MINERALS TECHNICAL ADVICE NOTE 2:COAL

January 2009

Introduction

1. This Minerals Technical Advice Note (MTAN) (Wales) sets out detailed advice on the mechanisms for delivering the policy for coal extraction through surface and underground working by mineral planning authorities (MPAs) and the coal mining industry. It should be read in conjunction with Minerals Planning Policy Wales (MPPW) which sets out the general policies for all mineral development and the Ministerial Interim Planning Policy Statement (MIPPS) on Health Impact Assessment (HIA). This advice note uses the term “coal working” throughout. This term reflects the broader usage of “mineral working” as development consisting of the winning and working of minerals, and includes surface coal working, recovery of coal from tips and underground coal working unless otherwise stated.

2. Planning Policy Wales, MPPW, Ministerial Interim Planning Policy Statements, Minerals Technical Advice Notes and Circulars should be taken into account by MPAs in Wales in the preparation of development plans. They will usually be material to decisions on individual planning applications and mineral review applications and will be taken into account by the Welsh Ministers and Planning Inspectors in the determination of called-in planning applications and appeals.

3. Government policies and planning guidance on the provision of coal have previously been set out in Mineral Planning Guidance Note 3 (MPG3) published in 1994 for England and Wales. MPG 3 (1994), apart from the Annexes, was cancelled by MPPW. This MTAN supersedes the 1994 Annexes, which are hereby cancelled. MPG7: The Reclamation of Mineral Workings (1989); paragraphs 31 to 42 of MPG11: The Control of Noise at Surface Mineral Workings (1993); and Planning Policy Guidance 14: Development on unstable land (1990) are hereby cancelled only in respect of coal-related development.

4. The MTAN also contains advice on best practice. This is intended to bring together suggestions for developers, operators, mineral planning authorities and others on the approach to sustainable coal working. With time, some specifics of this advice will be superseded by improvement in technologies and processes, but the general proposals will remain valid.

Background

5. The National Assembly for Wales has a legal duty to pursue sustainable development in all it does. This is built into its Constitution through section 121 of the Government of Wales Act 1998. Section 39 of the Planning and Compulsory Purchase Act 2004 applies to any person who or body which exercises any function in relation to a local development plan. The person or body must exercise the function with the objective of contributing to the achievement of sustainable development.

6. The Sustainable Development Scheme adopted by the National Assembly in November 2000 acknowledges that our environment is Wales' greatest asset, that there is an inextricable inter-dependency between our economy and our environment, both having an impact on our communities and our way of life. A thriving and competitive economy where finite resources are used prudently must be compatible with a cleaner and protected environment that includes the natural, social, cultural and historic environment. Starting to Live Differently, the Sustainable Development Scheme of the National Assembly for Wales (2006), explains that the vision of sustainable development remains a broad one, embracing commitments to improving quality of life, promoting equality and tackling disadvantage and poverty.

7. The Environment Strategy is the Welsh Assembly Government's long term strategy for the environment of Wales, setting the strategic direction for the next 20 years. The Strategy has five main environmental themes, of which sustainable resource use covers material consumption and waste; water; soils; minerals and aggregates.

8. Coal is a non-renewable natural resource. To help to meet society's need for energy while protecting amenity and the environment, coal extraction will follow the key principles of sustainable mineral extraction set out in MPPW, to:
   - provide mineral resources to meet society's needs and to safeguard resources from sterilisation
   - protect areas of importance to natural or built heritage
   - limit the environmental impact of mineral extraction
   - achieve high standard restoration and beneficial after-use
   - encourage efficient and appropriate use of minerals and the re-use and recycling of suitable materials.

9. This coal MTAN sets out how impacts should be assessed and what mitigation measures should be adopted, and seeks to identify the environmental and social costs of coal operations so that they are properly met by the operator. Responsible stewardship of natural resources and the environment requires coal working to respect ecological limits and to protect critical natural capital. In considering the effects of coal extraction, MPAs should take into account the level of activity that a particular locality and its community can sustain, as well as the potential benefits from coal working. The effects include potential impacts on people and the environment. Potential benefits include job opportunities, the value to the economy, land stabilisation and the scope for landscape and amenity improvements.

10. The future use of coal in Wales will be governed by the requirement to reduce carbon emissions. Carbon dioxide is produced in the combustion of coal for energy generation and in coal transport, and methane is released by its excavation. Wales aims to achieve emission reductions of 3% per year by 2011 in areas of devolved competence, and in the longer term the UK is committed to a cut in greenhouse gas emissions of 80% below 1990 levels by 2050. Applications for coal working should demonstrate that actions to reduce carbon emissions from the extraction and transport of coal are included in the proposals.

Providing coal resources to meet society's needs

Energy Policy and Coal Supply

11. The objective of energy policy is set out in MPPW: to ensure a secure, diverse and sustainable supply of energy at competitive prices. This objective takes in the Government's concern for the environment, health and safety and a fair deal for all consumers, as well as its commitment to all aspects of sustainable development. While UK coal is available and the generators continue to choose it, UK coal contributes to energy diversity and supply.

12. The current Energy Policy of the United Kingdom is set out in the Energy White Paper of May 2007, building on previous work including the 2003 Energy White Paper and the Energy Review Report in 2006. The consultation draft "Renewable Energy Route Map for Wales", spring 2008 is the first strategic step to delivering strong commitment set out in One Wales, to tackling climate change, including actions on diversified renewable energy generation.

13. The Energy Review (July 2006) states the Government believes that it is right to make the best use of UK energy resources, including coal reserves, where it is economically viable and environmentally acceptable to do so. It is likely that coal will be a strategic source of energy for the foreseeable future, and that the generating industry and the steel industry will require a steady supply at today's levels until 2020. There is, however, no forecast of need and no landbank of permitted reserves, such as for aggregates minerals.

14. MPPW states that opencast coal is generally more flexible and cheaper to produce than deep-mined coal, and that where UK coal is available and the generators continue to use it, UK coal contributes to energy diversity and supply. But there are important environmental and amenity issues that require very careful consideration.

Coal Production and Consumption

15. Information below is based on figures and analysis from the former Department of Business, Enterprise and Regulatory Reform (now Department of Energy and Climate Change), The Coal Authority (CA), Department for Transport (DfT), and British Geological Survey (BGS). It sets out the context for Welsh coal in 2007, but reference should be made to these sources for comprehensive and up-to-date information and trends.

16. In 2004, total UK production was 25.1 million tonnes (Mt); this fell in 2007 to 17Mt, with 8.9Mt coming from opencast. Very little UK coal is exported (half a million tonnes), and in 2007, 43 Mt were imported, reflecting continuing demand for the generating sector. UK coal consumption in 2007 was 62.7Mt, of which electricity generation used 52.4Mt. Total UK stocks at the end of the year were just over 14Mt.

17. Opencast coal production in Wales has slowly declined from 3 Mt in 1995 to just over 1 Mt in 2007/8, and deep-mined Welsh coal production in 2007/8 was 168,000 tonnes. Between 2005 and 2006, permitted opencast reserves in Wales increased from 3.9Mt to 17Mt.

18. Coal demand in Wales in 2007 was in excess of 6 Mt; some 30% for coke production and blast furnace use, 70% for electricity generation. There is also a Welsh market for coal, particularly anthracite, in industry and domestic boilers. The steel industry at Port Talbot developed around the extensive coking coal resource of the South Wales coalfield, as coke is an essential raw material for steel making.

Opencast coal statistics

19. Information on production and permitted reserves of coal in Wales, Scotland and England from 1994 is currently collected annually by the Minerals Planning Authorities with coal resources, and collated[1] by the British Geological Survey (BGS) in collaboration with The Coal Authority. Minerals Planning Authorities are asked to continue to contribute to the summary of opencast coal statistics.

Employment

20. In 2006 Wales directly employed about 750 people in the coal industry. For every 100 jobs in coal production, between 50 and a hundred jobs are supported elsewhere in Wales.

The Coal Authority

21. The Coal Authority is a Non-Departmental Public Body with responsibility for all the interests previously vested in British Coal in respect of unworked coal and coal mines and for the liabilities associated with past coal mining and unworked coal. The main functions of the Authority are to manage the coal resources under its control, encourage economically viable operations to work these resources, grant licences for coal exploration and extraction, provide effective management of subsidence damage claims, and provide information on past, present and proposed future coal mining activities. Any activities which intersect, disturb or enter any of the Authority's coal interests require the prior written permission of the Authority. Failure to obtain permission for such activities is a trespass, with the potential for court action.

[1] http://www.bgs.ac.uk/mineralsuk/minequar/coal/occ/home.html

The Local Development Plan

22. Where relevant, MPAs should set out their strategy for the sustainable management of the coal resource in their Local Development Plan (LDP), directing coal working away from sensitive locations and ensuring that any environmental or community impacts can be mitigated. For certainty, areas where coal should not be worked, buffer zones around existing and proposed coal working sites and areas to be safeguarded should be shown on the Proposals Map.

Surface Coal Resource Zones

23. Appendix A contains an extract from the British Geological Survey (BGS) description of the coal resources of the south and north Wales coalfields. The resources have been divided into three zones, within which coals of potential economic interest for opencast extraction may occur. It is acknowledged that this information is limited. The three zones are defined only by their outcrop at surface; the extent beyond this of economical coal resources is influenced by a range of factors, including surface constraints, the geological structure, previous surface and underground working areas, and the coal quality. Accessibility determines the surface extent for excavation and overburden storage and thus, in turn, the depth of the excavation.

24. The primary Resource Zones constitute the main targets for opencast coal extraction and have been much exploited. The secondary Resource Zones are areas in which the coals are generally thinner and less concentrated in distribution. Nevertheless, the zones are an important resource and its coals have been exploited and continue to be worked, albeit on a smaller scale. Smaller areas of thin coal may lie outside these zones (tertiary zone).

25. The BGS holds a Geographical Information System (GIS) with information for Wales on the coal resource and major constraints; the linework for the three resource zones is available to MPAs electronically. MPAs can base their appraisals on the BGS Resource Maps or, if they choose, can supplement this information with other sources of data. They are encouraged to consult the Coal Authority, as a source of baseline information, and coal operators, who may be able to provide useful advice.

Areas where coal working will not be acceptable

26. MPPW seeks to provide certainty in the future extraction of energy minerals, and says: *Mineral planning authorities should therefore consider all available information on the extent of energy mineral resources. They must provide as much guidance in their unitary development plans (superseded by LDPs) as possible to indicate where it is likely to be environmentally acceptable for these resources to be worked. To achieve this degree of certainty, policies should state where such operations would not be acceptable and should provide unequivocal statements as to why, and should also provide a set of clear criteria against which any future proposals will be assessed in those areas where there is a possibility of extraction*.

27. The MPA should set out the criteria against which potential locations for proposed coal working during the plan period are assessed. The evidence for defining the areas where surface coal working will not be acceptable should be

described in the technical documents and considered in the Strategic Environmental Assessment and Sustainability Appraisal. These provide the background to the LDP policy and to the Proposals Map, on which the areas where coal working will not be acceptable should be shown.

28. The surface expression of the coal (the sum of the areas defined by BGS as the primary, secondary and tertiary Resource Zones) provides the baseline information on which the determination of areas where coal working will be unacceptable should be based.

