



SCOTTISH EXECUTIVE

Development Department
Planning Services

Victoria Quay
Edinburgh EH6 6QQ

Telephone: 0131-244 7532
Fax: 0131-244 7555
ben.train@scotland.gsi.gov.uk
<http://www.scotland.gov.uk>

Your ref:
Our ref: P/ZPP/11/12

13 January 2003

Dear Sir or Madam

PLANNING ADVICE NOTE 64: RECLAMATION OF SURFACE MINERAL WORKINGS

I am pleased to enclose Planning Advice Note 64: Reclamation for Surface Mineral Workings. It gives advice on how mineral operators and planning authorities can ensure that mineral workings are reclaimed to a high standard as soon as possible after working has ceased.

Please note that the advice in PAN 64 incorporates the remaining extant information from Scottish Development Department Circulars 49/1978 *Report of the Committee on Planning Controls over Mineral Working* and 5/1982 *The Town and Country Planning (Minerals) Act 1981 Explanatory Memorandum* into the Planning Series. These Circulars are now cancelled.

Enquiries about the content of this advice note should be addressed to Ben Train, Area 2-H81, Victoria Quay, Edinburgh, EH6 6QQ, telephone 0131 244 7532. It can be viewed at www.scotland.gov.uk/planning. Further copies of the advice note are available from Planning Services, 2H, Victoria Quay, Edinburgh, EH6 6QQ, telephone 0131 244 7543, or e-mail john.stuksis@scotland.gsi.gov.uk.

I attach a copy(ies) for your information.

Yours faithfully

JIM MACKINNON
Chief Planner





64

RECLAMATION OF SURFACE
MINERAL WORKINGS





SCOTTISH EXECUTIVE
Development Department

Planning Advice Note

PAN 64

Reclamation of Surface Mineral Workings

December 2002
© Crown copyright 2002
ISSN 0141-514X
ISBN 0 7559 0672 1

Astron B28433 12/02

PLANNING SERIES:

- **Scottish Planning Policies (SPPs)** provide statements of Scottish Executive policy on nationally important land use and other planning matters, supported where appropriate by a locational framework.
- **Circulars** which also provide statements of Scottish Executive policy, contain guidance on policy implementation through legislative or procedural change.
- **Planning Advice Notes (PANs)** provide advice on good practice and other relevant information.

Statements of Scottish Executive policy contained in SPPs and Circulars may be material considerations to be taken into account in development plan preparation and development control.

Existing National Planning Policy Guidelines (NPPGs) have continued relevance to the decision making, until such time as they are replaced by a SPP. The term SPP should be interpreted as including NPPGs.

Statements of Scottish Executive location-specific planning policy, for example the West Edinburgh Planning Framework, have the same status in decision making as SPPs.

CONTENTS

	Paragraph
Introduction	1
Definition of Terms	7
Legislative and Policy Context	10
Assessing Reclamation Proposals	13
Potential Afteruses	16
Restoration Considerations	21
Management of Soil Resources	22
Soil Stripping and Reinstatement	25
Soil Storage	30
Soil-forming Material	34
Soil Handling Machinery	37
On-site Vehicles Movements	41
Landform	42
Drainage	45
Aftercare Considerations	48
Choice of Vegetation	50
Under-drainage	51
Secondary Treatments	53
Fertilisers	54
Weed Control	55
Irrigation and Watering	56
Control of Livestock and Wild Animals	57
Reclamation to Agriculture	60
Consultation on Agricultural Reclamation	62
Agricultural Restoration	63
Agricultural Aftercare	64
Reclamation to Forestry	66
Consultation on Forestry Reclamation	67
Forestry Restoration	72
Forestry Aftercare	73
Reclamation to Amenity Uses	76
Consultation on Amenity Reclamation	79
Amenity Restoration	81
Amenity Aftercare	83
Water Areas and Watercourses	87

Landfill	90
Conditions	93
Drawing up Conditions	98
Restoration and Aftercare Schemes	101
Restoration Scheme	103
Aftercare Scheme	106
Planning Agreements	110
Financial Guarantees	112
Monitoring and Enforcement	116
Annual Reports and Meetings	118
Assessment Reports	121
Technical Working Group	124
Reviews of Mineral Planning Permissions	126
Development Plans	128
Enquiries	130
Notes	131
Case Studies	
Annex A – Mineral Workings in Scotland	
Opencast Coal	
Sand and Gravel Workings	
Hard Rock Quarries	
Slate Workings	
Metalliferous Mining Sites	
Tailings Lagoons	
Peat	
Annex B – Reclamation Legislation	
Annex C – Model Conditions	
Annex D – Reclamation Information to be Submitted with a Planning Application	
References	
Glossary	

INTRODUCTION

1. The continued working of primary minerals is necessary to meet society's demands for construction and other purposes, although there is an increasing use of recycled and secondary materials (particularly in the provision of materials for the construction industry). A key aim of Scottish Executive policy is to ensure that land worked for minerals is reclaimed as soon as possible after working has ceased. To achieve this mineral operators and planning authorities need to ensure that satisfactory reclamation procedures are in place before, during and after extraction to bring land back to an acceptable condition.
2. Reclamation of surface mineral workings can enhance derelict and degraded areas, remove ground instability caused by old mineral workings, create habitats, improve countryside access and provide community facilities and geological sites of interest. Reclamation can therefore bring environmental and community benefits, although the restored landscape can take several years to mature. Case studies highlighting successful reclamation practice are provided on pages 33 to 36.
3. In the past, land was typically returned to agriculture or forestry use. In recent years it has been shown that reclamation operations can create or enhance a wide range of habitat types and landscape features including woodland, hedgerows, wet grassland, reed beds, open water and watercourses. Reclamation can thereby contribute to targets in UK and Local Biodiversity Action Plans.
4. Advances in reclamation techniques now enable minerals extraction sites to be reclaimed to a high standard. To achieve this commitment is needed from all parties involved in the planning and implementation of site working and reclamation. Mineral operators, in consultation with other parties, need to treat reclamation as an integral part of the mineral extraction process.
5. This Planning Advice Note (PAN) provides advice on:
 - relevant legislation and policy;
 - assessing reclamation proposals;
 - potential afteruses;
 - reclamation processes;
 - consultation procedures;
 - planning conditions;
 - restoration and aftercare schemes;
 - planning agreements;
 - financial guarantees;

- monitoring and enforcement; and
 - development plans.
6. This advice note aims to help planning authorities and operators improve the reclamation of surface mineral workings by building on existing experience and where appropriate disseminating and improving best practice. Annex A summarises the characteristics of the main mineral types worked in Scotland and provides advice on their reclamation. Useful references are provided for further reading.

DEFINITION OF TERMS

7. Restoration and aftercare processes are treated separately under planning legislation. It is important that planning authorities are consistent in their application of the terms, particularly in the scope of works required separately under restoration and aftercare conditions.
8. **Restoration** is used to mean operations carried out after the extraction of material is complete and involves using subsoil, topsoil or soil-forming material to restore the site. **Aftercare** is the steps taken after restoration to bring land up to the required standard for the intended afteruse, and can include planting, maintenance of planting, fertilising, cultivating, stone picking, watering or works after restoration to improve drainage.
9. **Reclamation** consists of the operations associated with the extraction of minerals that are intended to return the area to an acceptable environmental condition, and to a condition suitable for the intended afteruse. Reclamation includes both restoration and aftercare and events which take place before and during mineral extraction, for example the correct stripping, storage and reinstatement of soils.

See Effectiveness
of Provisions for
the Aftercare of
Mineral Workings,
DETR (2000).
[www.planning.
odpm.gov.uk/
epamw/index.htm](http://www.planning.odpm.gov.uk/epamw/index.htm)

LEGISLATIVE AND POLICY CONTEXT

10. The legislative provisions covering the reclamation of mineral workings have been introduced incrementally since the Town and Country Planning (Minerals) Act 1981. These have now been consolidated within the Town and Country Planning (Scotland) Act 1997 (the 1997 Act) schedules 3, 8, 9 and 10. This confers powers to impose conditions on planning permission for surface mineral workings where the land is to be used for agriculture, forestry or amenity purposes, and details how the conditions may be imposed and assessed. Information on the development of reclamation legislation is provided in Annex B.
11. Policy on the reclamation of mineral workings is contained in the National Planning Policy Guidelines on Land for Mineral Working (NPPG 4) and Opencast Coal and Related Minerals (NPPG 16).
12. The European Commission are considering an initiative on 'the management of waste resulting from prospecting, extraction, treatment and storage of minerals' (www.europa.eu.int). This may in due course have implications for the reclamation of mineral workings.

The Office of the Deputy Prime Minister (ODPM) has commissioned research on 'Cost Benefits of Financial Guarantees or Securities in the UK Extraction Industry'.



ASSESSING RECLAMATION PROPOSALS

13. There is an expectation that mineral operators will address reclamation as part of their planning application for mineral working (see paragraph 94). Improvement in reclamation techniques and the ability to create enhanced landscapes or community resources has led to the release of some areas of land which would not otherwise be made available for mineral working. However, if proposals for reclamation are impracticable planning permission for the mineral extraction will not be granted.
14. Planning authorities need to ensure that necessary controls are in place to achieve agreed reclamation proposals. They need to consider:
 - who to consult;
 - timescales for mineral extraction, restoration and aftercare;
 - where possible phasing the development to secure progressive reclamation;
 - stripping, storage and reinstatement of soils;
 - overburden storage;
 - recovery of soil-forming material;
 - drainage;
 - potential off site impacts;
 - measures for monitoring and implementation of any remedial measures;
 - financial guarantees; and
 - securing the removal of buildings, hardstandings, plant and machinery upon cessation of operations.
15. Mineral operators need to ensure therefore that the planning application includes sufficiently detailed information to allow consultees to form an opinion and the planning authority to make a decision. Pre-application discussions will help determine the level of detail required. (See Annex D)

POTENTIAL AFTERUSES

16. As a consequence of improvement in reclamation techniques, there are many options for afteruses. Larger mineral extraction sites can incorporate a range of these afteruses. Executive policy encourages afteruses that bring about environmental improvement.
17. Legislation makes specific restoration and aftercare provisions where the intended afteruse is agriculture, forestry and amenity. A separate planning application is likely to be required for afteruses other than those covered by these categories. The amenity category is broad and includes:

See Schedule 3,
Part 1, Paragraph
2 (2) of the 1997
Act.

See Minerals and the Natural Heritage in Scotland's Midland Valley, Scottish Natural Heritage (SNH) (2000).

- amenity planting;
- informal recreation;
- access; and
- nature conservation.

It effectively embraces afteruses that require planting and management of vegetation but are not covered by the definitions of agriculture or forestry. It also includes the creation of water areas and watercourses (see paragraphs 87–89).

18. The reclamation of mineral sites to a form that accommodates built development is uncommon as the majority of surface mineral workings are in rural locations. However, if this is proposed specialist advice will need to be sought on the engineering implications for the restoration process and a separate application for the afteruse submitted.
19. The afteruse is generally decided through discussion between the operator, having regard to the wishes of any landowner or lessee, the planning authority and other statutory and relevant non-statutory consultees. Pre-application discussions allow planning authorities and consultees the opportunity to consider the proposed afteruses and suggest alternatives before a formal application is submitted. These discussions can often be encouraged as part of the Environment Impact Assessment scoping exercise. They can also help operators to identify opportunities for the creation and enhancement of natural heritage or community facilities. Consultation with the local community can help establish what afteruses provide suitable landscape, educational and recreational benefits.
20. The decision on what afteruses are suitable will be informed by the:
 - development plan;
 - local biodiversity action plan;
 - local access strategy;
 - landscape character;
 - surrounding land uses;
 - water environment;
 - type of soils available for restoration; and
 - safety considerations.

