FENWICK SOLAR FARM

Fenwick Solar Farm
EN010152

Framework Soil Management Plan

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1. Introduction

1.1 Overview

1.1.1 This Framework Soil Management Plan (SMP) sets out principles and procedures for good practice (embedded mitigation measures) and bespoke mitigation measures in soil handling, storage, and reinstatement to be used for Fenwick Solar Farm (the 'Scheme'). It sets out a framework that the appointed Contractor will follow to minimise adverse effects on soil resources.

1.1.2 To secure effective delivery of the soil management measures, they must be implemented by the Contractor through location-specific soil management method statements (or similar) for the construction phase. The works must also be monitored to audit compliance with the Framework SMP and location-specific construction method statements and allow ongoing advice on soil management to be provided.

1.1.3 This Framework SMP is based upon AECOM's experience, as well as relevant and applicable guidance, including:

a. The Department for Environment, Food and Rural Affairs' (Defra) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Ref. 1);

b. The Ministry of Agriculture Fisheries and Food's (MAFF) Good Practice Guide to Handling Soils (Ref. 2); and

c. MAFF's update the Institute for Quarrying's (IoQ) Good Practice Guide for Handling Soils in Mineral Workings (Ref. 3).

1.1.4 It is noted that, although the IoQ guide (Ref. 3) is titled for use in mineral workings, it is applicable to all infrastructure projects, particularly those where large volumes of soil are to be stripped, stored, and reinstated, such as the cable installation works to be undertaken as part of the Scheme.

1.1.5 This Framework SMP assumes that all mitigation measures pertaining to protected species and other environmental issues provided for in other management plans, such as the Construction Environmental Management Plan (CEMP), are in place, to allow soil stripping, storage and reinstatement operations to proceed.

1.1.6 This Framework SMP will be revised to produce a detailed SMP prior to commencement of the construction phase and will be informed by information provided through detailed soil surveys completed within the Solar PV Site. Detailed soil surveys are not proposed for the Grid Connection Corridor because there would be no above ground infrastructure and therefore any impacts would be temporary during construction and subject to the measures outlined within this Framework SMP. The City of Doncaster Council has agreed with this approach but recommended that a planning requirement be considered to ensure that the soils are not degraded during the construction process and farming activities can recommence following completion. The detailed SMP will provide industry standard good practice measures and be considered a 'live document' to be updated as required, should further information become available.

1.1.7 Production of the detailed SMP is secured through Requirement 15 of the **Draft Development Consent Order [EN010152/APP/3.1]**.

1.1.8 To aid understanding of this Framework SMP, a glossary of technical terms used is presented at the end of the document.

1.2 Roles and Responsibilities

1.2.1 The effective implementation of the detailed SMP, pursuant to this Framework SMP, requires that roles and responsibilities are clearly defined and understood. Specific job titles, roles, and responsibilities will be defined by the Contractor in the detailed CEMP and SMP. The roles and responsibilities are expected to be broadly similar to those described below but roles may be combined if competency exists across functional activity.

1.2.2 The site staff must be competent to perform the required tasks as they have the potential to cause an environmental impact. The training and awareness are to be ensured according to the procedures and tools described in the detailed CEMP and are to include measures, such as the provision of toolbox talks with all personnel involved in the groundworks and communicating the principles of good practice in soil management and its goals.

Project Manager

1.2.3 The Project Manager is responsible for:

a. Coordinating the delivery of all elements of the Scheme including ensuring conformance with the CEMP and other management plans, including the SMP, as well as any incident investigation required;

b. Facilitating the dissemination of generic environmental requirements to the project team;

c. Oversee the implementation and review of environmental procedures throughout the Scheme;

d. Monitoring the environmental performance of the Scheme through maintaining an overview of incidents, inspections and audits;

e. Ensuring that environmental considerations form an integral part of design and implementation of the works and to include environmental reviews as part of regular project meetings;

f. Reviewing environmental matters with Safety, Health, and Environment (SHE) Manager on a regular basis and as per Scheme requirements;

g. Liaising with Scheme SHE Manager on all environmental issues as appropriate;

h. Ensuring that all environmental incidents are reported to SHE Manager/Advisor according to agreed procedures; and

i. Nominating individual team members to support the Applicant in public relations and community liaison activities, including local community meetings.

Site Manager/Engineer

1.2.4 The Site Manager/Engineer, working with the Project Manager, is responsible for:

a. Understanding and implementing all environmental procedures as identified in the CEMP and other management plans, including the SMP, and ensuring that site operations function in compliance;

b. Reviewing risk assessments and method statements (RAMS) and/or Environmental Method Statements (EMS) submitted by the Contractor prior to beginning new works activities;

c. Reviewing the Safety, Health and Environment (SHE) Plan , prepared and amended by the SHE Manager/Advisor;

d. Reviewing and monitoring the implementation, and accuracy of, the CEMP;

e. Conducting incident investigation in the event of an incident or near miss being reported by any worker or member of site management staff during site walkovers or inspections;

f. Monitoring of contractor compliance with plans and procedures;

g. Liaising with the emergency services;

h. Conducting regular site inspections;

i. Reviewing applications for environmental consents and permits in line with the Project Manager; and

j. Notifying the SHE team (and/or local authority) when a variation in working time may cause impact upon local residents or upon a local authority consent.

Safety, Health and Environment Manager/Advisor

1.2.5 The SHE Manger/Advisor, working with the Project Manager, is responsible for:

a. Providing site inductions and toolbox talks on safety, health and environmental matters and sensitivities to the appropriate staff prior to works being undertaken;

b. Preparing, reviewing and updating the SHE Plan;

c. Assisting the Project Manager and Site Manager/Engineer in reviewing and approving RAMS and/or Environmental Method Statements;

d. Ensuring the RAMS/Environmental Management Plans (EMPs) are implemented, ensuring compliance with procedures and legislation. Checking all documents for Duty of Care requirements, including:

   i. Weekly routine audits of the Contractor’s compliance with the CEMP – site activities and record keeping;

   ii. Monitoring or inspection of site activities in response to incidents, breaches of the CEMP or complaints received from a third party;

   iii. Inspections of works to ensure that environmental mitigation measures incorporated into the design have been implemented;

iv. Implementing corrective mitigation measures where proposed mitigation results in effects over and above those within any DCO Requirement, or license;

v. Delivering toolbox talks on environmental matters and sensitivities to the appropriate staff prior to works being undertaken.

