Please see Annex AP8 for supporting information, and the “Introduction” for Health and Safety considerations and advice on the use of the guidance.

1. Does the application propose criteria under which soil may be moved
   a. are there separate criteria for differing soil types
   b. do the criteria vary according to the machinery to be used
   c. does the criteria include reference to meteorological forecasts
   d. is there a company statement as to the intended operator’s reaction to adverse weather conditions
   e. are the dust control measures compatible with soil movement
   f. is the soil to be moved during an appropriate season
   g. are the criteria proposed unambiguous
   h. does the proposal avoid trafficking of the soil

2. Do the soil handling proposals include the following
   a. the recovery of all soil
   b. keeping different soil types separate
   c. soil storage or direct placement
   d. the removal of excess vegetation
   e. the control of weeds
   f. steps required in ponded / flooded areas
   g. measures to avoid soil erosion

3. Are the site working proposals compatible with the soil details
   a. is the phasing of soil movement / storage and replacement compatible with the mineral extraction programme
   b. is sufficient space allocated for soil storage and is the soil accessible for management and recovery throughout the working programme

4. Initial site preparation details
   a. How does the operator intend to gain initial access to the site
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<td>For more detailed information see:</td>
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<td>• Guidance on Good Practice for the Reclamation of Mineral Workings to Agriculture (DoE 1996) Appendix 2</td>
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1. Does the application propose criteria under which soil may be moved

a. are there separate criteria for differing soil types
   In general, the mineral operator should plan operations so that soil stripping is normally scheduled between the drier months of April to September inclusive. The risks to soil damage are further influenced by the types of soil and the machinery intended to be utilised. Lighter soil can generally be moved when wetter and for longer periods without damage. The period when soil can be handled is longer in the drier parts of the country, typically the east and south.

b. do the criteria vary according to the machinery to be used
   The period for soil stripping may be extended where the soil handling machinery or technique is such that trafficking over the soil is minimal, e.g. the dump truck and excavator loose-tipping method (where dump trucks do not traffic over soil).

c. does the criteria include reference to meteorological forecasts
   The planning application should make reference to meteorological forecasts and past data to assist in determining the extent of the risks in undertaking the soil stripping in the period identified. A company statement as to the intended operator’s reaction to adverse weather conditions should avoid any ambiguity.

d. is there a company statement as to the intended operator’s reaction to adverse weather conditions
   The operator should state any contingency plans to determine the suitability of continued soil movement when the weather changes. The operator must understand the potential implications on the working proposals of only undertaking soil movements under suitable conditions.

e. are the dust control measures compatible with soil movement
   The spraying of haulage routes, limiting of vehicle speeds, establishment of peripheral spray curtains near sensitive properties or vegetating the storage bunds should not compromise the potential of the soil when stripped, transported or replaced. If soil movement on dry, windy days was prevented to avoid a dust nuisance, then the soil programme could be compromised. In order to address both dust prevention and soil movement, it may be appropriate to redeploy equipment away from dust sensitive properties until the wind eases.

f. is the soil to be moved during an appropriate season
   The criteria for when to strip soil are fully set out in Appendix 2 of the publication ‘Guidance on Good Practice for the Reclamation of Mineral Workings to Agriculture’ (DoE 1996). The primary mechanisms by which soil dries are surface evaporation and transpiration by plants. Evaporation seldom dries soil beyond a depth of 30cm, so drying of subsoil depends upon the moisture extracted by plant roots. Land due for stripping should be kept vegetated until as close as possible to the time of stripping. Evaporation and transpiration increase from spring to mid summer and soil moisture deficit builds to a maximum in July or August.
Consequently, these months are the prime time to move soil. The earlier or later in the year that soil is stripped or moved, the greater the risk of causing damage.

g. **are the criteria proposed unambiguous**

Generally, there are two methods to determine whether the consistency of soil is favourable for handling. The “WormTest”, adapted for field situations, is only suited to soil with greater than 10% clay content and less than 70% sand. The method entails rolling a ball of soil on a flat surface (e.g. a glazed tile) to form a thread 0.3cm in diameter. If a 0.3cm thread cannot be formed without crumbling, the moisture content is assumed to be drier than the lower plastic limit and therefore, less prone to damage if soil handling is carried out. However, it is considered advisable that the moisture content should be 3 to 5 % drier than the lower plastic limit, especially when motor-scrappers are to be used. The alternative approach is for the prior laboratory determination of the moisture content of the soil at its lower plastic limit for each soil type. A proprietary on-site soil moisture meter is then used to assess soil moisture relative to the lower plastic limit of that particular soil type. If 80% of the samples are at or below the acceptable moisture content, then soil stripping may commence. The lower plastic limit is the point at which, for each particular soil type, the soil changes from being plastic to crumbly (dry and friable). If soil handling takes place when soil is at or wetter than its lower plastic limit, damage to soil structure is more likely to occur. The criteria for determining when soil is fit to be handled should be clearly understood by all personnel.

h. **does the proposal avoid trafficking of the soil**

Clear identification of intended haul routes and soil storage areas should avoid indiscriminate trafficking of unstripped and partly stripped soil. The soil handling method can affect the agricultural quality of the restoration through severe soil deformation (compaction and smearing). This is primarily caused through trafficking, the effects of which increase with increasing soil wetness. Haul roads must have been stripped of both topsoil and subsoil before use.