It is important to consider the long term implementation of the afteruse, and in particular, who is likely to be responsible for future site management and finance.



RESTORATION CONSIDERATIONS

21. The objective of restoration is to secure the replacement of overburden and soil materials and creation of landforms in ways that ensure land is brought back to the standard required for proposed afteruses. This involves replacement of topsoil, subsoil and soil-forming materials to required depths, minimising damage to soil structure and other characteristics important for vegetation growth. It involves creating gradients that anticipate and facilitate the drainage requirements, and taking account of the local water tables.

MANAGEMENT OF SOIL RESOURCES

22. Management of soil resources at all stages of minerals development is essential as inappropriate handling and storage of soil can cause compaction, smearing and loss of soil structure which can result in the site being unsuitable for the intended afteruse. The following aspects of soil management should be considered:
- soil stripping and reinstatement;
 - soil storage;
 - soil handling machinery;
 - on-site vehicles movements; and
 - weather and soil conditions.
23. Planning authorities normally require the separate stripping, storage (where necessary) and reinstatement of soils in correct sequence of defined thickness of topsoil, subsoil or any other soil-forming materials. The thickness of each soil type should be based on the findings of a site survey of soil resources and the requirements of the proposed afteruses. A site survey should provide information on the amount, depth and characteristics of:
- topsoil;
 - subsoil;
 - soil-forming material; and
 - overburden.
24. Where a site contains considerable variations of soils it is often necessary to require separate stripping (and storage and replacement) of each main soil type. It is important to ensure that topsoil and subsoil are not mixed. Conditions to manage soil resources will however only be effective if operators and planning authorities ensure that they are properly complied with.

SOIL STRIPPING AND REINSTATEMENT

25. Mineral operators and planning authorities should aim to minimise the potential for damage to soils by limiting when and how soils are stripped and reinstated. Stripping soils and placing them directly on land being restored is preferable to soils being stored, although the temporary storage of some soils will usually be required. This corresponds with the aims of a phased restoration scheme and prevents double handling, which may damage soil quality.
26. Planning authorities usually require that soils are handled only when they are in a dry and friable condition and limit the months when these operations can take place (see model condition 6). Care must be taken in using conditions based on soil moisture status. The use of rainfall criteria in planning conditions can be unnecessarily restrictive.
27. Even during periods of weather generally suitable for soil stripping, supervision needs to ensure that operations are suspended after heavy rain. The damage caused to soils by continuing earthmoving during wet conditions may be difficult to reverse during aftercare. Planning authorities and operators should therefore work to timetables that avoid soil stripping and movement during wet periods.
28. The movement of soils in dry and windy conditions can cause a dust nuisance to surrounding property or some land uses, such as wetland habitats or sensitive industrial developments. There may also be a potential problem of suspended solids in run-off following soil stripping. Controls to prevent run-off into surface waters need to be put in place where this is identified as a potential risk. It is recommended that Scottish Environment Protection Agency (SEPA) is consulted on controls to prevent run-off into surface waters.
29. Conditions for progressive reclamation can limit the area taken for mineral working at any one time and relate it to the rate of restoration of earlier phases of the operation. It is however important that conditions permit a sufficient area of land to be stripped of soils in advance of mineral extraction to allow for wet periods when soil stripping operations may be impracticable. It is not advisable to specify actual dates in conditions for phasing of soil stripping operations, unless there are overriding reasons.

Further advice is available in PAN 50 Annex B: The Control of Dust at Surface Mineral Workings.

SOIL STORAGE

30. When soil is not placed directly on to land being restored it is placed in soil storage heaps. Current evidence suggests that while some deterioration to soil quality can occur during storage, some changes can be reversed following restoration, although microbial biomass and activity as well as structural stability may take longer to recover.
31. It is important that operators have an accurate understanding of the volumes of topsoil, subsoil and overburden they require to store within the boundaries of the site and that their proposals are drawn up to ensure that satisfactory storage can be secured. Plans should show details of any storage heaps including their

location, height (relative to the ordnance datum), shape and soil type. Planning conditions can:

- define the location, height and shape of storage heaps;
- require that storage heaps are seeding and kept weed free;
- prevent storage heaps from being unduly damaged by vehicles;
- require that heaps are marked with signs showing the soil type and depth (see model condition 8 for above points); and
- ensure control and treatment of surface water run-off from areas of soil storage to prevent pollution of adjacent water bodies.

See PAN 50 Annex A: The Control of Noise at Surface Mineral Workings.

32. Soil storage heaps need to be located away from extraction operations and land liable to flooding. They can be used for landscaping and noise attenuation during the extraction operations. If continuous mounds are used dissimilar soil can be separated by a third material, such as sand, to avoid mixing soil types. It is important to establish vegetation cover on soil storage heaps quickly to prevent soil being blown off.

33. Whilst it is generally accepted that low soil storage heaps are preferable in order to minimise deterioration of soils in the inner parts of heaps, there are no universally applicable maximum height limits. Soil heaps should be restricted to the minimum height practicable, compatible with the amount of soil storage space available on site and the need to protect the quality of the soil. Height limits of 3 metres for topsoil and 4 or 5 metres for subsoils are common. A plan of soil resources can be requested to assist monitoring (see model condition 10).

SOIL-FORMING MATERIAL

See Soil-forming Materials: Their Use in Land Reclamation. Wye College, University of London and Forestry Research (1999).

34. Many older mineral sites and some new sites have limited soil resources available for restoration purposes, and it is impractical to import large volumes of soil. In such circumstance successful restoration can be achieved through the use of soil-forming material. Soil-forming material is mineral or organic matter which has at least some of the properties of a soil and can be used as a medium for vegetation growth. It may be found in the overburden or identified deeper in the geological strata being worked. It can be a substitute for natural soils or be used as a supplement. The type of natural soils being used and the vegetation proposed will inform what soil-forming material is suitable.

35. Opportunities to identify soil-forming material occur before and during mineral extraction. A soil survey can provide information on the chemical and physical properties of the materials and suggest the measures needed for the required vegetation growth. It is important that soil-forming material with the most promising characteristics are fully recovered (see model condition 7). Site working should be sufficiently flexible to permit the recovery of suitable

materials as they are encountered and good management is required to ensure they are rapidly assessed. Peat-based soil-forming materials can cause unstable and dangerous ground conditions. Soil-forming materials need to be handled with the same care afforded to natural soils. Contingency may be made for storing additional volumes of material. Forestry and amenity afteruses are generally suited to restoration using soil-forming materials. Agricultural and intensive recreational afteruses normally require topsoil.

36. Reclamation using soil-forming materials for all afteruses except possibly nature conservation, will require the use of amendments. Organic waste materials can be used as an amendment, although application rates should be carefully calibrated to prevent the risk of pollution. There is a wide range of organic waste materials which may be suitable for use as an amendment, however these can only be used where the receiving environment will not be adversely affected. SEPA should be consulted about all reclamation and land improvement schemes where the use of organic amendment is proposed. They will be able to advise on waste management licensing controls which apply and the procedures for making an application for a licence or registering an exempt activity.

SOIL HANDLING MACHINERY

37. The choice of soil handling machinery is usually determined by the mineral operator and agreed with the planning authority. Specifying the use of particular types of machinery in conditions is not recommended as this restricts the flexibility to take account of advances in techniques and practice during the course of mineral operations.
38. The two most common types of soil handling machinery used are earthscrapers and dumptrucks – hybrids of these are sometimes used. Bulldozers are often used to spread soil to the required thickness, particularly in conjunction with a dumptruck and excavator.
39. Earthscrapers are used for stripping, moving and spreading soils. The soil is collected by an angled blade at the base of the machine and then spread back on ground being restored or stored for later use. Due to their design earthscrapers have to travel over soil and can therefore cause compaction, particularly when the soils being moved are moist.
40. In the 'dumptruck method', an excavator and dumptruck operate on land where the soil has already been removed. If correctly implemented this method minimises soil compaction, allows movement of soils in wetter conditions than an earthscraper and may reduce the need for remedial work during the aftercare period (see model condition 12).

ON-SITE VEHICLES MOVEMENTS

See PAN 50 Annex C: The Control of Traffic at Surface Mineral Workings.

41. The movement of on-site vehicles needs to be carefully controlled to ensure that soils are not repeatedly trafficked over. Conditions can be used to control the routing of vehicles to avoid unnecessary movement over unstripped and restored soils or soil storage heaps (see model condition 11). Recently reinstated soils are particularly vulnerable to damage.

LANDFORM

42. The planning application should show the intended final landforms, gradients and drainage (3 dimensional plans are helpful). This should be informed by an assessment of the landscape prior to extraction. The landforms achievable will often depend on the mineral being extracted (see Annex A). Final landforms need to be stable, suitable for the intended afteruse and respect the areas landscape character. Where appropriate the natural gradients and rock features of the surrounding landscape should be simulated in the final landforms. The final landforms will however affect the total mineral resource which can be extracted and there may need to be a compromise between maximising the use of the mineral resource and minimising the landscape impact. There may need to be some flexibility to take account of changes necessitated by operational and safety demands.
43. Creation of the final landforms should be integrated with restoration and the operators working methods. Consideration may need to be given to developing a reclamation margin, which is a zone around all or part of the quarry perimeter where the working method is geared mainly towards reclamation rather than mineral production.
44. The creation of steep slopes can cause soil erosion. Conversely, insufficient slope can result in waterlogging and surface ponding. It is therefore essential that the proposed landforms in the restoration scheme are designed to avoid creating flat surfaces or basins where water can collect, unless required for wetland creation. It is common for the final landform to be designed with minimum gradients of 1:50 or even 1:33. For agricultural machinery to operate safely the maximum gradient is 1:5 and for forestry machinery it is 1:3.

DRAINAGE

See paragraphs 51 and 52 for information on aftercare treatments to improve drainage.

45. The water environment at a site after extraction and reclamation will likely be substantially different from the original condition. Restoration proposals need to take account of both on-site and off-site drainage. An Environmental Impact Assessment will usually include a hydrological and hydrogeological survey that assesses the effects of mineral extraction and the reclamation proposals on the water environment. In the future, consideration will have to be given to the implications of the Water Framework Directive, including how proposals relate to River Basin Management Plans.

46. The success of reclamation often depends of the ability of water to drain through the soil profile and shed from the restored landform. Reasons for inadequate drainage include:
- poor infiltration causing surface ponding;
 - compacted and slowly permeable horizons within the restored soil profile;
 - slowly permeable substrate below the soil profile;
 - a high water table; and
 - inadequate surface gradient.
47. Discharges from on-site drainage can affect downstream watercourses or groundwater. The operator may require a consent to discharge from the site. Sites with potential drainage problems need to be investigated to ensure the reclamation proposals are acceptable. Preparation of pollution prevention plans and early consultation with SEPA is recommended. It may be possible to use Sustainable Urban Drainage Systems (SUDS) to treat surface water run-off. Some materials, such as sandstone, exposed during extraction may have to be sealed during restoration to ensure they do not pollute the water environment.

The Executive is in the process of preparing a Ground Water Regulation's code of practice for mineral workings.