29. In defining these areas where coal working will not be acceptable, MPAs should take into account that coal working will generally not be acceptable within 500 metres (m) of settlements, or within International and National Designations of environmental and cultural importance. The SEA/SA of the LDP may identify additional areas of constraint for the LDP period. These could include, for example, Air Quality Action Zones; areas where demonstrable cumulative and in-combination effects mean that an area cannot absorb further environmental impacts; and where clear evidence can be provided that coal development would have an adverse effect on proposals to attract or retain investment in an area.

30. It is for the MPA to define a "settlement" and a settlement boundary, but they should also ensure through the development control process that there are no unacceptable impacts on individual houses or sensitive properties. The research undertaken by BGS used a grouping of ten properties as the baseline for a settlement, which has the advantage of a coherent spatial approach.

31. As a part of the LDP process, the MPA will consider proposals put forward for coal working sites over the plan period, with acceptable candidate sites to be shown on the Proposals Map. The coal industry is asked to co-operate to provide information at an early stage.

Buffer Zones

32. MPPW sets out the concepts and policy on buffer zones in paragraph 40; a Buffer Zone is described as an area of protection around permitted and proposed mineral workings. They must be clearly defined and indicated in Unitary Development Plans (now LDPs). The MPA will show buffer zones on the Proposals Map, as 500m around permitted or proposed working, from the site boundary (or boundary for surface development for underground mining), unless there are exceptional circumstances as set out in paragraph 40 of MPPW or in paragraph 51, below.

33. For both surface and underground coal working, the buffer zone will cease to apply once the Restoration Certificate is, or could be, issued.

Safeguarding shallow coal resources

34. Coal can only be worked where it is found, and a long-term strategy is required to protect what may become a strategic resource. MPPW sets out the requirement to safeguard the minerals which society may need in paragraph 13: *Areas to be safeguarded should be identified on proposals maps and policies should protect potential mineral resources from other types of permanent development which would either sterilise them or hinder extraction, or which may hinder extraction in the future as technology changes.* The designation does not

indicate an acceptance of working, and may be overlapped by the areas where coal working will not be acceptable during the plan period. To identify areas for safeguarding, it is necessary that …*the location and quality of the mineral is known and that the environmental constraints associated with extraction have been considered.*

35. Because of the degree of detail needed to assess the viability of a coal resource, the uncertainty of the markets in the long term and the potential for technological change, the following steps will be considered as meeting that requirement.

36. The MPA should determine whether primary and secondary coal Resource Zones lie within its area; the BGS Resource Maps provide this information. The MPA may have additional information to supplement the BGS linework to provide more detailed or up to date information, but there is no requirement for them to seek additional information and the existing lines defining seam outcrops and depth limits are sufficient.

37. Where Coal Resource Zones are present, the MPA should exclude from these Resource Zones International and National Designations of environmental and cultural importance, and Settlements.

38. Where the MPA has clear evidence that an area within the remaining resource zones will not realistically be viable, the area should be excluded. This might be because of previous opencast working unlikely to be revisited, for which acceptable evidence would be recent working, the depth or basal seam of the workings, taken from the completion plan of the workings; or MPA records; prohibitively thick drift cover; or borehole evidence from previous prospecting. The Coal Authority and industry may be able to provide advice. These rules provide a balance between the work entailed in obtaining information and the extent of the areas covered by the safeguarding policy. The areas to be safeguarded must be shown on the Proposals Map of the LDP. It should be noted that coal resources will continue beyond the safeguarded areas.

39. Areas for development in the LDP should only conflict with the safeguarded areas if no alternative location can be found, or if the development area cannot be modified to avoid the safeguarded coal resource. If the conflict remains it should be clearly identified and future applicants will need to demonstrate that:

- the coal resource is not of potential value, or
- an acceptable amount of the mineral can be extracted prior to development, or
- it would not meet either of the tests of environmental acceptability or community benefit to extract the coal, or
- the development is of a temporary nature and can be completed and the site restored to a condition that does not inhibit extraction within a reasonable timescale – this would include windfarms, or
- it is a minor development, including householder applications such as extensions to houses and fences, walls, bus shelters.

40. Proposed development within 500m of a safeguarded area that is not within an existing settlement boundary, and will result in a new settlement or sensitive building, should also be appraised to determine its impact on protected coal resources.

41. The MPA should liaise with adjacent authorities to ensure consistency and continuity of safeguarded areas.

42. Pre-extraction should be considered where development is proposed on a coal resource, whether or not the resource is safeguarded.

43. This advice does not safeguard coal which would be worked by underground methods. However, where the CA or the coal industry has knowledge of long term proposals for underground coal working, they should inform the MPA. This will enable any potential impacts to be considered for other proposals coming forward in the LDP. It is recognised that there may be confidentiality issues.

Policies for development control

44. MPAs should set out a general policy in the LDP to ensure that the potential environmental, amenity and health impacts from coal operations are kept within acceptable limits. (See section on *Reducing the impact of coal extraction*). MPAs may need to prepare Supplementary Planning Guidance (SPG) to set out more detailed guidance on the way in which policy in the development plan will be applied in particular circumstances or areas. SPG does not form a part of the development plan but must be consistent with it. SPG should be subject to the proper procedures of consultation, revision and formal adoption by the MPA.

45. MPPW states:

1) The proposal should be environmentally acceptable or can be made so by planning Conditions or obligations, and there must be no lasting environmental damage.

2) If this cannot be achieved, it should provide local or community benefits which clearly outweigh the disbenefits of likely impacts to justify the grant of planning permission.

Further criteria apply to protected sites and restoration.

46. MPAs should set out in the LDP or in SPG the criteria against which they will assess the impacts in considering an application, or review of Conditions. The MPA will consider the effects on the surrounding environment and communities, and where these effects cannot be adequately controlled or mitigated, the second test of MPPW must be applied. MPAs should make clear the principal criteria they will use in determining local or community benefits. Examples of criteria related to community benefit might include:

- The removal of hazards arising from previous underground working,
- The restoration of land to public amenity and open space,
- The creation of areas for nature conservation,
- The remediation of damaged land,
- Demonstrable employment or economic benefits, or
- The preparation of land suitable for future built development.

47. Where permission is granted after the second test is applied, the control and mitigation of impacts will still be required.

Restoration and afteruse

48. The LDP or SPG will provide guidance on the appropriate uses of land within the Plan area, and hence the restoration and afteruses that are likely to be acceptable in the local context. The MPA should consider providing guidance on their expectations of for acceptable land use and should consider how quantifiable standards of "fitness for use" can be defined, or, alternatively, reclamation and working methods specified in Conditions, to enable enforcement if necessary.

Exceptional circumstances

49. Exceptionally, having considered the evidence put forward with a surface or underground coal working application, coal working may be permitted within 500m of settlements. Factors to be considered include:

- where coal working provides the most effective solution to prevent risks to health and safety arising from previous mineral working;
- to remediate land damaged by shallow coal workings or mine waste, where coal extraction appears to be the most sustainable option;
- where topography, natural features such as woodland, or existing development, would significantly and demonstrably mitigate impacts;
- where major roads or railways lie between the settlement and the proposed operational area and coal working would not result in appreciable cumulative and in-combination effects;
- where the surface expression of underground working does not include the significant handling or storage of the mineral or waste;
- when the proposal is of overriding significance for regeneration, employment and economy in the local area; or
- where extraction would be in advance of other, permanent, development which cannot reasonably be located elsewhere.

50. Where such exceptions justify surface working within 500m of a settlement, the area of working should be restricted to the area reasonably necessary for remediation. The MPA should seek the best balance between the scale, working-method and the timing of individual phases, the opportunities for early restoration and aftercare, and hours of working. Strong evidence of the necessity for remediation, including the evaluation of options, is required to justify working within 200 m of a settlement, and the social and environmental impacts on the affected settlement must be carefully weighed.

51. There are occasions where the site boundary of an existing or proposed site is drawn widely to encompass conservation areas for wetland or tree planting, or where a rail access forms a part of the site. If it can be clearly demonstrated that such areas will generate only insignificant impacts, the MPA may wish to consider defining an operational boundary which excludes such non-operational areas. Such a boundary must be set out in the supporting evidence for any proposed site and identified clearly in any planning permission. Any subsequent application to alter the use of land outside the operational boundary would not meet the criteria for a minor extension.

Extensions

52. Paragraph 41 of MPPW states says that extensions to existing mineral workings are often more generally acceptable than new greenfield sites. This

needs to be balanced with the policy on buffer zones and take into account issues of cumulative and in combination effects. A piecemeal approach to extensions, whether lateral or to depth, can increase the uncertainty for local communities. Applications for coal extraction should identify any adjoining coal resources.

53. For surface coal workings, if the application for an extension is beyond the original site boundary or outside any operational boundary agreed by the MPA, the economic preference for extensions should be very carefully weighed against the social and environmental costs. Approval of an application does not carry any presumption in favour of any future extension, which would be determined on its merits and in relation to national planning policy, the development plan and any other material consideration. The applicant will wish to consider the extent of the new application site boundary. They should look carefully at how spoil mounds, coal preparation, stocking and loading areas, offices and access arrangements can be relocated to enable as much of the original site as possible to be released into aftercare, with restored public access. As a part of any application for extension, the operator is encouraged to demonstrate that this does not delay progressive reclamation of the principal part of the existing site. This new site area will require a newly drawn buffer zone.

54. An application for a minor extension is regarded as very short-term and small-scale, and an integral part of the original site. It would be within the existing site boundary, or operational boundary if applicable, and require no amendment to the buffer zone. Where a minor extension is applied for (both lateral extensions and extensions to depth would be a new application) the MPA should consider matters such as whether:

- the proposal would be the most sustainable way to prevent hazards from the migration of gas or water or the collapse of unstable ground
- it is necessary for physical access to reserves on the original site, including for reasons of stability
- the proposal would stabilise the ground in advance of planned development
- the reclamation of the original site would sterilise the resource in the proposed extension
- it would lead to a significantly improved reclamation scheme
- the cumulative effect would be acceptable
- it is closer to housing or sensitive development than the existing site
- it will delay the restoration of the existing site by an appreciable time
- it will impact on communities already affected by the original site, and if so what are the benefits for those communities and what are their views
- the operator has a good track record on the environment, on community consultation, and in responding to complaints.
- the original site has a restoration bond which would not need to be increased.

Use of Conditions, Planning Obligations and Agreements

Conditions

55. Conditions must satisfy all the tests in Welsh Office Circular 35/95, The Use of Conditions in Planning Permissions. This section refers to planning Conditions that relate to environmental management, which should be for matters that are

under the control of the operator and should not be in conflict with Health and Safety legislation. Conditions should be used to ensure that coal operations are carried out in such a way that impacts are minimised at source and controlled to acceptable levels. They can require limits to the duration of the permission, best practice, measurable performance requirements, an adequate and appropriate monitoring scheme, measures to mitigate impacts, and beneficial site phasing and design.

56. When considering environmental management, care is required to consider how a Condition could be enforced. It may be appropriate to set thresholds and limits to identify harm, and the actions required to rectify the problem and to prevent recurrence. Planning Obligations or Legal Agreements may be the more appropriate mechanism to control the development.

