



Yorkshire Water – Wombwell WWTW Solar Array

Outline Construction Environmental
Management Plan

PREPARED FOR
Downing LLP

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CONTENTS

1.	INTRODUCTION	1
1.1	BACKGROUND	1
1.2	ENVIRONMENTAL ROLES AND RESPONSIBILITIES	2
1.3	SITE DESCRIPTION	3
1.4	BASELINE ECOLOGICAL CONDITIONS	4
2.	AIMS AND OBJECTIVES	8
2.1	REVIEW PROCESS	8
2.2	LEGISLATION, POLICY AND GUIDANCE	8
2.3	ENVIRONMENTAL POLICY	11
3.	ENVIRONMENTAL MEASURES	11
3.1	INTRODUCTION	11
3.2	PUBLIC LIAISON, GENERAL ENQUIRIES AND COMPLAINTS	11
3.3	ENVIRONMENTAL INCIDENT RESPONSE	12
3.4	NEAR MISSES	13
4.	DECOMMISSIONING	38

APPENDIX A SITE LAYOUT PLAN

APPENDIX B PEA REPORT

APPENDIX C OUTLINE SITE WASTE MANAGEMENT PLAN

APPENDIX D OUTLINE INCIDENT RESPONSE PLAN

LIST OF TABLES

TABLE 2.1	LEGISLATION, POLICY AND GUIDANCE	9
TABLE 3.1	ENVIRONMENTAL MEASURES	14

LIST OF FIGURES

FIGURE 1	SITE LOCATION
FIGURE 2	SITE LAYOUT

1. INTRODUCTION

1.1 BACKGROUND

An Outline Construction Environmental Management Plan (oCEMP) has been completed by Environmental Resources Management Limited (ERM) on behalf of Downing LLP (the Applicant) for the development of a solar photovoltaic (PV) array (the Development) at the Wombwell Wastewater Treatment Works (WWTW) property (the Site).

The Site resides within the wider land ownership of the Wombwell WWTW (WWTW Site). This oCEMP follows the submission of the Certificate of Lawful Development's (CoLD) application for the same Development and a review of responses received from the local planning authority (LPA) thereafter, which have been addressed throughout this document.

The Development would be a PV farm with associated infrastructure including inverters, transformers, generators, switchgear, electrical equipment, fencing, CCTV Security columns, underground cabling, control room, access tracks, and onsite parking. The Development would have a generating capacity of up to 370 kilowatts (kW) and would reside within the Site red line area of 1.212 hectares (ha). The location of the Development on the Site within the WWTW Site is shown in Figure 1 and the full proposed layout of the Development is shown in Figure 2 in Appendix A.

Permission is sought for installation of the Development for an operational period of 25 years, following which the Development would be fully decommissioned, and the land restored in line with the pre-development baseline.

This oCEMP has been produced to support and provide additional information for the Development, specifically to set out environmental protection measures during construction and to help inform the authoring of a final Construction Environmental Management Plan (CEMP) at the detailed design stage.

This oCEMP takes into account activities to be undertaken during the construction phase of the Development, including:

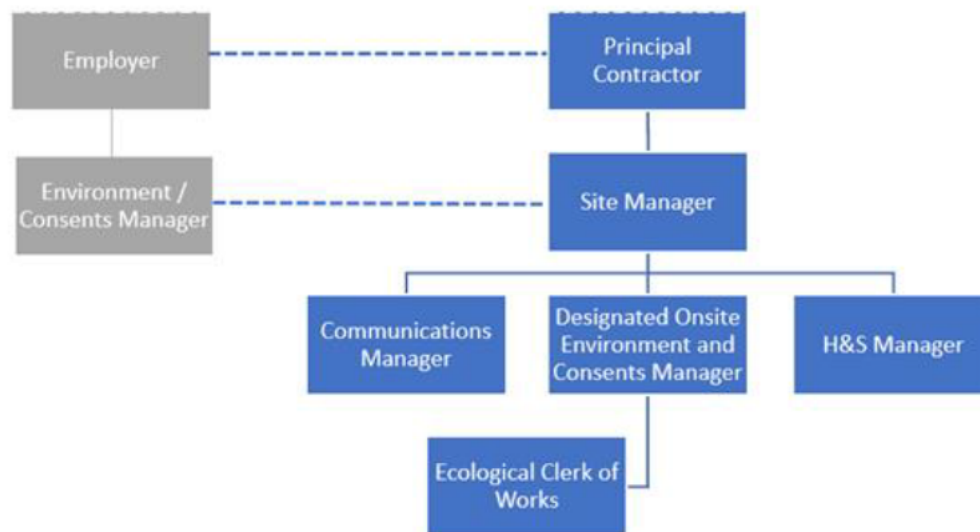
- Access tracks;
- Foundations required for the PV panels; and,
- Hardstanding areas and ancillary infrastructure (including temporary construction compound, underground cable route, and associated infrastructure).

This oCEMP highlights measures that should be used during construction activities to reduce potential impacts on environmental receptors. This is intended to be a 'live' document and should be updated with more detailed proposals for measures when further information becomes available.

The measures set out in this oCEMP are based on industry standards and good practice at the time of writing, driven by international and national legislation as well as national and local policy. In-line with this, the measures proposed are intended to be proportionate to the potential effect on environmental receptors with commensurately more robust measures proposed where greater effects are likely to occur.

1.2 ENVIRONMENTAL ROLES AND RESPONSIBILITIES

Environmental roles and responsibilities vary between different stages of a project. Information regarding roles specific to the works can be found below.



Employer: The Employer fulfils the role of the Client, and as such has oversight of all construction work packages. The Employer ensures that project requirements are properly implemented, controlled and effectively documented. It is the Employer’s responsibility to ensure that suitable processes and resources are in place to ensure the Principal Contractor complies with the health, safety and environmental obligations.

Principal Contractor: The Principal Contractor, has lead responsibility for practical construction of the Development, including the appointment of a competent Site Manager, Health and Safety (H&S) Manager, and sub-contractors, agreeing and setting construction environmental targets with the Employer, and ensuring all activities are in compliance with the requirements of the Code of Construction Practice (CoCP), Stage-specific CEMPs and other associated reports and appendices. This contractor will be deemed to be the Principal Contractor for the purposes of the Construction (Design and Management) Regulations 2015 (CDM Regulations).

Site Manager: The Site Manager will have the overall day-to-day responsibility for the delivery of the development and will oversee all operational aspects of the construction programmes. The Site Manager will be required to familiarise the contents of this document and liaise with the H&S Manager in order to deliver appropriate environmental awareness and guidance to operatives. It will be important for the Site Manager to establish a system for dealing with enquiries or complaints from the public, local authorities, or statutory consultees. Any complaints that may arise will be logged, reported and addressed and complaint close-out reports will be produced and submitted.

H&S Manager: The H&S Manager role is to oversee and enforce the implementation and adherence to all relevant health & safety provisions. This role will have overall responsibility for maintaining and updating H&S provisions, and be on-site to advise, guide, support and promote awareness of the on-site requirements to all personnel. The H&S role will be filled by an appropriately qualified and experienced staff member of the Principal Contractor.

Designated On-site Environment and Consents Manager: The Employer will appoint an appropriately competent person or persons (the Designated On-site Environment and Consents Manager) to undertake relevant environmental tasks and supervision as detailed in this document, prior to, during and upon completion of the Works. Together with the Principal Contractor's Environment and Consents Manager and their designated Ecological Clerk of Works (ECoW), the Consents Manager will monitor and report CoCP and CEMP implementation through liaison with the H&S Manager, Site Manager, and other parties as appropriate.

Ecological Clerk of Works: If required, a suitably qualified and experienced ECoW will be appointed by the Principal Contractor and will be responsible for providing advice about ecological issues and ensuring that the measures specified in the CEMP are implemented correctly and in line with industry guidance. An ECoW should be appointed from commencement of construction to final commissioning of the Development, or end of the construction period, whichever is the later to monitor the entire construction period. An ECoW is also likely required for certain periods prior to and/or during decommissioning. The scope of work of the ECoW shall include, but not be limited to:

- Monitoring compliance with the ecological mitigation works detailed in the CEMP;
- Providing advice on adequate protection of nature conservation interests on-site;
- Providing contractor tool-box briefings about legally protected species and their habitats;
- Ensuring any required protected species licenses are in place and providing advice and monitoring compliance with the license conditions; and,
- Ensuring visual checks on surrounding watercourses are carried out regularly to identify possible construction effects.

1.3 SITE DESCRIPTION

The Development will occupy an area of 1.212 ha and is located within the wider WWTW Site, with the freehold land having been acquired by a conveyance dated December 16, 1976. The land is registered to Yorkshire Water Services Ltd under title number SKY45119 and has been used by Yorkshire Water for WWTW storage, access, and related functions. The Site receives wastewater flows from the surrounding area and treats it to the required standard. Above ground, various types of equipment, machinery and tanks required for the operation of the WWTW are visible on site.

The Site is located within Grade 3 agricultural land, which is categorised as good to moderate quality agricultural land with moderate limitations that affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. The Site has not been agricultural use since the time of WWTW's construction.

The Site is not accessible to the public and is under the sole control of the Applicant, with gated access to the Site through the existing WWTW. This area has historically been used for operations relating to the WWTW such as housing infrastructure and material storage and is part of the wider complex. The use of the land has not changed since the date of acquisition; the Site is therefore considered to be operational land for the purposes of the Town and Country Planning (General Permitted Development) Order 2015 (as amended).

1.4 BASELINE ECOLOGICAL CONDITIONS

A Preliminary Ecological Appraisal (PEA) of land that would accommodate the Development Site was completed by BL Ecology on 20 November 2020¹. The purpose of the PEA was to identify potential ecological constraints and mitigation measures associated with a small-scale solar development in relation to relevant nature conservation legislation and biodiversity planning policy. It should be noted that the PEA was undertaken for the entirety of the Applicant's landholding at Wombwell (WWTW Site), including the current Site red line boundary around the Development, to help inform site selection and design (refer to Appendix A, Figure 2). The full PEA report is included in Appendix B for reference. Based on the recommendations described in the PEA report, further ecological surveys undertaken at the Site included:

- Preliminary Roost Assessment (PRA) of buildings and trees², completed 13 April 2022;
- Updated badger survey², completed 13 April 2022;
- Emergence/ re-entry survey for bats³, completed on 10 August 2022;
- Water vole survey of Bulling Dike³, completed 14 September 2022; and,
- Invasive non-native species (INNS) of plant survey³, completed 14 September 2022.

During each site visit, ecology surveyors identified any potential change from baseline habitats described in the PEA report. In addition, a review of MAGIC mapping was undertaken to identify updates to designated sites within 2 km of the Site⁴. Further ecological survey reports are included in Appendix C and the findings of these ecological surveys identified the following:

- There are no statutory or non-statutory designations of conservation interest present on the Site and no sites⁵ that form part of the UK National Site Network within 2 km of the Site;
- The Dearne Valley Wetlands Site of Special Scientific Interest (SSSI) is located directly adjacent to the Site to the east. The SSSI is designated for a range of ornithology features including breeding birds (gadwall, garganey, pochard, bittern, black-headed gull and willow tit); as non-breeding birds (gadwall and shoveler) and an assemblage of breeding birds of lowland damp grasslands, lowland scrub and a mixed assemblage of lowland open waters and their margins and Lowland fen;
- The Site is largely dominated by tall ruderal vegetation and hard-standing, with small areas of semi-improved neutral grassland scattered broadleaved trees along the eastern boundary. The Site crosses the Bulling Dike, where an existing access track and bridge pass over a watercourse characterised by a narrow channel of deep water with marginal and bankside vegetation dominated by tall grasses. Habitats within the Site are common and widespread

¹ BL Ecology. (2020). *Solar PV Site Screening Project, Site 44 – Wombwell Treatment Works, Preliminary Ecological Appraisal Report (Document Ref. 084_19_44_RE01)*. Commissioned report to Yorkshire Water from BL Ecology Ltd (Issued 04 November 2020).

² Bell, A. (2022). *Yorkshire Water Solar Sites – Wombwell – Badger and GLTA Report Rev00*. Arcus Consultancy Services Ltd., York.

³ Hesketh, C. (2022). *Wombwell Water Treatment Works – Further Ecological Survey Report*. RSK Biocensus, Helsby.

⁴ Natural England (2023) Magic Map (version 3.2) [Online] Available at: [Magic Map Application \(defra.gov.uk\)](https://magic.defra.gov.uk/) (Accessed 13.02.2024).

⁵ This includes Special Protection Areas (SPAs), potential SPAs, Special Areas of Conservation (SACs) and candidate SACs; as well as Ramsar Sites and proposed Ramsar Sites (as per National Planning Policy Framework),

throughout the Barnsley Metropolitan region; and not considered to be representative of any protected or priority habitats;

- Three ponds were recorded within 250 m of the Site. These were subject to Habitat Suitability Index (HSI) Assessment for great crested newt (GCN), with two of the ponds being classified as below average suitability for GCN and one of the ponds being classified as poor. eDNA tests were conducted on these ponds on 24 June 2020 and the results were negative, which suggests GCN do not use these ponds for breeding. Furthermore, no GCN records were returned within the data search; and no licence applications or licence returns relating to GCN have been identified within 2 km of the Site from MAGIC mapping. Therefore, GCN are unlikely to be present within the Site, and no impacts to GCN are anticipated. The presence of other widespread amphibian species (e.g., common toad) cannot be ruled out, and as such there is a risk of these species being killed or injured during the construction phase with proposed mitigation measures outlined in **Table 3.1**;
- No setts or signs of badger presence have been recorded within the Site, however, there is potential for badger to forage within, and commute through, the Site, and establish new setts, in the intervening period between ecological surveys being completed and the commencement of the works. Therefore, there is a risk of this species being killed, injured or disturbed during the construction phase (including night works) and measures to mitigate this risk are included in **Table 3.1**;
- The PRA determined that immature broadleaved trees along the eastern boundary of the Site contain Potential Roost Features (PRFs) considered to be of Negligible suitability for roosting bats. Six buildings within the WWTW (B1, B2, B7, B8, B9 and B10) were recorded as having PRFs of Low suitability for roosting bats. No bats were observed emerging from any buildings during the emergence / re-entry survey; although noctule, common pipistrelle and soprano pipistrelle were recorded during the survey. Therefore, there are no bat roosts present within the Site and no impacts to roosting bat roosts is predicted. There is potential for foraging and commuting bats to be affected during night works with proposed mitigation measures outlined in **Table 3.1**;
- Habitats within the Site are likely to be suitable for common and widespread species of breeding birds, and vegetation removal undertaken during the nesting bird season (March to August inclusive) has potential to affect breeding birds. Proposed mitigation measures are outlined in **Table 3.1**;
- Bulling Dike provides potential foraging and commuting otter habitats due to proximity and connectivity to wetland habitats within Wombwell Ings, Broomhill Flash and Waterside Park, as well as the River Dearne approximately 1 km east of the Site at Marle's Bridge. No holts, resting places or signs of otter were recorded during the surveys, although there is potential for otter to establish new holts and resting sites within and adjoining the Site in the intervening period between ecological surveys and the commencement of works. Therefore, there is a risk of this species being killed, injured or disturbed during construction works (including night works). Proposed mitigation measures are outlined in **Table 3.1**;
- Grassland areas provide potential terrestrial habitats for widespread species of reptile and the desktop study identified records of grass snake and adder within the locality. No features that could be used as hibernacula were recorded within the Site; although, log piles were noted to the south of the Site that provide potential hibernacula. More extensive grassland

habitats to the west of the Site would be retained and unaffected by the Development. No incidental sightings of reptiles were recorded during the survey; however, there is potential for reptiles to be killed or injured during construction works. Proposed mitigation measures are outlined in **Table 3.1**;

- The Bulling Dike contains largely suboptimal habitat for water vole, with banksides dominated by scrub with little or no marginal vegetation. Burrows recorded along the bankside were not considered to be sufficient in size to be accessible to water vole; and no droppings or latrines were recorded during the survey. Therefore, it is unlikely that water vole are present and not likely to be affected during or after the construction works;
- Bulling Dike represents potential aquatic habitat for white-clawed crayfish, however, no records of white-clawed crayfish were returned from the desk study and no populations are currently known within the lower reaches of the River Dearne so it is unlikely this species is present. Therefore, no impacts to white clawed crayfish are anticipated during or after the construction works;
- Open grassland and tall ruderal habitats within the Site have the potential to support brown hare. Although no incidental evidence of brown hare was noted during any site visit, their potential presence cannot be ruled out, which means any brown hare present could be killed or injured during construction works, as a result of vegetation removal. Proposed mitigation measures are outlined in **Table 3.1**;
- Open grassland and tall ruderal habitats within the Site have the potential to support foraging hedgehog. Summer and winter nesting habitat within the Site is extremely limited due to lack of extensive broadleaved woodlands and mature trees. There is potential for hedgehog to forage and commute through the Site in the intervening period between ecological surveys being completed and the commencement of construction works, which means any hedgehog present could be killed or injured during construction works. Proposed mitigation measures are outlined in **Table 3.1**;
- The Site supports limited habitat for invertebrates due to the relatively small scale of tall ruderal vegetation and hard-standing within the Site and lack of other extensive habitat features (e.g., extensive wetland, woodland, boundary features, mature trees and priority habitats);
- There is potential for the Bulling Dike to support fish. Therefore, there is potential for fish to be killed, injured or disturbed during the works. Proposed mitigation measures are outlined in **Table 3.1**; and,
- Himalayan balsam was recorded along the margins to the Bulling Dike and within the north-east corner of the Site at Town Lands. Therefore, there is potential for the Development to cause invasive non-native species of plant to spread into the wild during construction works. Proposed mitigation measures are outlined in **Table 3.1**.

No permanent or temporary land-take from within any designated sites is required, including the Dearne Valley Wetlands SSSI. The Development will result in the localised loss of predominantly tall ruderal vegetation and hard-standing, as well as small areas of semi-improved neutral grassland. Given that there are no extensive wetland, woodland, boundary features, mature trees or scrub habitats within the Site (habitats typically associated with the key features of the

SSSI), it is unlikely that species protected by the SSSI designation would establish nests or regularly utilise habitats within the Site. More suitable and extensive habitats are present within approximately 500 m of the Site at Wombwell Ings, Broomhill Flash and Waterside Park. Therefore, there is potential for individual birds to pass through the Site as they move through their range (e.g., gadwall, willow tit), though it is unlikely that these species will make regular, permanent use of the Site.

Whilst the Development may require periodic inspections for security and maintenance purposes, the Development is located in areas of limited habitat suitability for SSSI notified features that adjoin the operational WWTW, which is subject to regular disturbance from the presence of site personnel. Therefore, no significant additional disturbance is likely to occur during the operational phase.

Given the extremely small-scale nature of the Development, limited habitat suitability, limited duration of construction activities, and application of good practice during construction, it is considered unlikely that SSSI notified features would be damaged as a result of the Development. A preconstruction walkover survey will be conducted prior to the commencement of works to develop the mitigation measures that will be included in the final CEMP to confirm that damage is unlikely to occur to SSSI notified features as a result of the Development. The development of these mitigation measures will be done in consultation with and be subject to agreement by Natural England before works commence.

The Development could result in the loss of up to 1.2 ha of predominately tall ruderal vegetation and hard-standing; as well as small areas of semi-improved neutral grassland, however, habitat loss would be largely temporary as permanent land-take will be limited to the access track, individual footings for security fencing, and individual foundations for the solar array (i.e., concrete, ballast, ground screw). As such, vegetated areas and associated habitats would be retained in the long-term with appropriate restoration, and potentially enhanced with suitable management measures.

The Bulling Dike will not be directly affected as new cabling required for electrical connection works would be secured within appropriate ducting attached to the existing watercourse crossings, limiting the extent of temporary earthworks to areas beyond banksides of the Bulling Dike. Therefore, no loss of in-stream, riparian or bankside habitat features is predicted. Whilst the Development does not include activities that would require any discharge to ground or surface waters, there is potential for pollution to aquatic habitats and downstream receptors during construction works as a result of accidental spillage of fuels, oils and chemicals in relation to construction vehicles and equipment. Proposed mitigation measures are outlined in **Table 3.1**.

Potential impacts on wider biodiversity are likely to be significant at the local site level as recorded habitats are common and widespread throughout the local area. The potential for protected species to be present will be mitigated through the application of good practice during construction (e.g., timings of works, pre-works checks, sensitive vegetation removal at the appropriate time of year, a site-based ecologist to provide advice and support to the contractor(s) during construction, provision of bug/mammal/bat/bird boxes to support positive gains in local biodiversity). Furthermore, the Development will adhere to appropriate biosecurity measures during the works (i.e., the appropriate storage, transportation, disposal and/or management of

arisings) to avoid causing invasive non-native species of plants to spread into the wild. Ecological mitigation measures are further detailed in **Table 3.1, Section 3** of this oCEMP.