<http://www.scotland.gov.uk/library5/environment/tgwr-00.asp>

AFTERCARE CONSIDERATIONS

48. The objective of aftercare is to ensure that land is treated for a number of years after the initial restoration has been carried out, in order to improve the structure and stability of the soil, install site infrastructure such as drainage and establish and manage the vegetation.
49. The aftercare period starts once the restoration conditions are satisfied. In the case of progressive restoration the aftercare period begins from compliance with the restoration condition in respect of the relevant part of the site. The statutory aftercare period is 5 years from compliance with the related restoration conditions. The aftercare period should be specified in the conditions. There should be an exchange of correspondence that clearly agrees when the aftercare period has begun. This is particularly important on large sites where reclamation may be phased. There is no legislative provision for the suspension of the aftercare period. Aftercare may be extended by mutual consent, through a planning agreement, where this will enable reclamation objectives to be achieved.

See Schedule 3, Part 2, Paragraph (7) of the 1997 Act.

CHOICE OF VEGETATION

50. The choice of vegetation will be influenced by the intended afteruse, tolerance of climatic and substrate conditions and the surrounding vegetation and landscape. The choice of vegetation that re-establishes the soil structure is particularly important for agricultural aftercare.

UNDER-DRAINAGE

51. Achievement of satisfactory soil drainage is essential if high standards of reclamation are to be achieved. In principle underdrainage should be installed as early as possible – even sites susceptible to settlement may benefit from a sacrificial drainage scheme (see model condition 26). There may be some instances where underdrainage is not needed, for example where permeable topsoils overlay permeable subsoil above the level of the water table. However, underdrainage is usually necessary for all agricultural afteruses and some forms of amenity use. During the aftercare period operators need to check that outfalls from drains are running freely.
52. In phased restoration schemes, it may be more appropriate to wait for a reasonably sized block of land to become available for drainage schemes rather than to design drainage schemes for small pieces of restored land which then require integration. The integration of wetland habitats, openwater and watercourses into the restoration scheme can aid overall site drainage and benefit natural heritage (see paragraphs 87 to 89).

SECONDARY TREATMENTS

53. Secondary treatments such as ripping and stone picking may be required to improve the condition of the soil. Ripping (subsoiling) can alleviate some of the drainage problems caused by compaction. The best effect of soil ripping may be achieved by ripping after subsoil spreading and again after topsoil spreading, and in some cases, repeating this during and possibly by agreement beyond the aftercare period. Ripping is most effective on soils that are dry enough to shatter

readily. However, some soils may remain too wet over most of the year to be effectively ripped. The presence of large stones in topsoil affects the ease with which the soil can be cultivated and can reduce the amount of available water for vegetation. Following the correct procedures for soil reinstatement will reduce stoniness. Planning authorities can require that stones of a certain size are removed from the surface and buried (see model condition 16).

FERTILISERS

54. The amounts of fertilisers and lime required will vary according to the specific site conditions and the proposed afteruse. Over-application of fertiliser or fertilising at inappropriate times can result in pollution of surface and ground waters. It is therefore essential that nutrient balancing is considered. Assessment reports (see paragraph 121 to 123) prepared at the end of restoration and during the aftercare period may include soil and vegetation analysis and an independent assessment of fertiliser requirements. There may be no need to use fertilisers on some sites, particularly nature conservation afteruses. Adequate soil nitrogen levels may instead be attained using grass legume mixes.

WEED CONTROL

55. Weed control is important to prevent dominance of undesirable species. Assessment reports prepared at the end of restoration and during the aftercare period may include assessment of which herbicides, fungicides and pesticides to use and when and how to apply them. Weed control is particularly important for tree planting schemes. Mulches can be used in many situations to control weeds.

IRRIGATION AND WATERING

56. Prolonged dry periods can damage vegetation particularly newly planted trees. The potential need for watering, and methods of applying it, may need to be considered.

CONTROL OF LIVESTOCK AND WILD ANIMALS

57. Excessive grazing can result in poaching which can lead to loss of soil structure, waterlogging of the upper soil horizons, poor grass growth and possible erosion. Whereas low intensity grazing can be used as an aftercare management tool to encourage the establishment of semi-natural grassland, improve soil quality and help control weeds.
58. The aftercare scheme should provide details of livestock management on reclaimed land. In the early years following restoration, possibly extending beyond the aftercare period by agreement, the land may be unable to support as many animals per hectare as undisturbed land. It may be necessary to exclude livestock altogether for limited periods especially during periods of prolonged wet weather (see model condition 23).
59. Controls on rabbits, deer and other wild animals may be required. It is generally preferable to exclude wild animals altogether during the aftercare period. Techniques to manage wild animals include fencing, tree guards and removal.

RECLAMATION TO AGRICULTURE

60. Most mineral sites in Scotland are in agricultural use prior to extraction. In many cases the sites will be reclaimed back to an agricultural afteruse, although increasingly forestry and nature conservation afteruses are being applied either across part or all of the site. Modern reclamation techniques enable mineral extraction to occur without the irreversible loss of agricultural land quality. On some sites agricultural land quality may even be enhanced.
61. Planning authorities need to ensure that operators obtain professional advice in assessing the quality of agricultural land affected by the development. This can be used as the basis for setting the standards to be achieved through reclamation and determining the potential soil resources available on the site. Information on the classification of agricultural land is available from the Macaulay Land Use Research Institute in Aberdeen.

CONSULTATION ON AGRICULTURAL RECLAMATION

62. It is recommended that planning authorities consult Scottish Executive Environment and Rural Affairs Department (SEERAD) agricultural staff on all reclamation proposals where the intended afteruse is agriculture, although there is no statutory requirement under the 1997 Act.¹ SEERAD agricultural staff will be able to advise whether an agricultural afteruse is appropriate and provide comments on the proposed conditions or aftercare scheme. Further advice on reclamation to agriculture can be obtained from specialist consultants. Planning authorities can require that operators submit reports during the restoration and aftercare period assessing the condition of agricultural land and specifying the steps to improve its quality (see model condition 19). SEERAD agricultural staff can provide comments to planning authorities on these reports where they raise serious concerns.

AGRICULTURAL RESTORATION

63. The landforms created through the restoration process are particularly important for agricultural afteruses. Good soil conditions are also vital for successful agricultural reclamation. Agricultural afteruses generally demand a higher quality of soil than forestry or amenity afteruses.

AGRICULTURAL AFTERCARE

64. The statutory 5 year aftercare period is generally considered appropriate for agricultural afteruses. The principle aim of the aftercare period should be to improve the soil conditions and not agricultural productivity. Deep rooting crops, such as cereals and vegetables, help dry out the subsoil and aid soil structural development, but usually require cultivation and cropping which may increase

¹ Schedule 3, Part 4, Paragraph 3(a) of the 1997 Act requires that planning authorities consult the Forestry Commission on the steps to be specified in aftercare conditions which specify a use for agriculture. In practice, the Forestry Commission will provide very limited comments on agricultural afteruses, however for the time being this is a statutory requirement.

the amount of trafficking and lead to compaction. Crops that leave the soil bare over the winter months or require harvesting late in the year should be avoided. For most sites sowing out to grass during the aftercare period will be the most appropriate crop.

65. The installation of field drainage is generally required for land being returned to agricultural use. However, the requirement to install it needs to be determined through an assessment of site conditions, as it is not always necessary. It is important that SEPA is consulted on drainage proposals. Limitations on stock rates and periods of grazing may be required. Ripping is often necessary.

RECLAMATION TO FORESTRY

66. Reclamation of mineral sites to forestry can bring many benefits beyond just timber production. Forestry can integrate reclamation proposals with the prevailing landscape character, increase natural heritage interests, provide shelter for crops and allow opportunities for recreation and access. It is the Executives policy to expand the forestry cover in Scotland. Reclamation to forestry is particularly suited to upland locations or old mineral permission sites where soil resources are insufficient or compacted.

CONSULTATION ON FORESTRY RECLAMATION

67. The Forestry Commission is responsible for the protection and expansion of Scotland's forests and woodlands. It has a role as a statutory consultee on mineral applications. The Forestry Commission also conducts research on improving woodland establishment and has considerable experience in reclamation practice.
68. It is recommended that the Forestry Commission is involved as early as possible in consultations to advise on afteruses rather than being consulted once the afteruse has already been decided. This affords them the opportunity at an early stage to suggest where forestry might be appropriate and areas to avoid. Planning Authorities may want to agree with the Forestry Commission on the most effective way it can contribute to the consultation process.
69. There is no statutory requirement for planning authorities to consult the Forestry Commission on restoration conditions when forestry is the proposed afteruse. However, it is recommended that they are consulted, as the standard of restoration is critical to the achievement of satisfactory aftercare. Under the 1997 Act, planning authorities are required to consult the Forestry Commission before imposing an aftercare condition specifying a forestry afteruse and prior to approval of an aftercare scheme specifying a forestry afteruse. The Forestry Commission can provide a view on whether the forestry afteruse should be specified in a condition or in an aftercare scheme.
70. For the purpose of aftercare conditions, forestry is defined in the 1997 Act as "the growing of a utilisable crop of timber". It is recommended that planning authorities also consult the Forestry Commission on significant areas of amenity woodland planted for its recreation, nature conservation and landscape value. Within the Central Scotland Forest area, it is recommended that planning authorities also consult Central Scotland Countryside Trust (CSCT). Scottish Natural Heritage (SNH) can be consulted when the afteruse includes amenity woodland planting. SEPA can be consulted on the potential impact of forestry on controlled waters.
71. The 1997 Act states that while aftercare is being carried out, planning authorities may consult the Forestry Commission as to whether the steps specified in an aftercare condition or scheme are being taken. Planting schemes supported by the Woodland Grant Scheme are evaluated by the Forestry Commission after 3 and 5 years. However, on the cessation of each phase of restoration and

landscaping, planning authorities can require that operators submit a report which assesses the condition of all planting and specifies any remedial action required in the ensuing planting season (see model condition 19). Subsequent assessment can take place as part of the annual review and at aftercare meetings. It is recommended that assessments examine stock density, growth rates, plant condition and the average height of crop compared with normal expectations for trees grown in the locality. The Forestry Commission can provide comments to planning authorities on these assessment reports. Guidance is available from the Forestry Commission on the environmental assessment of forestry schemes.

FORESTRY RESTORATION

72. Adequate drainage, which is important for successful forestry reclamation, is achieved through controlling the slope of the restored landform and drainage channels. Under-drainage is rarely used in forestry reclamation. Poor site drainage can affect the longer term survival and growth of trees. Anaerobic soil conditions, where the soil is free of molecular oxygen, caused by even very short episodes of waterlogging can kill tree roots.

FORESTRY AFTERCARE

73. The statutory 5 year aftercare period is generally considered appropriate, unless the woodland is established by means other than planting, eg direct seeding or natural colonisation. The timing of the first year's aftercare steps will normally be designed to prepare for tree planting between October and March. These steps may include soil sampling, fertilising, cultivation, drainage and the sowing of nitrogen fixing and slope stabilising crops. A condition requiring the erection and maintenance of fencing to protect young trees may be attached to planning consents.
74. The highest quality plants and the highest standards of plant handling and planting are essential for plant survival on restored sites. It is recommended that trees are planted in accordance with BS 3936 – part 1 specifies requirements for trees and shrubs used in amenity planting and part 4 specifies requirements for trees and shrubs used in timber production. A condition can be attached to ensure that the trees planted are of suitable quality (see model condition 21). The species choice will need to be adjusted to suit the soil and site conditions. For natural heritage benefit it is preferable to plant native species of local provenance. Before trees are planted ripping may be required to overcome soil compaction which can lead to waterlogging and poor root development.
75. The responsibility for management and ownership of sites reclaimed to forestry or amenity woodland may be passed to other organisations such as Forest Enterprise, an executive agency of the Forestry Commission responsible for the management of forests and woodlands, or CSCT.

