Please see Annex RN8 for supporting information, and the “Introduction” for Health and Safety considerations and advice on the use of the guidance.

1. **Does the working method for the soil replacement appear logical/feasible**
   - a. is the site progressing to plan
   - b. is sufficient area available to commence restoration
   - c. is the soil being moved from the correct parts of the site to the correct restoration areas

2. **Is the soil in good condition**
   - a. is the soil from bunds
   - b. is the soil being directly placed
   - c. is the soil imported

3. **Is the soil being replaced in the correct sequence**

4. **Are measures to avoid compaction being rigorously applied**

5. **Are stones being removed**

6. **Is the work on target for completion**
   - a. is there time available to undertake drainage and cultivation activities
   - b. are there contingency plans for adverse weather conditions

7. **Is the replaced soil to be vegetated over winter**
   - a. is there time to establish a crop
   - b. how will the land be managed over winter
   - c. are interim measures required if the whole soil profile is not replaced

8. **Are the waste disposal operations compatible with soil replacement**
   - a. is the landfilling being undertaken by a different company to the mineral operation
   - b. who is responsible for the restoration of the site
   - c. are the landfilling and mineral operations compatible
   - d. can landfill traffic be controlled to prevent damage to restored areas
For more detailed information see:
- Guidance on Good Practice for the Reclamation of Mineral Workings to Agriculture (DoE 1996)

Cross references:
- AP 5, 6, 7, 8, 9, 10
- SW 8, 9
- RN 6, 7
1. Does the working method for the soil replacement appear logical / feasible

a. is the site progressing to plan
Site operations may have been ongoing for some time and it is appropriate to check that the site is still progressing to plan and that the original working proposals have not altered.

b. is sufficient area available to commence restoration
Soil can only be replaced when there is a sufficient area infilled or restored. Delays to restoration can occur if the site is dependant upon imported inert fill to achieve restoration levels, or if the rate of silt settlement in lagoons changes due to differing specifications, mineral quality or marketing influences. The amount of discard or waste material may not be as high as originally expected, or else the quantity of mineral higher than expected. All these factors can lead to the carefully synchronised working plan submitted at the time of planning application becoming outdated.

c. is the soil being moved from the correct parts of the site to the correct restoration areas
It is a sensible precaution to check that the soil strategy is still valid and that the soil is being used in accordance with it.

2. Is the soil in good condition

a. is the soil from bunds
The soil from store should be of a known type (having been stripped, stored and recorded). A visual inspection should be undertaken to ensure that the operations are not down-grading the material by lifting in unsuitable conditions or through mixing with other dissimilar soil types.

b. is the soil being directly placed
In circumstances where soil is being directly placed elsewhere on the site for restoration, any deterioration or change in the soil types arriving at the area being restored should be immediately noted and appropriate action taken. The direct placement of soil avoids any potential deterioration caused by storage.

c. is the soil imported
Imported soil should be stored separately. This should give the opportunity to examine the suitability of the soil for the intended use. British Standard Number 3882 Specification for Topsoil (1994) provides specific guidance for topsoil. It establishes three grades of material and gives recommendations for their use and handling. It is important to consider the physical characteristics or contamination (including any glass or foreign objects). The soil needs to be visually examined before placement.
3. Is the soil being replaced in the correct sequence

The operation should follow a detailed replacement plan showing soil units to be replaced, haul routes and the phasing of vehicle movements. The soil units should be defined on the site with information to distinguish types, layers and thickness. Detailed daily records should be kept of operations undertaken (including the removal of stones and other damaging materials, the results of any assessment of the need for additional decompaction and the effectiveness of decompaction work undertaken), and site and soil conditions.

4. Are measures to avoid compaction being rigorously applied

Ideally, every effort should be made to ensure the soil is replaced, avoiding compaction by the use of loose-tipping methods (Sheets 1 – 4 Good Practice Guide for Handling Soils (MAFF April 2000). However, if compaction does occur within replaced soil layers or in overburden, this needs to be relieved, including within overburden where this is being used as subsoil substitute. If left untreated, the compaction will restrict the volume of soil able to be exploited by the plants to satisfy their requirement for moisture and nutrients, and can lead to drought symptoms in dry periods. The key depths in assessing agricultural land quality are 70cm, the assumed moisture extraction depth of the potato crop, and 120cm, the corresponding depth for winter wheat. Agricultural subsoiling is generally only effective to depths up to 45cm. It is therefore important to avoid or remove compaction sequentially for each soil layer as replaced. Any compaction in the lower soil layers and the top of the replaced overburden will otherwise remain untreated.