2. AIMS AND OBJECTIVES

The CEMP is intended to demonstrate measures that could be used during the construction phase of the Development to adequately protect environmental resources. Detailed proposals for such measures will be documented prior to construction and will provide the same or greater protection for the environment as those described in this oCEMP. The measures are proportionate to the risk and, where greater risk is highlighted at specific locations prior to construction, specific measures would be agreed for those locations.

The objective of the CEMP is to contribute to the successful delivery of the Development, achieved through a structured approach to good construction management, taking into account information and research documented in the environmental reporting, whilst incorporating flexibility to account for unforeseen conditions and innovation.

A copy of the CEMP and related files and reports will be kept in the site offices of the Principal Contractor for the duration of the works and will be made available for review at any time.

Upon completion of the works, the Principal Contractor will submit a complete copy of the final set of information to the Developer for their records. This information will include electronic scans of all hard copy reports, data, field records and correspondence which are gathered over the course of the construction works, and all updates to the CEMP.

It is intended that the CEMP will be a live document that is regularly reviewed and updated to reflect conditions experienced on-site.

2.1 REVIEW PROCESS

Where the Principal Contractor has standard documents within their own Company or Corporate Environmental Management Plan which might cover a particular requirement of this oCEMP, this will be provided to the Developer and the relevant corresponding documents will be made available.

A checklist will be issued providing the Principal Contractor with a summary of the minimum information to be provided to the Developer pre, during and post-construction. The Developer will undertake review and acceptance of the Principal Contractor's provided information prior to commencement of construction works.

Once the CEMP has been updated prior to the commencement of construction, a copy of the CEMP incorporating the results of an updated ecology walkover will be provided to the LPA for review and comment.

2.2 LEGISLATION, POLICY AND GUIDANCE

The legislation, policy and guidance set out in **Table 2.1** below, has been considered in the production of this document. Should relevant legislation, policy or guidance change, this section and the associated measures should be reviewed.

TABLE 2.1 LEGISLATION, POLICY AND GUIDANCE

Legislation	
The Town and Country Planning Act (1990)	https://www.legislation.gov.uk/ukpga/1990/8/contents
The Planning Act 2008	https://www.legislation.gov.uk/ukpga/2008/29/contents
The Civic Amenities Act (1967)	https://www.legislation.gov.uk/ukpga/1967/69
The Construction (Design and Management) Regulations 2015	https://www.legislation.gov.uk/uksi/2015/51/contents
The Waste (England and Wales) Regulations 2011	https://www.legislation.gov.uk/uksi/2011/988/contents
Water Resources Act 1991	https://www.legislation.gov.uk/ukpga/1991/57/contents
The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017	https://www.legislation.gov.uk/uksi/2017/407/contents
Control of Pollution Act 1974	https://www.legislation.gov.uk/ukpga/1974/40
Hazardous Waste (England and Wales) Regulations 2005 (as amended)	https://www.legislation.gov.uk/uksi/2005/894/contents
Waste Framework Directive 2008/98/EC	https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX%3A02008L0098-20180705
The Conservation of Habitats and Species Regulations (Amendment) (EU Exit) Regulations 2019	https://www.legislation.gov.uk/uksi/2019/579/contents/made
Wildlife and Countryside Act 1981 (as amended)	https://www.legislation.gov.uk/ukpga/1981/69
The Natural Environment and Rural Communities (NERC) Act 2006	https://www.legislation.gov.uk/ukpga/2006/16/contents
The Environment Act (England) 2021	https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted
The Protection of Badgers Act 1992	https://www.legislation.gov.uk/ukpga/1992/51/contents
The Health and Safety at Work etc. Act 1974	https://www.legislation.gov.uk/ukpga/1974/37/contents
The Management of Health and Safety at Work Regulations 1999	https://www.legislation.gov.uk/uksi/1999/3242/contents/made
The Control of Substances Hazardous to Health (COSHH) (2002)	https://www.legislation.gov.uk/uksi/2002/2677/regulation/7
Policy	
National Planning Policy Framework	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1182995/NPPF_Sept_23.pdf
Policy SD1 Presumption in favour of Sustainable Development	https://www.barnsley.gov.uk/media/17249/local-plan-adopted.pdf

Policy D1 High Quality Design and Place Making	https://www.barnsley.gov.uk/media/17249/local-plan-adopted.pdf
Policy LC1 Landscape Character	https://www.barnsley.gov.uk/media/17249/local-plan-adopted.pdf
Policy GI1 Green Infrastructure	https://www.barnsley.gov.uk/media/17249/local-plan-adopted.pdf
Policy CC1 Climate Change	https://www.barnsley.gov.uk/media/17249/local-plan-adopted.pdf
Policy BIO1 Biodiversity and Geodiversity	https://www.barnsley.gov.uk/media/17249/local-plan-adopted.pdf
Policy GD1 General Development	https://www.barnsley.gov.uk/media/17249/local-plan-adopted.pdf
Policy CC4 Sustainable Drainage Systems (SuDS)	https://www.barnsley.gov.uk/media/17249/local-plan-adopted.pdf
Policy RE1 Low Carbon and Renewable Energy	https://www.barnsley.gov.uk/media/17249/local-plan-adopted.pdf
Policy CC3 Flood Risk	https://www.barnsley.gov.uk/media/17249/local-plan-adopted.pdf
Policy Poll1 Pollution Control and Protection	https://www.barnsley.gov.uk/media/17249/local-plan-adopted.pdf
Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention) (1976)	https://jncc.gov.uk/our-work/ramsar-convention/
Council Directive 92/43/EEC (Habitats Directive)	https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A01992L0043-20130701
Hedgerows Regulations 1997	https://www.legislation.gov.uk/ukxi/1997/1160/contents/made

Guidance

Environment Agency and National Groundwater and Contaminated Land Centre (2001) Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention	https://webarchive.nationalarchives.gov.uk/ukgwa/20140329082415/http://cdn.environment-agency.gov.uk/scho0501bitt-e-e.pdf
CIRIA (2009) Unexploded Ordnance (UXO) A Guide for the Construction Industry C68	https://www.ciria.org/ItemDetail?iProductcode=C681&Category=BOOK
The Construction Industry Research and Information Association (CIRIA), (2015), Environmental Good Practice on Site Guide (C741)	https://www.ciria.org/CIRIA/CIRIA/Item_Detail.aspx?iProductcode=C741&Category=BOOK
CIRIA, (2001), Control of Water Pollution from Construction Sites (C532)	https://www.ciria.org/CIRIA/ProductExcerpts/C532.aspx
The SuDS Manual (2015)	https://www.ciria.org/ItemDetail?iProductCode=C753F&Category=FREEPUBS

2.3 ENVIRONMENTAL POLICY

The Development should be delivered in accordance with good construction practice, both in its approach to the management of effects on the environment and in its support of local communities.

In doing so, the following approach has been developed and is delivered through the implementation of the CEMP and associated plans and reports:

- The Developer, along with the Principal Contractor, and other parties to the construction process (once appointed) will act collaboratively and cooperatively to achieve the best environmental outcomes;
- The works will progress in accordance with the requirements of the environmental reporting and methods agreed with the Council and Consultees;
- The Developer undertakes the appointment of a contractor that is competent;
- The Developer undertakes the appointment of a contractor that is experienced in delivering works in environments similar to those at the WWTW Site and in implementing mitigation works of a similar nature to those defined in this CEMP and environmental reporting within the Environmental Appraisal;
- The Principal Contractor plans the work integrating from the outset the objectives of the Proposed Development and the environmental requirements defined in this CEMP and environmental reporting within the Environmental Appraisal;
- The Principal Contractor programmes work in a manner that is safe and that the work and mitigation measures have the greatest opportunity to be effective;
- The Principal Contractor develops contingency plans for reasonably foreseeable events. The Developer, Designer and other parties take reasonable steps to support the development of the Principal Contractor's plans taking into account responsibilities;
- The Principal Contractor shall take reasonable steps to notify local communities of operations during the Development that may impact on domestic or business activity and will use appropriate methods to manage the impact; and,
- In all operations, management of the environment and control of effects will be an integral part of the design, management and construction process.

3. ENVIRONMENTAL MEASURES

3.1 INTRODUCTION

Appropriate measures have been identified to manage potential effects on the receiving environment that may arise as a result of the construction phase of the Development. These have been outlined in **Table 3.1**.

These measures have been separated out by topic area with each measure aligned against the potential effect it was intended to mitigate and the receptor the effect would otherwise have impacted.

3.2 PUBLIC LIAISON, GENERAL ENQUIRIES AND COMPLAINTS

In-line with best practice at the time of writing, the following approach to communication will be adopted.

The Principal Contractor will have in place a plan covering community liaison, enquiries and complaints. Measures that will be adopted by the Principal Contractor as part of the construction of the Works include:

- The Site Manager will establish a system for dealing with enquiries or complaints from the public, local authorities or statutory consultees;
- Displaying an information board containing contact names, telephone numbers and addresses, and the helpline number at appropriate locations on the boundaries of the Site will be in place to inform the local community;
- Prior to commencing main construction activities, occupiers of premises in the vicinity of the Works will be notified by the Principal Contractor of the nature of the works, access restrictions, and provided with contact details to which any enquiries should be directed; and,
- Any complaints that may arise will be logged, reported and addressed. The system will include measures to keep all relevant parties informed about the progress of complaints.

It is proposed that during construction, any external enquiries or complaints relating to an environmental and consents matter shall be reported to the Principal Contractor's Communications Manager, who will inform and discuss with the Environmental/Consents Manager, ECoW and the H&S Manager as necessary.

The Communications Manager will then work with the on-site team to investigate, address and respond to the complaint accordingly. Environmental complaints will be recorded on the Principal Contractor's HSE system in accordance with HSE management procedures.

Records of complaints will be regularly monitored by the Principal Contractor and Employer to check that an appropriate and timely response has been made, and to identify emergent trends which may require further investigation. Roles and responsibilities are defined further in Section 1.2 of this oCEMP.

3.3 ENVIRONMENTAL INCIDENT RESPONSE

Should, despite the measures outlined in **Table 3.1**, an environmental incident occur, the following steps of notification will be taken. This will be included within the initial site induction for all operatives, by the appointed Principal Contractor:

- Any operative witnessing an incident must immediately report the incident to the designated Site Manager & H&S Manager; and,
- Following this, the Site Manager/Assistant Site Manager shall implement remedial measures and notify the Applicant's Project Manager.

For a spillage, in addition to the above:

- If a spill has reached a surface water drain or watercourse, or soaked away in open ground, the Site Manager/Assistant Site Manager will contact the Environment Agency immediately on the 24hr helpline;
- If incidents do not fall into any precise category, and if there is any doubt, the Environment Agency will always be contacted through the Site Manager/Assistant Site Manager; and,
- Additional advice and support will be available and will be acquired by contacting the ECoW.

3.4 NEAR MISSES

Where observed, environmental 'near misses' will also be reported, i.e., situations or occurrences that could potentially lead/contribute to an environmental incident in slightly different circumstances (e.g., no drip tray below plant when refuelling, or inappropriately stored oils/chemicals). These will be logged by the Site Manager and reviewed by the Applicant's PM.

An outline Site Waste Management Plan (SWMP) and Outline Incident Response Plan are included in Appendices C and D. Full details of the responses to incidents are included in the Outline Incident Response Plan.

TABLE 3.1 ENVIRONMENTAL MEASURES

Potential Receptors	Predicted Changes and Potential Effects	Proposed Measures
General		
All	Increase in general disturbance resulting in a change in the receiving environment	Core working hours are proposed to be between 07.00 until 19.00, Monday to Friday and 07.00 until 13.00 on Saturdays (unless in exceptional circumstances where need arises to protect plant, personnel or the environment). A start-up and close down period for up to an hour before and after the core working hours is proposed. This does not include the operation of plant or machinery that may cause a disturbance. If work is to be undertaken outside of daylight hours, lighting will be used for the works areas only and shall not be allowed to spill onto neighbouring wildlife habitats, including trees, hedgerows, paths, woodlands and ponds. Any lighting required during works will be shielded or fitted with hoods to reduce light spill. Quieter construction activities at this time would be undertaken to reduce disturbance. Exceptional circumstances in the above context are defined as reasonably unforeseeable circumstances which would result in the curtailment of construction activity, causing an increase in health and safety risk to humans or other receptors as determined by a suitably qualified and experienced person. The Applicant, or the Principal Contractors appointed by the Applicant, will notify the Council of any situations changing the approved working hours before they are implemented. Site Inductions will be held for personnel working on the Site on their first visit to the Site. This will include an introduction to all health and safety measures applicable on-site, as well as any Stage-specific environmental considerations. As a minimum, the following information will be provided to all inductees: • Health, Safety and Environment (HSE) Policy; • Significant environmental aspects and potential impacts of their work; • Objectives and Targets; • Submission of environmental improvement ideas, near misses and incidents; • The implications of not complying with environmental consent requirements; • Environmental site rules and requirements; • Species and / or habitat protection requirements; • Protocol for archaeological discoveries and watching brief; • Pollution prevention (e.g., silt mitigation and protection of the water environment); • Waste management practices; and, • Environmental Incident and Emergency Response Procedures (EIERP). Stage-specific environmental constraints will be presented in the induction. This will include known sensitive areas, restricted working zones, watercourses and buffer zones, refuelling (or refuelling

Potential Receptors	Predicted Changes and Potential Effects	Proposed Measures
		exclusion) areas, location of skips, etc. Where updates occur, all site personnel will be informed of the change via a Toolbox Talk (see below). Toolbox Talks will be provided during construction, in order to provide on-going reinforcement and awareness training. Toolbox Talks and training are arranged by the Principal Contractor and delivered by specialist personnel on-site as required. The Principal Contractor submits a schedule for Toolbox Talks at least one week prior to commencement of construction. The proposed schedule, to be considered as a live document, is consistent with the programme; i.e., toolbox talks for specific environmental issues are scheduled in advance of when those issues are anticipated to be encountered during the construction programme, if possible. Additional Toolbox Talks are added as required, based on circumstances such as unforeseen risks, repeated observation of bad practices, perceived lack of awareness, pollution events, etc. Specifically, the Principal Contractor provides, as a minimum, environmental training on the following topics: • Training on the use of spill kits (on ground and in surface waters), provided on a regular basis (to account for staff/sub-contractor changes etc.); • Training on silt mitigation e.g., installation of silt fencing etc., silt mitigation measures to relevant construction / site staff; • Contaminated land; • Archaeology; • Buried infrastructure; and, • Ecology. A record of all training and Toolbox Talks, their content and the attendees are maintained by the Principal Contractor.
All	Incident arising from the construction of the development resulting in an emergency or a threat to personnel or the development itself.	Emergency Response Procedures will be contained within the Construction Phase Plan (CPP) written by the Principal Contractor. This includes evacuation procedures, emergency access and egress, muster points, location of first aid facilities and a list of emergency contact telephone numbers for key personnel and emergency services. Emergency arrangements will be documented on all site notice boards, and would include details of: • A map with route to nearest medical facilities; • Emergency contact number; • On-site team contacts; • Incident Notification; • First Aid Arrangements; • Fire Emergency Arrangements; • Environmental Incidents; and, • Security Arrangements.

Potential Receptors	Predicted Changes and Potential Effects	Proposed Measures
		All personnel will be made aware of and required to follow Site Emergency Protocols. This will form part of their induction process. Should an incident involving injury or damage to vehicles or plant take place, the Site should be left undisturbed as far as is reasonably practicable (in accordance with personal health and safety). Where it is necessary to move equipment, materials or people to prevent or reduce environmental impact, photographs will be taken, wherever reasonably practicable (in accordance with personal health and safety), to allow easy reconstruction of the incident layout for any required investigative purposes. Both the Principal Contractor and Employer will be immediately notified of any incidents and contact will be made with the relevant emergency services, if required. Consultation with the relevant South Yorkshire County Fire & Rescue Services will be sought by the Applicant to develop an adequate emergency response in the event of a fire. The Applicant will provide the fire services with all the necessary information and will provide updates during operation as required.
All	Risk of environmental damage as a result of the construction activities.	Environmental site inspections will be undertaken by the Principal Contractor's On-site Environmental and Consents Manager supported by the wider site team. In addition, throughout construction at a frequency to be agreed as appropriate to the construction activity underway at the time, inspections and audits will be carried out by the Employer's Environmental Manager. Health and Safety inspections will be undertaken by the Employer's H&S Manager. The results of these inspections will be fed back to both the Principal Contractor and the Employer. Evidence of good practices are highlighted and where issues are identified, remedial actions will be put in place.
All	Risk of fire at the development as a result of construction activities.	Fire Prevention and Control: The office and welfare facilities associated with the Site will have in place appropriate plans and management controls to prevent fires in line with the Joint Code of Practice on the Protection from Fire on Construction Sites (9th ed.). A response plan, in the event of a fire breaking out, will be explained to personnel during site inductions. The Plan will be prepared by the Principal Contractor and will be specific to the Works being undertaken.
		A good housekeeping policy will be applied at all times. As far as reasonably practicable, the following principles will be applied: • All working areas will be kept in a clean and tidy condition; • Construction sites and working areas will be secured to prevent unauthorised access; • Open fires and the burning of rubbish will be prohibited at all times; • All necessary measures will be taken to minimise the risk of fire and the Principal Contractor will comply with the requirements of the local fire authority; • Adequate welfare facilities will be provided for site and construction staff; • Site waste will be stored securely to prevent wind blow;

Potential Receptors	Predicted Changes and Potential Effects	Proposed Measures
		- Rubbish will be removed at frequent intervals; and, - All reasonable steps will be taken to ensure mud, water and other loose material does not encroach onto the public highway, and if it does, steps will be taken to immediately address the concern.
All	N/A	Details of all storage of plant and materials to be used in construction will be provided to the relevant bodies prior to construction.
Anthropogenic and ecological	Increase in light disturbance affecting normal routine or use of environment	Control of artificial lighting is proposed to manage these potential effects. It is anticipated that artificial lighting will be required for security lighting, periods of reduced daylight, such as winter months, to supplement the availability of natural daylight and safely meet the working hours outlined above. The majority of work will be undertaken during natural daylight hours, however, where artificial lighting is required, it will comply with the following specifications: - Lighting will be kept to a minimum required for safe working; - Use motion-sensitive security lighting and avoid where possible the use of floodlighting; - Lighting will be directionally controlled and directed away from sensitive receptors (for example, wildlife habitats such as hedgerows, woodlands, paths and trees); - Lights will be fitted with 'hoods' or similar to control light spill beyond the horizontal plane; and, - Avoid lighting with ultra-violet (UV) components in areas where lighting is required for public safety purposes as UV light can be disruptive to bat behaviour.
Anthropogenic and ecological	Pollution events associated with the use of plant, site vehicles or chemicals leading to adverse effects on local, sensitive receptors	Best Practice Construction Methods: During construction best practice methodologies will be employed across the Site to minimise the potential for negative effects to arise as a result of the construction phase. These measures will be refined further once the detailed design is known and will be recorded in a CEMP which is a live document. In relation to general pollution prevention the following measures will be included as a minimum: - Provide sufficient bunding of fuel storage (110% of content capacity) or COSHH items to limit dispersal of spills or construction materials; - Associated pipework for oil and fuel storage to be stored within the bund; - Oil and fuel storage to be located at least 10 m from any existing surface water drainage systems; - Mobile bowzers will be locked when not in use; - Mobile bowzers will be double-bunded; - Using appropriate measures (e.g., drip trays) when refuelling at all locations and providing spill kits with these at all working areas; - If required, construction plant will only be washed in designated areas; - Maintenance of vehicles, plant and other site equipment to reduce spills; - Use of 'plant nappies', or similar, to manage point source pollution; - Use of wheel washes and a jet-wash water bowser to manage and remove material arising's or other substances off vehicle wheels;

Potential Receptors	Predicted Changes and Potential Effects	Proposed Measures
		- Storage of fuels and other chemicals in appropriate containers within secure locations such as construction compounds; - Appropriate spill kits kept in accessible locations on-site; - Fuel delivery vehicles only allowed access to site so far as the construction compounds; - Storage tanks (above or below ground) should have sufficient strength and structural integrity to hold without leak or burst and bunded in accordance with guidance; - Storage containers should have a minimum design life of 20 years; - To protect Biodiversity Action Plan (BAP) habitats, pollution prevent methods should be in place during construction works and PV panels should be sites a minimum of 10 m from ditches and waterbodies; and, - All storage containers are closed and locked when not in use.
Air Quality		
Anthropogenic and ecological	Generation of fugitive dust leading to soiling of sensitive receptors	Control of fugitive dust: A risk assessment shall be undertaken and documented, prior to construction, in accordance with the latest IAQM guidance. This will inform the extent of further assessment necessary and the design of appropriate management measures once the detailed design is available. These measures could include: - The use of wheel washes or jet-wash water bowser where appropriate to prevent tracking of dust; and, - Damping of arisings and construction materials during dry periods.
Anthropogenic and ecological	Generation of greenhouse gasses leading to localised effects on air quality	Control of local emissions: The Site is not situated within an Air Quality Management Area (AQMA) however, this section will cover the following mitigations on avoiding negative impacts to surrounding receptors: - Delivery times will typically be between 08:00 and 18:00 Monday to Friday and between 09:00 and 13:00 on Saturdays, with no deliveries on Sunday or Public Holidays; - Where possible, schedule deliveries to avoid the start and end of the school day (08:00-09:00 & 15:00-16:00). In exceptional circumstances, it may be required necessary to deliver during these times; - If mud or dirt arisings are anticipated through the programme of works, the Principal Contractor shall install and operate wheel washing facilities at the site entrance junction during construction and must remain in place for the duration of construction; - In the event of mud or any material arising's entering the public highway, the Principal Contractor must make use of road sweepers to remove any material arising's from the public highway; - All contractors must abide by the temporary warning signage and directional signage issued which will entail the proposed traffic management procedures, the correct route to the site for contractors and deliveries; and,