e. Ensuring Duty of Care with respect to all waste generated within the Order limits;

f. Preparing site specific mitigation plans in consultation with statutory consultees (in line with the Stakeholder Communications Plan) to ensure works can proceed in accordance with all environmental commitments and legislation;

g. Providing technical advice on the implementation of the CEMP including changes to legislative requirements and good practice;

h. Undertaking regular site inspections/walkovers to ensure construction practice is compliant with best working practices and approved RAMS/Environmental Method Statements. Between the SHE Manager and Ecological Clerk of Works (ECoW) environmental inspections will be undertaken daily. The SHE Manager/Advisor will have the authority to stop work where non-compliant working is observed;

i. Reporting any health and/or safety incidents to Site Management as per a defined reporting procedure (to be defined in the detailed CEMP);

j. Providing health and safety advice to construction managers;

k. Attending all construction progress meetings and providing updates on safety, health and environment performance of construction works. Also ensuring regular discourse with project site staff and subcontracted companies on environmental issues;

l. Monitoring weather forecasts and receiving Environment Agency flood alerts to allow works to be planned and carried out accordingly to manage extreme weather conditions, such as storms and flooding;

m. Investigating environmental complaints (in line with agreed project procedures, and communication to be in line with the Stakeholder Communications Plan);

n. Being the day-to-day contact with relevant authorities and other regulatory agencies, such as the Environment Agency; and

o. In conjunction with the Applicant, liaise with government departments, local authorities and other statutory authorities on environmental matters. Obtaining consents and permits, as per project needs.

Site Foreman

1.2.6 The Site Foreman is responsible to the Site Manager for:

a. Implementing the location-specific construction soil management method statements to manage soil handling and storage on site to ensure the sustainable use of the soil resource;

b. Ensuring daily records of weather conditions, stoppages and soil plasticity (moisture) testing are made and kept;

c. Ensuring that works are carried out safely, under correct conditions and in compliance with wider environmental requirements; and

d. Ensuring that the protection of services is maintained during the soil handling works.

The Land Officer

1.2.7 The Land Officer will be employed by the Contractor to provide local landowners and those with land-related interests information regarding daily construction activities. They may be supported by an Agricultural Liaison Officer (ALO) (or similar).

1.2.8 The Land Officer will ensure that the specifications of the detailed SMP and location-specific construction method statements/soil management plans are implemented. It is envisaged they will have sufficient soil science experience or will work in cooperation with a Technical Specialist Advisor (TSA) with soil science capability. This will ensure awareness of any potential issues arising which may include potential reinstatement issues which will impact upon crop losses and may culminate in increased compensation claims.

1.2.9 The main duties of the Land Officer will comprise, but will not be limited to:

a. Liaising between the Contractor, landowners/tenant farmers, other project teams that occur on the same land, and the Applicant;

b. Assessing the soil condition during and after the works using tactile and visual methods;

c. Assessing compliance of the work on site with the SMP;

d. Signing off the quality of restoration to allow for the commencement of the aftercare;

e. Ensuring the adequacy of the detailed aftercare programme and its annual updates (if required);

f. Soil sampling and production of annual aftercare reports; and

g. Signing off completion of the aftercare.

Environmental Clerk of Works

1.2.10 An Environmental or Ecological Clerk of Works (ECoW) will be appointed and ensure the implementation of, and compliance with, the provisions of the detailed CEMP and other management plans, including the detailed SMP.

1.2.11 The ECoW may be from a company who provide a general Clerk of Works who can liaise with a team of specialists in specific environmental subjects, such as soils and agriculture throughout construction where required, or may be a suitably qualified individual. The ECoW will be responsible for inspections and audits of the Contractor's work site to ensure compliance with environmental standards and requirements.

Technical Specialist Advisor

1.2.12 In relation to the SMP the main duties of a TSA will comprise, but will not be limited to:

a. Providing advice with respect to construction activities and their interface with respective technical areas of expertise;

b. Undertaking any necessary pre-construction surveys and supervising the implementation of specific mitigation measures, where required;

c. Undertaking any required monitoring related to their specialism;

d. Providing reports and maintaining contact with relevant stakeholders, as required; and

e. Providing specific advice with respect to any issues that arise.

1.3 Limitations of Use of the Framework Soil Management Plan

1.3.1 The Framework SMP should be read in conjunction with other project documents, including the **Framework CEMP [EN010152/APP/7.7]** and other plans and protocols referred to therein. The Framework SMP does not provide safe working guidance and should be read in conjunction with the relevant detailed construction method statements and risk assessments prepared by the appointed Contractor. Attention is drawn to the responsibilities arising from the Construction (Design and Management) Regulations (CDM) 2015 (Ref. 4).

1.3.2 Persons involved in the handling of soils and overburden or similar, and in the construction or removal of mounds or tips, must comply with the Health and Safety at Work Act 1974 (Ref. 5), but particularly aspects which relate to the construction and removal of tips, mounds, and similar structures. This requirement takes precedence over any suggested practice presented in this Framework SMP.

2. Review and Update of the Soil Management Plan

2.1.1 The Framework SMP will be reviewed and updated prior to commencement of the construction phase to consider additional site-specific soils data complied via the pre-commencement soil surveys and any other relevant data to become the detailed SMP.

2.1.2 The detailed SMP will include the following:

a. Maps showing topsoil and subsoil types, and the areas to be stripped and left in-situ;

b. Methods (including machinery) for stripping, stockpiling, respreading, and ameliorating the soils;

c. Maps showing locations of soil stockpiles and content (e.g. Topsoil type A, subsoil type B), including reference to original location;

d. Maps showing locations of where topsoil and subsoil types will be reinstated, with reference to specific stockpiles;

e. Schedules of volumes for each material;

f. Expected after-use for each soil, for example whether topsoil to be used on site, used off site, or subsoil to be retained for landscape areas, used as structural fill or for topsoil manufacture; and

g. Identification of person responsible for supervising soil management, building upon the roles and responsibilities set out in Section 1.2 of this Framework SMP.

2.1.3 It is noted that in relation to point ‘e’ above, it is expected all soils will be retained on site and reinstated in their area of origin and that the soil profile will not be disturbed due to the installation of Solar PV Mounting Structures, as these are typically driven directly into the ground without the need for foundations.

2.1.4 The detailed SMP will be considered a live document and will be updated throughout the construction phase of the Scheme, as required. Updates may be required for one or more of the following reasons:

a. A new environmental sensitivity is identified as a consequence of changing environmental conditions or following more detailed or additional survey work;

b. There are changes in the personnel responsible for supervising soil management;

c. Changes are introduced into the detailed design of the Scheme; and/or

d. Changes are introduced to construction methodology or programming.

2.1.5 The changes to the detailed SMP should be implemented via agreed procedures and changes approved by the Site Manager and Land Officer or ALO.

