removal) following consultation and agreement with the relevant authority.
		  • Monitoring of the effectiveness of the tree protection measures throughout the construction period by an appropriately qualified arboricultural consultant.
		• Trees intended to be retained which may die as a consequence of construction works will be replaced. Where reasonably practicable, the size and species of replacement trees will be selected to achieve a close resemblance to the original trees and taking cognisance of any management plans for immediately adjacent areas of woodland.
		• The supply, storage, handling, planting and maintenance of new planting will be undertaken in accordance with appropriate British Standards, including BS 8545; 2014 - Trees: from nursery to independence in the landscape – Recommendations; BS 5837 Trees in relation to design, demolition and construction – Recommendations, BS 3998 Tree Work - Recommendations; and BS 4428 Code of practice for general landscape operations (excluding hard surfaces) and other appropriate guidance including the UK Forestry Standard and the UK Woodland Assurance Standard.
			• As mentioned above

Environmental Topic	Potential Impacts	Environmental Action/Mitigation	Construction Monitoring

Ecology (should be read alongside the Ecological Management Plan in Appendix F)	• Airbourne Pollution from Dust Emissions
	• Loss of Habitat
	• Water borne Pollution
		• **Water-borne Pollution Prevention Measures**
		• The principal contractor will develop and implement appropriate measure to control the risk of pollution due to construction works, materials and extreme weather events. This will include a pollution incident control plan, as part of the contractor's environmental management system, which recognises the risk of pollution from construction activities and presents proactive management practices to ensure that any pollution incident that may occur, such as a diesel spillage, is minimised, controlled, reported to relevant parties and remediated. The plan will define the criteria for implementing the relevant measures.
		• The following measures will be adopted by the principal contractor to manage the risk of pollution incidents.
		  • Statement of appropriate information to be provided in the event of any incident such as a spillage or release of a potentially hazardous material.
		  • Notification of appropriate emergency services, authorities and personnel on the construction site.
		  • Notification of relevant statutory bodies, environmental regulatory bodies, local authorities and local water and sewer providers of pollution incidents, where required.
		  • Provision of maps showing the locations, together with address and contact details, of local emergency services facilities (e.g. 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 and awareness in implementing plans 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 contractors' organisation for pollution incident response.
		  • Provision of contacts for a competent spill response company that can be contacted at short notice for an immediate response (where appropriate).
		• In the preparation of local pollution incident response measures, the principal contractor will consult with relevant organisations, including 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 (the Government's advisory body on the natural environment), utilities companies and the respective local authorities (emergency planning and pollution control functions).
		• The principal contractor will have in place effective arrangements to investigate and provide reports on any potential or actual significant pollution incidents, including, as appropriate:
		  • 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
			• As mentioned above

Landscape and Visual	• No data	• Retention, protection and enhancement of existing trees, hedgerows and woodland where possible, to maintain the existing landscape character of the local area; • Provision of new native tree belts to provide visual enclosure and to screen views from sensitive receptors in close proximity with the Proposed Scheme; • Provision of new lengths of native hedgerow, some with native trees, surrounding the Proposed Scheme, to provide visual enclosure and enhance the setting of nearby residential properties and public rights of way within or in close proximity to the Proposed Scheme; • Provision of scattered native tree planting to break up the massing of the Proposed Scheme; and • Planting/landscaping of site boundary margins, through proposed species rich grassland in line with ecological requirements.	None

Environmental Topic	Potential Impacts	Environmental Action/Mitigation	Construction Monitoring