57. The Conditions are available for public inspection, and should be accessible for inspection at the site as well as at the MPA's offices.

Use of planning obligations and agreements

58. Policy concerning potential planning obligations for coal extraction in LDP are intended to make development acceptable in planning terms and potentially play a number of roles in coal operations. Agreements can be necessary to secure access for monitoring or off-site mitigation works, and may be required for long-term aftercare of the restored site. A Planning Obligation may be a unilateral undertaking by a developer, or an agreement between a developer and the MPA. As well as relating to activities and uses, it may require payments, for example to cover the cost of restoration, to be made to the MPA. Unacceptable development must not be permitted because of benefits offered by a developer that are not necessary in planning terms. Similarly, Planning Obligations should never be used purely as a means of securing for the local community a share in the profits of development.

59. Coal operators may unilaterally undertake to pay for mitigation, such as acoustic double-glazing for noise-sensitive properties or window cleaning for adjacent properties, as additional safeguards for amenity. This may be appropriate when directly related to the impacts caused by the coal development, but is not an alternative to other controls or a way of legitimising higher emissions than acceptable limits. Legal agreements may be appropriate when the impacts from off-site traffic are otherwise unacceptable.

Finance for a Reclamation Scheme

60. Financial guarantees provide reassurance that a site would be restored in the event of failure. They also help to establish and draw attention to the real cost of reclamation. MPPW considers financial guarantees in paragraphs 53 and 54. The applicant should thoroughly understand, and make financial provision for, responsibilities under the reclamation Conditions and agreements. MPPW states wherever it is reasonable to do so, authorities may require financial guarantees. Operators are encouraged, as a reasonable alternative, to participate in established mutual funding or guarantee schemes which safeguard against possible financial failure.

61. Restoration guarantees improve the certainty of site restoration for the regulator and the community. Although few in number in the UK, failures to restore sites have had significant cost implications for MPAs. This small but

significant number of failures does have important local impacts. Fourteen of eighteen cases listed where restoration has been unsuccessful due to financial failure of the minerals operator were associated with coal working. (ODPM, 2003).

62. The additional costs of certain types of guarantee are modest relative to total restoration costs and to the turnover of operators. Operators should demonstrate to the satisfaction of the MPA that they are covered by a bond or an established and properly-funded industry guarantee scheme, which would adequately finance a programme of restoration and aftercare in the case of default by the operator. Progressive restoration will require a stream of funding to be available at key stages.

63. Applicants should demonstrate what the likely financial and material budgets for restoration, aftercare and afteruse will be, and how they propose to make provision for such work during the operational life of the site. A number of different types are in use, such as cash deposit accounts, bonds and mutual funds, escrow accounts and mutual guarantee schemes. In all cases, operators should ensure that sufficient finance is available to enable them to meet fully restoration and aftercare conditions. This is important to avoid future dereliction and the possibility that the costs of reclamation of mineral sites might have to be borne by other public or private sources. The MPA should satisfy itself that the estimates are not unreasonable, and are index-linked, and to that end may wish to make use of an external specialist valuer. Annualised restoration costs will take into account the life of the operation.

64. To date, where there are significant environmental risks, case-by-case provision has been negotiated. Where bonds have been required, most were established via a planning agreement negotiated as part of the planning permission. Almost all the bonds involved the developer making a cash deposit or regular payments, with a third party signed up as a guarantor. Costs in negotiating and drafting financial guarantees, monitoring compliance and enforcement could be high. It may be appropriate for design and administrative costs to be added to the initial value of the bond. The Confederation of UK Coal Producers (Coalpro) does not, at present, have a mutual guarantee scheme in place.

South Wales Local Acts

65. In South Wales, local Acts contain powers to impose bonds or other financial guarantees for the restoration of coal sites in the event of default by the developer. The Dyfed Act (1987), the West Glamorgan Act (1987) Mid Glamorgan County Council Act 1987 require financial guarantees for coal mines. This private legislation was introduced in response to the problems arising from the restoration of small coal mines in the 1970s/80s.

66. The private-sector successors to British Coal Corporation acquired certain long-term leases over coal reserves, along with the mining assets which they purchased. The provisions in the Local Acts did not apply to British Coal, nor did they apply to the successor companies for a period of ten years; a period which has now expired.

Public participation and liaison

67. Guidance on best practice for liaison and complaints is contained in Appendix B

68. The MPA is well placed to encourage discussions between applicants and the community about proposed projects and listen to their concerns, needs and suggestions. The process should ideally begin with exploration, and continue throughout the life of the project, centred on the community. The strategies to avoid or minimise impacts –environmental, social and economic – should be discussed with the stakeholders and their solutions canvassed.

69. MPAs should set out how the community will be able to participate with respect to coal working throughout the processes of application, the monitoring of permissions during working, and post closure. The affected community should be involved in Health Impact Assessment (HIA), in considering mitigation, specific controls, thresholds, monitoring, and community benefit for operations, particularly those within 500m of settlements, and in restoration, aftercare and afteruse.

70. Resources for MPAs, for the environmental and health agencies, and others are a key issue for coal planning. To use these resources effectively, it is important to encourage good communication and co-operation between the technical stakeholders, and this needs to be done at a strategic level. Coal applications often require specialist skills and planning authorities may not always have the expertise to judge what information is required or to evaluate it where that information has been provided. These may be specific scientific and technical skills, not all of which will be employed on a routine basis. One approach is for groups of local authorities to team up to provide a central resource, to be funded and managed by agreement.

Permitted Development Rights

71. The Town and Country Planning (General Permitted Development) Order 1995 grants permitted development rights for certain types of development and can provide developers with flexibility to carry out works that would not significantly alter the impact of their operation on the surrounding area. However there is no grant of permitted development rights in relation to any development that falls within Schedule 1 of the Town and Country Planning (Environmental Impact Assessment) Regulations 1999. Development that falls within Schedule 2 of the Regulations is subject to a screening process. Where the proposed development is of a type mentioned in Column I of Schedule 2, and (1) any part of it is to be carried out in a sensitive area, or (2) any applicable threshold or criterion is respectively exceeded or met in relation to it, then no permitted development rights are granted in respect of it unless the local planning authority have adopted a screening opinion to the effect that the development is not EIA development or the Welsh Ministers have directed that EIA is not required.

72. General Permitted Development Order 1995 Schedules 19, Development ancillary to mining operations; 20, Coal mining development by the Coal Authority and licensed operators; 21, Waste tipping at a mine; and 22, Mineral exploration, are particularly relevant to coal working.

73. If applicants proceed with a development in or near a European Site on the assumption that it benefits from a permitted development right, without first checking whether it is likely to have a significant effect on the site, they run the

risk of undertaking the project without the benefit of planning permission and being liable to enforcement proceedings. The onus is on the developer to be sure that the development is lawful.

Protecting areas of importance

74. Planning Policy Wales sets out the objectives for conserving and improving natural heritage and the environment in Wales. Operations must meet international responsibilities, conserve statutorily designated sites, protect landscape and biodiversity and protected species. Despite negative impacts of coal operations, they can in some circumstances contribute to the restoration and enhancement of natural heritage through rehabilitation, landscape management and the creation of new or improved habitats.

National Parks and Areas of Outstanding Natural Beauty

75. The statutory landscape designations in Wales are National Parks and Areas of Outstanding Natural Beauty (AONB). The revised National Park purposes set out in section 5 of the National Parks and Access to the Countryside Act 1949 (as substituted by section 61 of the Environment Act 1995), are:

(i) to conserve and enhance the natural beauty, wildlife and cultural heritage of the National Parks; and

(ii) to promote opportunities for the understanding and enjoyment of the special qualities [of the Parks] by the public. Section 11A of the 1949 Act (as substituted by section 62 of the 1995 Act) places a general duty on all relevant authorities *to have regard to the purposes of the Parks.*

76. AONBs are designated by the Countryside Council for Wales. The primary purpose of the AONB designation is to conserve natural beauty.

77. Local Authorities have a statutory duty to have regard to these purposes. The landscape qualities of National Parks and Areas of Outstanding Natural Beauty are equivalent and the protection given to both types of area by the land use planning system are also equivalent. Major development should not take place save in exceptional circumstances.

78. Minerals development in National Parks and Areas of Outstanding Natural Beauty (MPPW, 2000) requires rigorous examination and all major mineral developments must be demonstrated to be in the public interest before being allowed to proceed. For this purpose, major coal developments are defined as those that in the opinion of the MPA require Environmental Impact Assessment. The tests of rigorous examination are set out in MPPW, but decisions must be compatible with the pursuit of their (National Park and AONB) purposes. The public interest tests are of preserving public health or public safety; or that the proposed development is needed at this time and there is no satisfactory alternative. There is no national statement of need for indigenous coal.

79. Coal development that might affect the settings of National Parks or AONBs should have regard to the purposes for which they were designated. In such cases a rigorous examination should be undertaken to determine whether the impacts on the purposes are acceptable or not and whether they can be avoided or adequately controlled through conditions.

Other Landscape Designations

Country Parks

80. Country Parks are managed by local authorities under the Countryside Act 1968. They are intended for recreation close to population centres and do not

necessarily have any nature conservation importance. Nevertheless, they are places for informal recreation in the natural environment. Proposals for opencast coal extraction within them should only be permitted if provision is made for a replacement of similar area, quality and accessibility to those communities previously provided for.

Common Land

81. Planning Policy Wales recognises that common land is a finite resource and should not be developed unnecessarily. Access to it should not be prevented or impeded unnecessarily and its proper management should be encouraged. The Countryside and Rights of Way Act 2000 created new rights for people to walk on areas of open country and registered common land. Where planning permission is being granted for development of common land the consent of the Welsh Ministers may be required under the various common land legislation provisions. The Commons Act 2006 provides for better protection for common land and greens by streamlining the consents system for works and fencing on commons and ensures that existing statutory protections are applied consistently. Part 3 of the Act contains provision to prohibit the carrying out of works on certain common land without the consent of the Welsh Ministers and makes provision about how consent may be obtained. It replaces section 194 of the Law of Property Act 1925, the main existing statutory control on works on common land, which is repealed. This means that works connected with the taking or working of minerals do not require consent under section 194 of the 1925 Act but will require consent under section 38 of the Commons Act 2006 on relevant land. However, paragraph 7 of Schedule 4 of the Act includes a transitional provision to prevent this requirement applying to works carried out in accordance with a planning permission under any enactment granted before commencement of section 38, so long as the works are carried out within the period allowed under the planning permission, or any extended period allowed by the planning authority. These provisions have not yet been brought into force in relation to Wales, however it is intended that they will be brought into force in 2009.

Other designations

82. Where coal working would destroy or degrade mature landscapes, ancient woodlands, important hedgerows which are features of the landscape of major importance for wild flora and fauna, or venerable trees it should only be permitted if reclamation benefits would outweigh the demonstrable harm. PPW states that ancient and semi-natural woodlands are irreplaceable habitats of high biodiversity value which should be protected from development that would result in significant damage.

Natura 2000

83. Special Protection Areas, Special Areas of Conservation and Ramsar Wetland Sites of International Importance and European Protected Species

84. The advice and procedures in the revised TAN5: Nature Conservation and Planning should be followed for any coal working proposals which might affect a Natura 2000 site or a European Protected Species.