3. Soil Types

3.1.1 A soil and ALC survey has been undertaken by specialist soils company Land Research Associates within the Solar PV Site. The data and survey methodology are further described within **ES Volume III Appendix 12-3: ALC Survey Report [EN010152/APP/6.3]**.

3.1.2 The ALC report identified that the National Soil Map (published at 1:250,000 scale) records all the land as Foggathorpe 2 Association. These are mainly clay soils with poor drainage formed in Quaternary clay deposits, with some lighter soils where windblown sand overlies the clay.

3.1.3 The ALC survey based on observations at intersects of a 100 m grid, giving a density of one observation per hectare. During the survey, soils were hand augered and pits were dug to a maximum depth of 1.2 m. The soils were found to dominantly consist of stoneless clay or heavy clay loam topsoil over slowly permeable clay subsoil. The subsoils show evidence of prolonged waterlogging to shallow depth (greyish colours with ochreous mottles) and are generally poorly structured immediately below the topsoil. These observations align with the description of the Foggathorpe 2 association

3.1.4 These soils are judged imperfectly draining (Soil Wetness Class III) under the local climate. In places, particularly in the east, sandier upper layers occur above the clay (mainly sandy clay loam in texture). Limited areas adjoining the River Went in the north have peaty subsoil, usually overlain by clayey alluvium. These areas are likely to be affected by shallow groundwater for long periods and are judged poorly draining (Soil Wetness Class IV

3.2 Solar PV Site

3.2.1 The land within the Solar PV Site is dominated by heavy soils with poor drainage, giving land of Subgrade 3b quality due to wetness/workability limitations. Small patches of better draining land are of Subgrade 3a quality. Small areas adjoining the River Went are limited to Grade 4 by flooding risk. See **ES Volume III Appendix 12-3: ALC Survey Report [EN010152/APP/6.3]** for further details.

3.3 Grid Connection Corridor

3.3.1 Site surveys were not undertaken for the Grid Connection Corridor as disturbance to soils will be temporary and subject to the measures outlined within this Framework SMP.

4. Good Practice Mitigation

4.1 General Principles of Soil Handling

4.1.1 The main threats to soil resources at construction sites are trafficking of vehicles/plant and incorrect handling which can cause damage to soil structure through compaction and smearing (both effects are sometimes referred to as deformation). These effects compromise the ability of the soil to perform its functions, such as providing adequate amounts of water, air and nutrients to plant roots. The risk of compaction and smearing increases with soil wetness.

4.1.2 To minimise the risk of damage to soil structure, the following main rules should be applied to all soil handling tasks:

a. No trafficking/driving of vehicles/plant or materials storage to occur outside designated areas;

b. No trafficking/driving of vehicles/plant on reinstated soil (topsoil or subsoil);

c. Only direct movement of soil from donor to receptor areas (no triple handling and/or ad hoc storage);

d. No soil handling to be carried out when the soil moisture content is above the lower plastic limit (the soil is plastic, see Soil Condition for an infield test, Table 1 and Table 2);

e. Soils should only be moved under the driest practicable conditions and this must take account of prevailing weather conditions;

f. No mixing of topsoil with subsoil, or of soil with other materials;

g. Soil only to be stored in designated soil storage areas;

h. Plant and machinery only work when ground or soil surface conditions enable their maximum operating efficiency;

i. All plant and machinery must always be maintained in a safe and efficient working condition; and

j. Daily records of operations undertaken, and site and soil conditions should be maintained.

4.1.3 Low ground pressure (LGP) models and tracked vehicles should be used where practicable. This will greatly minimise the extent and/or intensity of the soil loosening required after restoration. Consequently, it will reduce the costs and potential delays due to the need for additional soil cultivation.

4.1.4 It is anticipated that all construction compound areas will be subject to topsoil stripping, with the stripped material stored appropriately for reinstatement (in accordance with this plan). In circumstances where topsoil remains in situ, protective measures such as matting or cellular confinement systems would be applied to safeguard soil structure and function during the construction phase.

4.2 Stop Conditions

Adverse Weather

4.2.1 In certain weather conditions, the handling of topsoil and subsoil must be effectively managed to prevent damage. Topsoil and subsoil handling may need to be ceased under the following criteria:

a. In drizzle and/or intermittent light rain, handling can continue for up to four hours unless the soils are already in a plastic state (see Soil Condition);

b. If there is heavy rain (e.g. heavy showers, slow moving depressions), handling must stop immediately;

c. If there is sustained heavy rainfall of more than 10mm in 24 hours, soil handling must be suspended and not restarted until the ground has had at least a full day to dry, or an agreed soil moisture limit can be met; and

d. Soil shall not be handled or trafficked over/driven on immediately after a heavy rainfall (or snow/hail) in a waterlogged condition, or when there are standing pools of water on the soil surface.

4.2.2 If the works are interrupted by a rainfall event, soil stripping should be suspended and, where the soil profile has already been disturbed, the works should be completed to the base level in that location.

4.2.3 Before recommencing work, soil moisture content must be tested as described below in Soil Condition and Table 1 and Table 2 and work may only recommence if soil moisture is below the lower plastic limit. The weather forecast must also be checked and works only recommenced if agreed by the ALO.

4.2.4 Additionally, soil should not be handled or trafficked over/driven on when the ground is frozen or covered by snow.

4.2.5 Procedures should be in place to seek to ensure the above criteria should be clearly understood by all personnel.

Soil Condition

4.2.6 Irrespective of the weather, soils should not be handled when in a plastic state (when moisture content exceeds their lower plastic limit) and, as a general rule, should be dry when handled. This section and Table 1 and Table 2 set out the methodology for determining whether soils are in a state where they can be handled.

4.2.7 A project-wide seasonal constraint to the construction programme is not recommended as this may not be achievable in practice but seasonal wetness is the main feature of the soil types identified within the Order limits. Winter rainfall means that scheduling should seek to concentrate soil handling within drier periods of the year when the soils are below their plastic limit. However, due to the scale of the Scheme, it is understood that some soil handling when the soils are wet (in a plastic state) may be necessary. Wet working measures should be applied to the clay soils but it is recognised that the soil type may result in exceptions to the general rule of dry handling.