Potential Receptors	Predicted Changes and Potential Effects	Proposed Measures
		Drivers of all deliveries will be made aware of the approved route to the Site and to avoid idling of their vehicles.
Anthropogenic and ecological	Generation of dust and pollution with subsequent impact on local SSSI	The application site is situated directly adjacent to Dearne Valley Wetlands SSSI. As such, potential impacts may arise due to dust and other pollution incidents during construction. Designated sites within 200m of a dust source should be screened in for assessment of impacts. Further information regarding how this designated site will be impacted is therefore required.
Contaminated Land		
Site personnel, general public and ecological receptors	Excavation of contaminated substrate leading to health impacts for anthropogenic and ecological receptors	Site-Specific Risk Assessment: The land is anticipated to have a low risk for land contamination given the current and historic land-uses. However, a site-specific contamination risk assessment will be undertaken prior to construction to identify specific remediation measures, should they be needed, in-line with the detailed design. Additionally, site staff will adopt a 'maintained vigilance' approach to working. Management of arisings: In the event mud, sediment, and other material arisings as a result of the construction process will be managed to minimise the potential for negative interactions with human and ecological resources. As a minimum, the following will be undertaken, with further management activities defined in the CEMP once it is available following detailed design: - Arisings will be stored at a stable batter with bunding or other containment where appropriate; - Arisings will be stored away from areas where the public may encounter them; - Arisings will be damped down as needed during periods of dry weather etc.; - Arisings will be stored away from identified sensitive ecological receptors; and, - Arisings will be re-used/redistributed on-site, where appropriate, or transported away from site in-line with current best practice methodology.
Site personnel, general public and ecological receptors	Spillage of oils and fuel resulting in contamination	The construction compound will have a bunded area and this area will be underlain by an impermeable ground membrane layer. The bund will have a capacity of 110% of the stored liquid containers, including fresh concrete. This will reduce the potential for accidental spillages to contaminate surface water or groundwater. Best practice guidance on the prevention of spillages of chemical outlines the following measures: - Areas where transfer and handling of chemicals is to occur should have impermeable surface; - Drainage systems on-site should be designed to enable the containment of spillages and appropriate disposal and treatment; - Emergency procedures are implemented for a spillage incident and leak detection measures (if appropriate); - Regular maintenance and inspection of chemical storage facilities to be conducted (may be carried out by on-site ECoW); and,

Potential Receptors	Predicted Changes and Potential Effects	Proposed Measures
		Provision and training in the use of spill kits, as outlined below. Appropriately sized spill kit(s) will be provided, maintained, and located at strategic points across the Site. It is also recommended that all vehicles on-site have spill kits in the event of a spillage from a vehicle. This will contain materials, such as absorbent granules and pads, absorbent booms and collection bags. These are designed to halt the spread of spillages and will be deployed, as necessary, should a spillage occur elsewhere within the construction compound.
Surface water bodies	Contamination of, and transport via, surface water bodies leading to impacts on water quality and dispersal to receptors in the wider environment	Site-Specific Risk Assessment: The Site is anticipated to have a low risk for land contamination given the current and historic land-uses. However, the watercourse which runs through the application site is hydrologically connected to the Dearne Valley Wetland SSSI, therefore a site-specific contamination risk assessment will be undertaken prior to construction to identify specific remediation measures, should they be needed, in-line with the detailed design. Additionally, site staff will adopt a 'maintained vigilance' approach to working. Management of arisings: Arisings as a result of the construction process will be managed to minimise the potential for negative interactions with water bodies. As a minimum the following will be undertaken, with further management activities defined in the CEMP once it is available following detailed design: - Arisings will be stored at a stable batter with bunding or other containment where appropriate; - Arisings will be damped down as needed during periods of dry weather etc.; - Major earthworks will not be undertaken during adverse weather; - Arisings will be stored away from surface water bodies and flood zones, in locations with no clear pathway for arisings to enter water bodies; - Appropriate pollution prevention measures will be implemented to manage site run-off, capturing sediment before it can be discharged to the wider environment; and, - Arisings will be re-used/redistributed on-site, where appropriate, or transported away from site in-line with current best practice methodology.
Site personnel	Release of ground generating gasses leading to health impacts for site staff and risk of explosion	Site-Specific Risk Assessment: The Site is anticipated to have a low risk for land contamination given the current and historic land-uses. However, a site-specific contamination risk assessment will be undertaken prior to construction to identify specific remediation measures, should they be needed, in-line with the detailed design. Additionally, site staff will adopt a 'maintained vigilance' approach to working. Should it be necessary, site staff will wear appropriate Personal Protective Equipment (PPE).

Ecology and Biodiversity

General	Potential for loss, damage and/or disturbance to	Prior to works commencing on the Site, an ecological walkover survey will be undertaken by an ecologist, or appointed ECoW, to verify and, where required, update the baseline ecological conditions set out in the PEA Report ^{Error! Bookmark not defined.} and further ecological survey reports ^{Error! Bookmark not defined.}
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Potential Receptors	Predicted Changes and Potential Effects	Proposed Measures
	protected or priority habitats and species during construction works.	defined.,Error! Bookmark not defined.,Error! Bookmark not defined. in line with CIEEM guidelines on data validityError! Bookmark not defined., ⁶ . This will likely include a reptile survey of the Site, as well as precautionary methods of working to clear tall ruderal vegetation to enhance habitats in surrounding areas and benefit reptiles. A pre-construction riparian mammal survey of accessible watercourses will also be undertaken. This will be sufficient as nothing has been recorded and habitats are of limited suitability for badger, otter, water vole, etc. In addition, precautionary work regarding accessible ponds within 250 m of the Site will be undertaken. Furthermore, habitats will be assessed to verify the presence of priority habitats; namely open mosaic habitats on previously developed land. The Principal Contractor will not commence works until provided with a copy of the approved final CEMP. A pre-construction walkover is sufficient to inform the final CEMP, subject to agreement with the LPA. The Principal Contractor will obtain and comply with the requirements of any protected species licence in respect of works necessary to construct the proposed scheme that are likely to breach applicable conservation legislation. Licensing may be for UK and/or European protected species.
Dearne Valley Wetlands SSSI	Potential for loss, damage and/or disturbance to SSSI notified features during construction works.	The site adjoins the Dearne Valley Wetlands SSSI, and within the SSSI Impact Risk Zone (IRZ). Which requires Natural England to be consulted on planning proposals comprising solar schemes with a footprint exceeding 0.5 ha. Whilst the Development is not seeking planning permission, but to progress under Yorkshire Water's permitted development rights, it is recommended that Natural England is consulted due to the proximity of the Dearne Valley Wetlands SSSI.
Protected or priority habitats and species	Potential for pollution to the water environment from inappropriate storage or accidental spillage	Site work will be undertaken in accordance with good practice to reduce the potential for damage to the water environment and locally important habitats. Good practice measures that will be followed include: - Guidance for Pollution Prevention (GPP) (NetRegs, 2022)⁷; and, - Control of Water Pollution from Construction Sites (C532) (Construction Industry Research and Information Association [CIRIA], 2001)⁸.

⁶ CIEEM (2019), On the Lifespan of Ecological Reports & Surveys, Advice Note, Available from: <<https://cieem.net/wp-content/uploads/2019/04/Advice-Note.pdf>>

⁷ NetRegs. (2023) Guidance for Pollution Prevention (GPP) [online]. Available from: <<https://www.netregs.org.uk/>>

⁸ CIRIA. (2001) *Control of water pollution from construction sites. Guidance for consultants and contractors (C532)*. Construction Industry Research and Information Association [online]. Available from: <https://www.ciria.org/CIRIA/CIRIA/Item_Detail.aspx?iProductCode=C532&Category=BOOK>

Potential Receptors	Predicted Changes and Potential Effects	Proposed Measures
	of fuel, oils and chemicals,	
Protected or priority species	Potential for killing and injuring protected and priority species from deep excavations and material storage.	Any deep excavations that cannot be backfilled at the end of a shift, and would otherwise be left open overnight, will be covered and/or fenced off to prevent causing injury to animals that could fall in and become trapped. A suitable means of escape will be provided within extensive excavations that cannot be covered between shifts, so that large mammals, small mammals and amphibians/reptiles can escape (e.g., an angled plank of wood to function as a wildlife ladder). The creation of large stockpiles of soil will be avoided as these may attract badger and/or other animals to establish new setts/burrows during the construction phase. In addition, large diameter pipes will be capped off at the end of each shift to avoid badger and other animals from utilising these features. Prior to each shift, site personnel will visually inspect excavations, stockpiles and large diameter pipes to check that no animals are present. Sightings of animals within these areas will be reported to the Project Ecologist (or appointed ECoW) as soon as it is safe to do so and works will not re-commence until the Project Ecologist (or appointed ECoW) has confirmed whether any additional mitigation is required.
Protected or priority species	Potential for night works to disturb both foraging and commuting (nocturnal and crepuscular) species.	As far as practicable, works should be undertaken during daylight hours to avoid disturbance to nocturnal and crepuscular species in the locality that could forage and commute through the Site (e.g., bats, badger, fox, owls, etc). In the event that night works are unavoidable, temporary lighting will be limited to the minimum needed to illuminate temporary works areas and will be directed away from boundary features that are more likely to be utilised by protected and priority species.
Nesting Birds	Potential for loss, damage and/or disturbance to active nests during site clearance operations.	As far as practicable, removal of nesting bird habitats will be undertaken outside the core bird nesting season (March to August inclusive) to avoid potential damage or destruction of occupied nests or harm to breeding birds. If this cannot be achieved, works within the core bird nesting season will require pre-works checks of any vegetation to be cleared for nesting birds by a suitably qualified ecologist no more than 48 hours prior to works being undertaken. If any nesting birds are identified during the survey, they will be left in situ and protected for their entire nesting period or until the young birds have fledged the nest of their own accord.

Landscape and Visual Impact

Potential Receptors	Predicted Changes and Potential Effects	Proposed Measures
Residents and road users	Changes in visibility of site, including increased vehicle presence, lighting, and other construction activities, from the areas surrounding the Site leading to a reduction in visual amenity	There are no statutory or non-statutory landscape designations on the site. However, site-specific measures will be employed to manage the potential impacts on receptors in the receiving environment. These measures will be refined once the detailed design is known, however, they will include: • The existing green infrastructure within the Site will be retained within the site layout plan as far as is practicable; • Continued substantial screening of the site from the north as provided by existing Yorkshire Water infrastructure; • Use of existing mature trees to screen the site from the west and from residential views; • The existing PRow (Bridleway No. 10) within the Site should be retained to form part of the basis for the site layout plan; • Any areas of planting to be removed to be replaced by native planting; • Solar panels occupying existing arable fields will be set within newly created and lightly grazed pasture to improve biodiversity; • Consideration of landscaping screening of solar panels, impact of landscape screening on local views, and any longer-range views of solar panels; • A landscape and biodiversity management strategy will ensure that mitigation measures remain effective; and, • Provision of a CTMP.
Noise and Vibration		
Other anthropogenic and ecological receptors	Increase in disturbance through noise and vibration leading to a disruption of normal activity	Best Practice Construction Methods: The Principal Contractor will prepare a scheme of noise control and mitigation measures based on the final detailed construction plan. This can be submitted for approval in advance of works commencing, if required by the Planning Authority. As the Principal Contractor is yet to be appointed, the detailed construction plan has not been finalised at this stage. The Principal Contractor will observe BS 5228:2009+A1:2014+A1:2019 Code of Practice for Noise and Vibration Control on Construction and Open Sites (BS 5228) to inform noise control measures during the construction of the Development, with an awareness of noise pollution legislation. In accordance with BS 5228 best practice; the Principal Contractor will establish a process for handling any noise-related complaints during the construction period. These will be recorded, and a log will be maintained that will include details of the response and any action taken. This will be available upon request for inspection to the Planning Authority. All enquires whether a query or a complaint will be dealt with in a timely manner. Any complaints with regards to noise will be investigated as soon as practicable, and will be logged, along with the action taken to prevent further exceedances. Any complaints received are to be recorded into the register within 24 hours. The interested party will be notified what action is being taken to address the enquiry/ complaint as required.

Potential Receptors	Predicted Changes and Potential Effects	Proposed Measures
		The good practice measures detailed below will be implemented to manage the effects of noise during construction operations, and will be required of all contractors: • Operations shall be limited to core working hours; • Deliveries of plant and materials by Heavy Goods Vehicles (HGVs) to Site shall only take place by designated routes and shall be limited to the core working hours or such other times as agreed with the Planning Authority; • The site contractors shall be required to employ the best practicable means of reducing noise emissions from plant, machinery and construction activities, as advocated in BS 5228; • Where practicable, non-tonal and / or directional reversing alarms should be used; • Where practicable, the work programme will be phased, which would help to reduce the combined effects arising from several noisy operations; • Where necessary and practicable, noise from fixed plant and equipment will be contained within suitable acoustic enclosures or behind acoustic screens; • The main contractor and all sub-contractors will be required through their contract to comply with all environmental noise conditions, as listed within any future planning permission(s); • Where practicable, night-time working will not be carried out. Residents shall be notified in advance of construction activities likely to take place outside of the normal working hours, and noise activities will be kept to minimum during such times; • Any plant and equipment required for operation at night (23:00 - 07:00) (e.g., generators or dewatering pumps) shall be silenced or suitably shielded to ensure that the night-time lower threshold of 30dB shall not be exceeded at the nearest noise-sensitive receptors. Core working hours are proposed to be between 07.00 until 19.00, Monday to Friday and 07.00 until 13.00 on Saturdays (unless in exceptional circumstances where need arises to protect plant, personnel or the environment); • Static plant will be located away from sensitive receptors; • When not in use the plant will be switched off; and, • Loading and drop-off heights will be minimised.
Transport and Access		
Road users	Increased traffic during the construction phase.	Construction Traffic Management Plan (CTMP): A CTMP will be produced detailing specific measures to manage site traffic. Specific measures will include, but not be limited to: • Designated hours of site operation and appropriate delivery times in order to prevent inconvenience to local road users; • Arrangement of people and plant machinery regarding, machinery routes, and driver safety; • Minimized interface wherever possible between public and construction site traffic;

Potential Receptors	Predicted Changes and Potential Effects	Proposed Measures
		• Deliveries will be scheduled and arranged accordingly to prevent any inconvenience as far as it is reasonably practicable to residents living in close proximity to the works and other road users, along Ings Road; • Provision of appropriate parking facilities for site vehicles, reverse only policy and located away from sensitive receptors; • Means of access for construction traffic with due consideration given public right of way (PRoW) user safety along Ings Road (Bridleway Path no.10); • Designated areas located away from sensitive receptors for the loading/unloading and storage of plant and materials used for construction; • Procedure for controlled refuelling up of plant and equipment; • A banksman should be employed to control access to the Site entrance junction ensure that it is clear at all times. Reversing of vehicles is not to be done without reversing aid or banksman; • Ensuring that the delivery area is hardstanding and low likelihood for vehicles to pass onto any grass areas, causing mud to enter the roads. Plant equipment will not enter the off-site road system; • A sufficient turning area will be provided for HGVs within the site, all vehicles will enter and exit the site entrance in a forward gear; • If required, any road closures will occur temporarily during daylight hours but outside of local peak periods; and, • Temporary signage is proposed to clearly mark pedestrian and vehicle routes.
Pedestrians	Increase in traffic volumes leading to negative interactions with members of the public	CTMP: A CTMP will be produced detailing specific measures to manage site traffic. Specific measures will include: • Pedestrian routes shall be clearly separated from vehicle routes by fencing or suitable means; • Pedestrian routes shall be wide enough to safely accommodate the number of people likely to use them at peak times; • Pedestrian routes shall allow easy access to work areas; • Pedestrian routes shall be kept free of obstructions; • Pedestrian routes shall be clearly signed and suitably signed; • Pedestrian routes shall safely cross the main vehicle routes; • Pedestrians shall have a clear view of traffic movements at crossings and at gates which lead on to traffic routes; • Pedestrians shall have a clearly marked separate access for use at loading/unloading areas; and, • Pedestrian routes shall provide safe access to welfare facilities.

Potential Receptors	Predicted Changes and Potential Effects	Proposed Measures
Transport Access and	Access availability and storage of plant and materials.	The final CEMP will include measures covering the following: • The parking of vehicles of the Site operatives and visitors; • Means of access for construction traffic; • Loading and unloading of plant and materials; • Storage of plant and materials used in constructing the Development; and, • Measures to prevent mud and debris from being deposited on the public highway.
Ecological and geological receptors	Access of site by large vehicles or vehicles carrying heavy loads or creation of temporary tracks leading to negative effects on ecological and geological receptors	Best Practice Construction Methods: The Site will comply with best practice construction methods at the time of construction. In relation to access the preservation of ecological and geological receptors these measures will comprise, as a minimum: • Track matting will be deployed where heavy loads must cross the Site out with fixed track ways to prevent rutting or other damage to ecological and geological receptors; • Monitoring of heavily trafficked areas of the Site will be undertaken, and track matting deployed ahead of serious degradation; • Creation of new tracks will result in the generation of arisings which will be managed in-line with 'management of arisings'; and, • Creation of a Drivers Safe Work Practices Checklist
Soils		
Anthropogenic and ecological receptors	Loss or damage to soils due to construction activities	Best Practice Construction Methods: To minimise the risk of damage to soil structure, the following rules must be observed during all soil handling tasks: • No trafficking of vehicles/plant or materials storage to occur outside demarcated working areas; • No trafficking of vehicles/plant on reinstated soil (topsoil or subsoil); • Only direct movement of soil from donor to receptor areas (no triple handling and/or ad hoc storage); • Soil handling is to be determined based upon soil moisture content. Where practicable soil handling when soil moisture content is above the lower plastic limit (the moisture content at which soil begins to behave as a plastic material and the soil is deemed too wet to handle without causing damage to the soil structure), should be avoided; • Where soils are wet or damp, to minimise compaction, soils should be handled using excavators rather than dozers; • No mixing of topsoil with subsoil, or of soil with other materials; • Soil is only to be stored in designated soil storage areas; • All soil storage areas (stockpiles) must be planned appropriately and must have clear signage accordingly by the appropriate contractors to ensure no cross contamination occurs and ease of identification for reinstatement;

Potential Receptors	Predicted Changes and Potential Effects	Proposed Measures
		- Topsoil stockpiles should not exceed 4 m in height and subsoil stockpiles should not exceed 5 m in height. However, if the soil to be stockpiled is dry, formation of higher stockpiles may be permissible, if required, as the soil is likely to remain dry in the core of the stockpile for the entire storage period. However, the appropriateness of higher stockpiles will need to be established on a location-by-location basis; - Upon the placement of soils into stockpiles has been completed, rainfall and soil moisture conditions are of lesser importance, providing they do not lead to erosion resulting in a loss of the soil resource and potentially a change in soil composition if fine material is lost leaving a greater proportion of stones. Stockpile erosion can also result in significant environmental impacts, such as discharges of sediment laden for pathways that could be susceptible to local receptors (roads, drainage systems and surrounding land); - Locations and footprints of each stockpile will be accurately recorded on a plan of appropriate scale by the Contractor(s). Marker posts will need to be provided in locations which have been surveyed and recorded (this should also occur if further soil surveys are required); - Plant and machinery only work when ground or soil surface conditions enable their maximum operating efficiency (i.e., when machinery is not at risk of being bogged down or skidding causing compaction or smearing); - All plant and machinery must always be maintained in good working condition to ensure that the soil is stripped correctly, for example to ensure that the depth of the strip can be accurately controlled, and to minimise the risk of contamination through spillages; - The size of the earthmoving plant to be used should be tailored to the size of the area to be stripped and the space available within the working area; and, - If any soil or aggregate materials are imported as part of the construction, the materials should be subject to sampling and analysis to ensure it is suitable for its intended use from an environmental risk and waste management perspective. This process should be fully documented.
Materials Management	Management of soils on-site	Best Practice Construction Methods: Import, export (not anticipated) and reuse of material generated on-site will be undertaken in line with the requirements of the CL: AIRE Definition of Waste: Development Industry Code of Practice (version 2). No soils are expected to be generated that cannot be re-used on the Site. Any soils that cannot be re-used will be taken off site and disposed of in line with current waste disposal guidance. Further details will be included in the detailed CEMP produced by the appointed contractor. Refer to Appendix B for the oSWMP.