Other Environmental Designations

Sites of Special Scientific Interest

85. SSSIs contain the best examples of habitats and sites for flora, fauna, and geological or physiographical interest in the UK. Conservation legislation in England and Wales has been revised and strengthened under the CROW Act 2000. These statutorily designated sites must be protected from damage and deterioration, consistent with the objectives of the designation. SSSIs are a national constraint that should be shown by the MPA as an area where coal working would be unacceptable. There is a strong presumption against coal working that may harm the special features of any SSSI. An exception should only be made where the conservation and enhancement benefits of the development clearly outweigh both the impacts on the features of the site and any broader impacts on the national network of SSSIs. There may not always be an area of similar character and quality available, and the creation of replacement habitat is not always successful or appropriate. Coal developments on land outside the boundaries of a SSSI need to ensure the proper protection of the SSSI interest. Where an SSSI designation includes features dependant on hydrological conditions, it is probable that any scoping opinion for surface and underground coal working will provide that proposals within at least two kilometres of the SSSI will need to be assessed.

86. Before authorising operations likely to damage any notified features in an SSSI, MPAs must give notice of the proposed operations to the Countryside Council for Wales (CCW) and must take account of the Council's advice in deciding whether to grant planning permission[2]. If the integrity of the SSSI is dependent on groundwater, the Environment Agency must be consulted on any proposal that may have an adverse affect. If the SSSI is designated for its geological importance, the Association of Welsh Regionally Important Geodiversity Sites Groups (AWRIG) should be consulted.

Regionally Important Geodiversity Sites

87. Regionally Important Geodiversity Sites (RIGS) are designated for their scientific, educational, historic or aesthetic features as the most important places for geology and geomorphology outside SSSIs. Integrity sites contain finite deposits or landforms which are irreplaceable if destroyed; exposure sites provide exposures of a rock which is extensive or also well-developed below the ground and offer opportunities for RIGS creation.

National Nature Reserves

88. National Nature Reserves contain examples of some of the most important terrestrial ecosystems in Great Britain. They are managed to conserve their habitats or to provide special opportunities for scientific study of the habitats communities and species represented within them. They are declared by the CCW under the National Parks and Access to the Countryside Act 1949 and the Wildlife and Countryside Act 1981.

89. Other sites exist which are regionally or locally significant, and planning decisions should prevent harm to their biodiversity and geological conservation interests. Where coal development would result in significant harm to those interests, MPAs will need to be satisfied that there are not alternative proposals

[2] The Town and Country Planning (General Development Procedure) Order 1995

that would result in less or no harm. Development should result in net benefit to biodiversity wherever possible, and local Biodiversity Action Plans identify target habitats or species which would benefit from such improvements. S40 of the Natural Environment and Rural Communities Act 2006 provides that every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity.

Historic Environment

90. Statutory designations are based on features such as age, rarity, architectural and aesthetic quality, as well as local distinctiveness and sense of place. The historic legacy is irreplaceable. Earlier coal extraction may have left buildings and a relict landscape of historical importance, which must be considered before designating areas for future coal development.

91. In order to prevent the development of unacceptable coal extraction, full regard should be given to the desirability of preserving elements of the historic environment and their settings. This should be in accordance with Planning Policy Wales (March 2002) and the more detailed guidance set out in Welsh Office Circulars 60/96**,** Planning and the Historic Environment: Archaeology and Planning and 61/96, Planning and the Historic Environment: Historic Buildings and Conservation Areas. The elements include:

- sites with statutory protection, such as Scheduled Ancient Monuments, Listed Buildings and Conservation Areas
- non-statutorily designated sites where their historic importance is a material consideration, such as World Heritage Sites, Registered Historic Landscapes, Parks and Gardens and archaeological sites, and features identified in the Regional Sites and Monuments Records.

92. Development plans should present policies in relation to each, making clear the criteria which will be used to judge applications for coal development in or near these important features, including circumstances where opencast working is an option for the reclamation of land damaged by previous working.

Geoparks

93. Geopark is an UNESCO designation for geological, archaeological, ecological and cultural features. Coal proposals within a Geopark should consider the opportunity to protect or enhance these features.

Agricultural Land

94. Agricultural land quality is one of a number of sustainability considerations, with preference being given to development using land of the poorest quality first, considering also conservation interests. Land of grades 1, 2 and 3a of the Ministry of Agriculture Fisheries and Food Agricultural Land Classification is the best and most versatile agricultural land; this is a national resource and should be protected from development unless it will be restored to its original grade. It should only be used for coal development if there is an overriding need, and sufficient land in lower grades is either unavailable or has an environmental value recognised by statutory designation, which outweighs agricultural considerations. Where lower quality agricultural land is taken for opencast working and reinstated to agriculture then restoration should seek to avoid any irreversible long-term loss in land quality.

Public Rights of Way

95. Public Rights of Way often cross coal working sites and are diverted or extinguished for the permission. The applicant should identify such routes at an early stage and discuss them with the surveying authority. See also Environmental Impact and Restoration sections.

Reducing the impact of coal extraction

96. In common with other major mineral, waste, transport and industrial operations, coal extraction and processing can impact on the natural environment unless properly mitigated.

Best Available Techniques

97. The coal industry should keep impacts to a level that reflects the highest environmental standards and work for continuous improvement. Where limits are set it is not proposed that these should become the norm at which operations work. This guidance places a duty to use the best practicable means to reduce the impacts of coal working, and operators should adopt the Best Available Technology (BAT). The essence of BAT is that the techniques selected to protect the environment should achieve an appropriate balance between environmental benefits and the costs incurred by operators. Where environmental limits are defined and BAT would not achieve them, the MPA will need to consider the second test in MPPW (paragraph 62) relating to community benefits. However, BAT would still require operators to do all that is practicable to minimise emissions.

Environmental Management Systems

98. Guidance on best practice in Environmental Management Systems is in Appendix C

99. Operators are encouraged to adopt an environmental management programme and certification to include objectives and targets, documentation and records, operational and emergency procedures, responsibility and reporting structure, environmental impact, regulatory and legal compliance, and environmental performance review audits, emission and performance monitoring and measurement. MPAs should be provided with information about the International Organisation for Standardisation (ISO) 14001 or Eco-Management and Audit Scheme (EMAS) certifications on sites that they monitor; accreditation is a pointer to likely environmental performance.

Monitoring

100. Guidance on best practice in monitoring is contained in Appendix D

101. Monitoring is required to provide information on aspects of the coal working site before it starts, during its lifetime and after its completion for restoration and aftercare. It will ensure compliance with appropriate environmental standards and facilitate an effective response to complaints. The information is used:

- as the background against which to compare predicted and actual impacts
- as an input to models and forecasts
- to feed back into the risk assessment
- to confirm that environmental management is meeting its aims
- as a trigger if unacceptable impacts are found
- to ensure satisfactory and progressive reclamation is being achieved, and
- to ensure that lessons can be learned.

Baseline information

102. The baseline study should focus on the aspects of the environment that may be significantly altered. It assesses the state of the local environment. Every use should be made of data from existing sources, but there will invariably be gaps that require survey or surveillance. For some measurements a prior survey period of 12 months or more will be needed.

Compliance monitoring schemes

103. The MPA will require schemes of monitoring for compliance with Conditions, and legal obligations or agreements to be proposed in the Environmental Statement or Planning Application as an integral element of mitigation. The schemes will specify the methodology, the variables that will be measured and the monitoring locations. The schemes will be site-specific, taking account of any monitoring required under authorisation for coal extraction, processing and transport under the Environmental Permitting Regime and other regulations.

104. The agreed monitoring schemes will be included in Conditions, and legal obligations or agreements.

105. The MPA will either specify, or agree the monitoring scheme in writing with the applicant, who will be responsible for monitoring and how the results will be assessed, recorded, reported and used. As well as monitoring by the operators, monitoring will be undertaken by the MPA, Environment Agency (Wales) (EA(W)), and Environmental Health Officer (EHO). They will carry out periodic checks, particularly if complaints are received, and inform the operators and complainants of the results. Monitoring fees for minerals sites are included under The Town and Country Planning (Fees for Applications and Deemed Applications) (Amendment No.2) (Wales) Regulations 2006. The charging regime is for local planning authorities to recover the costs of carrying out their monitoring function. A maximum number of 8 chargeable site visits will be payable by the operator of an active mineral site.

106. Planning Authorities must consider enforcement action if monitoring shows that Conditions are breached. It may then be of assistance to all stakeholders to have scrutiny of systems, procedures and physical inspections by independent and technical experts.

107. Operators will report on monitoring in an agreed programme, most probably as an annual report, and inform the MPA as soon as practicable (within an agreed number of working days) if there is evidence of the limits being breached, including an explanation and a statement of action to remedy it.

108. The planning permission should include the time required for restoration and aftercare, so that monitoring and enforcement continue to apply and to support the confirmation of planning conditions and legal obligations and agreements.

Monitoring by other regulators

109. Advice on best practice on working with other regulators is contained in Appendix E.

110. The protection of controlled waters is the responsibility of EA(W). Regulation and monitoring for other pollution matters at coal working sites is carried out by local authorities. This includes monitoring of noise, dust and blasting. Primary

regulation is under the Environmental Permitting (England and Wales) Regulations 2007. Coal sites are classed as Part B activities, permitted by local authorities. Part IV of the Environment Act 1995 contains provisions relating to local air quality management.

Environmental Impact Assessment

111. Advice on best practice is contained in Appendix F.

112. EIA is a procedure that draws together, in a systematic way, an assessment of a project's likely significant environmental effects. EIA is statutorily required to be applied, prior to 'development consent' being granted for any project which is likely to have significant effects on the environment. The principal regulations which apply are the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999. Regulations brought into force in 2000 amend the 1999 Regulations and apply EIA to mineral conditions' reviews. These reviews of mineral permissions are carried out under provisions in the Planning and Compensation Act 1991 and the Environment Act 1995, and apply to surface and underground coal working.

113. Advice on the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 (SI 1999 No 293 as amended) is available in Wesh Office Circular on Environmental Impact Assessment (EIA) (Welsh Office Circular 11/99), on the Welsh Assembly Government's website (www.wales.gov.uk). While elements of the guidance are set out below in relation to coal working, MPAs and applicants should be aware of the overall requirements.

114. Where an MPA is asked to provide a "scoping opinion" the statutory process requires discussion between the authority, applicant and statutory bodies and it should to consider whether it should extend consultations to involve the public and other interested bodies. MPAs may wish to make this a clear intention in Local Development Plan Community Involvement Schemes as this will assist in reassuring local communities that they can have confidence in the procedures.

115. Open cast mining where the surface of the site is over 25 hectares falls under Schedule 1. All other coal working fall under Schedule 2 of the Regulations, where the planning authority is required to consider whether the project is likely to have a significant effect on the environment. The only exception is for the construction of buildings or other ancillary structures where the new floor space does not exceed 1,000 square metres. The MPA will be aware that small-scale projects in or close to sensitive areas can have effects just as damaging as those from large-scale development. The indicative thresholds in the circular are not determinative; the test is one of significant effect and where this is the case, EIA must be carried out. The EIA Directive is to be interpreted as having a "wide scope and broad purpose". The likelihood of significant effects will tend to depend on the scale and duration of the works, and the likely consequent impact of noise, dust, discharges to water and visual intrusion.