4.2.8 If soil is excavated and placed in stockpiles when wet (above the plastic limit), they are easily compacted by the machinery handling them or the

weight of the soil above in the stockpile. Additional measures will be required to minimise damage to soil structure as far as practicable. Such additional measures may include, but are not limited to, reducing stockpile heights to low single tiered mounds, reducing the number of times the soil is handled during wet conditions, and using equipment that is less detrimental to soil structure (excavator and dump truck). As well as damage to soil structure when soils within a stockpile are compacted, the core of the stockpile remains anaerobic throughout the storage period. This results in the soil being very difficult to handle and respread at the time of reinstatement (i.e. it will not be in a friable state and break down into a suitable tilth). To achieve the required standard of restoration, a period of drying and appropriate additional cultivation is required to repair soil structure and reaerate the soil and ensure the soil is acceptable for planting. Should wet handling of soils be required, appropriate soil handling, drying and cultivation methodologies will be adopted and operational aftercare measures are outlined in Section 4.11.

4.2.9 Once the placement of soils into each stockpile has been completed, rainfall and soil moisture conditions are of lesser importance providing they do not lead to significant environmental impacts, such as erosion and discharges of sediment laden water from the stockpiles to drainage ditches and other watercourses.

4.3 Field Testing of Soil Conditions

4.3.1 Prior to the start or recommencement of soil handling operations, the following two stage methodology comprising a moisture state test and a consistency test should be undertaken. This approach is set out in IoQ guidance (Ref. 3) and is considered to be less open to interpretation and easier to conduct than use of consistency testing.

4.3.2 At least five points per area to be worked on a given day should be sampled (a minimum of one point per 50 m of the length of the working area, or two samples per hectare). The sample should be a composite of at least five subsamples from around each sample point. Samples of both topsoil and subsoil should be taken and sampled separately.

Soil Moisture Scale

4.3.3 The samples should first be tested for soil moisture state as per the methodology in Table 1.

Table 1: Testing for Soil Moisture State

Test	Rule for Handling
If soil sample is wet, films of water are visible on the surfaces of soil particles and aggregates; or If soil sample readily deforms into a cohesive ‘ball’ when squeezed	Soils should not be handled (or if handling cannot be avoided additional measures be required as per Soil Conditions section above).
Soil peds break up/crumble readily when squeezed in the hand. Sample does not form a cohesive ball.	Soils can be handled.

Test	Rule for Handling
If the sample is moist, there is a slight dampness when squeezed between the fingers, but it does not significantly change colour (darken) on further wetting.	No handling by dozers but may be handled by excavators if the consistency test is passed.
Sample is dry and brittle. Sample looks dry and changes colour (darkens) on wetting.	Soils can be handled if the consistency test is passed.

4.3.4 As required, samples should be further tested for consistency as per the methodology in Table 2.

Table 2: Testing for Soil Consistency

STEP A **Attempt to roll sample into a ball by hand**	
It is impossible because the soil is too hard (dry).	Soils can be handled.
It is impossible because the soil is too loose (dry).	Soils can be handled.
It is impossible because the soil is too loose (wet).	Soils should not be handled (or if handling cannot be avoided additional measures be required as per Soil Conditions section above).
It is possible to roll the sample into a ball by hand.	See Step B
STEP B **Attempt to roll the ball into a thread of 3 mm diameter on a flat non-adhesive surface using light pressure from the flat of a hand**	
It is impossible as the soil crumbles or disintegrates.	Soils can be handled.
It is possible to roll a 3 mm diameter thread.	Soils should not be handled (or if handling cannot be avoided additional measures be required as per Soil Conditions section above).

4.3.5 The final decision on whether soil handling can commence will be made by the ALO and be based upon at least 80% of samples passing the relevant test(s).

4.3.6 The above criteria should be clearly understood by all personnel involved in soil handling.

4.4 Soil Preparation

4.4.1 Marking and signposting of all undisturbed areas where there is to be no construction activities or vehicle trafficking over/driving will follow detailed

works plans and construction method statements (to be prepared post-consent by the Contractor). Any trees, hedgerows, or valuable habitats which are to be retained will be marked out with barrier tape and subsequently protected and managed.

4.4.2 As per the requirements of detailed works plans and construction method statements (to be prepared post-consent by the Contractor), any underground services crossing the area of soil stripping are to be surveyed and their depth and position clearly marked to ensure they are not impacted by the stripping works. To ensure the integrity of the service infrastructure is maintained after stripping, the service location may require fencing off or, if the area over the service is to be trafficked, additional protection or mitigation may be required.

4.4.3 Mark each soil storage area for different types of topsoil, subsoil, and mineral substrate. In some locations, the excavated soil profile may contain more than one distinct subsoil horizon (layer). Where this occurs due to the different properties of the different horizons, they must be excavated and stored separately. Locations requiring the storage of more than one subsoil horizon should be identified through review of the soil survey records and specified in the location-specific construction method statements.

4.4.4 If watercourse crossings are identified in location-specific construction method statements, a 2 m width of topsoil will be left unstripped at either side of the ditch/watercourse to act as a filter for water run-off.

4.4.5 To reduce the likelihood of anaerobic conditions developing within the topsoil stockpile, the topsoil surface should either be bare, under stubble, or have only short surface vegetation prior to the soil strip commencing. To achieve short surface vegetation (for example in areas of permanent pasture or grassland), if not already done so prior to the land being handed over to the Scheme, the area should be mown or strimmed. Cuttings should be lifted and disposed of off-site to a suitably licenced facility with reuse and recycling favoured over disposal (e.g. recycling via a local composting facility). Cuttings must not be added to or mixed with the stripped soil, as the presence of excessive amounts of plant material in the stockpile will be detrimental to its quality due to its putrefaction (rotting) in anaerobic conditions. Alternatively, the vegetation may be killed off by application of a suitable, Environment Agency approved, non-residual herbicide applied not less than two weeks prior to commencement of soil stripping operations at the location. Herbicide may only be used with the consent of the landowner and subject to the conditions/restrictions within the contract. Should herbicide be required a method statement will be prepared prior to the work commencing. This will include measures to protect ground and surface water, including that such work would not be undertaken during or before rainfall and high winds. Such work will only be carried out by competent personnel using products approved for UK use with adherence to manufacturer’s instructions.

4.5 Soil Stripping

4.5.1 Topsoil can be stored on either topsoil (of the same type) or on subsoil. Subsoil can only be stored on subsoil and, therefore, the topsoil must be stripped from subsoil storage areas in advance of subsoil stripping and subsequent storage.

4.5.2 The stripping method should follow one of the suggested methods as described in the Institute of Quarrying's Good Practice Guide for Handling Soils in Mineral Workings (Ref. 3). As stated, topsoils and subsoils will be stored separately.