Noise and Vibration	• Noise impacts on residential dwellings from on-site construction activities; and
	• Vibration impacts on residential dwellings from on-site construction activities.
		• The use of BPM, specifically to mitigate against noise:
		  • all construction plant used on the site will be in good working order and certificates of inspection and maintenance will be held on site and available on request;
		  • all plant items should be properly maintained and operated according to manufacturers' recommendations and in such a manner as to avoid causing excessive noise and vibration;
		  • as far as reasonably practicable, all plant items should be sited so that noise and vibration at nearby sensitive properties is minimised;
		  • all plant items operating intermittently on the site should be shut down in the intervening periods;
		  • all pneumatic tools should be fitted with silencers or mufflers where practicable;
		  • no loud music or loud radios will be played on the site;
		  • construction vehicles should not idle on local roads waiting to enter the site;
		  • works (including deliveries) would be programmed such that the requirement for working outside normal working hours is minimised;
		  • where construction works are occurring within 50m of a residential property, if appropriate, temporary environmental noise barriers will be installed around plant items to provide screening; and
		• the importance of noise and vibration and its potential to affect those living and working nearby will be included in the general induction training for the site and specific training will be given to staff who will have particular responsibility for managing noise and vibration during construction.
		  • Mitigation for operational road traffic noise can be considered in terms of mitigating the source, the pathway of noise or at the receiver.
		  • In terms of mitigation at source, this includes the design of the road itself, the 3D alignment of the carriageways and the road surface type.
		  • The Proposed Scheme alignment is designed to avoid passing close to residential receptors as far as reasonably practicable.
		  • The pavement surface type can impact the noise levels produced by vehicles. The Proposed Scheme has a design speed lower than 75 kph and as such would not gain a benefit from a low noise surface (based on the road surface corrections provided in DMRB LA 111).
		  • The path of noise between source and receiver can be mitigated through screening measures in the form of earth bunds or acoustic barriers.
		  • Screening measures for noise mitigation generally only provide notable benefits in terms of noise level reduction where receptors are within 300m of the road carriageway. As the majority of residential receptors are further than this distance to the Proposed Scheme carriageway, the benefits from additional screening measures design would be limited. Furthermore, DMRB LA 111 advises that the value for money of operational noise mitigation should be considered. The value for money can be calculated based on a comparison of the cost of the mitigation, against the monetised acoustic benefits of the mitigation to human receptors in residential properties. For acoustic mitigation to be value for money, notable noise level decreases at multiple residential properties are generally required. In this case, as the dwellings within close proximity of the Proposed Scheme are fairly isolated, acoustic barriers would not be value for money. Furthermore, given the large distances to most of the residential properties within the detailed calculation area, the benefits from additional acoustic barriers would likely be too small to be perceptible to existing residents. Finally, secondary glazing or noise insulation can be installed for individual receptors in order to reduce noise levels inside dwellings. The NIR sets our eligibility criteria which should be met in order for properties to be offered noise insulation. In the case of the Proposed Scheme, generally noise levels at dwellings within the detailed calculation area are low and an enhanced façade sound insulation performance would have limited benefit to residents inside their homes as it is likely that acceptable internal noise levels would be achieved with their existing façade and glazing. In any case, noise insulation is generally not considered as mitigation for a significant effect as it only reduces internal noise levels but not external levels.
		  • The pavement surface type can impact the noise levels produced by vehicles. The Proposed Scheme has a design speed lower than 75 kph and as such would not gain a benefit from a low noise surface (based on the road surface corrections provided in DMRB LA 111).
			• Periodic monitoring by a suitably competent person throughout the construction phase to ensure that Best Practicable Means (BPM) identified are adhered to at all times.