116. Schedule 2 development also includes underground mining and deep drillings, with the exception of drillings for investigating the stability of the soil.

117. All new opencast mines, to include recovery of coal from tips, and underground mines will generally require EIA, and MPAs should provide clear reasons for their decision if they determine otherwise.

118. Details of any measures proposed by way of mitigation should be included in the ES and expressed so that it is clear what is to be done and by when, and in a way that facilitates the drafting of planning Conditions. Conditions designed to mitigate the likely effects of a proposed development are not a substitute for environmental impact assessment. Remedial measures that are well-established and uncontroversial, such as cleaning wheels of trucks and covering load in lorries to minimise dust, may be taken into account during screening but for more complex and less clearly established mitigation measures, it may be less appropriate. The planning permission and the Conditions attached to it must be designed to prevent the development from taking a form - and having effects - different from what was considered during the EIA. MPAs should be aware of this when considering the appropriateness of including a Condition that requires an applicant to submit a scheme after the permission has been granted.

119. When determining applications, the MPA has to take into account the cumulative impacts of simultaneous and/or successive working of a number of sites in a wider area of coal resource. These may affect communities and localities over an extended period, depending on the nature, age and size of the sites. Cumulative effects can result from a combination of past, present or foreseeable future actions. Best Practice is proposed in Appendix G.

Health Impact Assessment within the EIA

120. Guidance on best practice for Health Impact Assessment (HIA) is in Appendix H. A Ministerial Interim Planning Policy Statement has been issued for HIA in relation to coal working.

121. A planning application for coal working that may have significant effects on human health should be accompanied by HIA as part of the EIA This does not in itself mean that such developments have unique, significant, or necessarily negative health impacts. It does recognise, however, that to meet expressed concerns, not only should the technical evidence be rigorously assessed, but also the local community should be properly informed and involved and people's views heard about the application. The outcomes of health impact assessment are particularly important for individuals and communities, and therefore their participation in the process is vital. When health has to be balanced against other policy objectives, it should be done in full knowledge of the consequences, whether positive or negative. The Welsh Assembly Government has developed core aims based on the United Nations Convention on the Rights of the Child, which should be considered in scoping HIA.

122. HIA should assess the potential direct and indirect effects on the health of a population and the distribution of those effects within that population; it is a flexible but systematic way of considering the possible impacts of developments on people's health. The public seeks a certain level of scrutiny to provide assurance that the potential risks to health have been considered and can be adequately controlled. HIA will provide this scrutiny. Case law has identified that public perceptions of harm can be a material consideration in planning decision making even if not objectively justified by the facts. However, little or no weight should be attached to those perceptions if they cannot be justified, for example if accepted international standards for protection of public health are met.

123. Information to enable the MPA to assess potential impacts on health can already be required in the scoping opinion for Environmental Impact Assessment

(see best practice in Appendix F) and scoping opinions for coal working should incorporate relevant matters from Appendix H with respect to health issues. Applicants are advised to provide as much information as possible on health impacts within the Environmental Statement for coal development; drawing together the relevant information into a non-technical health summary. This will provide the basis for public participation, while the detailed evidence is contained in the ES. It will set the site-specific information into the context of current understanding of health impacts, and of national criteria and thresholds, and provide the basis for public participation and contributions. The process is iterative, with the findings of the initial public consultation on health issues being reported in the ES. Applications for coal working should provide adequate information on health impacts within the ES. If an applicant refuses to supply an HIA when asked to do so as part of the ES, the MPA may decide that it cannot proceed to determine the application without that information.

124. There are two aspects to Health Impact Assessment - the carrying out of the assessment (by the applicant) and the quality assurance or evaluation, by independent professional people who understand health impact assessment and can provide the public assurance that the assessment is valid. This appraisal may be undertaken by the authority itself or by other organisations, possibly the Local Health Board (LHB). MPAs must assess HIAs and other health information in considering opencast coal planning applications and, in doing so, may seek advice from independent specialists to enable them to evaluate the assessments.

125. When the MPA is considering coal working applications, Local Health Boards, Local Service Boards (LSB), and Environmental Health Officers (EHOs) should be consulted, to provide an opportunity for the health sector to influence coal working to improve their effects on health and well-being. EA(W) may be undertaking their own consultations, and it will be helpful to share information. The Planning Authority will wish to use a collaborative approach to develop systems that will allow timely responses to requests and access to relevant information and take into account resources. Companies with experience of HIA have resources and knowledge that may be prepared to contribute and it is recommended that they be consulted on coal proposals.

126. The scale of the assessment will depend on the timescales, the resources available and the complexity of the project. At a strategic level the LDP should identify any areas where coal working would be inappropriate. When considering applications, Rapid Assessments can involve a single stakeholder meeting and a report – identifying the stakeholders will be a part of the assessment. More comprehensive assessments can take months and involve systematic literature reviews, new data collection and expert analysis. The rapid form of assessment is likely to be appropriate in most cases. Best practice guidance on the HIA process was published in 2004. [3]

127. For major developments, or particularly sensitive receptors, a Health Assessment Panel is recommended, to advise from pre-application to post-closure. This panel would meet at intervals, for scoping, assessment, to advise on mitigation and conditions, and to evaluate monitoring results if appropriate. Other interested parties and the general public should also be given an opportunity to comment. The panel will provide a composite conclusion, which

[3] Improving Health and Reducing Inequalities, A practical guide to health impact assessment (Welsh Health Impact Assessment Support Unit)

will inform the MPA in reaching a decision on the application and ongoing monitoring requirements.

128. Appropriate health monitoring conditions should be included in any planning permission. The developer would monitor and report on the impacts of the site, with additional monitoring by EA(W) and the EHOs, and the MPA should integrate the results to ensure a co-ordinated approach.

129. The evidence for the Sustainability Appraisal of the LDP will contribute to the baseline information on air-quality; water quality; contaminated land, and on demographic and health statistics.

Social Impact Assessment within the EIA

130. Advice on Social Impact Assessment is in Appendix J

131. When a proposal for coal working is not environmentally acceptable, the second test for such proposals in MPPW requires the MPA to balance local or community benefits against the disbenefits of likely impacts. One aspect of this will be the physical benefits of land restoration, but other factors need to be considered. The MPA will need to adopt a process for considering these less measurable factors, to ensure that decision making is both just and transparent. This will require them to assess, to a reasonable degree, the changes to people's quality and way of life, their community, their environment, health and wellbeing. Discussions with the applicant and consultees will identify when this test is likely to be a part of the decision process. Scoping for the ES will then require information relevant to the MPA's decision.

Dust

132. Guidance on best practice on dust is in Appendix K

133. When dust has the potential to affect the use of land it can be a material consideration for planning purposes.

Sources of dust from coal workings

134. The potential for the generation of dust at surface coal workings is largely related to the hardness of the materials being handled, the amount of handling and the size of the product. Blasting, handling operations, processing, haulage on unsurfaced site roads, coal stocking yards and windblow across disturbed site surfaces are significant sources. Once reduced to the size of dust, the particles can become airborne. As well as certain site activities which increase dust emission, such as dropping material from a height or crushing, in general, there is a likelihood that the greater the volume handled the greater the dust generation. Underground working too can produce dust from stock and waste piles, particularly of fines.

135. Dust is generally a collective name for solid particulate matter, in the size range of 1-75 microns in diameter (BS6069: Characterization of air quality). Dust in the atmosphere are those particles capable of becoming airborne to disperse in the atmosphere, which in most cases returns to settle on surfaces. For the purposes of this document, dust is categorised as particulate matter PM_{10} (i.e less than 10μm in diameter), and nuisance dust (greater than 10μm).

136. The potential drift distance of particles is a function of the initial height of the particle above ground level, the terminal settling velocity of the particle, and the degree of atmospheric turbulence. Smaller particles, particularly PM_{10}, have much slower gravitational settling velocities and are much more likely to have their settling rate retarded by atmospheric turbulence. These smaller particles remain airborne for a long time, and atmospheric modelling and measurements of air pollution demonstrate a strong regional contribution to PM_{10} levels (Department of Environment, Food and Rural Affairs (DEFRA) 2005). Particulate matter , particularly the smaller species such as $PM_{2.5}$ can have a significant transboundary component and can be transported thousands of kilometres.

Particulate material PM_{10}

137. Particulate air pollution is emitted from many different sources and may damage human health and the environment. Emissions should be avoided, prevented or reduced. Epidemiology has consistently demonstrated an association between adverse health effects and particulate matter; there is no known safe level of exposure to particulate matter and exposure can lead to impacts ranging from minor effects on the respiratory system to premature mortality. There is general consensus that some health effects are dominant in susceptible subgroups, for example elderly people, children, those with pre-existing lung or heart disease or diabetes. The balance of evidence suggests that it is the combustion-derived components of PM_{10}, rather than particles from natural sources that are primarily responsible for harmful effects. (Department of Health (DoH),1999)

The Air Quality Strategy

138. Amongst other things, the Air Quality Strategy for England, Scotland, Wales and Northern Ireland sets health-based objectives to maintain and improve the quality of ambient air in the UK. The Strategy recognises that there are national, regional and local dimensions to air quality and that air quality problems may occur because of local factors. Part IV of the Environment Act 1995 places a statutory duty on all local authorities to review existing air quality in their area. This process is known as Local Air Quality Management (LAQM). Where the air quality standards and objectives are not likely to be met the local authority must declare an Air Quality Management Area (AQMA) and develop an action plan in pursuit of the objectives. The Air Quality (Wales) Regulations 2000 sets the objectives for particulate matter.

139. Air quality should be a consideration for coal policies within the LDP and for development control.

- Any Air Quality Management Areas (AQMA) will be excluded from areas defined as suitable for future coal operations in the Development Plan
- When assessing proposals for coal operations, the predicted emissions of particulate matter must not cause a breach in overall air quality standards, taking into account the Air Quality Strategy and any Addenda.
- If emissions from an active coal process results in levels higher than the objectives prescribed in AQS, the MPA is required to set out what steps it intends to take as a part of its AQMA action plan.

Particulate material from opencast

140. Emission estimates from quarrying in the UK (which includes coal working) in 2001 were estimated at 20.6 kt (thousand tonnes) of PM_{10}, of which about 70% was greater than $PM_{2.5,}$ and 30% less. However, the uncertainty of this estimate is 10-1000% (DEFRA, 2005). Emissions from quarrying are estimated to provide 11.4% of PM_{10}; 5.9% of $PM_{2.5}$ and 2.3% of PM_1 in the UK.

Particulate material and health

141. The UK approach aims firstly at a general reduction of concentrations in the urban background and secondly, to ensure a minimum degree of health protection everywhere, this is combined with an absolute concentration cap.. This is to ensure that large parts of the population benefit from improved air quality (health benefit is gained from every 1 µg/m^3 reduction in PM_{10}). (Air Quality Expert Group, 2005)

142. The potential health impacts of particulate matter from opencast sites are often raised as a health concern by local communities. Endorsed by the Committee of Medical Effects on Air Pollutants, the University of Newcastle-upon-Tyne's report "Do particulates from opencast mining impair children's respiratory health?" (DoH,1999) concluded that it is relevant to consider the contribution of opencast coal sites to PM_{10} levels in communities up to 1000m from a site. Health issues will be considered in the HIA, supported by specific dust and particulate matter assessment

Baseline study

143. The ES will include a baseline study and site-specific modelling to assess the potential contribution of a coal operation to particulate matter at different phases of the operation (from site preparation to aftercare), for any sensitive site within one kilometre of the site boundary.

