EAST YORKSHIRE SOLAR FARM

East Yorkshire Solar Farm
EN010143

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 the East Yorkshire Solar Farm (hereafter referred to as 'the Scheme'). It sets out framework that the appointed Contractor will follow to minimise adverse effects on soil resources.

1.1.2 To secure effective delivery of the Framework SMP, it must be implemented (by the Contractor) through site-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 to 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 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, such that the soil stripping, storage and reinstatement operations can proceed.

1.1.6 This Framework SMP will be revised (to produce a detailed SMP) prior to commencement of construction operations and will be informed by information provided through the detailed soil surveys completed within the Solar PV Site and detailed pre-construction soil surveys undertaken along the working width of the Grid Connection Corridor. These pre-commencement soil and ALC surveys along the Grid Connection Corridor will incorporate all land which will be subject to direct disturbance, and which has yet to be subject to a detailed soil survey. Not only will these data aid in the production and implementation of the detailed SMP, but they will also provide baseline land quality data for the reinstatement of land within the proposed working area of the Grid Connection Corridor. The detailed SMP will 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 (DCO) [EN010143/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 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 location specific detailed CEMP and SMP. The roles and responsibilities are expected to be broadly similar to those described below.

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 (to be prepared post-consent) and are to include measures such as the provision of toolbox talks with all personnel involved in the groundworks, 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; and

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.

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 environment method statements (EMS) submitted by the Contractor prior to beginning new works activities;

c. Monitoring of Contractor compliance with plans and procedures; and

d. Conducting regular site inspections.

Safety, Health and Environment (SHE) Manager/Advisor

1.2.5 The SHE Manger/Advisor 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. Assisting the Project Manager and Site Manager/Engineer in reviewing and approving RAMS and/ or Environmental Method Statements (EMS);

c. Ensuring the RAMS/EMPs are implemented, ensuring compliance with procedures and legislation;

d. Providing technical advice on the implementation of the CEMP and other management plans, including changes to legislative requirements and best practice; and

e. Undertaking regular site inspections/walkovers to ensure construction practice is compliant with best working practices and approved RAMS/EMS.

Site Foreman

1.2.6 Responsible to the Site Manager for:

a. Implementing the site-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 may be supported by an Agricultural Liaison Officer (ALO) (or similar), employed by the Contractor to provide local landowners and those with land-related interests information regarding daily construction activities.

1.2.8 The Land Officer/ALO will ensure that the specifications of the detailed SMP and site-specific construction method statements/soil management plans are implemented. It is envisaged that the ALO will have sufficient soil science experience or that they 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/ALO 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 will ensure the implementation of, and compliance with, the provisions of the CEMP and other management plans, including the 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, where required throughout construction, or they may be a suitably qualified individual. The ECoW will be responsible for inspections/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 the Technical Specialist Advisor (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 SMP

1.3.1 The Framework SMP should be read in conjunction with other project documents, including the **Framework CEMP [EN010143/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 Etc. Act 1974, in particular aspects which relate to the

construction and removal of tips, mounds and similar structures (Ref. 5). This requirement takes precedence over any suggested practice presented in this Framework SMP.

2. Review and Update of the SMP

2.1.1 The Framework SMP will therefore be reviewed and updated prior to commencement of construction to consider additional site-specific soils data complied via the pre-commencement soil surveys and any other relevant data to become the detailed (or Construction Issue) 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 ~~L~~locations of soil stockpiles and content (e.g. Topsoil type A, subsoil type B).

d. Schedules of volumes for each material.

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

~~a.~~f. Identification of person responsible for supervising soil management, building upon the roles and responsibilities set out in Section 1.2 of this framework document.

2.1.3 It is noted that in relation to paragraph 2.1.2 point e. it is expected that 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 frames, as frames are driven directly into the ground without the need for foundations.

~~2.1.2~~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;

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

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

~~c.~~d. Changes are introduced to construction methodology or programming.

~~2.1.3~~2.1.5 The changes to the Framework SMP should be implemented via an agreed procedures and changes approved by the Site Manager and Land Officer or ALO.