Water Environment

Potential Receptors	Predicted Changes and Potential Effects	Proposed Measures
Anthropogenic and ecological receptors	Construction activities lead to increased surface water flows resulting in an increased flood risk for sensitive receptors on and off-site	Best Practice Construction Methods: The Site will employ best practice construction methods with respect to managing surface water run-off. These will include, as a minimum: • Installation of surface water management techniques to control runoff based on Rural Sustainable Drainage Systems ('RSuDS'); • Installation of drainage measures within the temporary construction compound. This includes the installation of aggregate underlain by a permeable membrane which will be decommissioned before the operational phase of the development is implemented; • Permeable surfaces will be implemented where possible, with new access tracks to comprise permeable surfaces (e.g., Type 2 aggregate); • The grounds surrounding and between the solar panel arrays will be planted with native species rich grassland and wildflower mix which will act as dripline planting, this will limit possible channelisation from surface water from solar panel arrays and promote interception and infiltration potential throughout the Development; and, • Given the limited impermeable areas (e.g., substation and inverters) it is proposed that surface water management measures will be utilised to promote the interception and storage of surface water local to the impermeable infrastructure (e.g., bounded by permeable aggregate).
Anthropogenic and ecological receptors	Construction activities lead to increased surface water flows resulting in an increased need for drainage on the Site.	Best Practice Construction Methods: Drainage from the Site will include elements of RSuDS design as mentioned above, where appropriate. RSuDS replicate natural drainage patterns and have a number of benefits: • RSuDS will attenuate run-off, thus reducing peak flow and any flooding issues that might arise downstream; • RSuDS will treat run-off, which can reduce sediment and pollutant volumes in run-off before discharging back into natural drainage network; and, • In addition, any installed drainage management system, where necessary, will be implemented to avoid any surface water run-off to public roads.
		Drainage for permanent or semi-permanent earthworks is required to control surface water run-off and discharge to appropriate outlets. Best practice earthworks drainage measures include: • Drainage ditches; • Sumps; and, • Culverts. Prior to temporary access track and earthwork construction, site operatives will identify flush areas, depressions or zones which may concentrate water flow so that site drainage design will maintain hydrological connectivity.

Potential Receptors	Predicted Changes and Potential Effects	Proposed Measures
		All earthworks will have a gravity drainage system and all water will drain to an adequately sized sump. If dewatering of excavations is necessary, wastewater will be treated using the aggregate sub-base, further details are provided in Appendix B. Trackside drainage ditches are to be constructed parallel to the access track and follow the same gradient as the access track. <i>Image example of a trackside drainage ditch and cross drainage culvert.</i>  Water within channels should be allowed to flow and should not be stagnant, and tracks should be free from standing water through inclusion of camber or cross-fall. Sustainable drainage systems such as swales with vegetated channels are preferential and will be designed to intercept, filtrate and convey run-off.
		Sediment and drainage management: The use of soil stockpiles will be minimised by earthworks planning. However, where stockpiles are used, silt fences and silt mats will be employed to minimise sediment levels in run-off. All stockpiled material will be stored at least 50 m from watercourses in order to reduce the potential for sediment to be transferred into the wider surface water system and will be regularly inspected to ensure that erosion of the material is not taking place. Stockpiles must be regularly monitored for holes, and they should also be fenced to ensure that they do not attract badger activity. <i>Image example stockpile and drainage ditch</i>

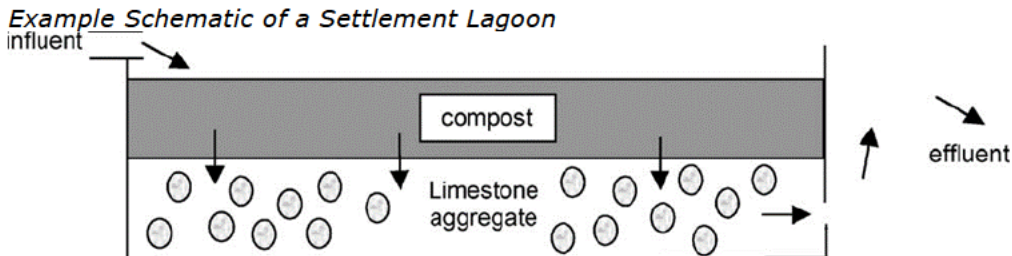
Potential Receptors	Predicted Changes and Potential Effects	Proposed Measures
		 Water polluted by sediments are not allowed to leave the site untreated and the final discharge from the site must have acceptable levels of sediment (in line with baseline levels). The contractor will work under a wet weather working policy during construction. Works that could mobilise sediments and impact the water environment would be stopped during heavy precipitation events. Silt traps may be utilised to trap and filter sediment-laden run-off from excavation works at the Site, including foundations for the sub-station, temporary construction compounds and temporary access tracks. Silt traps and matting are to be installed at the following locations: • Within drainage ditches but will be sited to avoid slopes with a gradient greater than 1 in 20; • At the inlet (sump) or outlet side of culverts; and, • At the outfall of settlement lagoons to filter sediment during times of heavy rainfall as shown in the image example below. <i>Example image of silt matting combined with silt fencing</i>

Potential Receptors	Predicted Changes and Potential Effects	Proposed Measures
		 Silt fences are to be used as perimeter controls on the site at the downslope end of earthworks or disturbed soils. They should be used in conjunction with other sediment and water treatment solutions where required. To comply with best practice, they should be installed as follows: • Installed perpendicular to the gradient of the slope; • Construct a trench on the up-gradient side; • Install stakes on the down-gradient side; and, • Position with a curve to the end of the fence in the up-gradient direction to help capture surface run-off. Silt fences should not be installed in the following: • Within drainage ditches or channels; and/or, • Running parallel to the direction of slope.

Potential Receptors	Predicted Changes and Potential Effects	Proposed Measures
		Silt fencing will be monitored by the ECoW and should be cleared regularly of sediment and silt build-up, and after heavy rainfall and storm events. Silt fencing will should be replaced, when necessary, as monitored by the ECoW. <i>Example image of typical Silt Fencing</i>  Settlement lagoons allow for contaminated water to be retained to allow for the settlement of silt and sediments to an acceptable level prior to discharge to the water environment. They will be implemented where appropriate and take the form of large trenches dug into the ground and are often bunded. To avoid harm to wildlife, strong, badger-proof, fencing must be used around any lagoons to prevent animals from entering and drowning. Settlement lagoons should be installed so as to retain water long enough for silt to settle out. The length of time required will depend on the type of silt with finer silts and clays taking longer to settle. Further measures may include the use of flocculent to further facilitate the settlement of suspended solids. The appropriateness of flocculent use must be discussed with Natural England and the Environmental Agency prior to its introduction into settlement lagoons. Flocculants can be pollutants if the incorrect dosage is used.

Potential Receptors	Predicted Changes and Potential Effects	Proposed Measures
		To comply with best practice, they should be installed as follows: • Install energy dissipation methods (e.g., rip-rap) at the inlet to minimise flow; • Install inlet pipe work vertically to dissipate energy of flow in; • Install a lined inlet chamber and outlet weir with materials such as geotextiles; • Install a long outlet weir; and, • Install two or three lagoons in a series to increase silt retention and storage as shown in the example image below. Settlement lagoons should be inspected regularly by the ECoW to ascertain the functionality of the system. Settlement lagoon outflow discharge may be pumped, when required, for maintenance purposes. A 'Siltbuster' is a method of pumping excess silt-laden water and treated prior to discharge. Any pumping activities will be supervised and authorised by the Principal Contractor's Project Manager. <i>Example Image of a settlement lagoon</i> 

Potential Receptors	Predicted Changes and Potential Effects	Proposed Measures
		Best Practice Construction Methods: Foundations and linear infrastructure such as roads, tracks and trenches can disrupt groundwater flow. If carried out in close proximity to GWDTE, construction activities can have adverse effects on these receptors. Measures to protect GWDTE are based on mitigation and good practice, similar to those outlined already in this document, as well as avoidance of GWDTE habitats during design. The following measures will ensure that water quality and the flow supply of groundwater and near-surface water are maintained during the construction and operational phase of the Development. Key measures include: • Silt traps may be deployed to trap and filter sediment-laden run-off throughout the construction phase of the Development; • Settlement lagoons may be constructed and actively managed to control water levels and ensure that any runoff is contained, especially during times of rainfall. The location and management of the settlement lagoons is essential and will not be sited within vulnerable wetland areas where they may cause drying out and direct loss of habitat; • Flush areas, depressions or zones which may concentrate water flow, will be identified in advance of construction and a suitable drainage design shall be developed to address each location, to ensure hydraulic connectivity; • Site drainage design will avoid any severance of saturated areas to ensure hydrological connectivity is maintained. Site drainage design will be produced in advance of construction; • The length of time excavations is kept open, and the duration of any dewatering will be minimised; • All excavations will be sufficiently dewatered before concrete pours begin and that dewatering continues while the concrete cures. However, construction good practice will be followed to ensure that fresh concrete is isolated from the dewatering system; and, • Water from dewatering activities is generally treated by settlement lagoons and will be discharged onto vegetated surfaces, ensuring no net loss of water from the hydrological system. If ponding of water is observed during the discharge onto vegetated surfaces, additional measures may be employed.
Anthropogenic and ecological receptors	Groundwater Dependant Terrestrial Ecosystems (GWDTEs)	Dewatering may be required for excavations or construction of foundations. Based on the information provided within the Flood Risk Assessment, it is unlikely the excavations being carried out as part of this development will encounter groundwater. Should groundwater be encountered, and dewatering is required, water will be pumped into settlement lagoons for treatment and discharged onto vegetated surfaces. Temporary dewatering from excavations to surface water: RPS 261, from the Environment Agency should be followed for all dewatering activities. Discharge of water as a result of dewatering must not cause further erosion and energy dissipation measures should be put in place.

Potential Receptors	Predicted Changes and Potential Effects	Proposed Measures
		Dewatering must consider the impact on other groundwater abstractions and groundwater dependent terrestrial ecosystems (GWDTE). Further information on the protection of GWDTE are provided above. Settlement lagoons may also be constructed with a composting layer also allow for the treatment of any ochre water before being discharged into the hydrological system. A schematic diagram is displayed below: <i>Example Schematic of a Settlement Lagoon</i> 
Water Environment	Dewatering excavations construction foundations for or of	Control of Foul Water: The Site will use serviced 'porta loo' type facilities to manage the generation of foul water on on-site. These facilities will be situated away from any sensitive receptors on and off site and will be emptied at appropriate intervals.
Water Environment	Watercourse Crossings	The crossing of watercourses is to be avoided in the design where possible. Existing culverts and watercourse crossings may be upgraded and anticipated to be replaced with suitable pre-cast culvert designs. Identification of ecological requirements and limiting factors (e.g., breeding birds and fish spawning) should be conducted prior to installation of a watercourse crossing. The ECoW should be consulted before watercourse crossing construction can commence. The hydraulic capacity of the crossing is to be assessed and constructed peak river flow plus a climate change allowance. The EA peak river flow climate change allowances indicate the Don and Rother Management Catchment has a central allowance of 28% for developments with a lifespan into the 2080s. Watercourse crossings should not be installed in 'active' areas of a watercourse (e.g., meandering bends and depositional areas). Consideration should be given to the type of watercourse crossing acknowledging that hard engineering structures, such as concrete culverts, can make it more difficult to restore a site or decommission temporary structures (e.g., access tracks). Bottomless arched culverts will be used for the small-scale crossings.

Potential Receptors	Predicted Changes and Potential Effects	Proposed Measures
		The use of in-situ fresh concrete in the construction of watercourse crossings will be avoided where possible by the use of pre-cast elements. Watercourse crossings will be installed perpendicular to the direction of flow. In accordance with best practice guidance, each watercourse crossing shall be designed on a case-by-case basis to be appropriate for the width of watercourse being crossed, and the prevailing ecological and hydrological situation (i.e., the sensitivity of the watercourse). A number of factors, both environmental and engineering will influence the selection of structure type and the design of the crossing: • The use of appropriate structures to carry access tracks across watercourses taking into account the scale of the watercourse, ecological value, sensitivity to construction activities, topography and construction methodology; • There is a preference to avoid construction in watercourses altogether through the use of arch culverts appropriately designed not to impede the flow of water and allow safe passage for wildlife, such as fish, water voles, otters etc; • When installing culverts, care will be taken to ensure that the construction does not pose a permanent obstruction to migrating species of fish, or riparian mammals (i.e. the crossings will make provision for fish and wildlife migration); • Culverts should be sized so that they do not interfere with the bed of the stream post construction, (i.e., the crossings will leave the watercourse in as natural condition as possible or permit re-establishment of substrate post construction); • Single culverts will be used in preference to a series of smaller culverts that may be more likely to become blocked with flotsam and create erosion (i.e., the crossings will not constrict the channel); • To minimise impacts on the breeding of any fish found, any in-stream works in these areas will be conducted during in the in-rover working window of the 15th of June to 30 September to avoid the fish spawning season, where possible; • Ease and speed of construction are important to minimise disruption to the watercourse and surrounding habitat; • Culverts and headwalls should be designed to last the operational life of the Development; • Designs should be low maintenance and where possible self-cleansing; and, • Structures should be visually in keeping with the surroundings. Erosion to the bed and banks at a watercourse crossing as a result of scouring during high rainfall and storm events. Erosion can expose span structure foundations and/ or cause a drop forming at the outlet of the watercourse crossing. If this occurs, the inclusion of erosion protection measures may be required, such as baffles. The crossing should be reinstated and reinforced to allow for scour during higher flows. The crossing should be reinstated to allow for fish passage and continuity of the watercourse bed. If this is not possible, inclusion of a fish pass will be required.

Potential Receptors	Predicted Changes and Potential Effects	Proposed Measures
Water Environment	Contamination of nearby watercourses, and/or flooding impacting upon the functioning of Site infrastructure.	Parts of the Site have been identified as sitting within Flood Zones 2 and 3 and are therefore at risk of flooding. A Flood Risk Assessment (FRA) will be submitted alongside this oCEMP which will detail mitigation measures that will be put in place to avoid negative impacts on local watercourses, and to prevent flood water from impacting upon the functioning of Site infrastructure, as well as providing greater detail to the other potential hydrological issues and mitigation measures described above.
Waste		
All	Construction activities lead to generation of construction waste which negatively impacts on and off-site receptors	Best Practice Construction Methods: The Site will comply, where possible, with the waste hierarchy in the management of waste arising as a result of construction activity. The hierarchy stipulates elimination, reduction, re-use, recycling and finally disposal. The detailed design will inform more detailed, site-specific measures however it is anticipated that these measures will include: • Identification of types of waste that might be generated and responsibility for management; • Implementation of waste minimisation strategies; • Implementation of re-use and recycling strategies; • Set-up of waste disposal facilities; and, • Monitoring, auditing and reporting of waste on- site.

4. DECOMMISSIONING

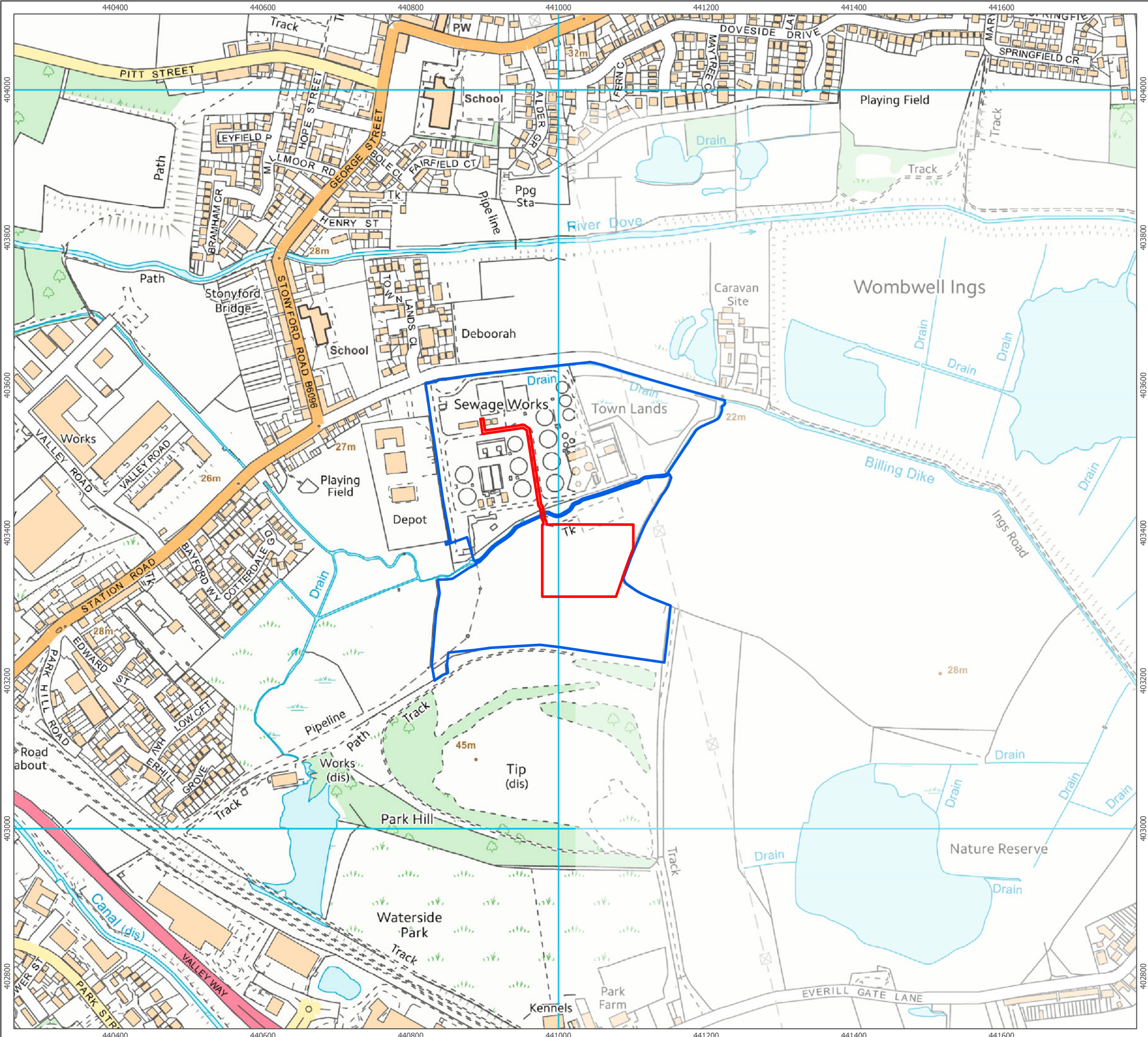
A Decommissioning and Restoration Plan will be provided prior to the commencement of decommissioning.

Decommissioning activities will be undertaken in accordance with best practice at the time and agreed with the relevant consultees in advance of the works commencing.