RECLAMATION TO AMENITY USES

See **Biodiversity and Opencast Coal Mining: A Good Practice Guide, RSPB & SNH (2000)**

76. The reclamation of surface mineral workings can often provide substantial opportunity to improve landscapes and habitats, expose earth science interest and enhance access and recreation provisions for local communities. Increasingly surface mineral workings are being reclaimed to afteruses that fall into the broad category of amenity. These involve the creation of:

- formal and informal recreational areas;
- woodland;
- grassland;
- geological exposures;
- reed beds;
- open water; and
- watercourses.

General planning conditions can require the construction of paths for recreation and access (see paragraph 95).

77. Amenity afteruses are often offered by operators as community benefit to increase the chances of an application gaining acceptance by the local community or where a return to the pre-extraction use of the land is not viable, such as with some hard rock quarries (see Annex A). Reclamation to natural heritage afteruses may be particularly appropriate where there are important habitats adjacent to the site, where soil or hydrological conditions suit a particular habitat type or where there are rock or landforms of particular interest. Natural heritage afteruses can be cost-effective and contribute towards achieving biodiversity targets.

78. It is not possible to recreate every habitat which could be adversely affected by mineral development. However, the reclamation of surface mineral workings provides a great opportunity to enhance natural heritage interests by extending, linking together or creating new habitats.

CONSULTATION ON AMENITY RECLAMATION

79. It is recommended that SNH be consulted on applications for the reclamation of surface mineral workings. Consideration may also be given to consulting other consultees such as the Royal Society for the Protection of Birds (RSPB) or the Scottish Wildlife Trust (SWT). Advice can also be obtained from SEPA. Advice on local needs and informal land and water-based sport and recreation may be obtained from SportScotland and SNH. CSCT can advise on proposals within the Central Scotland Forest area.

80. It is recommended that consultees are involved in initial consultation on afteruses rather than being consulted once afteruses have been chosen. The EIA process provides an opportunity for early consultation, and will identify existing natural heritage interest and assess the suitability of the site for habitat creation.

AMENITY RESTORATION

81. Many amenity afteruses have precise topographical requirements, such as site area and gradients. Many habitat types require low fertility soils, or the establishment of waterlogged conditions, to encourage the growth of the desired vegetation. The soil profile characteristics are important in determining the success of nature conservation after reclamation. The required soil profile will vary depending on the type of habitat. The correct soil fertility is required since soils that are too fertile will reduce the species diversity because more vigorous grass species will dominate and prevent species that do not respond rapidly to soil nutrients from establishing successfully.
82. Features of earth science interest, such as rocks or fossils, may be revealed during mineral extraction. Valuable earth science features can be retained in the form of rock exposures or sections. If evidence suggests there may be some earth science interest then a watching brief can be required during working. The permanent preservation of exposures and sections is generally unacceptable where this would sterilise large amounts of a mineral reserves (unless within a geological Site of Special Scientific Interest (SSSI)). There may be opportunities to locate exposures and sections near the limits of the working area to reduce sterilising mineral reserves. Where permanent exposure is proposed it is important to consider how earth science interest can be integrated with other afteruses and issues such as access, maintenance and the responsibility for ensuring safety of exposed faces. Local RIGS (Regionally Important Geological and Geomorphological Sites) Groups or SNH may be able to provide advice on the creation of permanent exposures.

See PAN 60: Planning for Natural Heritage, page 35, case study 19.

AMENITY AFTERCARE

83. The statutory 5 year aftercare period is generally considered appropriate for more formal amenity afteruses such as playing fields. However, sites reclaimed to natural heritage afteruses tend to require a longer period of aftercare to allow habitats to establish. This can be controlled by a planning agreement or by other voluntary arrangements between mineral operators, planning authorities, landowners and other relevant organisations.
84. Some nature conservation sites may require regular flooding to maintain certain habitats, whereas drainage and pumping may be required for other uses such as playing fields to prevent flooding in winter. Maintenance of water levels can be achieved through a planning agreement.
85. There are various methods of vegetation establishment that can be used on sites being reclaimed to amenity afteruses including seeding, natural colonisation and turf transplants. The process of natural colonisation can take years and is generally not suited to visually sensitive areas. If a formal sports afteruse, such as playing fields, is proposed planning conditions can allow for

aftercare to establish and sustain an appropriate grass sward. Weed control may be important to prevent dominance of a limited number of aggressive species. Weed control will also need to ensure that no harm is done to vegetation of interest.

86. Mineral operators may pass the responsibility for management of reclaimed sites to other organisations such as the RSPB, SWT, CSCT or the local authority.

WATER AREAS AND WATERCOURSES

87. Water areas and watercourses can be created as part of the proposed afteruse. These can enhance the landscape, provide recreational opportunities and create habitats for wildlife. Rivers and burns can be affected by opencast operations and may be diverted to allow extraction. Where watercourses have been degraded as a result of past mining or industrial activity their ecological value can often be enhanced through reclamation. Water areas can often cater for water recreational uses and natural heritage interests.

88. Where a mineral operator proposes to create a water area or watercourse it is best practice to submit information on:

- depths and areas of water to be created;
- safety features, especially if there is public access or its near to a populated area;
- the stability of steep slopes;
- hydrology and water quality;
- the provision of features such as islands, shallows and gently sloping shores which can greatly enhance the potential for habitat creation;
- treatment and planting of water and land margins;
- subsequent management of the area; and
- the risk of birdstrike to aircraft when the water area is located near to an airfield.

89. SNH and the RSPB will be able to provide advice on the creation of natural heritage interest in and around water areas. It is recommended that SEPA be consulted when preparing any restoration or aftercare scheme where it is intended to establish a water area or create or divert a watercourse. SportScotland and SNH can provide advice on water based recreation.

See *Reducing the Effects of Surface Mineral Workings on the Water Environment*, Symonds Travers Morgan (1998).

See SEPA documents *Watercourses in the Community and Pond, Pools and Lochans*.
www.sepa.org.uk/guidance/hei

LANDFILL

Guidance on the interaction between planning and waste controls is contained in NPPG 10: Planning and Waste Management. Further advice is given in PAN 63: Waste Management Planning.

90. Voids created by surface mineral workings have in the past been used for landfill. Demand for landfilling of these voids is expected to diminish in the future as waste treatment and minimisation increases. However, where the reclamation of a surface mineral working includes landfilling, it is vital that the requirements are integrated with the requirements and objectives for reclamation. A separate planning permission is likely to be required for landfilling.
91. Any proposal for mineral working which includes infilling the mineral void with controlled wastes currently requires either a waste management licence under the Environmental Protection Act 1990, as amended, or a permit under the Pollution Prevention and Control (Scotland) Regulations 2000, as well as planning permission.
92. Where the deposit of controlled waste has been carried out, reclamation to forestry is only desirable if the integrity of the landfill design (particularly the impermeable capping and any gas control system) will not be compromised, for example by supply of adequate thickness of soil over the landfill cap (a minimum of 1.5 metres is recommended) and selection of appropriate tree species.

CONDITIONS

See Schedule 3,
Part 1, Paragraph
(2) of the 1997
Act.

93. Planning authorities are given powers under the 1997 Act to impose two forms of restoration and aftercare conditions on agriculture, forestry and amenity permissions:
- conditions imposed at the time of granting planning permission, specifying the steps to be taken; or
 - conditions which allow a restoration and aftercare scheme to be submitted at a later date for approval by the planning authority.
94. If any restoration is likely to take place within 12 months of the commencement of working, then it is recommended that full details of the proposed restoration and aftercare be submitted, and a detailed set of conditions imposed with the planning permission. Where restoration will not take place for several years, it may be appropriate for some details to be submitted at a later date in restoration and aftercare schemes. However, the general principles of the proposed reclamation and aftercare, including detailed schemes for stripping and storage of soil materials, should be agreed from the outset as part of the planning application. This needs to be sufficient to demonstrate that the overall reclamation objectives are practically achievable. More advice on restoration and aftercare schemes is provided in paragraphs 101 to 109.
95. There are limitations on aftercare conditions:
- Aftercare conditions may only be imposed where the land is also subject to a restoration condition.
 - Aftercare conditions only apply where land is being reclaimed for use for agriculture, forestry or amenity.
 - Aftercare conditions can require only the treating of the land – such as planting, cultivating, fertilising, watering, draining or other steps for treating the land – aftercare conditions cannot require the erection, construction or maintenance of fencing, gates, paths, etc. General planning conditions should be used to cover these (see model condition 4).
96. There has been concern about whether restoration and aftercare conditions can cover works to water areas or watercourses. Preparation of the margins of water areas or watercourses will usually involve the movement or use of soil or soil-forming materials and can therefore be required as a restoration condition. This means the initial planting and management of the marginal or aquatic vegetation can be covered by an aftercare condition or scheme.

See Schedule 3,
Part 1, Paragraph
(5) of the 1997
Act.

97. Conditions may be worded so that, if it can be demonstrated that the aftercare objectives have been met, an early termination of the aftercare period can be achieved with the written agreement of the planning authority. Consultation with interested parties needs to be carried out prior to the termination of the aftercare period. On request from any person with an interest in the land, planning authorities can issue a certificate confirming that aftercare steps have been complied with – providing they are so satisfied.

DRAWING UP CONDITIONS

98. Planning authorities need to consider what conditions are required to ensure satisfactory reclamation. Conditions should be based on pre-application discussions and the site survey provided with the planning application, perhaps as part of the Environmental Impact Assessment. Draft conditions should be discussed with operators to ensure they are practicable.
99. Planning conditions for reclamation will vary according to:
- characteristics of the individual site;
 - intended afteruse;
 - type of mineral being worked;
 - method of working;
 - timescale of the working; and
 - planning policies for the area.
100. Where possible conditions should refer to drawings submitted in the application which described the proposed operations or afteruse rather than specifying detailed matters in conditions. For example, there is no need to specify the height of soil mounds if these are specified in the drawings.

RESTORATION AND AFTERCARE SCHEMES

101. Planning authorities can use conditions to secure the submission of a restoration and aftercare scheme, rather than specifying the detailed requirements of restoration and aftercare in conditions (see paragraph 93). These schemes can provide flexibility and allow for:
- the use of the most advanced techniques;
 - identification of more appropriate afteruses; and
 - unforeseen circumstances such as faulting, unrecorded old mine workings or water infiltration.
102. Schemes are usually prepared by the mineral operator, or a consultant working for them, with advice from the planning authority and consultees. Separate schemes for restoration and aftercare may be submitted, or both combined into a reclamation scheme. It can take time for the schemes to be prepared and agreed, therefore planning authorities need to specify in conditions a date for submission of the schemes that provides sufficient time for them to be agreed (see model conditions 1 and 2).

RESTORATION SCHEME

103. The restoration scheme should include details of:
- landforms proposed;
 - soil types, depths and characteristics;
 - soil handling machinery and on-site vehicle movements;
 - soil stripping, soil storage and reinstatement;
 - soil-forming material usage;
 - locations of important geological exposures; and
 - drainage channels.
104. Variability in the mineral extraction process and restoration materials means that adjustments to the scheme may be necessary as site working progresses. The scheme should therefore be subject to regular review and any modification agreed. If major adjustments are required then an updated restoration scheme may be necessary.
105. It is good practice for operators to start preparation of a restoration scheme at least 9 months prior to commencement of restoration on all or part of the site. It needs to be submitted to the planning authority at least 6 months prior to commencement of restoration of the full site or any phase.