3. Soil Types

3.1.1 National Soil Map of England and Wales (NATMAP) Vector data covering the Site has been purchased from LandIS**.** This is the most detailed available soils mapping covering England and Wales and is shown in **Figure 15-3, ES Volume 3 [EN010143/APP/6.3].** This is produced from survey data from the Soil Survey of England and Wales (Ref. 5); it provides digitised soil association data at a 1:250,000 scale. The scale of the data/mapping is such that it is not accurate to the field level and does not pick up small-scale local variations in soil type. It does however provide a general indication of the soil types within the Order limits and is considered to provide a robust baseline on which to base the Framework SMP for areas which have not been subject to soil survey.

3.1.2 A soil and ALC survey has been undertaken by specialist soils company Land Research Associates within the Solar PV Site and Ecology Mitigation Area. These data and survey methodology are further described within **Chapter 15: Soils and Agricultural Land, ES Volume 1 [EN010143/APP/6.1]** and **Appendix 15-3, ES Volume 2 [EN010143/APP/6.2].**

3.2 Solar PV Site, Ecology Mitigation Area, Interconnecting Cable Corridor and Associated Site Accesses

3.2.1 The NATMAP data identifies most of the soils within the Solar PV Site and all soils within the Interconnecting Cable Corridor as the Foggathorpe 2 (712i) association. These are mainly slowly permeable seasonally waterlogged stoneless clayey and fine loamy over clayey soils with some similar coarse loamy over clayey soils.

3.2.2 Small areas of soils of the Sessay (831b) association are mapped in the southern half of Solar PV Area 2g. These soils generally occur on flat land and are fine and coarse loamy often stoneless, permeable soils affected by groundwater. They are often associated with slowly permeable seasonally waterlogged fine loamy over clayey and clayey soils.

3.2.3 Soils of the Kexby (522a) association are mapped in a small area in the north-west Solar PV Area 1a. These are generally deep stoneless fine sandy soils which are affected by groundwater and are often associated with freely draining slightly acid sandy soils.

3.2.4 Soils of the Fladbury 3 (813d) association are mapped in the east of Solar PV Area 1e and Ecology Mitigation Area 1h, adjacent to the River Foulness. They are generally stoneless, clayey, fine silty and fine loamy soils affected by groundwater. They are often associated with loamy and clayey floodplain soils with naturally high groundwater.

3.2.5 Soils of the Newport 1 (551d) association are only mapped in southern portion of the Site Access from Newsholme Village into Solar PV Area 3c. This access will only be used during the operational phase of the Scheme and comprises and existing access track (see **Chapter 2:The Scheme and Chapter 13: Transport and Access, ES Volume 1 [EN010143/APP/6.1**]). There will therefore be no impacts to the deep well drained sandy and

coarse loamy soils of the Newport 1 association due to use of this access. The soil survey data for the Solar PV Site presented in **Appendix 15-3, ES Volume 2 [EN010143/APP/6.2]** broadly corroborates the NATMAP data. Three main soil types are recorded in the Solar PV Site

a. The dominant soil type across the Solar PV Site was recorded as slowly permeable clays - comparable to the Foggathorpe 2 association. These were recorded as mainly clay and heavy clay loam topsoils, directly over dense poorly-structured clay with evidence of seasonal waterlogging (greyish colours with ochreous mottles). This soil type is largely coincident with land recorded as Subgrade 3b.

b. Coarse loamy soils. These soils occur in sizeable deposits of Breighton Sand. They comprise deep permeable fine sandy loams or sandy clay loams, usually with lower layers indicating shallow groundwater (greyish and pale colours with ochreous mottles). These soils are judged freely-draining (Soil Wetness Class I or II). They principally occur in the south-east (Solar PV Area 2g) and south-west (Solar PV Area 3c) of the Solar PV Site with a small area in Solar PV Area 1a.

c. Loamy soils over clay. These intermediate soils occur on the boundary of the slowly permeable clays and the coarse loamy soils described above. They exhibit a sandy clay loam textured topsoil and upper subsoil, over slowly permeable clay at intermediate depth, and are judged to be imperfectly-draining (Soil Wetness Class III).