APPENDIX A SITE LAYOUT PLAN

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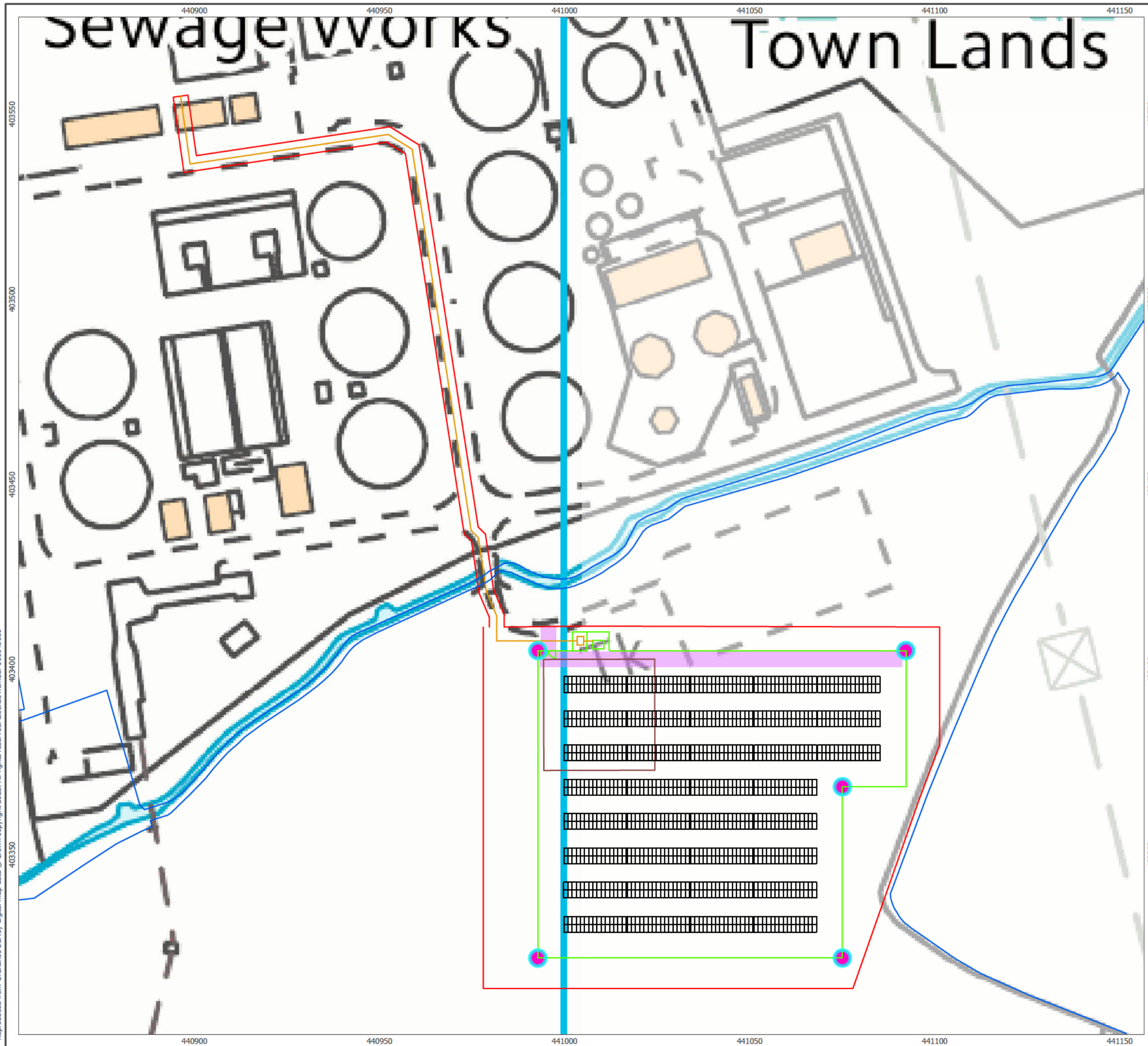
- Landownership Boundary
- Site Boundary

1:5,000 Scale @ A3
0 100 200 m
NORTH

Produced By: HT	Ref: 5208-REP-102
Checked By: JL	Date: 18/04/2023

Location Plan (Wombwell)
Figure 1

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- Site Boundary
- Landownership Boundary
- Proposed Access Road
- Temporary Construction Compound
- CCTV
- Cable Route
- Solar PV Module
- Fence

1:1,000 Scale @ A3

0 25 50 m

NORTH

Produced By: HT	Ref: 5208-REP-101
Checked By: JL	Date: 18/04/2023

Site Layout (Wombwell)
Figure 2

Yorkshire Water Solar Portfolio
CoLD Application Letter



APPENDIX B PEA REPORT



Project: Solar PV Site Screening Project

Site: Site 44 –Wombwell Treatment Works

Survey: Preliminary Ecological Appraisal Report

Client: Yorkshire Water

Reference: 084_19_44_RE01
Date Submitted: 4th November 2020
Version: V1



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Table of Contents

1	SUMMARY.....	4
2	INTRODUCTION.....	6
2.1	Background to Development.....	6
2.2	Objectives.....	6
2.3	Agreed Brief.....	6
3	METHODOLOGIES	7
3.1	General	7
3.2	Desk Study	7
3.3	Phase 1 Habitat Survey	7
3.4	Faunal Surveys	7
3.5	Impact Assessment.....	9
3.6	Limitations.....	9
4	RESULTS AND IMPACTS	10
4.1	Desk Study	10
4.2	Phase 1 Habitat Survey	11
5	RECOMMENDATIONS	19
5.1	General	19
5.2	Statutory and non-Statutory Sites	19
5.3	Habitats and Faunal Species	19
5.4	Optional Site Enhancements.....	22
6	REFERENCES.....	23
6.1	Cited References	23
7	FIGURES	25
7.1	Figure 1 – Site Location and Desk Study Results.....	25
7.2	Figure 2 – Phase 1 Habitat Map.....	25
7.3	Figure 3 – Photographs	25
8	APPENDIX 1 - IMPACT ASSESSMENT CRITERIA.....	26
9	APPENDIX 2 – HSI RESULTS.....	28

1 Summary

1.1.1 This PEA report has been produced to inform the development of ground-mounted solar photovoltaic (PV) panels at Yorkshire Water's Wombwell Treatment Works. Table 1 below highlights the constraints identified and the actions required.

Table 1 - Summary

Factor	Constraint Risk		Recommended Action
	Presence confirmed on site	Potential presence on site	
Sites of Nature Conservation Interest	On site	Within 2km	
Statutory sites	NO	NO	-
Non-statutory sites	NO	YES	-
Botany			
Biodiversity Action Plan (BAP) Habitat	YES	-	Grassland, hedgerows, running and standing water – avoid impacts to these habitats where possible, replacement and/or enhancement required if significant areas lost. Avoid works within 5m of the drain if possible. Pollution prevention methods should be in place.
Invasive non-native species (INNS)	NO	YES	If work is required within 5m of the drain an updated INNS survey should be conducted.
Faunal species			
Badger	NO	YES	Further survey if work required within 30m of dense scrub. Precautionary mitigation.
Bats	NO	YES	Further survey (bat activity survey of low potential buildings and daytime scoping assessment of trees if impacted). Precautionary mitigation
Birds	NO	YES	Vegetation removal should take place outside the breeding bird season (or after a check by a suitably qualified ecologist).
Great crested newts	NO	NO	No action required
Otter	NO	YES	Ideally no works within 5m of the drain. Ecological watching brief during removal of scrub.
Reptiles	NO	YES	Recommended that works take place during active period for reptiles, therefore avoiding winter and periods of excessive wet weather in order to avoid killing/injury of reptiles and to minimise the impact to habitats. Two-stage vegetation clearance (outside breeding bird season) and removal of all arisings
Water vole	NO	YES	Water vole survey to be carried out by a suitably qualified ecologist should the drain be directly impacted by the proposed works.
White-clawed crayfish	NO	UNLIKELY	No action required
Migratory and coarse fish	NO	YES	See general below.
BAP species	NO	YES	Amphibians, brown hare, hedgehogs and invertebrates. See general below.
General			
General actions which cover multiple botanical and faunal factors	- Ideally avoid removal of trees, hedgerow, dense scrub and the drain. - If tree removal is required additional tree planting should be considered. - Protect retained trees/hedges in line with BS:5387 (2012) guidelines - Site panels at least 3-4m from the site boundaries and 5m from watercourses where possible. - Security fencing (if required) should ideally allow a 20-30cm gap around the base to allow the passage of mammals - Excavations left open overnight should have a means of escape for trapped fauna, open pipework should be capped over night.		

	• Avoid night working and using security lighting during construction phase if possible. If lighting is required mitigation should be implemented to reduce the impacts to faunal species. • Avoid long-term security lighting where possible, reduce light spill onto boundaries if lighting is required. • Any scrub/tall ruderal to be removed should be cut in stages. • Habitat piles to removed by hand. • Pollution prevention methods should be in place during the development to avoid polluting the waterbodies within and surrounding the site. The Environment Agency's Pollution Prevention Guidelines should be consulted.
Biodiversity net gain	• Creating a 'scrape' within the grassland would complement the habitats in the wider landscape and provide habitat for a wider range of fauna; • Planting trees along boundaries would be beneficial for this open site, particularly along the eastern boundary in the southern half of the site. • Planting climbers up the security fencing would provide additional habitat for foraging bats and nesting birds. • Provision of bird and bat boxes on the buildings and trees.

1.1.2 In conclusion, the development of this site for solar panels could be undertaken with minimal impacts to habitats and faunal species. The area of semi-improved grassland/tall ruderal to the south of the TW is considered to be the preferential location on an ecological basis, as the grassland could be retained and managed appropriately under the solar panels and this is the largest habitat type on the site. However, this option would pose the problem of potentially requiring disturbance of the drain for connecting cables. In comparison, development on the triangle of land to the east of the TW would require permanent loss of trees and scrub, which are rarer habitats on this site.

1.1.3 Further survey work may be required depending on the location of the panels and connecting infrastructure. However, there is also potential for enhancements of the existing site that could provide a biodiversity net gain in the long-term.

2 Introduction

2.1 Background to Development

- 2.1.1 Yorkshire Water are considering the use of solar photovoltaic (PV) panels at sites across Yorkshire. It is proposed that the land at these sites is leased to external companies and therefore preliminary surveys are proposed to understand the potential risks prior to bidding.
- 2.1.2 Wombwell Treatment Works (TW) is being considered as a potential location for the PV panels and it is the focus of this ecology report. The area of land under consideration at Wombwell TW (hereby referred to as 'the site') is located at Ordnance Survey grid reference SE 40939 03519, as illustrated on Figure 1.
- 2.1.3 The proposal (hereby referred to as 'the development') involves construction of a 0.89ha (2.2a) 271kW solar PV installation on the 11.87ha site. Further details on the development, including construction and operational running and maintenance, are un-known at this stage

2.2 Objectives

- 2.2.1 The purpose of this report is to identify any ecological constraints to the installation and running of solar PV panels at Wombwell TW. The assessment therefore sought to classify habitats within the site, establish the presence or likely absence of species protected by European/UK legislation and policy, establish the value of the species/habitats identified, assess the potential impacts, and likely further surveys or mitigation required.

2.3 Agreed Brief

- 2.3.1 BL Ecology was commissioned to undertake a preliminary ecological appraisal of the site. The agreed brief was to:
- Undertake a desk study to ascertain protected species and nature conservation sites known within 2km of the site;
 - Complete a Phase 1 habitat survey of the areas likely to be affected by works;
 - Assess the habitat suitability for protected and BAP species; and
 - Submit a report with associated mapping, outlining the likely mitigation for the site including the need for additional surveys.

3 Methodologies

3.1 General

3.1.1 A survey area was defined which is shown on Figures 1 and 2 (hereafter named 'the site'). The walkover was undertaken on 21st May 2020 by Jennifer Clarke (MCIEEM), who has been an ecologist for 15 years and holds Natural England survey licences for great crested newts, bats and hazel dormice.

3.1.2 This chapter describes the methodologies involved for each stage of the assessment. Standard stages undertaken for this type of assessment include a desk study, a Phase 1 Habitat Survey, and an assessment of habitats available for the presence of protected faunal species. This methodology follows the CIEEM 'Guidelines for Preliminary Ecological Appraisal' (December 2017).

3.2 Desk Study

3.2.1 A standard 'study area' was defined which encompassed an area up to 2km from the site. The following sources were used in order to provide data:

- Protected sites and notable/protected faunal records from Yorkshire Water's data agreement with relevant local record centres;
- Multi-Agency Geographic Information for the Countryside (MAGIC) (www.magic.gov.uk) – to ascertain whether there are any statutory sites designated for nature conservation any recently granted (since 2009) European Protected Species (EPS) licences within 2km of the site; and
- Aerial photos – in order to aid preliminary ecological and overall assessment of the site.

3.3 Phase 1 Habitat Survey

3.3.1 A walkover survey was undertaken in accordance with Phase 1 Habitat Survey Guidelines (JNCC, 2010). This methodology provides a standard technique for classifying and mapping habitats. The approach is based upon differentiating between various vegetation and other topographical and substrate features such as watercourses. Each habitat type is described in terms of size, condition, and characteristic plant species present. Phase 1 Habitat maps are produced to illustrate the results and target notes are used to provide further information on habitat features of particular or potential interest.

3.3.2 All animal and plant names are referred to in the text under their common names and scientific names. All nomenclature for vascular plants follows Stace (1997). Floral diversity and broad NVC of plant communities has been recorded wherever possible.

3.3.3 Any plant species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) that may be present, particularly Japanese knotweed (*Fallopia japonica*), giant hogweed (*Heracleum mantegazzianum*) and Himalayan balsam (*Impatiens glandulifera*), have been recorded and mapped.

3.4 Faunal Surveys

Badger Presence/Absence Survey

3.4.1 Badgers can be found on a variety of habitat types. They generally prefer to create setts in undisturbed areas and within topography that is sloped. Preferred habitats for foraging include woodlands and grassland (Woods, 1995). The site was searched for any signs of

badger presence. Signs searched for included entrance holes (setts), dung pits, hair, footprints, badger footpaths, scratching posts, and snuffle holes.

Bat Survey

Daytime Inspection for Signs of Roosting Bats

- 3.4.2 The survey included the buildings (B1-B10) within the TW site; the exterior walls, the floor, windows and ledges of the buildings were assessed for signs of roosting bats using binoculars and a high-powered torch. No trees were assessed at the time of this survey.

Daytime Inspection for Bat Roost Potential

- 3.4.3 An assessment was also made of the potential for buildings B1-B10 to support bats at other times of year. Features searched for within buildings included cracked, missing or loose roof tiles, gaps in soffits, fascias or barge boards, gaps in brickwork, the presence of a cavity wall, access into the eaves, access under the ridge tiles, and any other crack or gaps at least 10mm in size.
- 3.4.4 The buildings were then awarded a level of potential to support roosting bats in summer, the breeding period, transitionally and in winter. The level of potential is defined by the presence of suitable roosting features together with the locality, environmental conditions, age and proximity to suitable bat foraging habitat. The levels of potential are defined below:
- **Negligible** – Building with no roosting potential and located in poor bat foraging habitat;
 - **Low** – Building with limited roosting potential with limited suitable bat foraging habitat. No suitability for breeding and/or hibernating bats;
 - **Moderate** – Building with some roosting potential of varying types and sizes, connected to some optimal bat foraging habitat. Some suitability for breeding bats and/or hibernating bats;
 - **High** – Building with multiple potential roosting cavities of varying types and sizes. High suitability for breeding bats and/or hibernating bats and connectivity to a range of optimal bat foraging habitats; and
 - **Confirmed roost** – Presence of droppings found internally, underneath roost access points or the presence of bats confirmed.

Breeding Bird Habitat Assessment

- 3.4.5 Nesting sites for birds depends on the species involved and can be created within structures (buildings, bridges, cliffs etc.), trees, shrubs, within ground vegetation and on bare ground, providing that suitable foraging habitat is adjacent. Habitats within the site were assessed for their suitability for breeding birds.

Great Crested Newt Habitat Assessment

- 3.4.6 Great crested newts require standing water on the site or on adjacent land. Any ponds within 250m of the site were considered. Three ponds were identified to the north of the site (P1-P3), all of which were assessed via the calculation of a Habitat Suitability Index (HSI) in line with the procedure set out by Oldham *et al.* (2000). The HSI is a quantitative assessment of the capacity of a water body to support great crested newts. Ten key suitability indices (SI) are used, and it is assumed that population size is determined by habitat suitability. The indices include criteria such as pond location, size, desiccation rate, water quality, shade, number of waterfowl and fish, number of other ponds within 1km, the quality of the surrounding terrestrial habitat, and the level of macrophyte cover in the pond.
- 3.4.7 The SI scores are expressed as a value between 0 and 1. They are used to calculate the HSI of the water body as a geometric mean, using the equation: $HSI = (SI1 * SI2 * SI3 * SI4 * SI5 * SI6 * SI7 * SI8 * SI9 * SI10)/10$. The final HSI is expressed as a single number

between 0 and 1, representing a completely unsuitable habitat or a completely suitable habitat for great crested newts respectively.

- 3.4.8 Due to the suitability of the waterbodies on the TW site to support great crested newts, eDNA samples were taken from selected waterbodies (P1-3) on 24th June 2020 by James Walker, who is a licensed newt surveyor (2020-47845-CLS-CLS) and Jacob Birkenhead, using kits provided by SureScreen Scientifics. Samples were taken following the technical advice note WC1067, as approved by Natural England. Samples were then returned to SureScreen Scientifics for analysis.

- 3.4.9 Great crested newts require different habitats at different times of the year; the site was searched for terrestrial habitat most suitable for newts including scrub, unimproved grassland, woodland and gardens (Oldham *et al.*, 2000).

Otter Habitat Assessment

- 3.4.10 Otters require freshwater habitat in the form of standing or running water. The water must contain prey species, such as fish, crustaceans or amphibians. Suitable riparian habitat is required that can support resting sites and natal dens, the latter of which are created within secure, undisturbed sites such as within exposed tree roots adjacent to the water, or within disused rabbit entrances. Habitats within the site were assessed for their suitability for otters.

Reptile Habitat Assessment

- 3.4.11 The habitat requirements of this group depend on the species involved. The most likely species to be encountered in the UK are common lizard (*Zootoca vivipara*), grass snake (*Natrix natrix*), slow worm (*Anguis fragilis*) and adder (*Vipera berus*). Reptiles require a heterogeneous habitat with different vegetation types and structures, including bare ground patches for basking. Habitats within the site were assessed for their suitability for reptiles.

Water Vole Habitat Assessment

- 3.4.12 This species requires freshwater habitat that has a relatively stable water level. Undisturbed riparian habitat is required that has an abundance of vegetation species such as grasses and rushes that provide both cover from predators and act as a food source (Strachan, 2011). Habitats within the site were assessed for their suitability for water voles.

White-Clawed Crayfish Habitat Assessment

- 3.4.13 This species of crayfish requires calcareous streams with an abundance of suitable refuges, such as a rocky substrate, tree roots and leaf litter (Holdich, 2003). Habitats within the site were assessed for their suitability for crayfish.

3.5 Impact Assessment

- 3.5.1 A preliminary impact assessment of the proposed development was undertaken following the 'Guidelines for Ecological Impact Assessment in the UK and Ireland (Second Edition, 2016)' by the Chartered Institute for Ecology and Environmental Management. Further details of the assessment methodology are provided in Appendix 1.

3.6 Limitations

- 3.6.1 The data collected and presented within this report is considered valid for a period of two years, after which update surveys are likely to be required to re-assess the conditions.
- 3.6.2 A full badger survey was undertaken whilst on site but there were some areas of dense scrub that could not be accessed. The trees were also not assessed for their bat roosting potential as part of this survey and no access was gained into the internal of the buildings. Further survey may be required if these are likely to be impacted.

4 Results and Impacts

4.1 Desk Study

4.1.1 Table 2 below provides the results of the faunal data search, which are mapped onto Figure 1.

Table 2: Faunal Data Search Results

Faunal Group/Species	Records on Site	Records within 500m	Records within 2km
Amphibians	None	None	None
Badgers	None	None	None
Bats	None	12 records consisting of common pipistrelle (<i>Pipistrellus pipistrellus</i>), noctule (<i>Nyctalus noctula</i>) and soprano pipistrelle (<i>Pipistrellus pygmaeus</i>).	Six records consisting of common pipistrelle, noctule (and soprano pipistrelle).
Birds	One record of Redwing (<i>Turdus iliacus</i>).	14 records consisting of Sch1 ¹ species of redwing, kingfisher (<i>Alcedo atthis</i>), avocet (<i>Recurvirostra avosetta</i>), greenshank (<i>Tringa nebularia</i>), barn owl (<i>Tyto alba</i>), and fieldfare (<i>Turdus pilaris</i>), as well as the BoCC ² amber list species green sandpiper (<i>Tringa ochropus</i>) and goldeneye (<i>Bucephala clangula</i>).	43 records consisting of Sch1 species kingfisher, avocet, greenshank, barn owl, fieldfare, merlin (<i>Falco columbarius</i>), little ringed plover (<i>Charadrius dubius</i>), hobby (<i>Falco subbuteo</i>), garganey (<i>Anas querquedula</i>), bittern (<i>Botaurus stellaris</i>) and spoonbill (<i>Platalea leucorodia</i>). Also, BoCC amber list species green sandpiper, goldeneye, and pintail (<i>Anas acuta</i>).
Otters	None	Three records of Eurasian Otter (<i>Lutra lutra</i>).	11 records of Eurasian otter.
Reptiles	None	Seven records consisting of grass snake (<i>Natrix natrix</i>) and adder (<i>Vipera berus</i>).	Two records of grass snake.
Water Voles	None	Six records of European water vole (<i>Arvicola terrestris</i>).	59 records of European water vole.
Fish	None	None	None
Crustaceans	None	None	None
Invertebrates	None	None	None
Floral invasive non-native species	None	32 records consisting of Himalayan balsam (<i>Impatiens glandulifera</i>), New Zealand pigmyweed (<i>Crassula helmsii</i>), giant hogweed (<i>Heracleum mantegazzianum</i>), Japanese knotweed (<i>Fallopia japonica</i>) and Canadian goldenrod (<i>Solidago canadensis</i>).	84 records consisting of Himalayan balsam, New Zealand pigmyweed, giant hogweed, Japanese Knotweed, Canadian Goldenrod, nuttall's waterweed (<i>Elodea nuttallii</i>), Japanese rose (<i>Rosa rugosa</i>), Canadian waterweed (<i>Elodea canadensis</i>), water fern (<i>Azolla filiculoides</i>), rhododendron (<i>Rhododendron ponticum</i>), Turkey oak (<i>Quercus cerris</i>), evergreen oak (<i>Quercus ilex</i>) and false-acacia (<i>Robinia pseudacacia</i>).

¹ Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), which places additional protection against disturbance, either during the breeding season or during the close season.