AFTERCARE SCHEME

106. An aftercare scheme requires two levels of information:
- an outline strategy of commitments for the 5 year aftercare period; and
 - a detailed programme for the forthcoming year.
107. The outline strategy broadly identifies the steps to be carried out in the aftercare period and their timing. A summary of the main items to be covered within the outline strategy is given below.

Outline Strategy for an Aftercare Scheme

The outline strategy can cover the aftercare steps detailed below plus any additional aspects that may be required by the planning authority. Person(s) responsible for carrying out these steps should be identified. Aftercare steps to be covered include:

Timing and pattern of vegetation establishment

A brief description of the sequence of vegetation establishment over the full aftercare period. Details of species composition, stock type and size, spacing, method, timing and position of planting, methods of vegetation establishment. A ground plan showing where different species are to be planted is helpful.

Cultivation Practices

An outline of the range of cultivations likely to be undertaken.

Secondary Treatments

Commitments to undertake secondary treatments such as moling, ripping, and stone picking need to be outlined.

Drainage

This can cover any commitments to undertake underdrainage; consultations with the planning authority in advance of installation to agree scheme design; timing of installation work within the aftercare programme plus commitments to carry out any necessary maintenance works or temporary drainage measures.

Fertilisers, Weed Control etc

Measures for improving soil fertility and control of weeds. The basis for determining need and application rates can be outlined (eg soil sampling and analysis); appearance or health of vegetation in amenity schemes. Methods of maintaining soil fertility.

Irrigation and watering

Information on equipment, siting of installations and criteria for determining irrigation rates.

108. The detailed programme normally covers requirements for the forthcoming year, including those identified above. It is recommended that the first years detailed programme be submitted with the outline strategy. Subsequent detailed programmes can be submitted as part of the annual report (see 118).

Detailed Annual Programme for an Aftercare Scheme

The scheme should identify the person(s) responsible for the year's programme. Detailed prescriptions can be provided for specific steps where appropriate including:

Vegetation establishment

It is recommended that details are provided on the cropping programme/planting schemes. For each field/area information should include details on:

- the nature and timing of any cultivations and stone picking operations including approximate depth of activities;
- the content of seeds mixtures; proposed seed rates and timing of sowing operations;
- fertiliser and lime application rates based upon the results of soil analyses; and
- details of spraying programmes, both herbicides and fungicides.

Vegetation Management

For grasslands, this can cover the anticipated timing and frequency of cutting; grass removal; proposed grazing regime including type, age and numbers of livestock and the extent of the grazing period. For other vegetation types, similar considerations can be given, together with specific requirements for the desired vegetation, including weed control.

Secondary Treatments

Specifications should include timing, working depths, time spacings and the equipment to be used for moling and ripping operations.

Field Drainage

Details on the timing of underdrainage installation work for the forthcoming year plus scheme details including a map showing pipe layout plus details on installation method; drain spacings; drain depths; pipe size and gradients; nature and depth of permeable fill; outfalls; post installation remedial works.

Irrigation/Watering

Details of irrigation proposals specific to the forthcoming year.

Tree and hedge establishment

This should confirm establishment proposals for the forthcoming year covering ground preparation, planting details (species, type of stock, establishment methods, planting density, timing) and maintenance including, as appropriate, beating up (replacement of dead trees); weed control policy; fertiliser application, protection from grazing animals and cutting/pruning.

109. The preparation of an aftercare scheme normally begins at least 9 months prior to commencement of aftercare on all or part of the site. It needs to be submitted to the planning authority at least 6 months prior to commencement of aftercare of the full site or any phase.

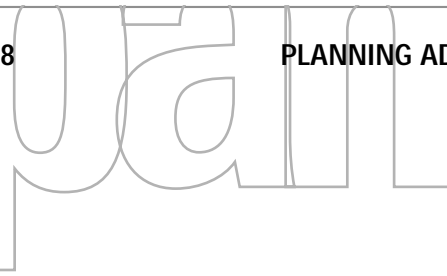
PLANNING AGREEMENTS

110. Planning agreements are attached to most planning applications for the extraction of minerals in Scotland. General advice on the use of planning agreements is given in SODD Circular 12/1996. Planning agreements for mineral sites are often used to secure the preparation of annual reports, assessment reports and financial guarantees.
111. For some afteruses such as nature conservation, which may not generate sufficient funds to be self-sufficient, it may be appropriate for planning authorities to seek a planning agreement between the owner and/or mineral operator to secure long term management beyond the statutory 5 year aftercare period.

FINANCIAL GUARANTEES

112. The Scottish Executive considers that financial guarantees are an appropriate means of reassuring local communities of operators' commitment and ability to meet their restoration and aftercare obligations. Financial guarantees to ensure full restoration and aftercare should the mineral operator fail to implement the agreed works can be provided by mutual funding schemes. However, in Scotland it is common practice for operators to provide a restoration and aftercare bond as a financial guarantee.²
113. Financial guarantees need to reflect the scale and type of mineral extraction proposed and avoid imposing costs on operators beyond what is necessary. Calculation of the bond by an independent specialist, perhaps paid for by the operator, will ensure that the sum calculated takes account of the full cost of restoration and aftercare, including professional fees. The bond can be reviewed at regular intervals during reclamation to ensure that it is in line with the cost of restoration and aftercare. Funding can be released as various stages are completed and the extent of disturbance is reduced. Letters releasing the funds will provide operators with confirmation that various stages have been reached.
114. The four main financial guarantees are:
- Insurance Company Guarantees (Surety Bonds) – These are provided by insurance companies and guarantee payments when operators are unable to satisfactorily complete restoration and aftercare works required by a planning agreement. Insurance companies base these bonds upon an appraisal of the technical ability, financial structure and track record of the mineral operator. Insurance companies will typically only offer bonds for up to 5 years. This may mean that surety bonds are not appropriate for long term mineral workings. Insurance companies may be unwilling to provide a new bond after the initial period if a company appears to be in financial difficulty.

² See paragraph 3.65 and 5.27 of Effectiveness of Provisions for the Aftercare of Mineral Workings. DETR (2000). www.planning.odpm.gov.uk/epamw/index.htm



- Bank Guarantees – These guarantees are underwritten by a standard security taken over assets or against a company’s overdraft/borrowing facility. The bonds are secured against tangible assets and can be granted for extended periods of time in excess of 5 years.
 - Parent Company Guarantees – A holding company or parent company may offer this type of guarantee for one of its subsidiary companies. The guarantee can however be lost if the parent company or another subsidiary company encounter financial difficulties.
 - Mutual Funds – These are guarantee scheme covering several operators, where risks are spread and the group offers security. Planning authorities can call upon the funds in the event of financial failure of a member that results in failure to comply with reclamation requirements. British Aggregates Association (BAA) and the Quarry Products Association (QPA) both have restoration guarantee funds.
115. It is important that the landowner, who in most instances will not be the mineral operator, understands their legal responsibilities and the legal powers of the planning authority. The landowner could ultimately be responsible for breaches of planning control and may be the recipients of enforcement action. Where possible the landowner should be made aware of their responsibilities and the terms of the financial guarantee.

MONITORING AND ENFORCEMENT

116. Mineral operators need to ensure that adequate systems are in place to correctly monitor site reclamation. Environmental auditing, either as part of an internal process or based on an industry standard, is beginning to be used by some operators to assess reclamation standards. It is also essential that planning authorities monitor for compliance with conditions and take enforcement action when necessary. Planning authorities must allocate adequate staff resources to ensure consistent and effective monitoring and enforcement.
117. It is good practice for planning authorities and operators to discuss the nature and frequency of monitoring before planning permission is issued. A planned series of visits by the planning authority at the main stages of reclamation can be agreed. These would include activities carried out during the extraction period that have implications for successful reclamation. These meetings can be referred to in planning conditions.

ANNUAL REPORTS AND MEETINGS

118. Most planning authorities specify in conditions the requirement for annual reports throughout the extraction, restoration and aftercare periods. It is recommended that annual reports:
- be based on annual site investigation;
 - include a record of all the works undertaken in the previous year (not just restoration or aftercare works);
 - cover both good points and problems;
 - provide a detailed programme for the forthcoming year; and
 - indicate whether compliance with specific conditions has been achieved.
119. A meeting between the person(s) responsible for carrying out aftercare, the planning authority, and any other expert advisers such as SNH is generally convened following receipt of the report.
120. Conditions or a planning agreement can specify the date and/or timings for submission of an annual report and convening of an aftercare meeting (see model conditions 28 and 29). The timing of the meeting will depend on the type of afteruse. For agricultural afteruse this could be late winter/early spring when soil conditions may be readily assessed. For forestry and amenity woodland, early spring would be an appropriate time, when annual growth can be readily assessed. The most suitable time for the annual meetings for amenity and nature conservation afteruses will depend on the type of afteruse or habitat being established.



ASSESSMENT REPORTS

121. In addition to the annual reporting, there may be occasions when independent professional expertise is required by planning authorities to assess whether the required standard of reclamation is achievable, or has been achieved. This can be provided in assessment reports prepared by suitably qualified professionals. Planning conditions or agreements can specify the occasions when these reports are required and the information to be provided (see model condition 19).
122. On the cessation of each phase of restoration and aftercare planning authorities may require an assessment report which examines whether the requirements of any conditions or schemes have been attained and if necessary specify remedial action. In some cases restoration may be followed immediately by the initial aftercare works in which case a report that combines the assessment of both restoration and aftercare may be appropriate.
123. Planning authorities may also request an assessment report, such as a soil resource survey, prior to the start of restoration to determine whether reclamation can achieve the standards of soil material or soil-forming material suitable for the proposed afteruse. This is particularly relevant to reviews of old mineral permissions.

TECHNICAL WORKING GROUP

124. Most sites have a liaison committee or advisory panel established prior to development commencing which encourages structured liaison between the mineral operator and the local community. In addition, planning authorities may form a technical working group responsible for reporting back to them on reclamation. The planning authority could chair the group. It may consist of representatives from the planning authority, mineral operator, any tenants or landowners and other interested parties. The group could meet twice a year until the end of the aftercare period. Although, the composition of the group and the frequency of meetings will be determined by the size, duration and sensitivity of the proposal.
125. The involvement of the landowner in the aftercare process should be encouraged so that when the land reverts to the landowner, either during or at the end of the aftercare period, they are fully aware of the objectives and techniques and are able to achieve the appropriate standards of aftercare.

REVIEWS OF MINERAL PLANNING PERMISSIONS

126. Guidance on implementing the new review provisions under Section 74 and Schedules 9 and 10 of the 1997 Act is contained in SODD circular 34/1996. Where a site is already subject to conditions which satisfactorily provide for restoration and aftercare there is no need to alter them. In other cases, appropriate restoration and aftercare conditions can be imposed.
127. Review sites have often been worked for many years, so the proposed new schemes for restoration and aftercare need to take account of the existing physical conditions and limitations. For example, older sites may have limited soil resources available for restoration purposes, or alteration of the site boundary may be required to enable the creation of suitable landforms. The afteruse chosen at the time a site was first permitted may not be appropriate at the time of a review, therefore a degree of flexibility is needed.