3.2.6 The coarse loamy soils and loamy soils over clay broadly match the description of soils of the Sessay association.

3.2.7 The soil survey of the Solar PV Site also identified areas of peat soils. These soils were only identified on small areas of floodplain land adjoining The River Foulness in the east of the Site (Solar PV Area 1e and Ecology Mitigation Area 1h). They either comprise deep humified (fen) peat or organic clays (peaty loams) in places with complex multiple layers of both. Drainage conditions vary from permanently waterlogged (Soil Wetness Class V) in the south (Solar PV Area 1e) to slightly groundwater-affected in the north (Ecology Mitigation Area 1h) (Soil Wetness Class II or III).

3.3 Grid Connection Corridor and Associated Site Accesses

3.3.1 The Foggathorpe 2 (712i) association (described above) is present to the north and south of the Grid Connection Corridor as shown in **Figure 15-3, ES Volume 3 [EN010143/APP/6.3]**.

3.3.2 The Romney (532b) association is associated with the alluvial deposits adjacent to the Rivers Derwent and Ouse. It therefore comprises the majority of the middle section of the Grid Connection Corridor **Figure 15-3, ES Volume 3 [EN010143/APP/6.3].** It comprises deep stoneless permeable calcareous coarse and fine silty soils formed over alluvial deposits. They are generally associated with flat land with naturally high groundwater, which is often controlled by ditches and pumps, but on the whole are considered well drained (wetness class I).

3.3.3 Where the Grid Connection Corridor moves away from the River Derwent around Brackenholme, the Sessay (831b), Blackwood (821b) and Fladbury 3

(813d) associations are encountered as shown in **Figure 15-3, ES Volume 3 [EN010143/APP/6.3].** The Sessay association is described above. The Blackwood association comprises seasonally wet, deep permeable sandy and coarse loamy soils formed over glaciofluvial drift. The Fladbury 3 association comprises loamy and clayey floodplain soils with naturally high groundwater. They are seasonally wet and formed over river alluvium.

3.4 Ecology Mitigation Area

3.4.1 The Ecology Mitigation Area will either remain under normal farming operations (Goose Mitigation Zone) or be converted to permanent grassland (Golden Plover Mitigation Zone – adjacent River Foulness), see **Figure 2-3, ES Volume 3 [EN010143/APP/6.3]**. No specific soil management measures are required in this regard. However, it is intended to create a network of 'blind' linear foot drains ('wader scrapes') within the Golden Plover Mitigation Zone (see also **Habitats Regulations Assessment Report [EN010143/APP/7.12]**). Foot drains would be created using excavators or rotary ditchers. The foot drains will be excavated within the topsoil horizon only (i.e., no subsoil material will be excavated) and therefore would be approximately 30 cm in depth. They would be 1 to 2 m in width to ensure a gently sloping edge profile. The topsoil will be scraped back and the excavated soil redistributed across the surrounding land. On decommissioning, the topsoil can be 'pushed back' to infill the drains. These works will be further considered within the detailed 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.

4.2 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 Conditions

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. The soil types identified within the Order limits combined with winter rainfall in the Region, mean that soil handling should be restricted to the drier periods of the year when the soils are below their plastic limit wherever possible. 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, additionally these wet working measures should be applied to the wetter, clay soils, as required.

4.2.8 If the soil is excavated and placed in stockpiles when wet (above the plastic limit), they are easily compacted by the machinery handling them, or by 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, using equipment that is less detrimental to soil structure (excavator and dump truck). As well as this damage to soil structure, when soils within a stockpile are compacted, the core of the stockpile remains anaerobic throughout the storage period. This damage results in the soil being very difficult to handle and re-spread at the time of reinstatement (i.e., it will not be in a friable state and will not break down into a suitable tilth). In this case, in order to achieve the required standard of restoration, a period of drying and appropriate additional cultivation is required (to repair soil structure and re-aerate the soil) to ensure the soil is acceptable for planting. Should wet handling of soils be required, appropriate soil handling, drying and cultivation methodologies will be set out in the detailed SMP and in site-specific construction method statements, as required.

4.2.9 For arable land, the period where the soil conditions will generally be the driest, and most optimum for soil handling operations, typically occur in the summer following the spring crop harvest, when the plant evapotranspiration will have dried the soil. However, this does not exclude soil handling at other times of the year.