² Eaton et al. (2015) Birds of Conservation Concern 4 - reviewed every five years and placed into one of three lists, red, amber or green according to their level of conservation concern

- 4.1.3 Table 3 below provides a list of all protected nature conservation sites within 2km of the site and the potential impact from the installation of phosphorus removal improvements. It should be noted that the impacts are not fully known at this stage.

Table 3: Nature Conservation Sites within 2km

Receptor	Details	Impact	Legislation (if relevant)
Statutory Nature Conservation Sites			
There are no Statutory Nature Conservation Sites within 2km of the site, but the site does fall within a SSSI Impact Risk Zone			
SSSI Impact Risk Zone of Denaby Ings SSSI	9km east of the site, designated due to its lowland fen, marsh, and swamp habitats.	The proposed development is unlikely to pose a risk to this SSSI due to the distance from the site, lack of connectivity, and dissimilar habitats, and the nature and scale of the development does not match the development descriptions likely to cause a risk to this SSSI.	Wildlife and Countryside Act 1981 (as amended)
Non-Statutory Nature Conservation Sites			
There are 5 Non-Statutory Nature Conservation Sites within 2km of the site			
Parkhill Nature Reserve LWS	Immediately south-west of the site, designated due to comprising scrub, grassland, inundation vegetation, open water and reedbed. Former brickworks.	Depending on the location of the development there may be indirect impacts such as dust, light, noise, and chemical pollution.	Barnsley Local Plan
Broomhill Flash and Wombwell Ings LWS	0.06km west of the site (at the closest point), designated due to comprising grassland and open water.		
Gipsy Marsh LWS	0.7km south-east of the site, designated due to comprising scrub, heathland, grassland, marsh, standing water and running water. Managed by the RSPB.	No anticipated impacted due to the distance from the site and lack of connectivity.	
Old Moor and Wath Ings LWS	1.1km south-east of the site, designated due to comprising grassland, inundation vegetation, standing water and reedbed. Managed by the RSPB.		
Houghton Marsh LWS	1.7km north-east of the site.		

4.2 Phase 1 Habitat Survey

- 4.2.1 Habitats found during the Phase 1 Habitat Survey are shown on Figures 2 and 3. All are common habitats found across the UK, with no rare flora or communities recorded during the survey. Table 4 below details the habitats found on the site and consideration of the faunal groups/species that could be present. An indication of the potential impacts has been provided; however, this is only outline at this stage and should be reassessed once the plans for the site have been formulated.

- 4.2.2 The site is 11.87ha in size, split into three distinct zones:

- The main TW comprised amenity grassland with hard standing and bare ground around the site infrastructure;
- To the south was an area of semi-improved neutral grassland and tall ruderal, with small areas of dense scrub and hard standing, plus scattered trees around the boundaries. This was separated from the main TW by a watercourse;
- To the east of the TW was a smaller area of semi-improved grassland with tall ruderal, scrub and semi-natural broad-leaved woodland.

Table 4: Survey Results and Potential Impacts

Receptor	Details	Potential Impact	Legislation (if relevant)
Habitats			
Semi-natural broad-leaved woodland	0.10ha present. Small patches of woodland present in the north-east of the site. Species included hawthorn (<i>Crataegus monogyna</i>), silver birch (<i>Betula pendula</i>) and goat willow (<i>Salix caprea</i>) (See Figure 3, Photograph 1).	Potential loss of trees. Root compaction leading to the death of trees may occur if appropriate mitigation is not undertaken. Slight adverse impact.	N/A
Scattered broad-leaved trees	Scattered around the boundaries of the site and in the north-east of the site. Range of ages, species included sycamore (<i>Acer pseudoplatanus</i>), goat willow, rowan (<i>Sorbus aucuparia</i>), elder (<i>Sambucus nigra</i>), large-leaved lime (<i>Tilia platyphyllos</i>), London plane (<i>Platanus x hispanica</i>) and occasional hawthorn and blackthorn (<i>Prunus spinosa</i>) (See Figure 3, Photograph 2).	Potential loss of trees. Root compaction leading to the death of trees may occur if appropriate mitigation is not undertaken. Slight adverse impact.	N/A
Species-poor intact hedge	240m present along the north-eastern boundary of the site, along the road. It was overgrown and approximately 4m high and 3m wide, did not appear to be managed. Species included pedunculate oak (<i>Quercus robur</i>), hawthorn and elder (See Figure 3, Photograph 3).	Potential loss of hedgerow – moderate adverse impact as a UKBAP and local BAP habitat. Damage to habitat e.g. root compaction leading to the death of trees may occur if appropriate mitigation is not undertaken – slight adverse impact if only minor negative impacts likely.	UKBAP/S41 NERC 2006 ³ Barnsley Biodiversity Action Plan
Dense scrub	0.34ha present, small areas in the north and south of the site. Dominant species included bramble (<i>Rubus fruticosus</i> agg.) (See Figure 3, Photograph 4).	Potential loss of or damage to habitat subject to location of Solar PV panels and operational maintenance strategy – slight adverse impact.	N/A
Scattered scrub	Scattered in the north-east of the site. Dominant species included bramble.	Potential loss of or damage to habitat subject to location of Solar PV panels and operational maintenance strategy – slight adverse impact.	N/A
Tall ruderal	2.50ha present in various areas across the site. Dominant species included common nettle (<i>Urtica dioica</i>), spear thistle (<i>Cirsium vulgare</i>), rosebay willowherb (<i>Chamerion angustifolium</i>) and cow parsley (<i>Anthriscus sylvestris</i>) (See Figure 3, Photograph 5).	Potential loss of or damage to habitat subject to location of Solar PV panels and operational maintenance strategy – slight adverse impact.	N/A

³ UK Biodiversity Action Plan Priority Species or Habitat/Section 41 of the Natural Environment and Rural Communities Act 2006

Amenity grassland	1.69ha present. Well-managed with a sward height of less than 5cm. Mainly dominated by grass species including annual meadow-grass (<i>Poa annua</i>), perennial rye-grass (<i>Lolium perenne</i>), and rough meadow-grass (<i>Poa trivialis</i>) (See Figure 3, Photograph 6).	Potential loss of or damage to habitat– slight adverse impact .	Barnsley Biodiversity Action Plan
Semi-improved neutral grassland	4.62ha present. Unmanaged and located within an undulating topography. Species included a range of grasses such as soft brome (<i>Bromus hordeaceus</i>), cock's-foot (<i>Dactylis glomerata</i>), smooth meadow-grass (<i>Poa pratensis</i>), false oat-grass (<i>Arrhenatherum elatius</i>) and meadow foxtail (<i>Alopecurus pratensis</i>), together with abundant herbs including cow parsley (<i>Anthriscus sylvestris</i>) (locally dominant in some areas), common nettle (<i>Urtica dioica</i>), creeping thistle (<i>Cirsium arvense</i>), teasel (<i>Dipsacus fullonum</i>) and occasional silverweed (<i>Potentilla anserina</i>). Soft rush (<i>Juncus effusus</i>) was locally frequent towards the southern site boundary, indicating an area of wetter ground conditions. Where rabbit grazing was abundant the sward length was shorter and Yorkshire-fog (<i>Holcus lanatus</i>) dominated, with sheep's fescue (<i>Festuca ovina</i>), ribwort plantain (<i>Plantago lanceolata</i>) and common vetch (<i>Vicia sativa</i>) were present. (See Figure 3, Photograph 7).	Potential loss of or damage to habitat and reduction in species biodiversity subject to location of Solar PV panels and operational maintenance strategy – slight adverse impact .	Barnsley Biodiversity Action Plan
Running water	A drain (Bulling Dike) was present running through the middle of the site. Approximately 2m wide and contained approximately 75cm of water. It had steep sloping, earth banks. Emergent vegetation included rushes, bankside vegetation was dominated by grasses and nettles (See Figure 3, Photograph 8).	Unlikely to be lost but damage could occur through trenching of cables. Indirect impacts could include: Polluting the channel through accidental spillages during the construction phase; Sedimentation during the construction period; Hydrological changes in the long-term by alterations in run-off may increase or decrease water levels and alter the ecological functionality of the receptor. Slight adverse impact.	Barnsley Biodiversity Action Plan
Hard standing	1.87ha present comprising the roads and paths leading in and around the site.	Any impacts are neutral as not a valuable habitat.	N/A
Bare ground	0.26ha present around the site infrastructure and buildings.	Any impacts are neutral as not a valuable habitat.	N/A

Buildings	Ten buildings were present in the north of the site where the main works were, labelled B1-B10 on Figure 2 and summarised in brief below: B1, B2 & B9 – redbrick buildings with pitched tiled roofs; B2 & B3 – prefabricated metal structures; B5 & B6 – small portacabins; B7 & B8 – redbrick buildings with pitched slate/concrete tiled roofs; and B10 – prefabricated building with pebble dash and corrugated metal cladding and a pitched roof.	Any impacts are neutral as not a valuable habitat.	N/A
Standing water (not within site boundary)	Three ponds (P1-P3) were present to the north of the site, the nearest was approximately 40m north-east. P1 and P2 were connected, P3 was a large pond part of Broomhill Flash and Wombwell Ings LWS.	Chemical poisoning through accidental oil and fuel spillage during the construction phase. Sedimentation during the construction phase from surface water run-off. Slight adverse impact as only minor/indirect impacts likely.	UKBAP/S41 NERC 2006 Barnsley Biodiversity Action Plan
Invasive non-native species (INNS)	No invasive non-native species were identified at the time of the survey however a range of INNS were identified in the data search as being within 500m of the TW site. The presence of the drain running through the site increases the likelihood of INNS presence. INNS on site are therefore possible.	Potential for spreading INNS around the TW site and onto other sites through movement of plants, soil and on machinery/footwear.	Schedule 9 WCA 1981
Target notes	TN1 – Pile of logs in the south of the site, suitable for reptiles and invertebrates.		N/A
Faunal Species			
Amphibians	Potential aquatic habitat present in three ponds north-east of the site boundary (within 250m of the site). In order to determine the suitability of the ponds for GCN the ponds were assessed using a habitat suitability index (HSI), the results of the HSI were: P1 – 0.5257 (below average) P2 – 0.4581 (poor) P3 – 0.57 (below average)	Killing/injury of Biodiversity Action Plan (BAP) amphibians (such as toads) during the construction phase through vegetation clearance, groundworks or vehicle movements. Killing/injury of BAP species would be a moderate adverse impact and contravention of the objectives of the UK BAP by reducing the population size. Loss of terrestrial habitat – slight adverse impact.	The Habitat Regs. 2017⁴ WCA 1981⁵ CRoW Act 2000⁶ UKBAP/S41 NERC 2006

⁴ The Conservation of Habitats and Species Regulations 2017

⁵ Wildlife and Countryside Act 1981 (as amended)

⁶ The Countryside and Rights of Way Act 2000

	(Full HSI calculations can be found in Appendix 2) The study by Oldham <i>et al.</i> (2000) found that 0.43 was the lowest score achieved where GCN presence was confirmed. The scores obtained for all of the ponds were above this threshold, therefore, GCN eDNA tests were conducted; the results were <u>negative</u> for the ponds, suggesting that GCN do not use the ponds for breeding. Furthermore, no GCN records were retrieved through the data search suggesting GCN are not present in the area. However, the presence of BAP species such as common toad (<i>Bufo bufo</i>) within the nearby waterbodies and terrestrial habitats on site, cannot be ruled out.		Barnsley Biodiversity Action Plan
Badger	No setts or signs of badger presence were found in the areas that were fully accessible during the survey, however, as some areas of dense scrub could not be accessed the absence of this species on site cannot be fully confirmed, although no signs of presence were found elsewhere on site, reducing the likelihood. Potential foraging habitat exists in the grasslands on site and potential sett building habitat within the scrub and woodland. The dense scrub in particular has low potential for the presence of an outlier sett.	Killing/injury of badgers if setts are damaged or destroyed; badger tunnels can extend 30m from the entrance and therefore piling activity within 30m of the dense scrub that was not fully surveyed still poses a risk of damaging or destroying a badger sett. This would constitute a moderate adverse impact and contravention of legislation. Loss of foraging habitat if fencing is required around the solar farm – slight adverse impact. Loss of potential sett creation habitat – slight adverse impact. Disturbance during the construction phase and during operation if night working is undertaken or if security lighting is implemented post-construction – slight adverse impact.	Protection of Badgers Act 1992
Bats	Potential roosting habitat within some of the buildings on site: B1, B2, B7, B8, B9, B10 – awarded low bat roosting potential for gaps under fascias, at the eaves and under cladding. Trees on site may offer bat roosting potential however these were not assessed at the time of the survey – unknown bat roosting potential. Site likely offers good foraging habitat and commuting routes along the hedge and woodland boundaries, and around the lines of scattered trees.	Killing/injury of bats and loss of roosts if works are required to the buildings that removes the potential bat roost features within buildings B1, B2, B7, B8, B9 and B10 without any mitigation or survey – moderate adverse impact and contravention of wildlife legislation. Killing/injury of bats and loss of roosts if removal of trees is undertaken without detailed survey – moderate adverse impact and contravention of wildlife legislation. Loss of foraging habitat and commuting routes – slight adverse impact. Disturbance to foraging/commuting bats during the construction phase through increased light, noise and dust and changes to site layout – slight adverse impact in the short-term.	The Habitat Regs 2017 WCA 1981 CRoW Act 2000 Barnsley Biodiversity Action Plan

		Disturbance to foraging/commuting bats during operation of the site if security lighting is required and if the site layout changes – <i>slight adverse impact.</i>	
Birds	A large amount of potential breeding bird habitat was present within the trees, hedge, scrub, woodland, grassland and aquatic habitats on site. The site would be suitable for a range of passerines as well as ground nesting birds, birds-of-prey and waterfowl. The data search provided records of barn owls; the grasslands on site would provide suitable foraging grounds for this species and it is possible that mature trees could provide nesting opportunities. Kingfisher nesting on site is considered unlikely due to the lack of exposed vertical banks along the drain (Bulling Dike) however they could utilise the drain for foraging. Other species identified from the data search that could use the habitats on site include redwing (record identified on site), fieldfare, merlin, little ringed plover, hobby, garganey and green sandpiper. The TW is surrounded by Nature Reserves, some of which are managed by the RSPB. The site is likely to form a network of habitats suitable for a wide range of bird species.	Destruction/damage to nests and hence killing/injury of birds during the construction phase if undertaken during the breeding bird season (between March and September inclusive dependent on weather conditions). This would constitute a <i>moderate adverse impact and contravention of wildlife legislation.</i> Loss of habitat for foraging and breeding – <i>slight adverse impact.</i> Disturbance to birds on site during the construction period through increased noise, light and human presence. – <i>slight adverse impact.</i> Potential for WCA Sch.1 species on site – this would be <i>moderate adverse impact and contravention of wildlife legislation.</i>	WCA 1981 Barnsley Biodiversity Action Plan
Otter	Potential aquatic habitat present within the drain on site that connects to the River Dearne in the east, which could provide both commuting and foraging habitat. Potential for resting sites and natal holts with dense scrub. Otter records exist for Wombwell Ings 0.07km north-east of the site.	Killing/injury of otters in holts or foraging on site through damage/destruction to holts and use of machinery on site – <i>moderate adverse impact and contravention of wildlife legislation.</i> Disturbance to otters on site during the construction period through increased noise, light, and human presence – <i>slight adverse impact.</i> Loss of resting sites through removal of bankside vegetation – <i>slight adverse impact.</i> Indirect impacts through chemical spills or pollution of the channel – <i>slight adverse impact.</i>	WCA 1981 Barnsley Biodiversity Action Plan
Reptiles	Potential habitat present within the grasslands, tall ruderal, and scrub habitats. Running water and the undulating topography on site is particularly suitable for grass snake. Grass snake and adder records	Killing/injury of reptiles during the construction phase through machinery movement and excavations (if required). This would be a <i>moderate adverse impact and contravention of wildlife legislation.</i>	WCA 1981 Barnsley Biodiversity Action Plan

	were identified within the data search as being within 500m of the site.	Loss of suitable habitat for reptiles – <i>slight adverse impact</i> but could be neutral dependent on management regime post-development. Disturbance to reptiles on site during the construction period through increased noise, light and human presence – <i>slight adverse impact</i>.	
Water vole	Potential aquatic habitat present within the drain on site which connects to the River Dearne in the east. The steep earth banks were well-vegetated with a range of grass and herbaceous species, Two historical water vole records exist for Parkhill Nature Reserve LWS immediately west of the site, the records were from a section of drain which connects to the drain on site. Various other water vole records exist for other waterbodies surrounding the site, suggesting a good population in the area.	Damage/destruction to burrows and hence killing/injury of water vole through excavation within 5m of the drain – <i>moderate adverse impact and contravention of wildlife legislation</i>. Disturbance to water vole on site during the construction period through increased noise, light, and human presence – <i>slight adverse impact</i>. Loss of suitable habitat through clearance of bankside vegetation – <i>slight adverse impact</i>. Indirect impacts through chemical spills or pollution of the channel – <i>slight adverse impact</i>.	WCA 1981 Barnsley Biodiversity Action Plan
White-clawed crayfish	Potential aquatic habitat present within the drain on site (Bulling Dike) which connects to the River Dearne in the east. However, no white-clawed crayfish populations were returned from the desk study and no populations are currently known in lower Dearne reaches (Barnsley Biodiversity Trust). This species will no longer be considered as part of this assessment.	No anticipated impacts.	WCA 1981 Barnsley Biodiversity Action Plan
Brown hare	Potential habitat exists for brown hare in the open grassland and tall ruderal habitats on site, especially in the habitats in the south.	Killing/injury of leverets during construction phase – <i>slight adverse impact and contravention of the objectives of the UK BAP</i> by reducing the population size. Loss of suitable habitat – <i>slight adverse impact</i>. Disturbance to brown hare during the construction phase and during operation through inappropriate lighting, increased noise and dust, and human presence - <i>slight adverse impact</i>.	UK BAP/S41 NERC Barnsley Biodiversity Action Plan
Hedgehogs	Potential foraging habitat exists in the grassland and tall ruderal habitats and potential hibernation habitat within the scrub, hedge and woodland.	Killing/injury during construction phase if they fall into excavations or are squashed by machinery – <i>slight adverse impact and contravention of the objectives of the UK BAP</i> by reducing the population size. Loss of suitable habitat – <i>slight adverse impact</i>.	UK BAP/S41 NERC Barnsley Biodiversity Action Plan

		Disturbance to hedgehogs during the construction phase and during operation through inappropriate lighting, increased noise and dust, and human presence - <i>slight adverse impact</i> .	
Invertebrates	The site offers suitability to host a range of invertebrate species in the grassland, scattered trees, hedgerow, scrub, tall ruderal and aquatic habitats.	Loss of habitat and reduction of invertebrate numbers and diversity – <i>slight adverse impact</i>. Potential increase in light, dust, and chemical pollution short-term during the construction phase – <i>slight adverse impact</i>.	Barnsley Biodiversity Action Plan
Migratory and coarse fish	Potential aquatic habitat present within the drain (Bulling Dike) on site which connects to the River Dearne in the east. Other suitable waterbodies exist around the site which may also be connected to the drain on site.	Potential sediment release through excavation of new outlets, if required, short term impact – <i>slight adverse impact</i>. Damage/loss of spawning sites and hence killing/injury/disturbance to spawning fish during close season through direct excavation to the ditch on site – <i>moderate adverse impact and contravention of wildlife legislation</i>. Indirect impacts through chemical spills or pollution of the channel – <i>slight adverse impact</i>.	UK BAP/S41 NERC Barnsley Biodiversity Action Plan

5 Recommendations

5.1 General

- 5.1.1 The development footprint will cover 0.89ha of the 11.87ha site. As the location of the development is not known at this stage the recommendations will set out the mitigation for a 'worst case scenario' for habitats and species and how this can be overcome and reduced by the location of the development within the site

5.2 Statutory and non-Statutory Sites

- 5.2.1 Parkhill Nature Reserve LWS is immediately adjacent to the site's western boundary and a buffer zone of at least 10m is recommended to limit the impacts to the LWS. Pollution prevention measures may be required to prevent indirect impacts, such as avoidance of excess dust, accidental pollution, and sedimentation. The Environment Agency's Pollution Prevention Guidelines should be consulted (although withdrawn from their website they remain a valuable source of information and can still be accessed on the archives).

5.3 Habitats and Faunal Species

- 5.3.1 Table 5 below provides the recommendations for habitats and faunal species that will potentially be impacted by the development. Further details of these recommendations should be included within a construction environmental management plan (CEMP) and a long-term management plan. If the size of the development footprint changes the ecological assessment should be updated as the mitigation is dependent on the site and size of impacted area.