2. **Do the soil handling proposals include the following**

a. **the recovery of all soil**

Even though calculations and surveys may identify specific depths at which to strip the soil, it is advisable to recognise the variances that do occur in soil depths. A strict adherence to a stated depth may result in topsoil not all being lifted or some subsoil being lifted with the topsoil. Personnel involved in soil stripping should be trained to fully appreciate and identify the difference between topsoil and subsoil.

b. **keeping different soil types separate**

Accidental mixing might be an inevitable consequence of complex soil patterns, where uneven layer boundaries preclude the precise separation of adjacent layers. Soil mixing probably causes the greatest difficulties where it affects
topsoil; lumps of contrasting subsoil in topsoil can cause workability problems and dilute the nutrient reserves. As part of the restoration strategy, it can sometimes be beneficial to amalgamate soil of different textures when carefully considered and managed. If this is to be undertaken it should be clearly set out within the application document. Topsoil and subsoil should not be mixed.

c. soil storage or direct placement
The extent to which soil will need to be stored and for how long should be stated within the application details. Wherever possible, direct placement of soil is preferable to being placed into store. However, this is seldom feasible during the initial stages of the site working. Also, later within the working programme, direct placement may be constrained by the mismatch between the soil currently being stripped and those areas requiring restoration. Careful planning of the phasing is necessary to ensure the efficiency of soil movements. Store soil on soil of the same type.

d. the removal of excess vegetation
Soil will be drier when stripped from under grass or immediately after the harvest of an arable crop than when stripped from fallow land, given the same soil type and weather conditions. There may be a need to harvest the arable crop early to enable a suitable soil-handling window to be available before the autumn. Leaving unharvested crops can result in excess crop residues, leading to anaerobic conditions in stored soil. Although this is a situation from which topsoil will recover, it can be avoided by the removal of excess vegetation immediately prior to soil stripping.

e. the control of weeds
Weeds should be controlled on uncropped parts of the site, otherwise soil bunds or soil replacement areas will be prone to future weed problems.

f. steps required in ponded / flooded areas
In existing ponded or flooded areas, the operator should clarify how they intend to deal with this potentially vulnerable soil. This may include pumping or drainage ditches being cut and then specific soil handling techniques. It should be recognised that in some areas prone to seasonal flooding, the period that the subsoil will be dry and friable enough to move may be very limited. In some instances, the soil may not dry out at depth.

g. measures to avoid soil erosion
The potential for soil erosion increases when vegetation is removed and therefore, the operator should outline the steps intended to deal with water that may enter or arise from the site in periods of wet weather. The application should detail the areas to be unworked, worked or restored in differing phases and the water management arrangements throughout the life of the site operations. The application should also detail how surface water from inside or outside the site is to be dealt with, and what steps would be required to establish crop cover to protect newly restored areas.
3. Are the site working proposals compatible with the soil details

a. is the phasing of soil movement / storage and replacement compatible with the mineral extraction programme

The phasing of soil movement / storage and replacement has to be compatible with the mineral extraction programme. Minerals are usually recovered throughout the year, but soil movement is restricted to a limited season. The submitted programme has to demonstrate that sufficient new areas of the site are stripped prior to the winter season, and enough overburden replaced through the winter to ensure soil can be replaced in the summer. The flexibility in any proposal should be carefully examined against the impact of any external factors, such as availability of inert fill, flooding or differing extraction rates.

b. is sufficient space allocated for soil storage and is the soil accessible for management and recovery throughout the working programme

Space required for soil storage can be extensive. The area required increases with the number of differing soil types that need to be kept separate. The base areas of soil bunds should be checked against the area shown on the application plans between the site boundary and any excavation area. Is the boundary a clearly defined feature, such as a fence, or is it a hedge that may extend further into the site than the plan indicates? If the heights are given for the soil bunds, then a check should be made of the proposed side slopes; the shallower the side slopes then the larger the base area required for a given soil volume. On steeply sloping sites, the area required for soil storage may be greater. The separation space between soil bunds should be clearly stated. In some instances, the use of geomembranes is acceptable to physically separate soil within linear bunds. Soil bunds are usually located at the periphery of the site to assist in noise reduction and to act as a visual screen. Space should be available between the boundary and toe of the bund to ensure access for maintenance, and for drainage measures. A stand-off of at least 5 metres is required between the toe of the bund and the excavation to ensure slope stability and access.

4. Initial site preparation details.

a. how does the operator intend to gain initial access to the site

The working proposals should also indicate the steps to be taken to gain initial access to the site and prevent trafficking over unstripped soil.