5. Are stones being removed

Stoniness of topsoil affects cultivation, seed germination and harvesting. Stoniness of topsoil and subsoil reduces their water retention and can affect the ALC of the restored land. It may be necessary to remove stones or damaging materials at each stage of the soil replacement process. Ripping of the overburden may have been undertaken to enable the removal of any oversized material prior to the subsoil being placed. Stoniness is a particular problem where the original soil is shallow over rock with a variable depth (e.g. limestone or shallow gravel). The size of stones to be removed, if appropriate, would have been determined at the application stage.

6. Is the work on target for completion

   a. **is there time available to undertake drainage and cultivation activities**

In general, the mineral operator should plan operations so that soil replacement is normally scheduled between the months of April to September inclusive. The risks to soil damage is further influenced by the type of soil and the machinery intended to be utilised. The earlier or later in the year that soil is moved, the greater is the risk of causing damage. It is particularly important on large restoration projects to ensure that soil is replaced early in the restoration season
in order to ensure that sufficient time exists in late August and September to undertake any subsoiling, drainage works, cultivation and sowing prior to the onset of winter.

b. are there contingency plans for adverse weather conditions
If significant rainfall occurs during operations, the replacement must be suspended. Replacement must not restart after significant rainfall until the ground has had at least a full dry day and the agreed criteria can be met. The suitability criteria for moving soil are fully set out in Appendix 2 of Guidance on Good Practice for the Reclamation of Mineral Workings to Agriculture (DoE 1996).

7. Is the replaced soil to be vegetated over winter

a. is there time to establish a crop
Soil erosion may be a major problem on newly replaced soil. The newly restored land is even more vulnerable if no crop is established over the winter period. Soil replacement should stop to enable the cultivation and establishment of a crop by September. Any later than this and the potential options to protect the soil are reduced. Grass sown in September provides good protection for restored soil over the winter period. From late September onwards crops such as cereals may be sown. In extreme circumstances a crop such as mustard to provide green cover may be sown, which will be ploughed in the following season.

b. how will the land be managed over winter
All crops should have established prior to winter. Leaving land fallow over the winter period is not a suitable option as this may lead to unacceptable soil damage. Spring sown crops are also unsuitable for the same reason. The established cover will protect the soil and help to dry the land during the growing season. No vehicles or livestock should be allowed onto the site over the winter period. However, if grass is well established in the autumn on dry soil, a light grazing regime by sheep will assist tillering.

c. are interim measures required if the whole soil profile is not replaced
It may be necessary to cease the soil replacement operations before the weather actually deteriorates. If overburden or subsoil has been replaced but no topsoil, it will still be advisable to establish an overwinter crop. Suitable drainage grips should be established to prevent ponding and erosion through the interception of surface water. Wherever possible, the ‘dirty’ water with suspended solids should be kept separate from the drainage of any restored areas to comply with any water discharge conditions.
8. Are the waste disposal operations compatible with soil replacement

a. is the landfilling being undertaken by a different company to the mineral operation

On sites where controlled wastes are to be imported as fill, the filling operation can affect the restoration of the site to agricultural use. On these sites, landfilling operations may be carried out by a different company from that involved in mineral extraction.

b. who is responsible for the restoration of the site

The responsibility for monitoring and engineering of the waste site is likely to be with the waste operator. A clear understanding of the respective responsibilities of mineral and landfill operator is required to ensure restoration activities are well co-ordinated and planned.

c. are the landfilling and mineral operations compatible

The design of leachate and landfill gas control systems must meet engineering requirements but also be compatible with the proposed after-use. Efforts should be made to position landfill gas collection pipes so as not to interfere with soil replacement and subsequent cultivation. The depth of soil, which will accommodate underdrainage, should be at least 1 metre. If extensive settlement is likely and future re-engineering proposed, then the possibility of partial restoration should be examined. This would involve the placement of some overburden and subsoil material over the cap or final fill material and the seeding of this additional layer. If further engineering operations are then required, they can be carried out with no damage to the bulk of the soil material, which can be kept in store until needed.

d. can landfill traffic be controlled to prevent damage to restored areas

There will need to be long term access for maintenance and monitoring of leachate and landfill gas control systems. Any vehicles used for this should be routed and controlled to prevent damage to restored soil.