4.2.10 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 State

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.
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 Where required as per **Table 1**, 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. After stripping, to ensure the integrity of the service infrastructure is maintained, 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 At designated crossings (specified in the 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, prior to the soil strip commencing the topsoil surface should either be bare, under stubble, or have only short surface vegetation. 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 above, 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 that the use of dumper trucks will not be required. Where soils are to be stored away from the excavation area, 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 to be stripped and the space available within the working area. The use of a long reach excavator, which will minimise the need for movement across the soil surface, and the 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 less the stand-off to operate; typically, three to four metres. 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; minimising 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. Make provisions to protect base of current or next strip from ponding/runoff by sumps and grips, and also clean and level the basal layer. At the start of each day ensure 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 that the soil will readily recover once re-spread, promoting timely and effective restoration. Stockpiled soil must not be vulnerable to compaction or erosion; must not cause pollution to surrounding watercourses; and must not increase flood risk to the surrounding area.

4.6.2 Potential soil erosion and water pollution can be minimised through a number of 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 the catchment (ponding) of water behind stockpiles. If storing soils near to hedges or hedgerows that require maintenance, the ALO should be consulted on 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 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 that they are easily identifiable at restoration, as specified in the 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, 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.

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 ‘forming’, the top and sides should be smoothed so that they can shed water, ensuring that the entry of the water to the stockpile is limited and that the stored soil remains dry; and helping prevent 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° 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° (1 in 2) 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° 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, illustrated in 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° 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 a 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; 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 the reinstatement will be carried out. The SMP will follow the principles of best practice including the Defra (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Ref. 1) and The Institute of Quarrying (2021) 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: to be agreed with landowner and subject to the conditions/restrictions within the contract; to 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, where required during dry weather, the stockpiles will be sprayed with water to prevent wind erosion (generation of dust) and to ensure that the seeds establish. The stockpile may be covered ~~in~~ 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 is to be managed (by spraying, mowing or strimming as appropriate and 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 wind barriers.

~~4.7.5~~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 is able to support plant rooting will be beneficial and able to aid stockpile stability and reduce erodibility. This detail will be included in the detailed SMP.

~~4.7.6~~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 footprints 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 then reforming the sides of the stockpile or implementing additional mitigation measures may be required, as described above.

4.8.4 The growth of trees and scrub on the long-term soil stockpiles for soils stripped from the Grid Connection 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 the catchment (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 in, and the pollution by sediment of, any existing watercourse, arising from construction activities.

4.9.3 The relevant sections of BS 6031: Code of Practice for Earthworks (Ref. 6~~Ref. 6~~) will be followed for the general control of site drainage.

4.9.4 Mud deposits will be controlled at entry and exit points to the Site 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 would 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 would be removed.

4.10.2 Land within the Cable Corridors 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° 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 the 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 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° excavator is used it must stand on top of the stockpile to load the dump truck. The stockpile is 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 that the full soil profile is restored in the correct sequence of horizons, and in a state where good soil profile drainage and plant root development are achieved; and by ensuring that 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 (preconstruction) 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 ~~were~~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 that the amount of soil left on the geotextile will be minimal and will not result in significant loss of soil.

~~4.10.8~~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 Technical Specialist Advisor.

Placement of Excavated Materials

~~4.10.9~~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.

~~4.10.10~~4.10.12 Following the placement of overburden to form the base layer, where required, 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

~~4.10.11~~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 that soil horizons are replaced to the correct thickness (with an allowance of up to 20% to allow for settlement).

~~4.10.12~~4.10.14 In most locations, direct excavation and restoration of the soil from the stockpiles using a long-reach back-acting/360° excavator will be possible. In 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 is to be used.

~~4.10.13~~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). In this method, the soil is replaced in strips above the base layer to recreate the original soil profile. The topsoil is replaced on the previously decompacted subsoil. The replacement is carried out in strips in a similar manner to the stripping operations. First, the initial strip width and axis is to be demarcated. The width of the strip is determined by excavator boom length less the stand-off to operate; typically, 5 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).

~~4.10.14~~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. Repeat the process 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

~~4.10.15~~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 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 that the soil is dry enough to shatter and for fissures to be created. As the soil in the trench is to be deposited through loose tipping (see earlier section), no ripping of the trench area will be required. 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

~~4.10.16~~4.10.18 The quality of the soil reinstatement will need to be verified by the ALO/Land Officer or TSA as described in Section 1.3. 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.

~~4.10.17~~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.