Water Environment	• Short-term increase in flood risk due to construction activities.
	• Potential effects on the water quality of surface water and groundwater resources due to construction activities or accidental leaks and spillages.
	• Potential increase in physical contamination (i.e. sedimentation) of surface water bodies due to ground disturbance.
	• Fluvial flooding is possible near the access road and pond 3 near Barnham Lane ditch.
	• Groundwater flooding is possible as excavation is proposed for the drainage ponds and road alignment from CH 15 to CH 100.
	• Sensitive water receptors that could be impacted by pollution are surface water bodies (Barnham Lane Ditch, Lidsey Rife and School Ditch) and groundwater bodies (Superficial Deposits). The pollution of both surface and groundwater bodies may be exacerbated by accidental spillages.
	• During periods of heavy rainfall, vehicle movements associated with construction activities resulting in damage to soil structure may generate increased sedimentation within surface run-off.
		• The use of BPM, operational management and design of the Scheme, including the provision of temporary attenuation features and runoff control.
		• Secondary mitigation measures during the construction phase will include the following:
		  • Excavation elements to be constructed during the summer months;
		  • Groundwater levels to be monitored during construction;
		  • Pile casing during piling and isolation of the area around the piling from surface water until piling is complete;
		  • Damp proof membranes will be incorporated during construction, to prevent the ingress of shallow groundwater into cuttings and excavations;
		  • Storage of material and construction activities should avoid areas of flood risk;
		  • Temporary bunding and settlement ponds;
		  • Preparation of incident response plans to set out the measures that must be taken in the event of a pollution incident;
		  • On-site availability of oil spill clean-up equipment including absorbent material and inflatable booms for use in the event of an oil spill or leak;
		  • Wherever possible, plant and machinery would be kept away from the drainage system and watercourses;
		  • Use of drip trays under mobile plant;
		  • Construction materials brought to the Site should be free of any contaminated material;
		  • Care should be taken to ensure that wet cement does not come into contact with surface water or near the streams and drainage ditches. Cement should be poured in dry and consideration should be given to use fast drying cement;
		  • If ground contamination is encountered during construction works, work would stop immediately and measures would be taken to prevent disturbance and mobilisation of contaminants, until the contamination has been treated in-situ or removed for off-site treatment;
		  • Working areas shall be clearly defined to ensure the disturbance of soils is minimised, where possible;
		  • Haul routes and accesses shall be clearly defined to minimise risk of accidents;
		  • The cleaning of vehicles wheels prior to leaving Site;
		  • Controlled and covered waste storage areas;
		  • Implementation of a Dust Management Plan (i.e. damping down) with subsequent consideration given to the management of surface water run-off;
		  • Installation of systems such as silt traps and swales designed to trap silty water including adequate maintenance and monitoring of these to ensure effectiveness, particularly after adverse weather conditions;
		  • Provision of environmental awareness training for Site workers;
		  • The surface water drainage design would be implemented on a phase by phase basis as part of the design solution to attenuate flow and control runoff from new impermeable surfaces;
		  • The implementation of a temporary drainage strategy to prevent uncontrolled runoff; and
		  • The operational drainage system will need to be protected from sediment or debris, and jetted on completion of the works to remove any accumulation of sediment or debris.
		• Measures to specifically minimise the short-term increase in flood risk due to construction activities include the following:
		  • Implement a construction-phase drainage strategy to intercept, capture and attenuate surface water runoff and adopt a phased approach to the construction of the operational drainage system to ensure impermeable areas are appropriately drained and attenuated prior to discharge. The construction-phase drainage strategy could include the provision of a bund along the lowest perimeters of the site to prevent uncontrolled runoff towards existing properties. Operational-phase drainage systems must be protected from ingress of sediment and debris and cleaned on completion of construction works.
		  • Storage of material and construction plant should be set back from the Barnham Lane Ditch and away from areas that may be at risk of flooding or existing overland flow routes described in the Flood Risk Assessment.
		  • To minimise groundwater seepage into the areas of excavation/cutting, deep excavations should be constructed during the summer months as far as practicable and groundwater levels should ideally be monitored during construction.
		• Measures to specifically minimise the potential effects on the water quality of water resources due to accidental leaks and spillages include the following:
		  • Surface water run-off from within the Site should be managed to prevent uncontrolled migration of pollutants to waterbodies. This could include temporary bunding and settlement ponds;
		  • Preparation of incident response plans, prior to construction, which should be present on-site throughout construction to inform contractors of required actions in the event of a pollution incident;
		  • Spillages and leaks would be immediately contained in line with the incident response plan;
		  • Oil, fuels and other harmful substances should be stored on an impermeable surface with appropriate drainage or containment;
		• Measures to specifically minimise the potential increase in physical contamination (i.e. sedimentation) of surface waterbodies due to ground disturbance include the following:
		  • Locating stockpiles and materials storage a minimum of 10m from any watercourses or drainage lines.
			• Groundwater level monitoring during the construction phase if groundwater is encountered.
			• Installation of systems such as silt traps and swales designed to trap silty water including adequate maintenance and monitoring of these to ensure effectiveness, particularly after adverse weather conditions.
			•