DEVELOPMENT PLANS

128. Local plans or minerals local plans can express in general terms the planning authority's strategy for mineral working and related development taking into account national and structure plan policy. They can provide guidance to applicants on the need for reclamation of surface mineral workings. They may provide further guidance on:
- information to be submitted with an application;
 - preferred afteruses and reclamation standards;
 - financial guarantees; and
 - monitoring requirements.
129. Local plans or minerals local plans may also include policies on abandoned or dormant sites which are considered unlikely to be reactivated during the plan period. This will help provide certainty to the local community and secure reclamation at the earliest opportunity.

ENQUIRIES

130. Enquiries about the content of this advice note should be addressed to Ben Train, Planning 3, Scottish Executive Development Department, 2-H81 Victoria Quay, Edinburgh, EH6 6QQ Tel: 0131 244 7532 or by e-mail to ben.train@scotland.gsi.gov.uk. Further copies of this PAN and a list of current NPPGs and PANs can be obtained by telephoning 0131 244 7543. This PAN and other PANs and NPPGs are available on the Scottish Executive web site www.scotland.gov.uk/planning

NOTES

131. Scottish Development Department Circular 5/1982, The Town and Country Planning (Minerals) Act 1981 Explanatory Memorandum, has been cancelled.

CASE STUDY 1

DRUMBOW, NORTH LANARKSHIRE

Improvements in wastewater processing technologies in recent years have helped the development of biosolid products suitable for use in land reclamation. Biosolids were used to reclaim a site at Drumbow in North Lanarkshire where the opencast coal operator abandoned the site before completing restoration and aftercare works. The site was left with badly compacted soils that were low in organic and nutrient content. Planning permission was granted for the creation of an area of woodland, wetland and pathways. Material from an inert bing was used to create a suitable landform and biosolids and canal dredgings were used to improve the soil structure and nutrient content to enable vegetation growth. The funds raised by using these waste materials enabled the development to proceed. The scheme was developed through a partnership approach between Central Scotland Countryside Trust (CSCT), Forestry Enterprise, Forestry Commission, Scottish Enterprise Lanarkshire, North Lanarkshire Council and Portcullis Developments.



Before reclamation



After reclamation

CASE STUDY 2

DAMSIDE, NORTH LANARKSHIRE

Damside opencast coal site in North Lanarkshire extends for 405 hectares. It was previously rough grazing with some dereliction due to the activities of small mines. Restoration has returned the site to improved grazing and forestry afteruses. This has been achieved with the help of specialist advice obtained by the mineral operator. They appointed a reclamation consultant to work on creating a landform fit for woodland and in the preparation of an aftercare scheme. CSCT was employed to design the woodland areas, obtain a woodland grant from the Forestry Commission and manage the woodland during the 5 year aftercare period. Areas returned to grazing were similarly managed by Scottish Agricultural College (SAC). They advised on suitable agricultural contractors, drew up specifications for necessary work, assessed the need for fertiliser application and prepared the annual report.

CASE STUDY 3

MEADOWHILL OPENCAST, CLACKMANNANSHIRE

The Meadowhill opencast site is situated east of Alloa, and covers 59 hectares. Land near the site and controlled by the mineral operator includes the Parklands Muir Wildlife Site. The indicative restoration plan submitted with the planning application was not suitable and did not fulfil the site's restoration potential. A planning condition therefore required a revised restoration plan. Clackmannanshire Council, SNH and SWT worked closely with the operator's landscape architect in preparing the restoration proposals, particularly on the creation of new wetland areas. A training session was held for the machine driver to ensure wetland area excavations maximised the ecological benefits. Progressive restoration helped mitigate wildlife displacement and habitat loss. Works to improve Parklands Muir Wildlife Site, which was outwith the operational site boundary but within the operator's control, took place in the first year of operations to provide alternative habitat from the onset.



During creation of the wetland area



Established wetland area

CASE STUDY 4

RIVER NITH DIVERSION, EAST AYRSHIRE

At House of Water opencast coal site in East Ayrshire diversion of the River Nith was carried out in order to extract coal from an area under the existing riverbed. At this location the River Nith is a relatively small upland burn. The planning authority attached a condition to the consent which required the operator to submit full details of the proposed diversion scheme within 12 months of the consent. This scheme was made part of a planning agreement. A Technical Support Group consisting of all relevant organisations was set up and regular meetings took place to discuss the project. The 3 kilometre river diversion was designed to replicate the natural meandering pattern of the existing stream. A floodbank and groundwater barrier was constructed to protect the mineral working area from flooding or ground water intrusion. The new channel is a permanent diversion, but following completion of coal extraction, the floodbank will be breached and floodplain storage returned. The RSPB is working with the operator to ensure that flood storage benefits will be combined with habitat enhancement, in accord with Ayrshire LBAP. The diversion has provided benefits in term of flood storage, water quality and habitat creation to encourage wildlife.



Diverted River Nith

CASE STUDY 5

GLENSANDA SUPERQUARRY, HIGHLAND

Glensanda is Scotland’s largest hardrock quarry, and is situated on the banks of Loch Linnhe, near Oban. It can operate 24 hours a day and has the capacity to produce 15 million tonnes of crushed aggregate per annum. The quarry is divided into 2 distinct operational areas. The crushed stone is transferred from the extraction area on the plateau of Meall Mhuic Artair down a shaft of 300 metres and through a tunnel 1860 metres long to the processing, storage and ship-loading facility on the coast.

The restoration plan is to integrate the production benches with the surrounding hillside. The site is being progressively restored starting with the more visible upper benches. Rock is blasted down to form screes which are left at the natural angle of repose. Peat is stripped and either used directly in restoration or stored for future use. It is pressed into the rock face or screes to help it adhere and prevent it from being washed off. Ultimately the site will simulate the surrounding landscape and be returned to moorland. A potential afteruse is to use the shaft to develop a pump storage hydroelectric scheme.



Restoration blasting



Images showing the production benches being integrated with the surrounding landscape

CASE STUDY 6

BIRNIE AND GLADDON LOCHS, FIFE

Birnie Loch and Gladdon Lochs near Collessie in Fife are a good example of a local organisation, in this case Fife Council, taking over the aftercare of sites with the active co-operation of the original operator. In the case of Birnie Loch, when permission for sand and gravel extraction was granted in 1982, the intention was to reclaim the site to agriculture. However, when workings began it quickly became apparent that there were extensive mineral deposits below the water table and that full exploitation of these would produce a water area rather than an area of dry land. Planning permission was changed in 1986 to allow for restoration to a loch with recreational and nature conservation afteruses. This site shows the need for flexibility in considering reclamation proposals. The progressive restoration was secured using planning conditions and a planning agreement. The end product is a loch with several islands, landscaped and tree planted margins, car parking, picnic areas and a footpath around the loch. Birnie Loch is now a Local Nature Reserve, regionally important for waterfowl and has won a number of awards (see PAN 60 case study 12).



CASE STUDY 7

RATHO QUARRY, EDINBURGH

Ratho Quarry, located to the west of Edinburgh, was first recorded on a map of 1852 and working of the quarry for hardrock ceased around the start of the 20th century. The quarry forms a huge amphitheatre, 130 metres across and 20 metres deep. Edinburgh City Council granted planning permission in 1997 to Ratho Quarry Company Limited for converting the redundant quarry to The Adventure Centre – Ratho, incorporating the National Rock Climbing Centre of Scotland. The development has been given support by the Sports Lottery Fund and Scottish Enterprise Edinburgh and Lothians.

The Adventure Centre, opening early 2003, will have the largest indoor climbing arena in the world which will be used for national and international climbing competitions, as well as other sporting and music events. The quarry walls have been incorporated into the centre to provide an authentic indoor climbing experience. The site works involved the removal of 250,000 tonnes of blast material from the oldest section of the quarry which was back-filled during the later stages of mineral working. Most of this stone is being reused for dry stonewalling and within the building itself. Further information can be found at www.adventurescotland.com



ANNEX A – MINERAL WORKINGS IN SCOTLAND

1. The following section summarises the characteristics of the main mineral types worked in Scotland, and provides guidance on their reclamation. It should be read in conjunction with the more general advice contained in this PAN.

OPENCAST COAL

2. The relatively high economic value of coal makes it cost effective to work seams overlain by thick layers of overburden. During the life of the site there is therefore a need for the storage of topsoil, subsoil and large volumes of overburden. The volumes involved can be minimised by progressive working and reclamation of the site. In many cases the high ratio of overburden allows the site to be infilled to pre-working levels without the need for importation of additional fill materials.
3. Soil wetness at opencast coal sites can cause difficulties when handling soils, as there may be limited opportunities during the year when the soils are in a suitable dry condition. Because of the heavy texture of soils often associated with opencast sites, reclamation schemes need to aim to install a drainage system as soon as possible following soil reinstatement.

SAND AND GRAVEL WORKINGS

6. Sand and gravel workings are a common form of mineral extraction in Scotland. Most production exploits drift deposits in river valleys or glacial and fluvio-glacial gravel deposits. The ratio of mineral to overburden is usually high, which means that the importation of fill is necessary if the land is to be returned to its original levels. In some cases this may not be appropriate or necessary.
7. Much of the sand and gravel resource is overlain by relatively thick and high quality soils, which enables high standards of reclamation to be achieved. At some sites very stony soils can be a limiting factor, which can be addressed through aftercare stone picking. Sites with a high water table can be allowed to fill with water following extraction and are often used for the creation of habitats for wildlife.

HARD ROCK QUARRIES

8. Hard rock quarries in Scotland include igneous rock, limestone/dolomite and sandstone. Many of these quarries were granted planning consent following the second world war when environmental considerations were not given the weight they are today. Consequently many were worked with little regard to reclamation. There are specific challenges associated with the reclamation of these older permissions including:
 - inadequate supplies of fill material;
 - shortage of soil resources;

- the water table level; and
 - sidewall stability.
9. The ability to integrate older quarries with the surrounding landscape can be compounded by the regularity of the quarry landscape, consisting of production benches and faces, and the quarry margin which can often finish abruptly at the boundary of the planning consent. Planning authorities therefore need to be flexible in reviewing old permission and may need to permit some variations in quarry boundaries to enable satisfactory reclamation to take place.
 10. Reclamation of new quarries or quarry extensions should be considered from the start of the planning process and integrated with the working methods. There needs to be a clear set of landscape objectives and a reclamation strategy that details the final landform, methods of working, progressive reclamation and integration into the adjacent landscape and land uses. This must be flexible since working objectives, priorities, opportunities and techniques will change over the long timescale. It is likely that most reclamation strategies for hard rock quarries will require updating during the life of the working.
 11. A number of techniques are available for reducing the visual impact of hard rock quarries. Production benches and quarry faces can be designed to create a landform in keeping with the surrounding landscape. Alternatives to final face treatment, such as restoration blasting and rollover, can create a more natural appearance by reducing the face angle and creating buttresses and scree slopes. Where fill materials are available, it may be possible to fill all or part of a site, including total or partial masking of the quarry margins. Consideration can be given to developing a reclamation margin (see paragraph 43 of the main text).
 12. The success of vegetation establishment is largely dependent on the soil resources available. In new quarries or extensions soils can be stripped and used in restoration. In older quarries where soil resources are limited use of soil-forming materials and amendments is usually required. Vegetation can be established directly onto the rock faces using techniques such as hydroseeding, pouring or spot seeding. Measures will be required to prevent damaged to vegetation from rabbits and other wild animals.
 13. It is essential that the long term safety of hard rock quarries is considered. The stability of quarry faces is the principal safety issue although deep water and steep banks resulting from sub-water level working and land instability are also important. Rock-fall can be a hazard to people and livestock and can destroy or disturb revegetated areas lower down the face. Stabilisation measures such as scaling can be undertaken on excavated quarry faces and slopes to ensure they are safe, particularly where members of the public have access. It is good practice that scaling is carried out before vegetation is planted. Careful recording and monitoring can be undertaken on a regular basis and ongoing scaling carried out where necessary.