Table 5: Mitigation and Recommendations

Receptor	Mitigation
Habitats and botany	
Semi-natural broad-leaved woodland, species-poor intact hedge and scattered broad-leaved trees	Trees and hedgerows are a valuable habitat for a variety of species including birds, bats, hedgehogs and invertebrates and are an important source of carbon uptake. Tree loss throughout the site should be avoided if possible. Should any trees require removal they should ideally be replaced with the same or similar species elsewhere on site or on a suitable receptor site. Timing of tree removal should follow the requirements of faunal species, see below sections for details. Root protection zones following BS:5387 (2012) guidelines should be marked out on site with fencing and clear signage.
Semi-improved neutral grassland, tall ruderal, and scrub.	The development footprint should be designed to impact these habitats as little as possible by aligning them in grids or a linear fashion. Should vegetation removal and soil stripping be required as part of the development the stripped area should ideally be re-sown with a wildflower grassland mix. A number of suppliers can provide specialist mix's that are designed for low maintenance biodiversity enhancement use within solar installations. A wildflower mix should be selected which takes into account the soil type and pH. Manufacturer/supplier instructions regarding sowing should be followed. If vegetation removal is not required operational maintenance should be kept to a minimum once the panels have been installed to maintain and increase the distribution, structure and species composition of existing habitats across the site. Maintenance levels of the site should be maintained until the panels are installed to ensure that the site does not increase in suitability for faunal species in the interim
Running water and standing water	Any development should ideally be located a minimum of 3m from the drain (Bulling Dike) running through the site.

	Pollution prevention methods should be in place during the development to avoid polluting the waterbodies on and around the site. The Environment Agency's Pollution Prevention Guidelines provides relevant information and should be consulted.
Invasive non-native species (INNS)	If any work (including vegetation removal) is required within 5m of the drain an updated INNS survey should be undertaken (winter must be avoided as some species are not visible over winter).
Faunal species	
Amphibians	Due to the risk that terrestrial amphibians such as toads may be present on site during the works a precautionary approach during site clearance and construction must be followed, to include: • Destructive hand searches of any potential hibernacula; • Areas of grassland, scrub and tall ruderal vegetation should be strimmed down to no lower than 150mm before being searched amphibians. Vegetation should then be strimmed down to ground level to render it unsuitable for future use by these species; • Strimmed vegetation should be immediately removed from the working areas, not left piled up which would create further amphibian species on site; and • Should any amphibians or reptiles be discovered at any time during the construction process all works should cease immediately and the advice of a suitably qualified ecologist sought (BL Ecology can be contacted on 01274 816800).
Bats	If the development will impact the buildings that were awarded low bat roosting potential a suitably qualified bat ecologist should be consulted to determine whether the potential roosting opportunities would be impacted by the works. It is likely that an internal building inspection and at least one dusk emergence bat survey should be carried out; dusk surveys must be conducted between May and August inclusive (BCT Guidelines 3rd Ed. 2016). If any of the trees on site are to be altered, damaged or removed a daytime bat scoping assessment of the trees should be undertaken by a suitably qualified ecologist. This can be undertaken at any time of the year but are most appropriate in winter when the tree canopy does not obscure views of the tree. The panels should be sited ideally 3-4m from the site boundaries to allow a natural verge along which bats can commute and forage (BRE, undated). Should potential linear foraging and commuting features, such as lines of trees or hedgerows, be removed they should be replaced either as new tree planting or native hedgerow planting to avoid fragmenting the landscape. No night working to be carried out. The site should remain unlit both during the development and post-development to maintain the ecological functionality for bats as potential foraging and commuting ground. If security lighting is required post-construction it should be kept to a minimum, avoid any shine onto the site boundaries (use hoods/shields), and avoid white and blue wavelengths of the light spectrum.
Badger	If excavation/piling is likely to be required within 30m of the dense scrub a presence/absence survey for badgers should be conducted by a suitably qualified ecologist. Ideally the survey should take place in winter when the vegetation is reduced; vegetation clearance may be required to enable the survey. Any open excavations should be covered overnight, or a slope/mammal path provided to allow any badgers that fall in safe egress out. Any open pipes within the ground should be capped overnight to avoid badgers and other mammals taking shelter inside. No night working to be carried out. The site should remain unlit overnight to maintain functionality of the site as a potential foraging ground for badger. Any permanent security fencing erected around the development should ideally include at least one ground level access point (300mm wide X 200mm) along each boundary to allow full access to potential foraging grounds. Alternatively, a gap 20-30cm high should be created at the base of the entire length of the security fencing to allow all small wildlife to pass through. Fencing should be set back 3.4m from the site boundary to allow passage of wildlife and a route for maintenance vehicles (BRE, undated). Should the development not take place within 12 months of the survey being carried out (21st May 2020) a pre-construction badger survey should be undertaken.
Birds	Tree and scrub disturbance/removal should be undertaken outside of the breeding bird season (i.e. undertaken between October and February). If this is not possible and vegetation has to be disturbed or removed during the active breeding bird season then a nesting check should be carried out by a suitably qualified ecologist within 48 hours of the vegetation removal.

	The grassland below and around the panels should be allowed to develop into good barn owl foraging habitat, consisting of tussocky grassland with a litter-layer not less than 70mm deep. Bare ground and short grass should be avoided (The Barn Owl Trust website).
Otter	At least a 5m buffer from the drain on site (Bulling Dike) should ideally be established, whereby no heavy plant, work vehicles or machinery should enter. If work is required within the drain, any scrub removal should be undertaken via hand tools under an ecological watching brief due to the risk of otter resting sites, this also applies to dense scrub across other areas of the site. No night working to be carried out. The site should remain unlit both during the development and post development so as to maintain the ecological functionality for otter as potential foraging and commuting ground. Pollution prevention methods should be in place during the development to avoid polluting the drain; the Environment Agency's Pollution Prevention Guideline should be followed.
Reptile	Due to the higher risk of reptiles at this site it is recommended that installation works should ideally take place when reptiles are active and can move out of the way of machinery, therefore works should be undertaken within suitable weather conditions between March and October inclusive (dependent on weather conditions). This restricted timing will also limit the amount of habitat damage by avoiding the periods of wettest weather. Vegetation should be strimmed (outside the breeding bird season) to no lower than 150mm initially, this will safeguard reptile species while disturbing them causing them to leave the working area. Two days later the vegetation should be cut to a height of 50mm. Arisings should be collected at the end of each day and removed from the site. Vegetation cuttings provide suitable habitat for reptiles providing them with both shelter and egg laying opportunities (for grass snake only), failure to remove the cuttings at the end of each day will make the site more suitable for reptiles. A short grass sward will encourage reptiles out of the working area, and therefore a short sward height of 50mm or less should be maintained throughout the works on site. Vehicles/machinery should only be permitted on strimmed vegetation and netlon fencing (or similar) should demarcate the routes to avoid unnecessary damage to surrounding habitats. Reptile exclusion fencing is not deemed necessary because the works are temporary and habitats will be restored post-installation.
Water vole	If the drain will be directly impacted by the proposed development it may be necessary to undertake a water vole survey. The extent of the survey would depend on the amount of habitat to be impacted; small areas could be effectively searched and burrows avoided. Large areas to be impacted would require a full presence/absence survey consisting of two visits (one survey in April to June and a second in July to September with the surveys at least two months apart). If the drain will not be directly impacted, a 5m buffer zone should be established whereby no heavy plant, work vehicles, and machinery should be present The drain should remain unlit both during the development phase and during operation.
Brown hare	Any security fencing should ideally incorporate a gap between the base of the fence and the ground to allow small wildlife to pass through; the gap should be 20-30cm high. Operational maintenance of existing habitats should be kept to a minimum to maintain functionality of the site as foraging ground for brown hare.
Hedgehogs	Any open excavations should be covered over-night or a slope/mammal path provided to allow any hedgehogs that fall in safe egress out. No night working should be carried out. Any vegetation clearance required during the hibernation period should be undertaken by hand. Any security fencing should ideally incorporate a gap between the base of the fence and the ground to allow small wildlife to pass through. The gap should be 20-30cm high. Operational maintenance of existing habitats should be kept to a minimum to maintain functionality of the site as foraging and hibernation ground for hedgehogs.
Invertebrates	As per the reptile section above, it is recommended that works on this site take place during good weather conditions to ensure minimal impact to the habitats during the construction phase, i.e. avoid winter and periods of extensive wet weather. Pollution prevention methods (Environment Agency's Pollution Prevention Guidelines) should be in place during the development to avoid polluting the habitats on the sites.

	Ensure that a range of habitats remain on site post-development by replacing lost habitats, e.g. if large areas of scrub are lost these should be replaced elsewhere. Operational maintenance of existing habitats should be kept to a minimum to maintain structure, species composition and functionality. The inclusion of a wildflower mix would increase the invertebrate species diversity.
Migratory and coarse fish	It is recommended that general watercourse mitigation is undertaken, following the Environment Agency's Pollution Prevention Guidelines, Works in, Near or Liable to Affect Watercourses (PPG5). This includes such measures as no refuelling near to watercourses, fuel should be stored in bunded tanks on an impervious base, and silty water to be disposed of to the foul sewer and never pumped straight into a watercourse.

5.4 Optional Site Enhancements

- 5.4.1 The provision of bat and bird boxes on the buildings and trees would provide roosting and nesting opportunities for bats and birds, enhancing biodiversity across the sites.
- 5.4.2 Creating a 'scrape' that periodically fills with water in the grassland areas would complement the surrounding habitat and provide habitat for a range of mammals, birds and invertebrates.
- 5.4.3 The site contains very few mature trees; planting lines of trees along boundaries provides commuting routes for fauna, sheltered areas, and varies microclimates across the sites. The eastern boundary in the southern half of the site would be ideal but other boundaries would also benefit from this approach.
- 5.4.4 Planting climbers up the security fencing would provide additional habitat for foraging bats and nesting birds.

6

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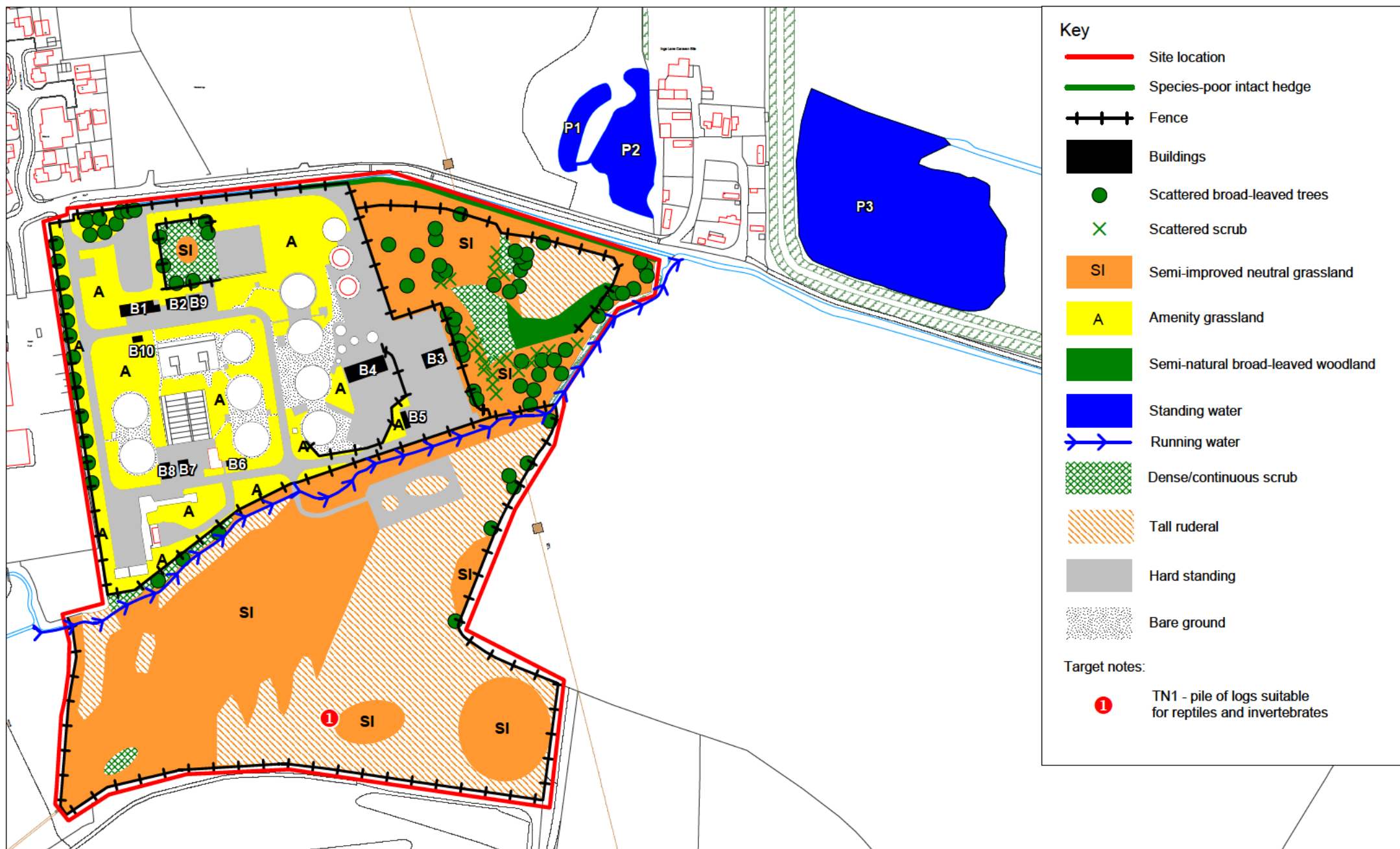
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7 **Figures**

7.1 **Figure 1 – Site Location and Desk Study Results**

7.2 **Figure 2 – Phase 1 Habitat Map**

7.3 **Figure 3 – Photographs**

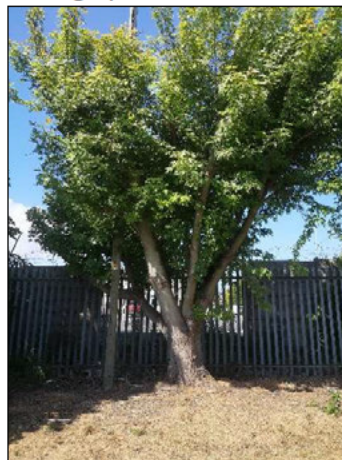


Date	23/10/2020
Map reference	084_19_44/RE01 - FIG 2 - V1
Drawn/Approved by	MG/JC
Scale	1:3'000 at A4

Photograph 1: Semi-natural broad-leaved woodland



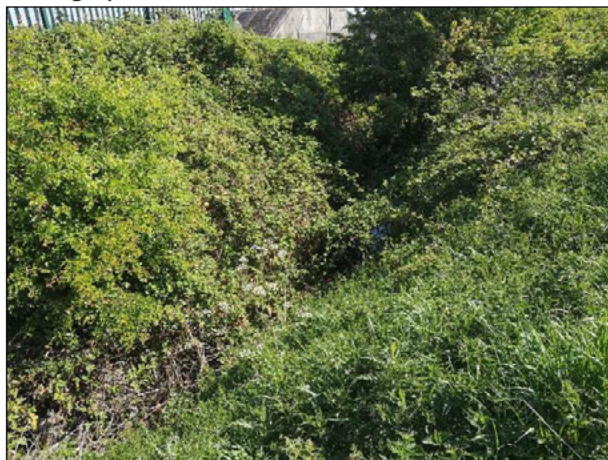
Photograph 2: Scattered broad-leaved trees



Photograph 3: Species-poor intact hedge



Photograph 4: Dense scrub



Photograph 5: Tall ruderal



Photograph 6: Amenity grassland



Photograph 7: Semi-improved neutral grassland



Photograph 8: Running water



Photograph 9: B1



Photograph 10: B2



Photograph 11: B3



Photograph 12: B4



Photograph 13: B5



Photograph 14: B6



Photograph 15: B7 and B8



Photograph 16: B9



Photograph 17: B10



	Project	Site 22 – Wombwell Treatment Works – Solar Scheme
	Title	Photographs
	Reference	084_19_44_RE01
	Figure Number	3, Page 3 of 3
	Created by	Megan Gledhill

8

Appendix 1 - Impact Assessment Criteria

- 8.1.1 It is important to be able to provide an objective, expert assessment/appraisal of the importance of an ecological receptor (habitats and species). To do this, BL Ecology Ltd followed the structure within the Chartered Institute for Ecology and Environmental Management's (CIEEM) Guidelines for Ecological Impact Assessment in the UK and Ireland (Second Edition, 2016). This provides for three steps in the process of assessing the significance of the impact of a development:
- 1) Evaluate the importance/sensitivity of the receptor (i.e. assign a conservation value to it);
 - 2) Predict the scale of the impact (in terms of extent, magnitude, duration etc);
 - 3) Assess the significance of the effect of those impacts relative to the conservation value of the site.
- 8.1.2 There is a fourth step to assess the 'residual' effects of the impacts with mitigation, which follows the same methodology as Step 3.
- 8.1.3 The first step in assessing the impact of a development is to assign a value to current ecological features and resources. Table 1 below provides a method for this assessment devised by BL Ecology Ltd. The categories of value are usually assigned in geographical terms, e.g. of international, national, local importance etc.
- 8.1.4 The value of an ecological receptor is determined by factors such as distribution, designation, rarity, population size, species assemblage, mobility, local distinctiveness and vulnerability. Whilst the legal protection or BAP status of a species or habitat must be taken into account, it cannot be automatically determined which category the receptor falls into, as that particular receptor may be in an unfavourable ecological condition, fragmented/isolated, or a small area/population.

Table 1: Assigning Nature Conservation Value

Nature Conservation Value	Examples
International	An internationally designated site (or candidate site) such as a Special Area of Conservation (SAC), a Special Protection Area (SPA), and Ramsar Sites; Habitats listed on Annex I of the Habitats Directive; or Significant population of a faunal species listed on Annex II of the Habitats Directive or a hibernation site for the same species.
National	A nationally designated site such as a Site of Special Scientific Interest (SSSI) and National Nature Reserve; A Priority Habitat as listed on the UK Biodiversity Action Plan (UK BAP) within favourable status; or A significant population of a Priority Species listed on the UK BAP.
Regional	A third-tier (locally) designated site such as Local Wildlife Sites, Important hedgerows under The Hedgerow Regulations 1997; A Priority Habitat as listed on the District BAP and within favourable status; A significant population of a Priority Species listed on District BAP; or A regularly occurring significant population listed in a Local Red Data Book;
Local	Habitats classed as common and widespread throughout the UK; Small numbers (non-breeding) of protected species; or Significant population of common faunal species.
Negligible	Minor/no nature conservation value.

8.1.5 Potential impacts that the development may have on the ecological receptor are then considered by deliberation of the following factors:

- Extent;
- Magnitude;
- Duration;
- Reversibility;
- Timing and Frequency;
- Cumulative effects; and
- Confidence in predictions (level of uncertainty).

8.1.6 The predicted magnitude of an impact on the ecological receptor is determined using Table 2 below. Impacts can be positive or negative and consider the likelihood that a change or activity will occur as predicted, on a scale of certain, probable or unlikely, this is without mitigation.

Table 2: Predicted Magnitude of Impact (Without Mitigation)

Magnitude	Criteria
Major negative	The proposed development is likely to permanently adversely affect the integrity of the ecological receptor.
Intermediate negative	No permanent effect on the integrity of the ecological receptor however the key attributes are likely to be adversely altered.
Minor negative	Neither of the above apply, but some minor negative impact is likely.
Neutral	No observable impact in either direction.
Beneficial	Impacts which provide a net gain for the ecological receptor.

8.1.7 Consideration of the magnitude of each impact against the nature conservation value of the ecological receptor produces a matrix table to determine the overall impact that the development is likely to have on the receptor. This is shown in Table 3 below.

Table 3: Estimating the Overall Appraisal Category (in term of significance)

Magnitude of Potential Impact	Nature Conservation Value				
	International	National	Regional	Local	Negligible
Major Adverse	Very Large Adverse	Very Large Adverse	Moderate Adverse	Slight Adverse	Neutral
Intermediate Adverse	Large Adverse	Large Adverse	Moderate Adverse	Slight Adverse	Neutral
Minor Adverse	Slight Adverse	Slight Adverse	Slight Adverse	Slight Adverse	Neutral
Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
Beneficial	Large Beneficial	Large Beneficial	Moderate Beneficial	Slight Beneficial	Neutral

Waterbody	SI Factor										HSI Score	Suitability
	Location	Pond area	Pond drying	Water quality	Shade (%)	Fowl present	Fish abundance	No. of ponds within 1km radius	Suitability of terrestrial habitat	Macrophyte cover (%)		
Pond P1	1	0.02	0.9	1	1	0.67	0.3	0.9	1	0.45	0.5257	Below Average
Pond P2	1	0.1	0.9	1	1	0.67	0	0.9	1	0.75	0.4581	Poor
Pond P3	1	0.1	0.9	0.67	1	0.67	0.3	0.9	0.67	0.45	0.57	Below Average



APPENDIX C OUTLINE SITE WASTE MANAGEMENT PLAN

Introduction

This Outline SWMP is submitted as part of a planning application for the Development which includes associated soft and hard landscaping.

The aim of this Outline SWMP is to protect the environment through implementation of effective management plans which relate to the management of waste throughout the life cycle of the Development.