Environmental Topic	Potential Impacts	Environmental Action/Mitigation	Construction Monitoring
Geology and Soils	• Impact on human health due to contamination • Impact on controlled water- Groundwater – Principal and Secondary (A) Aquifers underlying the Proposed Scheme. • Surface waters – On and off-site features including ponds and small streams bisecting the Proposed Scheme • Impact on below ground services- potable water supply pipes, buried concrete and foundations	• Completion of a targeted Phase 2 Contaminated Land Ground Investigation and production of a Generic Quantitative Risk Assessment (GQRA) (secured through a planning condition) to assess the ground conditions and extent of any contamination present within the Site. To also confirm the ground gas regime (if required). • Any risks from contamination will be managed as part of a Remediation Method Statement and validation report, secured through a planning condition(if required). • The reuse of soil within the Site should be governed by the production of a Materials Management Plan (MMP) in which chemical criteria are specified for the import of soils/fill material from off-site and for the reuse of Site won material. The stripping, storage and reuse of subsoil should be carried out in accordance with BS 8061:2013. • Completion of a Phase 2 Contaminated Land Ground Investigation and production of a GQRA (secured through a planning condition) to assess the ground conditions and extent of any contamination present within the Site. To confirm contamination of underlying groundwater (if present) and on-Site surface waters as well as determining groundwater levels and groundwater flow direction; • The ground investigation will determine whether further works for example, remediation and validation are required prior to the commence of construction works; and • If the preferred foundation solution includes piles (for any infrsture such as bridges), a Piling Risk Assessment may be required to confirm the absence of significant risk or mitigation measures required to limit the risk of contamination to deeper water bodies. • Completion of a Phase 2 Contaminated Land Ground Investigation and production of a GQRA (secured through a planning condition) to assess the ground conditions, sulphate concentrations and extent of any contamination present within the Site. • The adoption of barrier type materials for potable water supply pipes in accordance with UK Water Industry Research (UKWIR) will be considered to prevent contaminant ingress (if present). • To prevent any adverse effects to below ground structures, appropriate techniques and design solutions will be considered during the design of the proposed scheme, these will include Appropriate concrete in accordance with BRE Digest 1. 3rd Edition (including February 2018 amendments); and dedicated service corridors with clean, validated backfill. • Topsoil and subsoil to be stripped separately and to be tested for reuse potential. • The occurrence of contamination will be addressed during the construction phase, this will include remediation works (where required) and mitigation measures as outlined above. Providing these are in place the potential for exposure of any residual contamination to maintenance workers and future site users will be limited. •	• Construction phase air monitoring may be used to check the effectiveness of damping down of the dust on-Site (carried out by appointed contractor and secured via the CEMP). • Monitoring of ground gas will be required as part of the Ground Investigation, prior to the construction phase (to be secured by a planning condition). • Monitoring of groundwater levels will be required as part of the Ground Investigation, prior to the construction phase (to be secured by a planning condition).

Environmental Topic	Potential Impacts	Environmental Action/Mitigation	Construction Monitoring
Geology and Soils	• Impact on human health due to contamination • Impact on controlled water- Groundwater – Principal and Secondary (A) Aquifers underlying the Proposed Scheme. • Surface waters – On and off-site features including ponds and small streams bisecting the Proposed Scheme • Impact on below ground services- potable water supply pipes, buried concrete and foundations	• The Principal Contractor will be required to implement the measures summarised below to minimise the risk of contamination from construction activities: • Provision of designated storage facilities with appropriate signage. • Separate inert, non-hazardous and hazardous waste to include the completion of a waste classification. • Skips and storage receptacles will be sheeted/lidded and remain closed when waste will not be deposited into them. • Comply with air quality management measures. • Provision of spill kits, bunding/drip trays and securing and restricting access to fuel storage containers. • Correct storage of oil-based materials will comply with the Control of Pollution (Oil Storage) (England) Regulations 2001, as amended, and GPP2: Above ground oil storage tanks. Should fund removal of underground storage tanks, and relevant government guidance must be complied with. • Comply with the GPP26: safe storage – drums and intermediate bulk containers in relation to commercial storage handing and use. • Comply with CIRIA C741. Environmental Good Practice on Site (4th Edition) (CIRIA, 2015) (Ref:12.30). • Comply with CIRIA C532. Control of Water Pollution from Construction Sites (CIRIA, 2011). (Ref:12.31). • Comply with Construction (Design and Management) Regulations 2015 (Ref 12.32) • Comply with Health and Safety in construction document HSG150 (Ref 12.33) • Additional specific mitigation measures for identified receptors are summarised below and in Section 12.6. The measures will be secured by a planning condition, completed by a competent qualified person; and approved by the Local Authority and Environment Agency. • Targeted ground investigation and Generic Quantitiate Risk Assessment (GQRA). • Remediation works where required to include removal of impacted soils and subsewunt valdation. • Concrete design and barrier pipes to withstand any aggressive ground conditions. • Re-use of chemically suitable site-won and imported soils. • Implementation of surface water drainage systems to include interceptors for any future fuel chemical spills. • Provision of cover systems over any contamination that will remain in the ground including proposed hardstanding and a clean cover of topsoil within designated open / landscaping areas.	• Construction phase air monitoring may be used to check the effectiveness of damping down of the dust on-Site (carried out by appointed contractor and secured via the CEMP). • Monitoring of ground gas will be required as part of the Ground Investigation, prior to the construction phase (to be secured by a planning condition). • Monitoring of groundwater levels will be required as part of the Ground Investigation, prior to the construction phase (to be secured by a planning condition).
Climate	No data	• Ensure site and compound drainage infrastructure has sufficient capacity to withstand extreme rainfall events. • Ensure that site drainage and any access roads used during construction are monitored during periods of heavy rainfall. • Ensure appropriate traffic management measures are put in place to avoid areas of potential flooding. • Cover or fence stockpiles to prevent wind whipping, screen or fully enclose activities which have high potential for dust production, remove potential dust producing materials from site as soon as practicable. • Cover materials piles with waterproofing and where possible, store outside areas at high risk of flooding. • Ensure emergency response procedures are active on site to, in the event of flooding, minimise disruption and damage. • Ensure there is a process for the monitoring of weather and issuing weather warnings to staff where appropriate. • Ensure emergency response procedures are active on site to, in the event of snow and ice, ensure that roads and surfaces are gritted and cleared of snow. • Ensure welfare facilities are in place and sufficiently cooled. • Periodic rest breaks to be taken during the hottest part of the day. • Provide shade for workers in exposed areas. • Ensure workers use personal protective equipment to reduce exposure to UV radiation – light coloured, long-sleeved clothing, sun cream, sun hats. • Reviewing wind speed before commencing any work at height and ceasing work at height during storms. • Ensure all temporary infrastructure such as lighting and fencing are secured.	