14. Progressive restoration of hard rock quarries assists in returning the landscape to a form more in keeping with its surroundings within a shorter timescale. For long-life quarries, where the upper faces will be visible for many years prior to completion of mineral working, it is best practice to require progressive reclamation of finished upper faces and benches at an early stage.
15. Dormant quarries are those where planning permission is still extant but which are not being worked. Dormant sites are required to be registered but conditions only need to be submitted prior to the re-commencement of working. Operators may consider some form of interim or temporary reclamation on dormant sites using simple techniques of soil formation and revegetation to create some basic landscape improvements. Such reclamation could be reviewed if the quarry is re-activated. Planning authorities can attach a condition to new quarries or extensions requiring temporary landscaping or reclamation in the event that the quarry becomes dormant for more than say 5 or 10 years.
16. Abandoned or 'orphan' quarries are not controlled by the Review of Old Minerals Permissions regulations. Like other forms of derelict land they rely on other mechanisms for treatment. The landowner is responsible for dealing with significant hazards and public safety concerns, although funding for any work is usually limited. There are examples of funding from a variety of sources being co-ordinated to improve abandoned quarries, particularly near urban areas. Environmental improvements may be secured by allowing some reworking of abandoned quarries or quarries where reclamation has not been completed satisfactorily.

See Circular 34/1996 paragraphs 25 and 26.

SLATE WORKINGS

17. Slate working was once large scale in several areas of Scotland but the few existing workings are relatively small. Slate production created vast quantities of waste material, which was usually tipped adjacent to the working area. It is generally impractical to backfill quarry holes, and in most cases it is therefore necessary to reclaim the spoil *in situ*. Soil is rarely available in sufficient quantities to cover the spoil, and where vegetation establishment is required it is usual to plant directly into the spoil material. The physical and chemical characteristic of the spoil limits its suitability as a growth medium. In the absence of soil, surface preparation techniques usually include the crushing of the surface slate waste to produce fine fragments and the use of amendments.

See Slate Waste Tips and Workings in Britain. Richards Moorhead & Laing Ltd, 1995.

METALLIFEROUS MINING SITES

18. There is currently little metalliferous mining in Scotland although former spoil heaps do occur. Wastes from metal mines and those generated during the extraction and processing of materials such as gold and barytes, may contain concentrations of metals which present problems for the successful establishment of vegetation and hence for site reclamation.

See The Reclamation and Management of Metalliferous Mining Sites. ECUS, 1994.

See **Non-ferrous Metalliferous Mineral Extraction in Scotland – Processes and Environmental Consequences**. Wardell Armstrong, 1993.

19. Approaches to the reclamation of metalliferous mine sites vary from non-intervention to large scale earth moving and revegetation according to site characteristics. It is advised that expert advice is sought on a site specific basis to assess possible hazards in relation to planned usage.
20. The options for establishment of vegetation are generally to cover the wastes with soil and/or other soil-forming materials such as non-metalliferous overburden or to plant directly into the wastes using suitable species, including in appropriate cases metal tolerant plant varieties, with ground preparation treatments and amendments. In some instances barrier layers or membranes are required to prevent excessive percolation of water into the metal rich wastes.

TAILINGS LAGOONS

See **Restoration and Revegetation of Colliery Spoil Tips and Lagoons**. Richards Moorhead & Laing Ltd, 1996.

21. The fine-particle residues from the processing of minerals are normally disposed of as high moisture slurries into lagoons impounded within purpose built dams. The reclamation of tailings lagoons can present major engineering problems since the deposited materials may remain unstable for many years. The principal sources of tailings in Scotland are the working of coal, and associated minerals. Large silt lagoons from washing of sand and gravel or crushed stone may also present similar physical characteristics. Chemically, there are wide variations between the different types of tailing.

PEAT

See **Report of the Working Group on Peat Extraction and Related Matters**, 1999. www.planning.odpm.gov.uk/peatland

22. Reinstatement of sites to a condition suitable for an appropriate afteruse should be an integral part of the planning of peat extraction. Where peat bogs have been damaged by peat extraction they can be restored to a range of afteruses including agriculture, forestry or nature conservation. Restoration of Damaged Peatlands (Wheeler and Shaw, 1995) provides information on recreating raised bog habitats as well as alternative afteruses.

ANNEX B – RECLAMATION LEGISLATION

Activity	Legislative Derivations	Current Legislative Provisions	Circular
Attaching reclamation conditions to planning permission	Town and Country Planning (Minerals) Act 1981, Part II, Section 22. (Inserted after section 27 of the Town and Country Planning (Scotland) Act 1972.)	Town and Country Planning (Scotland) Act 1997, Schedule 3.	Circular 5/1982 (now cancelled)
Old mineral workings and permissions	Planning and Compensation Act 1991, Schedule 9.	Town and Country Planning (Scotland) Act 1997, Schedule 8.	Circular 2/1992 and Circular 26/1992
Review of mineral planning permissions	Environment Act 1995, Schedule 13.	Town and Country Planning (Scotland) Act 1997, Schedule 9.	Circular 34/1996 and Circular 34/1996 Annexes.

ANNEX C – MODEL CONDITIONS

Model conditions should be used with consideration to ensure that they are suitable for the specific requirements of each site. Conditions attached to planning consent need to be based on a site survey and discussions between the planning authority and the mineral operator. General guidance on the use of planning conditions is given in Circular 4/1998.

RESTORATION SCHEME

1. A scheme of the phased final restoration of the whole site shall be submitted for the written approval of the planning authority within [x] months of the date of this permission. The scheme shall include detailed information on landform levels, drainage, soil coverage, final boundaries and phasing.

Reason: To ensure satisfactory restoration of the site and timeous completion of the work.

AFTERCARE SCHEME

2. An aftercare scheme shall be submitted for the written approval of the planning authority within [x] months of the date of this permission. The aftercare scheme shall specify the steps to be taken, and the period during which they are to be taken, and who will be responsible for taking those steps to bring the land to the required standard.

Reason: To ensure effective landscape management to bring land to the required standard for the afteruses.

PHASED DEVELOPMENT

3. A detailed phasing plan shall be submitted. Each individual phase of mineral extraction shall be substantially restored in a phased manner in accordance with the provisions of the restoration scheme submitted as a requirement of condition [x]. Thereafter, the aftercare scheme submitted as a requirement of condition [x] shall be implemented in a phased manner in the first planting season following completion of each individual phase wherever practicable taking into account proposed working arrangements.

Reason: To ensure satisfactory reclamation of the site and timeous completion of the work.

BOUNDARY TREATMENT

4. Prior to the commencement of soil stripping the developer shall make stockproof and maintain, until reclamation is complete, all the existing perimeter hedges, fences and walls and shall protect the same from damage.

Where the site boundary does not coincide with an existing hedge, fence or wall, the developer shall provide and maintain, until reclamation is complete, stockproof fencing with gates and cattle grids at every opening.

Hedgerows within or bounding the site shall be maintained, cut and trimmed at the proper season throughout the period of working and reclamation of the site. Prior to the commencement of soil stripping, details of the stockproof fencing and means of maintenance required for hedgerows shall be submitted for the written approval of the planning authority.

Reason: To protect and maintain the boundary treatment of the site and prevent the incursion of livestock from surrounding areas.

SOIL STRIPPING

5. In each calendar year, soil stripping shall not commence on any phase until any standing crop or vegetation has been cut and removed.

Reason: To avoid the incorporation of concentrations of decaying vegetation in soil. The latter can create anaerobic conditions and impediments to root growth.

6. Topsoil, subsoil and soil-forming material shall only be stripped when they are in a dry and friable condition, no movement of soil shall occur during the month of [November, December, January, February and March], or when there are pools of water on the soil surface, unless otherwise approved in writing by the planning authority.

Reason: To prevent damage to soil by soil stripping during wet periods.

RECOVERY OF SOIL-FORMING MATERIAL

7. Any soil-forming material found during the course of soil stripping operations shall be recovered and stored for use in restoration, to replace any shortage and/or to cap the replaced overburden. Details of the quality of material found and its means and location of storage shall be submitted for the written approval of the planning authority.

Reason: To ensure the recovery of all soil-forming material on site to achieve satisfactory restoration.

SOIL STORAGE

8. Topsoil, subsoil and soil-forming materials shall be stored in separate heaps not exceeding [3], [5] and [5] metres respectively in areas defined in drawing number [xxx]. The heaps shall be shaped so as to avoid collection of water in surface undulations, shall not be traversed by heavy vehicles or machinery except in the course of stacking, maintenance or respreading and shall have a minimum [3] metre stand-off of undisturbed around them. Each heap shall be marked with signs for the duration of the storage period showing the soil type. Topsoil heaps shall only be stored on like texture topsoils and subsoils on like textured subsoils. Any heaps that will remain in situ for more that [3] months or over winter shall be seeded or hydro-seeded prior to the commencement of mineral extraction and thereafter be maintained in a tidy condition free from weeds.

Reason: To allow the planning authority to retain effective control over the storage of material on the site.



9. Overburden shall be stored in heaps as defined in drawing number [xxxx] which shall not exceed [12] metres in height.

Reason: To allow the planning authority to retain effective control over the storage of material on the site.

PLAN OF SOIL RESOURCES

10. Within [3] months of completion of soil handling operations in any calendar year, the planning authority shall be supplied with a plan showing the areas stripped of topsoil, subsoil and soil-forming material, the location of each soil storage mound and the quantity and nature of the material therein.

Reason: To facilitate soil stocktaking and monitoring of soil resources.

MOVEMENT OF MACHINES

11. No plant or vehicles shall cross any area of the unstripped topsoil or subsoil except where such trafficking is essential and unavoidable for the purposes of undertaking permitted operations. Essential trafficking routes shall be marked in such a manner as to give effect to this condition. No part of the site shall be excavated or traversed or used for a road or for the stationing of plant or buildings, or storage of subsoil or overburden or waste or mineral deposits, until all available topsoil and subsoil has been stripped from that part. The exception is that topsoil may be stored on like topsoil and subsoil may be stored on like subsoils.

Reason: To prevent unnecessary trafficking of soil by heavy equipment and vehicles which may damage the soil.

12. Only low ground pressure machines shall work on re-laid topsoil or subsoil to replace and level topsoil. Topsoil shall be lifted onto subsoil by equipment that is not standing on either re-laid topsoil or subsoil.

Reason: To prevent compaction of the topsoil and upper layers of subsoil.

OVERBURDEN, SUBSOIL AND SOIL-FORMING MATERIAL REPLACEMENT

13. Any material greater than [500mm] in any dimension evident on the re-instated overburden shall be removed before other soil is replaced. Materials that are removed shall be disposed off-site or buried at a depth not less than [3] metres below the final pre-settlement contours.

Reason: To remove obstacles capable of impeding land drainage operations.

14. The overburden shall be ripped to a depth of [300mm].

Reason: To improve drainage of the restored site.

15. Subsoil and soil-forming material shall be spread in even layers on the top of the overburden to a depth agreed in writing with the planning authority.

Reason: To restore subsoil and soil-forming material to a satisfactory condition.

16. Any material which is not subsoil or soil-forming material or objects which are larger than would pass through a wire screen mesh with a spacing of [200mm] on the re-instated soil shall be removed before topsoil is replaced. Materials that are removed shall be disposed off-site or buried at a depth not less than [3] metres below the final pre-settlement contours.