Prior to construction of the Development, the Principal Contractor will update this Outline SWMP to ensure it is a suitably detailed document. The Principal Contractor will take ownership of the Detailed SWMP and will adhere to the principles presented within it.

The Detailed SWMP is a key tool which is used to plan, implement, monitor and review waste minimisation and management during the construction, operation and decommissioning phases of the Development.

This Outline SWMP provides guidelines and details of the minimum requirements which the Principal Contractor shall include in their detailed SWMP. The Detailed SWMP will be put in place by the appointed Principal Contractor prior to commencement of the construction phase of the Development and will be implemented in conjunction with the CEMP to ensure environmental effects on-site are reduced.

It is anticipated that all excavated materials will be utilised on-site as part of the permanent works and site restoration process resulting in no waste arising from these elements of the Development.

Any import, export (not anticipated) and reuse of material generated on-site will be undertaken in line with the requirements of the CL:AIRE Definition of Waste: Development Industry Code of Practice (version 2)⁹. As such, this Outline SWMP considers only the management of the waste arising from other imported construction materials.

The Waste Hierarchy

The 'Waste Hierarchy' provides an outline approach of how waste management should be assessed within the Outline SWMP, see Plate 2. The Waste (England and Wales) Regulations 2011¹⁰ place a duty on all persons who produce, keep or manage waste to apply the 'Waste Hierarchy' in order to minimise waste production at every stage of the Development.

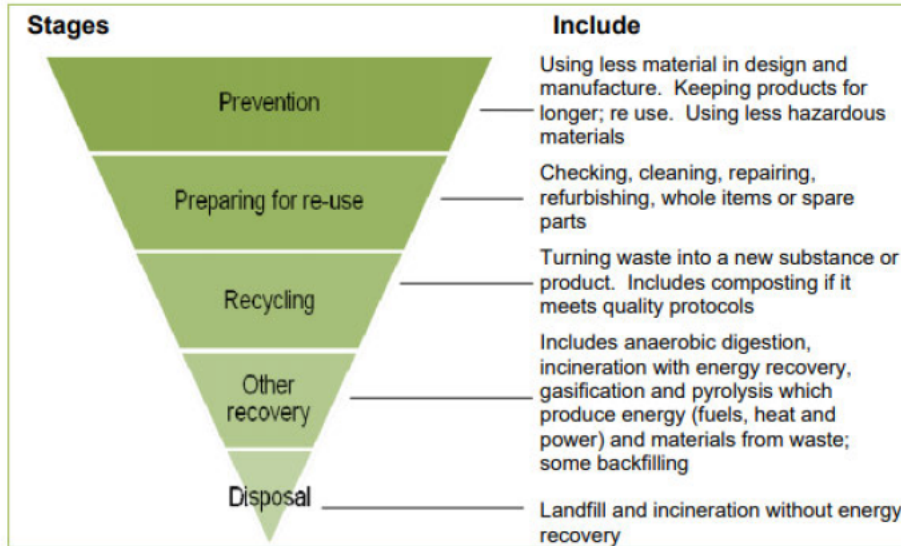
The 'Waste Hierarchy' promotes selection of the Best Practicable Environmental Option (BPEO) and preferred option for management of waste.

⁹ Contaminated Land: Applications in Real Environments (2011): The Definition of Waste: Development Industry Code of Practice (Version 2)

¹⁰ Legislation (England and Wales) (2011): The Waste (England and Wales) Regulations 2011 [Online] Available at: <https://www.legislation.gov.uk/ukxi/2011/988/contents/made> (Accessed 14/06/2023)



WASTE HIERARCHY¹¹



The core waste management principles of reduce, reuse, recycle, recover and disposal as defined in the 'Waste Hierarchy', are embedded within this Outline SWMP.

Waste Prevention

Minimisation of waste generation is achieved through careful design and creating a 'waste aware' culture on-site. All reasonable actions will be taken by the Principal Contractor to avoid the production of and/or minimise the volume of waste produced as a result of the Development. This can be through reducing consumption, using resources efficiently, and designing for longevity.

Waste Separation for Reuse and Recycle

Where possible, the separation of waste will be carried out at the source in order to maximise opportunities for reuse and recycling. Segregation of waste will require training, monitoring and enforcement.

Waste Storage, Disposal and Transportation

All areas used for temporary storage of waste on-site will comply with Defra and EA guidelines and will be clearly signed. Waste storage facilities will be provided at source using the best environmental options available. Any hazardous or special waste will be stored in separate, secure containers and clearly identified as such.

¹¹ Defra (2011) Guidance on applying the Waste Hierarchy [Online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69403/pb13530-waste-hierarchy-guidance.pdf (Accessed 14/06/2023)



Disposal activities will also be carried out in accordance with the EA, Pollution Prevention Guidelines (PPGs¹²) in order to ensure compliance with current waste legislation.

A review plan for the PPGs is currently underway, replacing them with a replacement guidance series, Guidance for Pollution Prevention (GPPs¹³). GPPs provide environmental regulatory guidance for Northern Ireland, Scotland and Wales and environmental good practice guidance for the whole UK.

As the Site is within England the PPGs still provide regulatory guidance for the Development, however the activities will also be carried out in accordance with GPPs to demonstrate environmental good practice.

Waste transportation will take place at regular intervals to avoid the accrual of waste. Where possible, delivery vehicles will aim to remove waste materials on return trips.

Only registered waste carriers will be authorised to transport waste and a Waste Transfer Note (WTN) will be completed for each load of waste, which must contain a record of their waste carrier registration number. Copies of each WTN will be filed as an appendix to the SWMP and held for at least two years. The appropriate European Waste Catalogue (EWC) code will be established using updated Technical Guidance (WM3)¹⁴ and will be noted on the WTN, in addition to how it is contained. All sites receiving waste must have an appropriate permit, licence or registration exemption, the details of which should also be recoded.

If required, the EA will be advised in advance of any hazardous waste movements and Waste Consignment Notes (WCNs) will be purchased in advance for this type of waste transportation. These consignment notes will be held for at least three years.

Policy Context and Legislation

As of 2013, the production and implementation of a SWMP is no longer a legal requirement, however it is regarded as best practice¹⁵. Policy and legislation do dictate the management of waste and therefore, the following items have been considered when developing the SWMP:

- The Environmental Protection Act 1990¹⁶;

¹² Environment Agency (2014): Pollution prevention guidance (PPG) [Withdrawn] Available at: <https://webarchive.nationalarchives.gov.uk/20140328090931/http://www.environment-agency.gov.uk/business/topics/pollution/39083.aspx> (Achieved material accessed 14/06/2023)

¹³ NetRegs (2021): Guidance for Pollution Prevention (GPP) [Online]. Available at: Guidance for Pollution Prevention (GPP) documents | NetRegs | Environmental guidance for your business in Northern Ireland & Scotland (Accessed 14/06/2023)

¹⁴ Environment Agency, Scottish Environment Protection Agency & Natural Resources Wales (2015) Waste Classification: Guidance on the classification and assessment of waste (1st Edition v1.1.GB) Technical Guidance WM3, EU Exit Update (Jan 2021) [Online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/948735/Waste_classification_technical_guidance_WM3.pdf (Accessed 14/06/2023)

¹⁵ IEMA (2008) Practitioner Series No. 11, Waste Management: A Guide for Business in the UK. Institute of Environmental Management and Assessment.

¹⁶ UK Government (1990): Environmental Protection Act 1990 [Online] Available at: <https://www.legislation.gov.uk/ukpga/1990/43/contents> (Accessed 14/06/2023)

- The Hazardous Waste (England and Wales) Regulations 2005¹⁷;
- The Waste (England and Wales) Regulations 2011¹⁸;
- The Waste Framework Directive¹⁹; and,
- The Waste Management Plan for England 2013²⁰.

Should any surplus waste remain which cannot be reused or recycled, then the Landfill Directive 1999²¹ will apply.

Guidance

Several guidance documents were also used to develop this SWMP and include:

- Environment Agency, 2015, Manage Water on Land: Guidance for Land Managers²²;
- British Standards Institution, 2015, BS 5930:2015, Code of practice for ground investigations²³;
- Construction Industry Research and Information Association (CIRIA), 2015, Environmental Good Practice on-site (C741), 4th edition²⁴;
- Defra and Environmental Agency, 2018, Waste Duty of Care Code of Practice²⁵;
- Defra and Environmental Agency, 2019, Pollution Prevention for Businesses²⁶;
- Defra and Environmental Agency, 2021, Discharges to Surface water and groundwater: environmental permits²⁷;

¹⁷ Legislation (England and Wales) (2005) The Hazardous Waste (England and Wales) Regulations 2005 [Online] Available at: <https://www.legislation.gov.uk/ukxi/2005/894/contents/made> (Accessed 14/06/2023)

¹⁸ Legislation (England and Wales) (2011) The Waste (England and Wales) Regulations 2011 [Online] Available at: <https://www.legislation.gov.uk/ukxi/2011/988/contents/made> (Accessed 14/06/2023)

¹⁹ European Commission (2008) The Waste Framework Directive - DIRECTIVE 2008/98/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 19 November 2008 on waste and repealing certain Directives [Online] Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02008L0098-20180705> (Accessed 14/06/2023)

²⁰ Defra (2013) The Waste Management Plan for England 2013 [Online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/265810/pb14100-waste-management-plan-20131213.pdf (Access 14/06/2023)

²¹ European Commission (1999) Landfill of waste - Directive 1999/31/EC on the landfill of waste [Online] Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=LEGISSUM%3A121208> (Accessed 14/06/2023)

²² Environment Agency (2015) Manage Water on Land: Guidance for Land Managers [Online] Available at: <https://www.gov.uk/guidance/manage-water-on-land-guidance-for-land-managers> (Accessed 14/06/2023)

²³ British Standards Institution (2015) Code of practice for ground investigations - BS 5930:2015+A1:2020

²⁴ Construction Industry Research and Information Association (2015): Environmental Good Practice on Site (C741), 4th edition

²⁵ Defra and Environmental Agency (2018) Waste Duty of Care Code of Practice [Online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/759083/waste-code-practice-2018.pdf (Accessed 14/06/2023)

²⁶ Defra and Environmental Agency (2016) Pollution Prevention for Businesses [Online] Available at: <https://www.gov.uk/guidance/pollution-prevention-for-businesses> (Accessed 14/06/2023)

²⁷ Defra and Environmental Agency (2021) Discharges to Surface water and groundwater: environmental permits [Online] Available at: <https://www.gov.uk/guidance/discharges-to-surface-water-and-groundwater-environmental-permits> (Accessed 14/06/2023)



- Defra and Environmental Agency, 2020, Oil Storage Regulations for Businesses²⁸;
- Institute of Environmental Management and Assessment (IEMA), 2008, Practitioner Vol. 11 Waste Management: a guide for businesses in the UK²⁹; and,
- Wrap, www.wrap.org.uk³⁰.

The above guidance on waste management will be used to ensure the following objectives are met through the Outline SWMP:

- Legal obligations of the Development;
- Waste production is minimised;
- Waste is recognised as a resource;
- Project build costs are minimised;
- A framework for continuous improvement and best practice is implemented and maintained; and,
- Adverse environmental impacts associated with the production and management of waste materials are minimised.

Anticipated Waste Streams

The list below provides an indication of the expected waste streams, however this list is not exhaustive and additional streams may be added as the works progress:

- Waste from welfare facilities;
- Waste chemicals, fuels and oils;
- Packaging;
- Waste metals; and,
- Wastewater.

Waste from Welfare Facilities

Temporary welfare facilities will be provided during the construction phase. These facilities will include toilets, washing and drinking water. This could include a connection to the public mains water supply, and a cess tank that would be periodically emptied and taken off-site by a licensed operator. All on-site welfare facilities will be clearly signposted and maintained.

Where excess surface water occurs from the area of the buildings, this would be collected and treated in a Sustainable Urban Drainage System (SUDS), prior to discharge.

Toilet Facilities

²⁸ Defra and Environmental Agency (2020) Oil Storage Regulations for Businesses [Online] Available at: <https://www.gov.uk/guidance/storing-oil-at-a-home-or-business> (Accessed 14/06/2023)

²⁹ IEMA (2008) Practitioner Series No. 11, Waste Management: A Guide for Business in the UK. Institute of Environmental Management and Assessment.

³⁰ Waste and Resources Action Programme (WRAP) [Online] Available at: <https://wrap.org.uk/> (Accessed 14/06/2023)



During the construction phase, 'Porta-loo' type facilities, or equivalent, will be used and emptied by an approved waste contractor, therefore minimising potential effects on drainage ditches and watercourses.

Other Domestic Refuse

Collection facilities for refuse will be provided to segregate waste. These facilities will be clearly marked, positioned in appropriate locations and protected from the weather and animals.

Waste Chemicals, Fuels and Oils

All fuel and oil will be stored within designated area and contained by a small bund constructed from material sourced on-site and lined with an impermeable membrane in order to prevent any contamination of the surrounding soils, vegetation and water table, in accordance with Defra and Environmental Agency Oil Storage Regulations for Businesses³¹. Any contaminated run-off within the bund will be disposed of at an appropriate waste management facility.

Any used (contaminated) spill kits, absorbent granules, sheets or fibres must be disposed of in accordance with the COSHH Regulations³² and amended workplace limits for exposure to COSHH materials³³ and in accordance with the spill management plan.

Packaging

Construction waste generated is expected to be restricted to general construction waste (e.g., off cuts of timber, timber pallets, cardboard, wire, cleaning cloths, paper, etc.) which will be sorted and either recycled or disposed of off-site to an appropriately licenced landfill by the Principal Contractor.

Packaging will be separated at the source of generation on-site, where practical. This approach uses the Waste Hierarchy by encouraging reuse and recycling of materials, such as plastic, wood and paper.

Waste Metals

It is likely that this will be produced from excess steel (e.g., from the solar panel mounting structures or cuttings from underground cabling). Any waste metal would be recycled as appropriate.

Wastewater

Dewatering of Excavations

³¹ Defra and Environmental Agency (2020) Oil Storage Regulations for Businesses [Online] Available at: <https://www.gov.uk/guidance/storing-oil-at-a-home-or-business> (Accessed 14/06/2023)

³² Health and Safety Executive (2002) Control of Substances Hazardous to Health 2002 (COSHH)

³³ Health and Safety Executive (2020) EH40/2005 Workplace exposure limits. Containing the list of workplace exposure limits for use with the Control of Substances Hazardous to Health Regulations 2002 (as amended)



Based on the information provided within the Flood Risk Assessment accompanying the Solar Farm Planning Statement, it is unlikely the excavations being carried out as part of this development will encounter groundwater.

Should groundwater be encountered, and dewatering is required, water will be pumped into settlement lagoons for treatment and discharged onto vegetated surfaces. Details of such activities are included in the Outline CEMP.

Alkali (limestone) may be added to the base of dewatering pits to buffer acidic water, should intrusive site investigations indicate the presence of acid mine water in near surface groundwater. Settlement lagoons may also be constructed with a composting layer also allow for the treatment of any ochre water before being discharged into the hydrological system. A schematic diagram is displayed below:

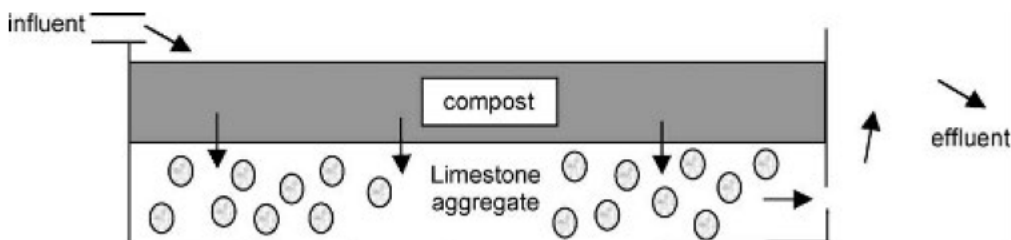


Diagram taken from Johnson & Hallberg (2005)³⁴.

Cleaning Activities

A vehicle washing facility or designated jet-wash water bowser will be in the construction compound or other designated area, if necessary. The sump water will either be pumped to a licenced carrier and disposed of offsite or discharged to vegetated surfaces if the water quality meets EA requirements.

³⁴ Johnson & Hallberg (2005) Acid mine drainage remediation options: a review [Online] Available at: Acid mine drainage remediation options: a review - ScienceDirect (Accessed 14/06/2023)



APPENDIX D OUTLINE INCIDENT RESPONSE PLAN

Introduction

An Incident Response Plan will be implemented throughout the construction and operation of the Development.

Prior to the commencement of construction, the lead principal contractor shall set up an emergency response plan/procedure, in order to ensure that this plan is adequate for the nature and lifetime of the project and the environment in which works are being undertaken.

The Incident Response Plan will include emergency contacts who will coordinate response activities in the event of a pollution incident.

This Incident Response Plan will include an outline procedure similar to that set out below:

1. **Make the situation safe:** Do not compromise the health and safety of site personnel in controlling a pollution incident. Ensure that appropriate Personal Protective Equipment (PPE) is available to use where necessary.
2. **Stop the source of the pollution incident:** Identify the cause of the emergency or incident and act immediately to prevent further pollution.
3. **Contain the pollution incident:** Once the source of the pollution has been stopped, act to prevent the pollution that has already taken place from spreading. Ensure that appropriate materials are available in appropriate quantities to use where necessary. For example, absorbent materials and booms to soak up the pollution are required to deal with spillages of liquid contaminants. For example, an excavator may be used to dig containment facilities or bunds where containing large volumes of pollutants.
4. **Notify the pollution incident:** Any emergency or incident will be reported as soon as possible after the above initial control measures have been implemented detailing the nature, cause and location to ensure that appropriate action is taken. Where appropriate, the site team should refer the incident to a specialist clean up Contractor. Where pollution is serious, or containment has failed, it may be necessary to contact the Local Authority, the Environment Agency and/or Natural England as relevant to the incident.
5. **Monitor the pollution incident:** Once the pollutants are contained, the site of the pollution should be monitored on an ongoing basis until the pollutants and contaminated materials are successfully removed and if necessary, further action taken to contain the pollutants. Where it is possible that pollution has spread, the surrounding water bodies and watercourses should be inspected and monitored on an ongoing basis to identify the extents of the pollution. In the event of pollution due to sedimentation of watercourses, those watercourses should be checked during periods of high rainfall or during construction activities with the potential for significant run-off.
6. **Clean up the pollution incident:** Once the pollution incident has been stopped, contained and the full extents defined, a strategy for cleaning up should be developed. All waste generated by clean-up activities should be disposed of in accordance with current legislative requirements and the site waste management plan and copies of all transfer notes retained.



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7. **Learn from the pollution incident:** Ensure that any lessons from the incident are communicated to all relevant staff and appropriate action taken elsewhere on-site if necessary. Update all relevant Method Statements and Toolbox Talks, and ensure new information is communicated to site staff.

Environmental Incident Protocol

In the event of an environmental incident occurring, the following protocol (or similar) will be adopted:

- The appropriate notification protocols shall be implemented immediately following a planning or environmental spillage or incident, followed by immediate notification of the Site Manager. Should a serious environmental incident occur, the EA should also be notified;
- The Site Manager will investigate the incident, with inputs from specialist advice as to appropriate measures to remedy or mitigate any potential pollution arising from the incident;
- Assuming the issue arose from the failure of a control system, the issue shall be rectified at the earliest opportunity;
- The response action shall be recorded on the Environmental Complaints/ Spills/ Incidents Report by the Site Manager or ECoW;
- A log of all environmental spills/ incidents and follow-up actions should be kept and made available for inspection; and,
- All complaints received from the public or other interested parties as a result of the installation works must be recorded on the Environmental Complaints/ Spills/ Incident Form.

Reporting of Environmental Incidents

All accidents, incidents and near misses (including spills, dust, noise pollution etc) will be reported to the Site Manager immediately, these will be recorded and investigated by the Site Manager and if there is legitimate concern for the surrounding flora and fauna after the incident, then an ECoW will be contacted for advice.

Details which will be recorded on the report will include:

- A description of the incident;
- Contributory causes;
- Adverse effects;
- Measures implemented to mitigate adverse effects; and,
- Effectiveness of measures implemented to prevent pollution incidents.

Emergency Contact Details

A notice displaying emergency contact details will be displayed in a prominent location within the site accommodation / office, including emergency spill response team details.

Internal Emergency Pollution Response Team

The details of at least two lead members of staff with responsibility for emergency pollution response will be included in this section, as well as the details of the ECoW during construction:



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- Primary emergency contact;
- Secondary emergency contact; and,
- Ecological Clerk of Works.

External Organisations

This section will be populated with contact telephone numbers for organisations to be contacted following a pollution incident (contact details are specifically excluded to ensure that the final version of the CEMP includes the most up to date details). Examples of the types of organisations/call lines to be included are:

- EA Incident Hotline; and,
- Natural England.



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Brazil	Poland
Canada	Portugal
China	Puerto Rico
Colombia	Romania
France	Senegal
Germany	Singapore
Ghana	South Africa
Guyana	South Korea
Hong Kong	Spain
India	Switzerland
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