144. Emissions from opencast can be estimated by using United States Environmental Protection Agency (USEPA) guidance, specifically Technology Transfer Network Clearinghouse for Inventories & Emissions Factors**,** Emissions Factors and Policy Applications Center (EFPAC)[4]. DEFRA (2005) reports that emissions from opencast are estimated by using a USEPA (1997) factor of 0.1g/kg of material, and identified research on emissions of particulate matter from mining and quarrying and on source apportionment of PM is as high priority. A review of emissions from mining, quarrying and construction is described in the DEFRA report as being in progress.

145. In the interim, unless and until better information is available, it is strongly recommended that calculations included in the ES should follow the guidance for Western Surface Coal Mining[5] (chapters 11 and 13) which sets out factors for different materials and activities. For some activities the emission value is as Total Suspended Particulate which, measured by the standard high-volume air sampler, has a relatively coarse size range, described as 30 µm. Where this is the best figure available, this should be made clear.

146. There is necessarily a degree of uncertainty with these figures, increased because operating characteristics and climate are potentially different, and the applicability needs to be considered. However, in the absence of specific figures, these emission factors will indicate the comparative magnitude of emissions and

[4] http://www.epa.gov/ttn/chief/efpac/index.html
[5] http://www.epa.gov/ttn/chief/ap42/ch11/final/c11s09.pdf

allow sensitivity analysis of different approaches. Site monitoring will contribute towards calibration of these figures.

147. Useful sources of baseline information exist in community-monitored PM_{10} data and air quality-monitoring network data from the Automatic Urban and Rural Network (AURN) data. Monitoring and assessment can draw on these sources but they are unlikely to provide sufficient information for the relevant area at the detail needed. Any scoping opinion for the ES will provide advice.

Monitoring of Particulate Material

148. Procedures to monitor and control particulate matter (and other air quality pollutants where relevant) should be adopted. Monitoring will comply with and complement the Local Air Pollution and Prevention Control monitoring. Certain quarry processes are controlled by Environmental Permitting (England and Wales) Regulations 2007. A summary of the advantages and disadvantages of the different samplers available is provided in the report by Air Quality Expert Group for DEFRA, Particulate Matter in the United Kingdom, 2005.

Reducing particulate material from diesel vehicles

149. The air pollution from off-road engines is exacerbated because most off-road machines move very slowly. During the 1990s, reductions in particulate material emissions from diesel vehicles were mainly achieved through improvements to engine design and fuel systems, aided by the reduction in sulphur content. However, legislation concentrates on mainly larger engines. Engines manufactured before the legislation, and in many off-road categories, remain outside the legislative scope. Emission standards for non-road engines adopted by the European Parliament in 2004 and phased-in from 2006 to 2013, apply only to new vehicles and equipment. Replacement engines to be used in machinery already in use should comply with the limit values that the engine to be replaced had to meet when originally placed on the market. To meet more stringent particulate material emission controls, diesel vehicles, especially the larger ones, would require exhaust after-treatment processes to further reduce emissions. For existing fleets, operators are encouraged to consider retrospective diesel particulate filters or diesel oxidation catalysts for maximum air quality improvement, and to use low sulphur fuel. Dust modelling should be based on predictions for the machinery that will be employed at the site. Fingerprint analysis of various hydrocarbons can assist in attributing such particles to their source.

Nuisance Dust

150. Nuisance dust reduces environmental amenity, with agriculture and transport being major sources. The impacts include visible plumes and haze; the soiling of surfaces; contamination of soils, vegetation and water-bodies; and effects on personal comfort, amenity and health. Coal dust is highly visible and can result in an unsightly coating.

151. Dispersal of dust is determined by how long the dust remains airborne and is highly weather-dependent, making it difficult to predict. Theoretical drift distance, as a function of particle diameter and mean wind speed, has been computed for fugitive dust emissions. Dust from opencast sites is mainly coarse; gravitational settling is appreciable so dust concentrations decrease rapidly away from the source. Large particulate material (over 30μm) returns to surface quite quickly; medium-size particles (10-30μm) will generally travel 100-250m from the source under normal conditions. *In adverse weather conditions, coarse dust travels 500m from the source* (Bate and Coppin, 1991). Residents can potentially be

affected by dust up to 1km from the source, but continual or severe concerns about dust are most likely to be experienced near to dust sources (generally within 100m) (Arup Environmental, 1995).

Nuisance dust baseline measurements and prediction

152. The ES should include information on dust for coal working applications. This will include baseline monitoring, prediction and modelling, control and mitigation, and monitoring. Ambient levels of dust need to be measured and assessed over a reasonable period, to establish existing local baseline conditions and to systematically identify sources of dust.

Nuisance Dust Monitoring and mitigation

153. Proposals should include a monitoring and mitigation scheme to address best practice as set out in Appendix K. The prime objective is to reduce dust to acceptable levels, but enforceable monitoring protocols are also required. The setting of a new limit for nuisance dust must be in tandem with more sensitive monitoring protocols that will indicate short-term episodes of high nuisance dust levels, which could be otherwise lost by techniques using monthly or annual averaging. The monitoring scheme needs to be objective, consistent, repeatable and robust. It also needs to be directional to identify the source and when necessary supported by the measurement of identifiable characteristics of colour, size fraction or mineralogy. The scheme should ensure that, in addition to monitoring at sensitive locations, there are sufficient locations to monitor bearings around the site. Conditions should identify the location and number of monitoring stations, the duration and frequency of monitoring, and the types of gauge.

154. Active monitoring systems are based on occupational health systems and suited to measuring over short periods, while passive systems, developed through an environmental approach, are best suited for longer periods. Methods monitor either dustfall or surface soiling. Devices using the reflectivity of glass slides, or sticky pads, are simple and inexpensive. Vertically mounted sticky pads allow directional monitoring and sampling for analysis. Dust monitoring using sticky pads measures the discolouration caused by dust with a smoke stain reflectometer. This loss of reflectance is expressed as the percentage effective area coverage (EAC%) per day. Absolute Area Coverage (AAC%) is a measure of the proportion of an area that has been dusted, irrespective of dust colour. Both EAC% and AAC% can be used as a measure of nuisance caused by dust.

Limits for nuisance dust

155. Goodquarry [6] has analysed public response to deposition rates and categorised other nuisance dust standards. They conclude that the “unofficial” UK rate of 200mg/m^2/day or, where the colour of dust is taken into account, 20-25 EAC% soiling units per week, is too high to be acceptable for amenity purposes. Vertical deposition monitoring (dust mass in settlement) and directional deposition monitoring (dust mass in flux) are not comparable. For coal working, the MPA should set conditions of a maximum 80mg/m^2/day as a weekly average, **or** set limiting criteria as the combination of 100% AAC across a single 45^o sector over a 7 day period or the dusting effect or discolouration where the EAC is greater than 25% for a single sector within the same period. (The Geoffrey Walton Practice, 2004)

[6] http://www.goodquarry.com

Other Regulators

156. Quarrying and coal handling processes are regulated by Local Authority Pollution Prevention Control (LAPPC). Prescribed processes such as the crushing or grinding of extracted minerals are subject to the Environmental Permitting (England and Wales) Regulations 2007. Guidance on the regulation of coal working sites as activities permitted under LAPPC is given to local authorities in Process Guidance Note 3/5 (04), Secretary of State's Guidance for Coal, Coke, Coal Product and Petroleum Coke (England and Wales). Site haulage is controlled under LAPPC. The environmental permitting regime applies only to specified processes. If dust from parts of the coal sites not regulated by the environmental permitting regime, for example earthworks, and noise and odour is a statutory nuisance, the relevant provisions of the Environmental Protection Act 1990 will apply. See also Environmental Permitting list of guidance and glossary, www.defra.gov.uk.

Blasting

157. Guidance on best practice in blasting is in Appendix L

Opencast coal working and blasting

158. Blasting is deployed on opencast sites to loosen faces and open fissures, and therefore maximum instantaneous charges are generally lower for opencast sites than for hard-rock quarrying. These can be further reduced by blast design, at an increase of drilling and detonator costs. Smaller, more frequent blasts lead to smaller but more frequent impacts, and the balance between these factors will need to be discussed between interested parties. UK opencast coal sites blast on average 33 times per month in comparison to 6 times a month at quarries. (DETR,1998). The amount of blasting required on an opencast site is a function of the rock, of the machinery available to lift and remove the material, and of the removal rate.

Blasting impacts

159. Blasting is used to loosen rock that is too strong for site excavators to remove efficiently. It causes ground vibration, air overpressure, noise and dust, and exceptionally, flyrock. Damage to structures, ranging from cosmetic to structural, occur if the dynamic stresses induced exceed the integral strength. This depends on the structure, its condition and the magnitude, duration and frequency of the vibration. The frequency is largely determined by the geological conditions. Within low-rise residential structures, magnification can occur, typically at frequencies between 4 hertz (Hz) and 15Hz, values generated by blasting on opencast sites. Hairline cracks in the weakest materials found in residential structures should not be caused at vibration levels less than 20mm per second peak particle velocity (ppv) at a frequency of 15 hertz (Hz), or lower than 50mms^{-1} ppv at 40Hz and above.

160. Blasting is perceived at much lower levels, and people express concern over nuisance and possible damage. Although damage or the fear of damage is people's major concern, vibration levels rarely approach the levels that would induce hairline cracks. People are very sensitive to vibration and some people become aware of vibration as low as 0.5mms^{-1}, but the human body is not capable of accurately quantifying its magnitude. Imperceptibility is not generally a reasonable requirement, although it may be for a hospital operating theatre or precision laboratory, or for certain fragile structures of historic importance. The criteria would need to be based on pre-existing vibration levels that occur as a result of normal occupancy.

Air overpressure

161. Vibration in the atmosphere is generated as a pressure wave, heard as noise (at above 20Hz) and felt as concussion. Both the noise and the concussion can cause a structure to vibrate. Wind speed and direction, cloud cover, temperature and humidity influence air overpressure. A scheme to minimise air overpressure can be improved by integrated monitoring of weather conditions, site operations and blast details. The amount of burden affects the level of air overpressure produced. An excessive burden increases the ground vibrations. If the burden is too small, the surplus energy transfers into gaseous energy that produces high levels of air overpressure. Spacing of the holes and their delay times of detonation are other important factors. If the spacing is insufficient, then very strong air blasts will result. As with ground borne vibration, it is important for the operator to recognise the conditions under which blast overpressure may be a problem.

Fly-rock

162. The Quarries Regulations 1999 ensure, as far as is practicable, that blasts are implemented to the design specification and this reduces fly-rock incidents. It is not appropriate for planning control to impose further restrictions than are controlled through the Health and Safety legislation. A public road near to coal workings may need to be temporarily closed during blasting operations if it is within the designated danger zone. Consideration should be given to the impact on traffic and the relevant road authority should be consulted.