4.5.3 It is expected that in most locations, the excavated soil will be stored on the margin of the working area and the use of dumper trucks will not be required. Where soils are to be stored away from excavation areas, two excavators and one transport vehicle will be required for soil stripping operations. One excavator will be required to undertake the soil stripping and the other to form the soil stockpiles. The excavator undertaking the soil stripping should be fitted with a toothed bucket, except where use of a toothless bucket is required to prevent damage to potential underlying archaeology. The method, if correctly carried out, should avoid severe compaction as soil trafficking is minimised.

4.5.4 The size of the earthmoving plant to be used should be tailored to the size of the area being stripped and space available within the working area. The use of a long reach excavator which minimises the need for movement across the soil surface and use of tracked vehicles or vehicles with a low ground bearing pressure is recommended to further reduce soil compaction.

4.5.5 Prior to commencement of soil stripping, the width of each strip must be determined. Strip width is determined by the length of the excavator boom and stand-off to operate but is typically 3 m to 4 m. The strip width should make full use of the reach of the excavator. This will maximise the time the excavator can remain at a fixed location before moving further along the strip. This minimises the number of locations subject to the weight of standing plant.

4.5.6 Where the stripping operation is likely to be interrupted by rain or there is likely to be overnight rain, any exposed subsoil down to the basal layer should be removed before suspending operations. Provisions to protect base of current or next strip from ponding/runoff by sumps and grips and clean and level the basal layer should be made. At the start of each day, it should be ensured there is no ponding in the current strip or operating areas and the basal layer is to level with no ruts.

4.6 Creation of Stockpiles

4.6.1 Correct storage/stockpiling will maintain soil quality and minimise damage to soil structure and soil biota. This ensures the soil will readily recover once respread, promoting timely and effective restoration. Stockpiled soil must not be vulnerable to compaction or erosion, cause pollution to surrounding watercourses, or increase flood risk to the surrounding area.

4.6.2 Potential soil erosion and water pollution can be minimised through good practice measures, including but not limited to the avoidance of trafficking over/driving on the soil stockpiles, the seeding of stockpiles, and the use of intermittent spaces in the stockpiles.

4.6.3 Soil should not be stacked closer than 10 m from a watercourse or ditch. Gaps shall be left where necessary to allow for surface water drainage and avoid ponding of water behind stockpiles. If soils are stored near hedges or hedgerows that require maintenance, the ALO should be consulted to confirm a sufficient track width for agricultural machinery and vehicles to

undertake the maintenance e.g. hedge cutting. Soil should not be stored in the root protection area of trees.

4.6.4 Ecologically important soils, for example open mosaic habitat soils (if confirmed as present within the Order limits) and woodland or hedgerow soils, must be stripped and stored separately to ensure the seedbank is retained and not mixed with neighbouring agricultural soils. These stockpiles must be appropriately marked out and clearly signed to ensure they are easily identifiable at restoration, as specified in location-specific construction method statements.

4.6.5 Generally, topsoil stockpiles should not exceed 3 m in height and subsoil stockpiles should not exceed 5 m in height. However, if the soil to be stockpiled is dry (below the plastic limit) formation of higher stockpiles may be permissible as the soil is likely to remain dry in the core of the stockpile for the entire storage period. However, the appropriate height of stockpiles will need to be established on a location-by-location basis.

4.6.6 Stockpiles are to be formed by ‘loose-tipping’ followed by ‘shaping’ to form a level surface on top of the pile and uniform gradients down the sides. During the ‘forming’ stage, the top and sides should be smoothed so that they can shed water, ensuring the entry of the water to the stockpile is limited so the stored soil remains dry and prevents erosion and ponding. This is achieved by dragging the bottom of the excavator bucket along the stockpile surface.

4.6.7 The natural angle of repose of a soil, and hence the maximum gradient (slope) of the stockpile sides, depends upon its texture and moisture content. The maximum achievable slope angle is 40 degrees, however shallower angles are often more appropriate. Where soil bunds are likely to be in situ for a long period (usually greater than six months), they should be seeded and maintained. In this case, a maximum slope of 25 degrees is considered appropriate as it would allow safe working conditions during stockpile maintenance (e.g. strimming), however, this will be defined in location-specific construction method statements. Where soil bunds are to be in situ temporarily or short term (usually less than six months), they may not require seeding. However, weather conditions and soil sensitivity to erosion should be considered and appropriate measures put in place to reduce soil erosion where necessary.

4.6.8 The topsoil and subsoil stockpiles along cable trenches are to be formed using one backacting/360 degree excavator as they will be too close to the excavation to require transport in a separate vehicle.

4.6.9 If transport is required, the method described in the IoQ Guide, Part 2 Sheet B: Building Soil Storage Mounds with Excavators and Dump Trucks (Ref. 3) will be followed.

4.6.10 A dump truck should transfer soil material between the stripping and storage areas. The dump truck should enter the storage area, reverse, and back-tip the soil load starting at the furthest end of the stockpile. The activity should be repeated by tipping the soil against the forming stockpile without the wheels traversing onto previously tipped material. For this operation, a second back-acting/360 degree excavator will be required with the boom reach allowing it to form a stockpile of up to 4 m while standing on it. Use of a front-loading machine to form the stockpile is possible if this is the Contractor’s preference. If this alternative is chosen, the tipped soil must not be travelled or pushed with a bulldozer blade. It must be lifted by the front-

loading machine and tipped into place to form a desired stockpile height. The top and side surfaces of the stockpile must be formed to shed the rainwater.

4.7 Use of Stripped Soil (Maximum Time Stored and Backfilling)

4.7.1 Prior to commencement of works, a detailed SMP will be prepared in accordance with this Framework SMP. The detailed SMP will set out the management of soil on areas such as temporary working compounds, temporary and permanent tracks, and sites of temporary and permanent buildings. The detailed SMP will include details of topsoil and subsoil stripping depths, how and where soils will be stored, conditions under which soil stripping and reinstatement will be carried out, and how reinstatement will be carried out. The detailed SMP will follow the principles of good practice including the Defra Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Ref. 1) and The Institute of Quarrying Good Practice Guide for Handling Soils in Mineral Workings (Ref. 3).

4.7.2 Where soil is expected to be stored for a period of more than six months, the stockpiles should be seeded with appropriate low maintenance grass/clover mixture (or similar) which is agreed with landowner and subject to the conditions/restrictions within the contract. This will protect the soil against erosion, minimise soil nutrient loss, and maintain soil biological activity. Appropriate seeding will also help prevent colonisation of the stockpile by nuisance weeds that could spread seed onto adjacent land.

4.7.3 In the period where vegetative cover on the stockpiles is establishing, the stockpiles will be sprayed with water during dry weather, where required, to prevent wind erosion (generation of dust) and to ensure that the seeds establish. The stockpile may be covered with an appropriate geotextile to stabilise it until the vegetation cover becomes effective.