Reason: To remove obstacles capable of impeding land drainage operations.

REPLACEMENT OF TOPSOIL

17. Topsoil material shall be spread in even layers on the top of the overburden to a depth agreed in writing with the planning authority.

Reason: To restore topsoil to the best potential condition.

18. As soon as the ground is sufficiently dry after compliance with condition [17], the topsoil shall be ripped at a depth agree beforehand with the planning authority. Any stones lying on the surface and which are larger than would pass through a wire screen mesh with a spacing of [100mm], together with any objects likely to obstruct future cultivations, shall be removed from the site.

Reason: To restore topsoil to the best potential condition, and to remove obstacles capable of impeding normal agricultural and land drainage operations.

ASSESSMENT REPORTS

19. Following the completion of each phase of restoration a report shall be prepared by a suitably qualified professional, named to and approved by the planning authority, setting out details of the condition of the restored soils (including chemical analysis) and landforms, and thereafter specifying steps to be implemented to secure any remedial action so required.

Reason: To allow assessment of the restoration works and ensure satisfactory restoration of the site.

AFTERCARE PERIOD

20. Following the completion of restoration of the whole site (or smaller manageable blocks as may be agreed by the planning authority), that land shall be put under effective aftercare management. The period of aftercare shall extend for 5 years from the date of final topsoil restoration for the whole site (or smaller manageable blocks of the site) as confirmed in writing by the planning authority.

Reason: To bring the land to the required standard for [xxxx] use.

TREE PLANTING

21. All tree and shrubs to be planted shall comply with BS 3936. Verification of this requirement shall be submitted to the planning authority, by a qualified forester, landscape architect or arboriculturist, named to and approved by the planning authority, prior to the commencement of tree planting. All trees and shrubs planted within the aftercare period which become diseased, damaged or are

removed are to be replaced with a similar number of trees and plants of the same species within the first available planting season.

Reason: To protect and maintain the contribution of the tree planting to the landscape quality of the area.

WEED CONTROL

22. All weeds on the site shall be treated with weed killer, mulches or cut to prevent spreading within the site or to adjoining land.

Reason: To maintain the quality of the landscape in the area.

CONTROLS DURING WINTER MONTHS

23. Following restoration of the site and for a period of [2 years] thereafter (unless otherwise agreed with the planning authority) no vehicles (with the exception of low pressure types required for approved works), machinery or livestock shall be allowed on the land during the months of [November, December, January, February, March and April] without prior consent of the planning authority.

Reason: In the interests of the satisfactory return of the site into [xxxx] use.

SETTLEMENT

24. Any part of the site which in the opinion of the planning authority is significantly affected by differential settlement that occurs during the restoration and aftercare period, and would interfere with [xxxx] operations, shall be filled. The mineral operator shall fill the depression to the final settlement contours specified with suitable imported soil to the specification to be approved in writing by the planning authority. Topsoil, subsoil and other overburden moved in the course of the work shall not be mixed and shall be handled and replaced in accordance with the above conditions.

Reason: To deal with differential settlement when required.

DRAINAGE

25. During the aftercare period, temporary works (eg ditches, watercourses, settling lagoons) shall be carried out as necessary to prevent soil erosion, flooding of land within or outside the site, or the erosion or silting up of existing drainage channels within or outside the site.

Reason: To ensure satisfactory drainage of the land and prevent damage to surrounding land.

26. Within the first [x] years of the aftercare period, a field drainage system shall be installed in accordance with a scheme to be approved beforehand by the planning authority. On completion of the field drainage system, the developer

shall provide the planning authority with 2 copies of a scale plan accurately recording the drainage system.

Reason: To ensure satisfactory drainage of the land.

27. Within the first [x] years of the aftercare period, a field water supply system shall be installed in accordance with a scheme to be approved beforehand by the planning authority. On completion of the field water supply system, the developer shall provide the planning authority with 2 copies of a plan recording details of the system.

Reason: To provide livestock with a water supply.

ANNUAL REPORT

28. Before [xxxx] of every year during the aftercare period, a report shall be submitted by the developer to the planning authority recording all operations carried out on the land in the previous year, providing a detailed programme for the forthcoming year (for the approval of the planning authority). It shall indicate whether compliance with conditions has been achieved.

Reason: To bring the land to the required standard for [xxxx] use.

ANNUAL MEETING

29. Before [xxxx] of every year during the aftercare period, the developer shall attend a site meeting with the planning authority, on a mutually agreed date, to discuss the report prepared in accordance with condition [28], and to which the following parties shall also be invited: all the owners of land within the site; all occupiers of land within the site; and representatives of other statutory bodies as appropriate. The developer shall attend additional aftercare meetings as required by the planning authority.

Reason: To allow inspection and appraisal of the site to ensure its reclamation within the aftercare period.

REMOVAL OF BUILDINGS AND PLANT

30. Within [3] months from the completion of all extraction operations on site, all buildings, lighting, plant and vehicles shall be removed from the site unless required for restoration operations and all haulage routes, storage areas and hardstanding shall be removed and restored in accordance with the approved restoration schemes required by condition [1]. Details of any buildings and/or plant vehicles retained for the period of restoration shall be submitted for the written approval of the planning authority before the cessation of mineral extraction on site.

Reason: To maintain the quality of the landscape in the area.

ANNEX D – RECLAMATION INFORMATION TO BE SUBMITTED WITH A PLANNING APPLICATION

It is good practice to include the following information:

- An Ordnance Survey plan of the area indicating:
 - the outer boundaries of the area to be excavated;
 - the outer boundaries of the total site so that the areas allocated for topsoil, subsoil, soil-forming material and overburden storage can be identified;
 - existing land uses, vegetation, levels and gradients;
 - details of existing paths and tracks;
 - existing features on site such as field boundaries, stone walls and hedges; and
 - details of any existing topsoil or subsoil heaps that may be used in restoration, including position, types and qualities available.
- Details of the type and depth of proposed workings and volumes of material to be removed. If the mineral operator has drilled the site during routine site evaluation then any data obtained can be offered, especially with relation to watertable level, soil-forming materials which would be useful in restoration and depth and nature of topsoils, subsoils and overburden.
- A plan of the type of reclamation proposed including:
 - projected plan of contours and final levels of the site, together with information about replacement depths for soil-forming materials, subsoil and topsoil in the form of target restoration profiles (3 dimensional plans are helpful);
 - afteruses for the site;
 - the phasing and timescale of the working, restoration and aftercare;
 - the methods of filling where appropriate, types of fill and materials proposed;
 - the methods of stripping, transporting and restoring soils; including where appropriate schemes for retrieving and utilising soil-forming materials and for dealing with different soil types and machine movement;
 - proposed outfalls for drainage of the restored land;
 - proposed access roads to restored land, fencing and water supply; and
 - for sites taking controlled wastes, details of proposed pollution control measures.

- Any air or ground photographic evidence that might be available for the area (not essential but helpful if available).
- Details of existing land uses/land cover.
- Where restoration will not take place for several years, the mineral operator should submit a summary of the principal items that they propose to include in an aftercare scheme, to be agreed at a later date.
- Details of proposals for nature heritage enhancement indicating how they fit with local biodiversity action plans.
- Details of proposals for recreation and access facilities, including paths and tracks.

REFERENCES

Department of Environment (1994), Report of the Working Group on Peat Extraction and Related Matters. www.planning.odpm.gov.uk/peatland

Department of the Environment, Transport and the Regions (DETR) (2000), Effectiveness of Provisions for the Aftercare of Mineral Workings. www.planning.odpm.gov.uk/epamw/index.htm

Dobson & Moffat (1993), The Potential for Woodland Establishment on Landfill Sites.

Environmental Consultancy University of Sheffield (ECUS) (2002), Reclamation of Limestone Quarries by Landform Simulation – Full Report and Appendices on Monitoring of Trial Sites. <http://www.planning.odpm.gov.uk/rlqls/contents.htm>

ECUS and Richards Moorhead & Laing Ltd (1994), The Reclamation and Management of Metalliferous Mining Sites.

Land Use Consultants (1992), Amenity Reclamation of Mineral Workings.

Land Use Consultants and Wardell Armstrong (1996), Reclamation of Damaged Land for Nature Conservation.

Ministry of Agriculture, Fisheries and Food (1993), Code of Good Agricultural Practice for the Protection of Soil.

Moffat A, and McNeill J (1994), Reclaiming Disturbed Land for Forestry, Forestry Commission Bulletin 110.

Nature Conservancy Council (1990/1991), Earth Science Conservation in Great Britain: a strategy, Appendices: A Handbook of Earth Science Conservation Techniques.

Richards Moorhead & Laing Ltd (1995), Slate waste tips and workings in Britain.

Richards Moorhead & Laing Ltd (1996), Restoration and Revegetation of Colliery Spoil Tips and Lagoons.

RPS/Clouston and Wye College (1996), Guidance on Good Practice for the Reclamation of Minerals Working to Agriculture.

RSPB/SNH (2000), Biodiversity and Opencast Coal Mining: A Good Practice Guide.

SNH, Scottish Enterprise and Paths for All Partnership (2001), Lowland Path Construction – A Guide to Good Practice.

SNH (2000), Minerals and the Natural Heritage in Scotland's Midland Valley.

Symonds Travers Morgans (1998), Reducing the Effects of Surface Mineral Workings on the Water Environment.

Wardell Armstrong (1993), Non-ferrous Metalliferous Mineral Extraction in Scotland – Processes and Environmental Consequences.

Wardell Armstrong (under preparation), Effective Approaches and Techniques in Landscaping and reclamation of hard rock quarries.

Wheeler & Shaw (1995), Restoration of Damaged Peatlands.

Wye College, University of London and the Forest Research, (1999), Soil-forming Materials: Their Use in Land Reclamation.

GLOSSARY

Amendments: the addition to soil of materials, usually with the aim of improving soil quality. For example fertilisers, lime or organic waste materials.

Biosolids: treated sewage sludge.

Controlled waters: defined in section 78A(9) by reference to section 30A of the Control of Pollution Act 1974; this embraces territorial and coastal waters, inland fresh waters, and ground waters.

Humified: organic matter transformed into humus.

Humus: the well-decomposed, relatively stable part of the organic matter found in aerobic soils.

Hydroseeding: seed, fertiliser, amendment and mulch is mixed with water and sprayed onto the surface. Suitable for inaccessible areas such as rock faces.

Microbial biomass: the total mass of living micro-organisms in a given volume of soil.

Overburden: any material overlying the mineral deposit, which must be stripped prior to extraction and can be unutilised in the restoration.

Poaching: when land becomes muddy from being trampled.

Pouring: a variation on hydroseeding, where slurry with seeds is poured over a steep slope from the top and runs down over the slope and onto ledges and crevices.

Ripping: deep cultivation to loosen compacted soil.

Scaling: the loosening of a material normally attached to another by surface adherence, which then peels and breaks away.

Smearing: mechanical action on wet soil resulting in the formation of a thin compacted layer possessing low permeability.

Soil-forming material: parent material for a new soil used as a substitute for, or supplement to, natural soils in the course of land reclamation.

Spot seeding: seeds are sown (manually) in groups at various spots with slow release fertiliser placed at lower level. Used to sow trees and shrubs on slopes.

Subsoil: the soil material beneath the topsoil and overlying the bedrock; composed of weathered parent material, low in organic matter.

Topsoil: the biologically active, organically rich surface layers of a soil, which provide the principle medium for growth.

ISBN 0-7559-0672-1



9 780755 906727