Modelling and mitigation

163. Where blasting may be required on a site, the MPA will require modelling of blasting impacts for the different phases of the site, taking into account the structure and rock parameters, and proposed mitigation. The ES should include prediction and modelling of the impacts for the proposed, phased, blasting programme, based on the site investigation and best practice. Vibration is predicted from charge-weights and distance from the blast; geology controls the transmission. It must be demonstrated by predictive methods that thresholds will not be exceeded and a limit should be applied to ground vibration. The individual circumstances of a site must be considered and values should be compatible with current best practice guidance.

Blasting and planning

164. Because blasting at opencast sites is likely to be more frequent and for a different purpose to blasting at a hard rock quarry, it is appropriate to use lower limits. Conditions should include procedures for if recorded values exceed an agreed level. Typically these procedures would involve notification to the planning authority of the event together with an assessment of its implication with respect to future blasting activity and the site's vibration limit. A detailed scheme for approval should be included in the ES, so that it can be assessed as mitigation, to include:

- times of blasting – unless there are exceptional circumstances, such as a safety emergency, blasting should take place at regular and notified times between 10.00 and 16.00 hours on Monday to Friday, excluding Bank or National holidays
- a test blast in real conditions, using the advice in Best Practice
- a maximum level of ground vibration at vibration-sensitive buildings; ground vibration levels should not exceed a ppv of 6 mms^{-1} resultant value in 95% of blasts measured over a rolling three-month period as reviewed on a weekly

basis. If a blast should occur such that a residential or sensitive property outside the site boundary has or has been calculated to have received a vibration level equivalent to three standard deviations above the limiting value of 6mm/sec, then all blasting on site shall be suspended pending a thorough investigation into the occurrence. Blasting will only recommence once the MPA and minerals operator have reached an agreement as what exactly resulted in the incident and the best way to proceed.

- a scheme by which air overpressure is managed and mitigated through careful design of blasting operations; air overpressure should not exceed 120 dB linear, in 95% of blasts measured over any twelve-month period , and no individual blast should exceed 125db, measured at the nearest noise sensitive property
- a scheme of vibration monitoring so that compliance can be adequately demonstrated by the operator at any time. This must take into account all the elements of blast design.[7] The scheme will include the location and number of monitoring points; the type of equipment to be used and the parameters to be measured; and how often the measurements will be taken. An agreed method and frequency of reporting must be put in place.

165. Additional blast monitoring may be required as a result of complaints. It is vibration within a property which people experience most often and therefore in order to assess complaints regarding nuisance it may be necessary to monitor vibration within a property and at a location where the complainant considers the effects most noticeable. These measurements should be taken in conjunction with those taken outside in order to be able to quantify any magnification effects.

Other regulators

166. The Health and Safety Executive Mines and Quarries legislation addresses explosives, while the transport, storage, handling and use of explosives is covered by specific legislation. The Control of Major Accident Hazards Regulations 1999 (COMAH) exist to prevent or reduce the effects of major accidents involving dangerous substances. Blasting operations are covered by environmental legislation made under the Environmental Protection Act 1990 (as amended). Part 3 of the Environmental Protection Act 1990 places a mandatory duty on local authorities to investigate any complaints of nuisance and then take action where a nuisance is found, this includes nuisance from noise emissions and vibration. The relevant British Standard are: BS 5228 Noise and Vibration Control on Construction and Open Sites; BS 6472 Guide to Evaluation of Human Exposure to Vibration in Buildings; BS 7385 Evaluation and Measurement for Vibration in Buildings.

Noise

167. Guidance on best practice on noise is in Appendix M

Noise Impacts

168. Environmental noise, caused by traffic and industry is the source of an increasing number of complaints from the public. Noise can have a significant impact on quality of life, to the extent of harming well-being. Excessive exposure to noise may result in emotional effects, annoyance and activity disturbance, such as sleep interference. Low-frequency noise can cause distress to people who are sensitive to its effects. There is general agreement that noise can be a

[7] Environmental Impact of Blasting – planning to complyPegden M& Birch WJ. Transactions of mining and Metallurgy Section A. December 2005, Volume 114, No 40

source of annoyance, while prolonged or excessive exposure to high levels of noise can cause permanent medical conditions, such as hypertension and ischaemic heart disease. (WHO, Guidelines p.XII)

169. Where coal extraction and related operations would occur close to noise-sensitive development, particularly residential, and noise impacts cannot therefore be adequately controlled or mitigated to the levels set out below, the second test of MPPW should be considered. Unless the community and local benefits clearly outweigh, amongst other considerations, the loss of amenity resulting from noise, planning permission should be refused.

170. To protect the majority of people from being seriously annoyed during the daytime, the outdoor sound level from steady continuous noise would need not to exceed 55dB L_{Aeq} 1 hour on outdoor living areas. To protect the majority of people from being moderately annoyed during daytime, the outdoor sound level should not exceed 50dB L_{Aeq} 1 hour. (Institute for Environment and Health, 1997)

Baseline noise survey

171. As a part of the application, developers will provide a survey and assessment of background noise levels for the area that will be affected by the noise from the proposed site. This should record the noise at noise-sensitive properties. It is important to prevent "creeping" of ambient noise levels, whereby successive developments each add to the background noise. Background levels should exclude the existing contribution to noise from mineral, waste, and similar operations so that cumulative and in-combination effects can be assessed. Noise emissions from the coal site and the impact on noise-sensitive locations should be predicted, taking into account the operations, the noise character, and its spatial and temporal variation.

172. MPAs should take account of the local noise climate, particularly in areas of tranquillity that should be preserved as a national resource. Where certain species are particularly sensitive to noise, for example some small breeding birds, it may be appropriate to restrict certain activities at sensitive times.

Planning Conditions for noise

173. Planning Conditions should apply absolute controls on noise emissions, with limits normally but not exclusively set at particular noise-sensitive properties.

- MPAs should establish a noise limit at sensitive locations of background plus 10dB L_{Aeq} 1hr or 55dB L_{Aeq}, 1hr (free field), or whichever is the lesser, during normal working hours (0700 -1900, Monday to Friday excluding Public Holidays)
- In some noise sensitive locations, 0800 - 1800 hours may be more appropriate, with reduced levels defined for the dawn and evening one-hour periods
- When working is agreed between 0800 and1200 on Saturdays, MPAs may consider it appropriate to establish a reduced noise level
- At all other times, limits should not exceed 42dBL_{Aeq}, 1hr (free field) at sensitive locations.
- Where tonal noise contributes significantly it may be appropriate to set specific limits for this element.
- Peak or impulsive noise, which may include some reversing bleepers, may also require separate limits that are independent of background noise and should only exceptionally be permitted at night.

Short-term operations

174. Short-term operations that cannot easily meet these noise limits might include soil stripping, the construction and removal of baffle mounds and soil storage mounds construction of new permanent landforms and aspects of site road construction and maintenance. These activities can bring longer-term environmental benefits. Minerals advice in Wales has been that increased noise limits between 1000 and 1600 hours on Monday to Friday excluding Public Holidays of up to 67 dB (A)L_{Aeq} 1hr (free field) should be considered for periods of up to 8 weeks in a year, monitored at the noise-sensitive properties nearest to the source. However, this is approaching levels identified by the WHO as having the critical health effect of hearing impairment – 70dB for 24 hours. (WHO Guidelines p. XVIII). The MPA should assess the predicted noise for such operations, consider proposed and potential mitigation, and have evidence of the long-term benefits before agreeing the level, duration and frequency of such exceptions, and not to exceed 67 dB (A)L_{Aeq} 1hr (free field) for the hours identified above.

175. MPAs should also be mindful of the noise caused by traffic, including rail traffic, on and off site. Hours of working can limit on-site traffic to the same hours, access design and appropriate signage can encourage certain directions of movement and legal agreements can require drivers under the operator's control to follow specific routes to avoid noise sensitive locations. The Local Highway Authority must be involved in the drafting of any conditions or legal agreements. Caution is needed to ensure that restrictions on site or on certain routes do not result in worse impacts elsewhere.

Other regulators

176. For certain quarry processes, noise emissions are controlled under the Environmental Permitting (England and Wales) Regulations 2007 . Those concerned with coal development should have regard to the Environmental Noise (Wales) Regulations 2006 which implement EC Directive (2002/49/EC) Assessment and Management of Environmental Noise (the Environmental Noise Directive).

Guidance

177. Minerals Planning Guidance Note 11: The Control of Noise at Surface Mineral Workings (1993) provides advice on the monitoring and assessment of noise levels and much is still applicable (see paragraph 3 for cancellations). The Technical Advice Note (TAN) for Noise provides advice on how the planning system can be used to minimise the adverse impact of noise. Although the TAN does not deal specifically with noise from surface mineral extraction sites, general points are applicable and explanations of noise measurement terms are also relevant.

Visual impact

178. Guidance on best practice on visual impact is in Appendix N

179. Welsh landscapes are a valuable asset– a critical environmental, historic, tourist and recreational resource. This value is not confined to statutory sites but extends across all of Wales. The European Landscape Convention, ratified on 1 March 2004, recognises landscape as an essential component of people's surroundings. Coal extraction may be visually intrusive unless carefully sited and properly mitigated. Excavation can cut into a skyline; storage areas or screening mounds can obscure a distant view; plant, machinery and buildings, lighting and

screening fences intrude into the landscape. There may be a loss of mature woodland, hedgerows or other, valued, small landscape features.

Baseline survey and modelling

180. Landscape assessment is required as a part of the LDP. The MPA requires sufficient information to predict and judge the magnitude and significance of the effects that a potential coal operation may have on landscape character and visual amenities. LANDMAP is the national information system, devised by the Countryside Council for Wales, for taking landscape into account in decision-making. Detail is a strength of LANDMAP, but overlaying the five evaluated aspects produces a complex picture and it may be necessary to fine-tune the information to a particular purpose.

181. A description of potential landscape and visual impacts of the alternative options and designs, including the likely changes to the landscape following restoration, should be provided by the applicant in the ES. The rationale for the recommended option needs to be clearly explained. Visual impact should be a factor in the phasing and layout of the development, and in the restoration strategy. Both positive and negative landscape and visual impacts should be given due consideration, in a structured and systematic approach. Vegetation is an important factor in the landscape and its effect needs to be analysed in the landscape model in the ES.

182. Adverse visual impact must be kept to an acceptable level. The magnitude of change is relatively objective and quantifiable and should incorporate the compatibility of the project with the surrounding landscape, duration of impacts, scale of development, and reversibility of change. The significance of change involves a greater degree of subjective opinion. The quality, importance and rarity of special landscape elements, ability of the landscape to accommodate change, change in local and regional context, and the history of the landscape are all significant.

Landscape screening

183. Appropriate tree and shrub planting can reduce the visual impact of operations and enhance the landscape and wildlife potential. Details of the location, form, number, species, size, method of planting, site preparation and any necessary measures for replacing plants that fail should be required by Condition. Planting carried out several years in advance of the development improves its effectiveness. Where potential coal sites are identified in the LDP, there may be opportunities for advance screening. The MPA may wish to consider whether the benefits of such areas of advance planting, which will remain in place at least through restoration and aftercare, should be sufficient to justify the use of an operational boundary as described under exceptional circumstances, paragraph 51. Appropriate tree planting on land in the control of the developer but off-site, which could be included in a legal agreement, can also enhance natural landscape screening.