4.7.4 Stockpiles will be monitored for the presence of undesirable weed species and the stockpile vegetation cover managed by spraying, mowing or strimming as defined in location-specific construction method statements (or similar) to prevent the spread of seeds from the stockpile onto adjacent land.

4.7.5 Where soil will be stored for a shorter period than six months, they may not require seeding. However, weather conditions and soil sensitivity to erosion should be considered and appropriate measures put in place to reduce soil erosion, where necessary. Depending upon specific site and soil conditions, such measures may include spraying the stockpiles with water to prevent wind erosion (generation of dust) where required during dry weather, the use of specialist surface run-off control systems, covering the stockpiles with an appropriate geotextile to stabilise it, and use of wind barriers.

4.7.6 Where geotextiles are used for soil storage, geotextiles that are permeable and biodegradable are recommended. This will prevent soil movement but allow for water and air to pass through maintaining soil in a good condition. A geotextile that supports plant rooting will be beneficial and able to aid stockpile stability and reduce erodibility. This detail will be included in the detailed SMP.

4.7.7 The condition of all stockpiles is to be regularly monitored. If rainwater gathers on the stockpile surface or in areas directly adjacent to them,

drainage pathways to soakaway areas away from the stockpile should be provided.

4.8 Stockpile Records

4.8.1 The locations and footprint of each stockpile should be accurately recorded on a plan of appropriate scale. Marker post should be provided in locations which have been surveyed and recorded.

4.8.2 The approximate volume of each stockpile should be recorded, along with details of the type of soil stored.

4.8.3 Regular inspections of the stockpiled soils should be undertaken. If signs of erosion are observed, reforming the sides of the stockpile or implementing additional mitigation measures may be required.

4.8.4 The growth of trees and scrub on the long-term soil stockpiles for soils stripped from the On-Site Substation, Field Stations, or along access tracks should be prevented as the development of tree roots and stumps can hinder the later reuse of the soils.

4.9 Drainage

4.9.1 Gaps shall be left between soil stockpiles where necessary to allow for surface water drainage and avoid ponding of water behind stockpiles. In certain areas, as defined in location-specific construction method statements (or similar), ‘grips’ may be dug across the working area at predetermined locations to prevent erosion and prevent ponding against stockpiles. Appropriate measures such as stones, silt traps, and silt fencing should be employed as required.

4.9.2 All reasonably practicable measures, particularly maintaining vegetated buffer strips, will be taken to prevent the deposition of fine sediment or other material and pollution by sediment of existing watercourses arising from construction activities.

4.9.3 The relevant sections of BS 6031: Code of Practice for Earthworks (Ref. 7) will be followed for the general control of site drainage.

4.9.4 Mud deposits will be controlled at entry and exit points using wheel washing facilities and/or road sweepers operating during earthworks activities or other times as required.

4.9.5 Debris and other material will be prevented from entering surface water drainage through the use of toolbox talks to instil the benefits to soil and environment of maintenance of a clean and tidy site, aided by the provision, use and maintenance of clearly labelled waste receptacles, grid covers, and the presence of site security fencing.

4.10 Restoration

4.10.1 The Contractor will clear all temporary working areas and accesses as the work proceeds and when they are no longer required for the works. On completion of the construction works, all plant, materials, and temporary works/structures will be removed.

4.10.2 Land within the Grid Connection Corridor will be restored to its original land use. In most locations, direct excavation of the soil from the stockpiles using a long-reach back-acting/360 degree excavator will be possible.

4.10.3 Where larger stockpiles are created and there is a necessity for soils to be transported to the reinstatement area via dump truck, for example at temporary construction compounds, stockpile excavation is to follow the methodology described in IoQ Guide, Part 2, Sheet C: Excavation of Soil Storage Mounds with Excavators and Dump Trucks (Ref. 3). In this method, the dump trucks will enter the storage area travelling on the base layer (where topsoil and subsoil stripped) and on the subsoil (where only topsoil stripped). If back-acting/360 degree excavator is used, it must stand on top of the stockpile to load the dump truck. The stockpile will be dug to the base (the original subsoil) before moving progressively back along its axis.

4.10.4 The main objective for the restoration of agricultural land is to reinstate the land to its original (pre-development) Agricultural Land Classification (ALC) grade. This is primarily achieved by ensuring the full soil profile is restored in the correct sequence of horizons and is in a state where good soil profile drainage and plant root development are achieved. This ensures the reinstatement works cause minimum damage to soil structure.

4.10.5 Therefore, soil restoration measures have been designed to achieve soil profiles as close to the original as possible which is a prerequisite for the maintenance of the original agricultural land quality/other prior land use.

4.10.6 In areas where land compaction has occurred or where required by the landowner, it may be necessary to undertake subsoil restoration techniques to restore the structure of the subsoil and to assist with future drainage. Topsoil would be returned to its final location at the earliest suitable time of year. The topsoil would be levelled, cultivated, and reseeded as agreed with the landowner/occupier.

General Methods to be Used During Restoration

4.10.7 Soil reinstatement shall be subject to the same constraints of weather and soil moisture conditions as soil stripping. All methods must adhere to the general principles set out below.

Excavation of Soil Stockpiles

4.10.8 The size of the earthmoving plant to be used should be tailored to the size of the area to be reinstated. Front loading machines may be used, in which case they will not need to enter the top of the stockpile. Any exposed edges/surfaces should be shaped and at the end of each day and, where required, at the onset of rain.

4.10.9 Where geotextiles are used to stabilise stockpiles, the geotextile should be gradually removed from the stockpiles as the excavation progresses leaving enough to cover the end of the stockpile at the end of the working day (or during rain stoppage). The geotextile should be removed off-site to a local green waste composting facility or other suitably licenced facility. It is expected the amount of soil left on the geotextile will be minimal and not result in significant loss of soil.

4.10.10 Should the geotextile be sufficiently decomposed and break into small (a few centimetres wide) fragments upon the removal, it can be left on the stockpile

during the excavation and left in the reinstated soil. The suitability of this option should be assessed by the ALO, Land Officer, or other suitable person such as the TSA.

Placement of Excavated Materials

4.10.11 Where restoration involves the replacement of excavated materials, other than soils (i.e. material (overburden) from a depth greater than the base of the subsoil), the overburden must be replaced first. The overburden material may be overfilled by 10% to 15% to allow for settlement to the design profile.

4.10.12 Following the placement of overburden to form the base layer, the surface should be graded to the required landform and any debris removed before soils are reinstated. Similarly, where required, the surface of the overburden should be loosened to an appropriate depth of not greater than 1.2 m.