Environmental Topic	Potential Impacts	Environmental Action/Mitigation	Construction Monitoring
Population and Human Health	• Demolition of Hill Cottages (two dwellings), A47 and Orchard Cottage, Chequers Lane and Indigo Flamingo Home Furniture. This results in a permanent loss of the premises. • Construction works will have an impact on the land use and accessibility for the private property and housing, Community land and assets, Development Land and Businesses, Walkers, cyclists and horse-riders, human health	• **Construction Phase** • Both dwellings will be acquired under Compulsory Purchase powers. Mitigation in the form of compensation would be provided by the Applicant to the residents of the properties, paid at a rate equal to market value. • Appropriate diversions implemented for any PRoW temporarily disrupted during construction in order to minimise effects on accessibility and severance for WCHs. Where appropriate diversions are not available, temporary closures may be required. • Any PRoW, footway or carriageway diversions or closures undertaken during construction will be clearly advertised with signage prior to the commencement of works. The signage will display the temporary diversion routes in place. • Design of the diverted routes for WCH will consider vulnerable user groups (such as children, older people, and wheelchair users) and ensure accessibility is maintained for those with limited mobility where practicable. • Construction works will generally be contained within a fenced working area to ensure public safety. • The appointed contractor will liaise with residents, businesses, community facilities (and other relevant user groups identified) prior to the commencement of construction works to ensure they are aware of the programme and nature of the works; in particular, any works planned to take place at night. Any out of hours construction work will be agreed with KLWN Borough Council and/or Norfolk County Council (as relevant) in advance. • Access to residential properties, businesses, and community facilities will be maintained throughout the construction period, in agreement with occupants. • Good practice measures outlined within the Construction Traffic Management Plan (CTMP) will be implemented in order to avoid conflict with WCHs, local residents, and businesses. • **Operation Phase** • No opportunities or requirements for mitigation or enhancements during operation have currently been identified.	
Traffic and Transport	• Construction traffic adversely impacted local traffic volumes and flows; • During construction, Public Rights of Ways (PRoWs) and footpaths which intersect the Site and those in the surrounding area will either be temporarily closed or have restricted access to users.	• A detailed Construction Traffic Management Plan (CTMP) will prepared prior to the start of construction works to manage the impacts of construction traffic. This will include construction traffic volumes, delivery/ construction routes and proposed lane closures (for online construction activities), sustainable travel options and logistics. <u>This will also include a Construction Worker Travel Plan to</u> ~~This will~~ minimise the effects of the construction works on road users. • Temporary re-routing/ diversions of the PRoW will be discussed and agreed with the WSCC Public Rights of Way Officer prior to the start of construction activities and will be set out in the CTMP. All diversions will be publicised locally through the PLO to ensure the local community are aware of what the changes will involve, how long they will be in place for and a map to show the new route. Heras fencing will be used along the boundary of the diverted PRoW during construction to ensure users do not stray onto the construction site.	• None required.