~~4.10.18~~4.10.20 This 'after' statement will be compared to the 'before' statement to verify that 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 that any problems are identified and rectified early after construction. This will in turn minimise the period of aftercare and risk of compensation claims.

~~4.10.19~~4.10.21 It is noted that the physical conditions on restored land may take several years to stabilise; therefore, ALC survey is not normally undertaken (the land is not normally graded) until five years after soil replacement.

4.11 Accidental Spillages

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

4.11.2 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).

4.11.3 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.

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

4.11.5 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.

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

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

4.11.8 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.

4.12 Biosecurity

4.12.1 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.

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

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

4.12.4 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.

4.12.5 The UK Government's website advertising current occurrences and imposed restrictions with regards to animal and plant diseases (Ref. 7) should be checked by the appointed Contractor both pre-construction and at regular intervals throughout construction. 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).

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

4.13 Security of Sites

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

4.13.2 Security fencing will surround open excavations and will 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	Contractor	Once a month and after rainfall exceeding 10 mm in 24 hrs.

Item	What to look for	Responsibility	Frequency
	geotextile cover, invasive weeds		
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	Once, after reinstatement, re-inspected after remediation (if applicable).

6. References

Ref. 1 *Department of Environment, Food and Rural Affairs (DEFRA) (2009),* Construction Code of Practice for the Sustainable Use of Soils on Construction Sites. Available at: https://www.gov.uk/government/publications/code-of-practice-for-the-sustainable-use-of-soils-on-construction-sites [Date Accessed: 01 August 2023].

Ref. 2 MAFF (2000). Good Practice Guide for Handling Soils. Available at https://webarchive.nationalarchives.gov.uk/ukgwa/20090317221756/http://www.defra.gov.uk/farm/environment/land-use/soilguid/index.htm [Date Accessed: 01 August 2023].

Ref. 3 *Institute of Quarrying (2021).* Good Practice Guide for Handling Soils in Mineral Workings. Available at: https://www.quarrying.org/soils-guidance. [Date Accessed: 01 August 2023].

Ref. 4 HM Government (2015). Construction (Design and Management) Regulations (CDM). Accessed 17 May 2023. Available at: https://www.legislation.gov.uk/uksi/2015/51/contents/made [Date Accessed: 01 August 2023].

Ref. 5 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. 6 British Standards Institute (2009) BS 6031: Code of Practice for Earthworks. (not available online).

Ref. 7 Defra's Animal and Plant Health Agency website. Available at https://www.gov.uk/government/organisations/animal-and-plant-health-agency [Date Accessed: 01 August 2023].

Abbreviations

Abbreviation/Term	Definition
Framework SMP	Framework Soil Management Plan
Detailed SMP	Detailed Soil Management Plan
ALC	Agricultural Land Classification
IoQ	Institute of Quarrying

Glossary of Frequently Used Terms

Term	Definition
Topsoil	Natural topsoil or manufactured topsoil, varies in depth with soil type but usually covering the top 20-30 cm in which plants can grow healthily
Subsoil	Layer (or horizon) of soil immediately beneath the surface topsoil. Generally less structurally developed and less nutrient rich than the topsoil
Plastic	A plastic material can be moulded into a shape and the material will retain that shape. Where practicable, soil should not be handled when in a plastic state (considered to be too wet) and if handling is unavoidable additional measures must be in place
Field Capacity	The condition in which the soil is saturated with water and any water from rainfall will infiltrate quickly under the force of gravity or create waterlogging;
Soil ped	Soil peds are natural, relatively permanent aggregates of soil particles, separated from each other by voids or natural surfaces of weakness; and which persist through cycles of wetting and drying;
Lower Plastic Limit	The lower plastic limit is defined as the moisture content at which soil begins to behave as a plastic material. If the moisture content is below the lower plastic limit, it is considered to behave as a solid, or a non-plastic material
Tilth	Soil tilth is its physical condition, especially in relation to its suitability for planting or growing a crop. Soil with good tilth has large pore spaces for air infiltration and water movement. Roots only grow where the soil tilth allows for adequate levels of soil oxygen. Such soil also holds a reasonable supply of water and nutrients
Soil series	The lowest category in the soil classification system and are precisely defined based upon particle-size distribution, parent material (substrate) type, colour and mineralogical characteristics
Soil associations	Groupings of related soil series