Soil Reinstatement

4.10.13 Soil reinstatement is the reverse of soil stripping with topsoil being replaced over subsoil. The specifications for reinstated soil profiles are to be determined on a location-by-location basis using the soil survey data and set out in location-specific construction method statements. Care must be taken to ensure soil horizons are replaced to the correct thickness with an allowance of up to 20% to allow for settlement.

4.10.14 In most locations, direct excavation and restoration of the soil from the stockpiles using a long-reach back-acting/360 degree excavator will be possible. Through this method, the subsoil will be replaced first with the excavator travelling on the subsoil and gradually taking the topsoil from the stockpile and depositing it on the subsoil. The deposition is to be carried out by loose tipping and a toothed digger bucket used.

4.10.15 Soil replacement is to follow the methodology set out in IoQ Guide, Sheet D: Soil Replacement with Excavators and Dump Trucks (Ref. 3). Through this method, the soil is replaced in strips above the base layer to recreate the original soil profile and topsoil is replaced on the previously decompacted subsoil. The replacement is carried out in strips in a similar manner to the stripping operations. The initial strip width and axis is to be demarcated. The width of the strip is determined by excavator boom length and stand-off to operate but is typically 5 m to 8 m. A wide bladed bucket should be used to spread the soil (use of a toothed bucked must be avoided in this case).

4.10.16 The dump truck should reverse to the edge of the current strip and tip the lowest layer, without the wheels riding onto the strip. The dump truck must not drive away until all the soil is deposited within the strip without spillage over the basal layer. To achieve this, assistance from the excavator to ‘dig away’ some of the tipped soil may be required. The tipped soil should be spread to the full thickness required by the excavator utilising the digging, pushing, and pulling action of the bucket. Each load must be spread before another is tipped. The process should be repeated along the strip until it is completely covered with the required depth of the soil layer. Should the spread soil comprise of large blocks (greater than 0.3 m), they should be broken down by ‘slicing’ them with the excavator bucket.

Soil Decompaction

4.10.17 Due to the use of subsoil as the working surface, subsoil decompaction will be required prior to the placement of the topsoil. The method of using a low ground pressure bulldozer either fitted or towed with winged subsoiler tines is recommended. For the decompaction to be effective, the moisture content of the soil must be below the lower plastic limit, so the soil is dry enough to shatter and for fissures to be created. For this reason, early autumn is the optimm timing for sub-soiling. Further information on the issues surrounding soil compaction can be found in the IoQ Guide: Supplementary Note 3 – Compaction (Ref. 3).

Achieving the Restoration Standard

4.10.18 The quality of the soil reinstatement will need to be verified by the ALO, Land Officer, TSA. Post-restoration surveys will be required across all land reinstated to agriculture to determine whether target soil profile specifications have been met. The aftercare will commence after soil characteristics achieve the restoration standard.

4.10.19 It is anticipated that post-construction soil surveys will be undertaken to record the ‘after’ statement of physical characteristics of the restored soils.

4.10.20 This ‘after’ statement will be compared to the ‘before’ statement to verify the land has been restored to the required standard. If the restored soil properties are found to differ from the ‘before’ characteristics to an extent that makes it impossible for the standard to be reached, the remediation will need to be carried out before the aftercare commences. This approach will ensure any problems are identified and rectified early after construction. This will, in turn, minimise the period of aftercare and risk of compensation claims.

4.10.21 It is noted the physical conditions of restored land may take several years to stabilise and, therefore, ALC survey is not normally undertaken until five years after soil replacement. However, assessment of remediation success should take place sooner and operational aftercare implemented, as required, to ensure the soil returns to a healthy state and corrective measures are implemented if needed.

4.11 Operational Aftercare within the Solar PV Site

4.11.1 Notwithstanding the good practice described in this Framework SMP, compaction on the Solar PV Site may be evident through field observations, such as the presence of ponded water, poor plant growth, and eroded soil. Compaction can be determined through field measurements, including taking bulk density samples, using commercially available penetrometers. Other measurements, such as soil infiltration (Ref. 8), may be used as indicators of compaction.

4.11.2 Natural processes can alleviate soil compaction but additional measures to alleviate soil compaction are often desirable because

a. It can take many years for natural processes to loosen soil;

b. Natural processes operate primarily within the upper horizons of soil, and compaction from development can be present lower in the soil profile; and

c. Once soil compaction becomes so severe that plants and soil microbes can no longer thrive, natural processes are no longer able to reduce soil compaction.

4.11.3 The two most common methods for alleviating compaction are soil subsoiling and addition of organic matter. Note any operation of machinery within the established site must be compatible with the location of buried cables.

4.11.4 If subsoiling is required, then a suitably qualified agricultural engineer should specify subsoiler design and operation. If subsoiling is effective then the ground should be lifted slightly and remain relatively even behind the subsoiler, without major disruption of surface residues and plants. No more than a little subsoil and a few rocks should be pulled to the surface. The creation of furrows behind the subsoiler is an indicator that the shanks may not be deep enough, the angle on winged tips may be too aggressive, or the travel speed may be too high.

4.11.5 Compost results from the controlled biological decomposition of organic materials that has been sanitised through the generation of heat and stabilised to the point that it is beneficial to plant growth. It is an organic matter resource that improves the chemical, physical, and biological characteristics of soil. Compost has a lower bulk density than mineral soil particles (sand, silt, and clay) and, furthermore, aggregates soil particles into larger particles thereby creating additional porosity. Both the dilution and aggregation effects reduce the bulk density of the soil and water holding capacity of the soil is increased. Other benefits attributed to compost include increased plant production, increased root penetrability, reduction of soil diseases.

4.11.6 Compost may be spread over the soil surface or incorporated. Neither broadcast nor tilling in compost may be appropriate if a desired vegetation cover has already established or where there are established tree roots.

4.11.7 During the operation and maintenance phase, the condition of soils beneath and surrounding infrastructure (including Solar PV Panels) will be monitored through the performance of the established vegetation which acts as a proxy for soil health. The absence of regular cultivation is expected to support positive soil structure development over time. If vegetation or habitat performance does not meet expectations, further investigations into underlying soil conditions will be undertaken and appropriate management measures implemented.

4.12 Accidental Spillages

4.12.1 Fuel will be stored and used in accordance with the Control of Substances Hazardous to Health Regulations 2002 (Ref. 9) and the Control of Pollution (Oil Storage) (England) Regulations 2001 (Ref. 10).

4.12.2 Fuel and other potentially polluting chemicals will either be in self-bunded leak proof containers or stored in a secure impermeable and bunded area (minimum capacity of 110% of the capacity of the containers).

4.12.3 Any plant, machinery, or vehicles will be regularly inspected and maintained to ensure they are in good working order and clean for use in a sensitive environment. This maintenance is to take place off site, if practicable, or only at designated areas within the Scheme compound. Only construction

equipment and vehicles free of all oil/fuel leaks will be permitted on the Order limits. Drip trays will be placed below static mechanical plant.

4.12.4 All washing down of vehicles and equipment will take place in designated areas and wash water will be prevented from passing untreated into watercourses.

4.12.5 All refuelling, oiling, and greasing will take place above drip trays or on an impermeable surface which provides protection to underground strata and watercourses and away from drains as far as reasonably practicable. Vehicles will not be left unattended during refuelling.

4.12.6 All construction plant and machinery must be stored within designated construction compounds during both daytime and overnight periods. This is to prevent unnecessary soil compaction, disturbance, and the risk of contamination from potential fuel or oil leaks.

4.12.7 As far as reasonably practicable, only biodegradable hydraulic oils will be used in equipment working in or over watercourses.

4.12.8 Construction waste/debris are to be prevented from entering any surface water drainage or water body.

4.12.9 Surface water drains on public roads trafficked by plant or within the construction compound will be identified and, where there is a risk that fine particulates or spillages could enter them, the drains will be protected (e.g. using covers or sand bags) or the road regularly cleaned by road sweeper.

4.13 Biosecurity

4.13.1 The potential for disease and pathogen transfer between different areas of agricultural land is a biosecurity risk. The movement of soil (and incorporated seed/spore bank) is a mechanism for disease and pathogen transfer.

4.13.2 The good practice guidelines identified in this Framework SMP will minimise soil loss and soil movement through erosion, trafficking on vehicle wheels, or unauthorised export.

4.13.3 Stockpile maintenance describes the management of nuisance weed species in stockpiles and prevention of seed spread.

4.13.4 In addition, to minimise biosecurity risks, appropriate cleaning and/or disinfection of machinery, equipment, clothing, and footwear between holdings to mitigate against any disease outbreak or transfer of weeds between holdings may be required. This should be undertaken after working in areas considered to be at high risk before moving into uninfected areas. This is also particularly important for intensive pig and poultry units, cattle, and any land with organic designations.

4.13.5 The UK Government’s website advertising current occurrences and imposed restrictions with regards to animal and plant diseases (Ref. 11) should be checked by the appointed Contractor both pre-construction and at regular intervals throughout the construction phase. The Contractor should also subscribe to the Animal Disease Alert Subscription Service. All restrictions will be adhered to and may include additional biosecurity measures being implemented such as restricted movements within prevention zones and additional measures around the disinfection of plant and equipment (including boots and manual tools).

4.13.6 A Biosecurity Plan will be prepared prior to construction as secured through the detailed CEMP.

4.14 Security

4.14.1 Security will be in place at all sites with an office compound with patrols where plant would be stored overnight if left on-site.

4.14.2 Security fencing will surround open excavations and potentially guard machinery if left in situ around excavations. These measures will help prevent any vandalism that could lead to a pollution incident.

5. Monitoring Schedule

5.1.1 Table 3 summarises the requirements for record keeping and monitoring during the construction and restoration phases.

Table 3: Record Keeping and Monitoring during the Construction Phase

Item	What to look for	Responsibility	Frequency
Soil stockpiles	Erosion rills, water ponding, loss of protective vegetation or/and geotextile cover, invasive weeds	Contractor	Once a month and after rainfall exceeding 10 mm in 24 hrs.
Soil handling	Conformance with the SMP, record operations undertaken, weather and soil conditions, any problems and corrective actions undertaken.	Contractor	Daily.
	Conformance with the SMP, check daily record.	ALO/Land officer	Varies, but at least once a week.
Verification of the restoration standard	Has the soil profile been restored to, as much as practicable to do so, a condition when last time used for agriculture?	ALO/Land officer	After reinstatement, with reinspection following aftercare remediation (if applicable).

6. References

Ref. 1 Department for Environment, Food and Rural Affairs (Defra) (2009). Construction Code of Practice for the Sustainable Use of Soils on Construction Sites. Available at: https://assets.publishing.service.gov.uk/media/5b2264ff40f0b634cfb50650/pb13298-code-of-practice-090910.pdf. [Accessed 28 August 2024].

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Ref. 3 Institute of Quarrying (2021). Good Practice Guide for Handling Soils in Mineral Workings. Available at: https://www.quarrying.org/soils-guidance. [Accessed 28 August 2024].

Ref. 4 HM Government (2015). Construction (Design and Management) Regulations (CDM). Available at: https://www.legislation.gov.uk/uksi/2015/51/contents/made. [Accessed 28 August 2024].

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Ref. 6 Soil Survey of England and Wales (1984). Soils and their Use in Northern England and accompanying 1:250,000 map Sheet 1. (not available online).

Ref. 7 British Standards Institute (2009) BS 6031: Code of Practice for Earthworks. (not available online).

Ref. 8 Minnesota Pollution Control Agency (2023). Minnesota Stormwater Manual: Determining Soil Infiltration Rates. Available at: https://stormwater.pca.state.mn.us/index.php/Determining_soil_infiltration_rates. [Accessed 28 August 2024].

Ref. 9 HM Government (2002). Control of Substances Hazardous to Health Regulations. Available at: https://www.legislation.gov.uk/uksi/2002/2677/introduction. [Accessed 28 August 2024].

Ref. 10 HM Government (2001). Control of Pollution (Oil Storage) (England) Regulations. Available at: https://www.legislation.gov.uk/uksi/2001/2954/contents. [Accessed 28 August 2024].

Ref. 11 Defra (2024). Animal and Plant Health Agency website. Available at https://www.gov.uk/government/organisations/animal-and-plant-health-agency. [Accessed 28 August 2024].

Abbreviations

Abbreviation/Term	Meaning
ALC	Agricultural Land Classification
ALO	Agricultural Liaison Officer
CDM	Construction (Design and Management)
CEMP	Construction Environmental Management Plan
Defra	Department for Environment, Food and Rural Affairs
DCO	Development Consent Order
ECoW	Environmental Clerk of Works
EMP	Environmental Management Plan
IoQ	Institute of Quarrying
LGP	Low Ground Pressure
MAFF	Ministry of Agriculture Fisheries and Food
Ref.	Reference
SHE	Safety, Health, and Environment
SMP	Soil Management Plan
TSA	Technical Specialist Advisor

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