184. MPAs should encourage the appropriate management of features of the landscape which are of major importance for ecological coherence. Coal workings and their subsequent restoration can contribute to such linear structures that function as "stepping stones" or wildlife corridors.

Illumination

185. Light pollution is basically unwanted light. If illumination is poorly designed, excessive or badly positioned then it can have an adverse effect on the local environment and cause problems for people living in the vicinity.

186. Conditions should be used to control the type and siting of light installations and place restrictions on the spread and duration of light. There is a need to balance the provision of lighting to enhance safety with the need to protect the natural environment, to prevent glare and respect the amenity of neighbouring land uses. The MPA should take into account the category of natural light, from intrinsically dark areas through low, medium to high district brightness areas.

Stability

187. Stability is a material planning consideration in so far as it affects land use. Instability from surface workings and the surface operations of underground workings may affect land and land-use beyond the site boundary and it may threaten the safety of people in and around the site. (Instability from mining is considered in the section Underground Coal Working) These potential impacts are of particular interest to neighbouring land owners and owners of third-party services adjacent to the site. Instability may also be a cause of delays and additional costs in reclamation schemes. In due course, the implementation of the Mining Waste Directive through regulations will need to be taken into account.

188. MPAs need to consider stability in relation to coal workings and tips, and Local Planning Authorities (LPAs) need to consider stability in relation to development in, on or near abandoned coal workings and tips. Policies in the LDP, if necessary expanded in SPG, should outline the consideration which will be given to stability issues, taking into account the potential for apparently unrelated issues to have consequential effects on the stability of excavated or tipped slopes. Policies should seek to ensure that land use is appropriate when considering development above or below abandoned excavation slopes and on or near to disused tips or back-filled workings, and applications should be accompanied by a stability report prepared by a competent person.

189. Early discussions between the applicant and the MPA, appropriate consultation with neighbouring land owners and owners of third-party services adjacent to the site, and close liaison with the Health and Safety Executive (HSE) are necessary. The ES for a coal working application should include a design report prepared by a competent person which demonstrates that the perimeter slopes of any coal working and any internal slopes remaining after restoration will remain safe and stable. The ultimate limits of excavation, tipping, back-fill and final long-term slope details should be a Condition of any permission, although it is recognised that these may need to be reviewed and modified in the light of new information during the life of the site.

190. The ES will need to take account of the factors which might trigger particular concerns about stability, such as:

- proximity to built development or infrastructure;
- knowledge of previous instability problems;
- the criteria to be used to define stand-off distances or clearances between quarry slopes or tips and the site boundary or third-party structures; and
- the requirement for final slopes and restoration to be safe and stable

191. The MPA should also ensure that any changes to the proposed method of working, which may be desirable for other reasons, are appraised and assessed

for stability by a competent person. Where instability occurs or is expected, an assessment will be needed of the actual risks and of potential remedial or preventive measures.

192. The outline procedures set out in Appendix B of Minerals Planning Guidance (MPG) 5 identify the steps that should be followed when designing, assessing and inspecting quarry slopes. They are not prescriptive, and are not alternative measures to those required by statute, but they do illustrate good practice. There must be no conflict between planning Conditions and the statutory requirements of the Quarry Regulations.

193. Although the reporting requirements of The Quarries Regulations 1999 are different to those for planning, there are common interests and it is important to continue consultation between the operator, the HSE and the MPA from pre-application to closure. Where a significant hazard exists, the Quarries Regulations 1999 require that a geotechnical assessment be carried out, at least every two years, to identify and assess all the factors liable to affect the stability and safety of a proposed or existing excavation or tip. The Regulations also require that the operator shall ensure that in the event of abandonment of or ceasing of operations at a quarry, it is left in a safe condition. The MPA will wish to consider the reports and conclusions of the Health and Safety Executive.

194. Settlement of back-fill in surface workings continues indefinitely, albeit at an exponentially decreasing rate depending on the material deposited, the method of placement, total thickness, applied load and, most importantly, drainage conditions. Where built development is the proposed after-use, MPAs should impose Conditions to secure appropriate deposition and compaction to allow that development to proceed without the need for further ground treatment.

Other Regulators

195. Surface mineral workings –“quarries” are subject to the provisions of the Health and Safety at Work etc Act 1974 and the Quarries Regulations 1999. Under reg.3 of the Quarries Regulations, a quarry is a system of excavations, or reclamation site, or disused tip used for the extraction of minerals. The primary responsibility for the safety and stability of a surface mineral working is that of the operator, defined in the Quarries Regulations 1999 as "the person in overall control of the working of the quarry". Amongst other duties, The Quarries Regulations 1999 require operators to operate a scheme for the systematic inspection of all parts of a quarry. Enforcement is through the quarry inspectors of the Field Operations Division of the Health and Safety Executive (HSE). The Mines and Quarries (Tips) Regulations 1971 also, amongst other things, require inspections of all active and closed tips at appropriate intervals. Tips associated with underground mineral workings are subject to the provisions of the Mines and Quarries (Tips) Act 1969 and the Mines and Quarries (Tips) Regulations 1971. Enforcement of the tips legislation is through HM Inspectorate of Mines of the HSE. Part II of the Mines and Quarries (Tips) Act 1969 is concerned with the prevention of public danger from disused quarry and mine tips not associated with an active mineral working. Enforcement in respect of these Part II tips is by local authorities, rather than the HSE.

Transport

196. Guidance on best practice in transport is in Appendix O

197. MPPW provides guidance on transport in paragraphs 42 and 43. The MPA should seek to enable the carrying of material by rail or water wherever possible, through partnership with extractors and rail and water operators, and by the use of appropriate planning Conditions and obligations. They should identify and, where appropriate, protect sites and routes which could be critical for the movement of coal. Under the Railways Act 2005, in Wales Freight Facilities Grant (FFG) is available to assist with the extra costs generally associated with moving freight by rail, by offsetting the capital costs of providing rail freight handling facilities. It is also available to help companies reinvest in existing rail freight facilities. Most facilities needed to handle or carry freight by rail are likely to be eligible for FFG but capital expenditure must be involved. The Rail Environmental Benefit Procurement Scheme transferred to the Welsh Assembly Government 1 April 2007, and assists companies with the operating costs associated with running rail freight transport instead of road (where rail is more expensive than road).

198. Where coal is transported by road, the Local Highway Authority must be involved throughout the process. The MPA and coal operators should consider freight quality partnerships, to agree on lorry routes and loading and unloading facilities and on reducing vehicle emissions and vehicle and delivery noise levels. If there is serious doubt that local roads can accommodate the increase in heavy traffic that the proposed development is likely to generate, then, subject to the second test, planning permission may have to be refused.

199. MPAs should encourage the establishment of voluntary mineral site transport plans in consultation with local communities. Traffic Assessment (TA) will form a part of the ES; the Local Highway Authority will be involved in the scoping and assessment of the TA. This will include baseline assessment by means of local traffic surveys, by vehicle type, time of day, season, road type and area type, taking account of the scope of existing data. Estimates of traffic flows from existing surveys may also be useful for monitoring particular routes.

200. The MPA, in consultation with the Local Highway Authority will need to ensure that transport and traffic proposals are fully integrated with their strategy on air quality and taken into account when considering environmental impacts.

Water

201. All mineral workings have the potential to affect the water environment by changes to the quantity and quality of surface or ground water resources. Unless the MPA, taking advice from EA(W), is satisfied through careful risk assessment that the consequences of any adverse impact of extraction on the water environment is acceptable or that they can be made so by mitigation measures, the second test of MPPW should be considered. Unless the community and local benefits clearly outweigh the adverse impacts, planning permission must be refused. There is no legal remedy by which a person deprived of ground water by the legitimate activities of their neighbours can obtain redress. Where de-watering is proposed and is likely to have a seriously detrimental effect on neighbouring land, if no solution can be found, planning permission may have to be refused.

202. EU Directive 2000/60/EC establishing a framework for Community Action in the field of water policy, which is more commonly known as Water Framework Directive, establishes a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater. Key aims in relation to the

planning system are the promotion of sustainable water use and to establish a framework for the protection of surface and groundwaters which protects and enhances the status of aquatic ecosystems and wetlands. Under the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003, which implement the Water Framework Directive, the Environment Agency must prepare a statutory River Basin Management Plan will be prepared for each river basin district specifying environmental objectives to be achieved and outlining the actions, including through the local development plan system, that will be undertaken to meet those objectives.

203. Until the implementation of the relevant sections of the Water Act 2003, land-use planning will remain the primary mechanism for controlling:

- dewatering of coal workings
- borehole construction
- groundwater abstraction of water not controlled under the Water Resources Act 1991, and
- any activity that connects naturally separate aquifers or water-storage areas.

204. In addition, the developer will need to determine the effects of any potential mine-water rebound as a result of the cessation of dewatering operations at a particular site. In such circumstances a developer should agree with the MPA, and other consultees, those mitigating measures required to ensure the protection of any receiving surface and groundwater features and users, from the effects of any such minewater rebound, both in terms of quality and quantity.

205. Dewatering for mineral extraction and engineering works has been exempt from abstraction licensing, but the Regulations made under the Water Act 2003 will, once in place, lift that exemption. Coal development will require a transfer licence for the movement of water from one source to another. Some of the detailed requirements, needed to protect water resources, will be in licence conditions or planning obligations, but impacts remain a planning issue and the MPA must be satisfied that adequate monitoring and mitigation will be in place. The iterative approach followed by EA(W) will require consultation between the MPA and EA(W) to agree a programme, which avoids duplication and the need for repeated public consultation. The MPA and Environment Agency Wales will need to co-ordinate the issuing of their respective permissions and licenses. For sites with an existing permission, Transitional Regulations will apply.

Impacts on water from coal working

206. Surface and groundwater resources may be affected by:

- alteration to the surface topography over which water flows;
- change to the surface water flow pattern;
- alteration to the quantity and quality of water flows;
- change in water infiltration recharging the aquifer, either by quality or rate of recharge;
- de-watering of existing workings or diversion of watercourses which may reduce groundwater levels, change the supply of water to abstraction points or springs, or cause subsidence of ground surfaces;
- alterations to discharges from workings causing flooding, pollution or contamination of surface or groundwater sources;
- discharges from slurry lagoons or other treatments at coal preparation plants.

207. Surface and underground coal working and the storage of excavated materials have the potential to exacerbate flooding and therefore careful

assessment of the flood risk is needed. Particular attention must be given to workings in river floodplains because of the increased risks to surface water quality, ecology, river flow and floodplain hydraulics.

208. Surface coal working is likely to extend below the water table. Where no old mine workings are present, the ingress of water into the excavation is normally low, and water is managed through local pumping to settlement-lagoons where it can be treated prior to discharge. Where old mine workings are intercepted, water volumes can be extremely large; the area of mine workings and saturated fractured rock that is drained can very extensive, and the quality of the water can be poor. Underground coal working will necessarily dewater the area around the mine openings, and may partially dewater the entire volume of rock above the workings, and beyond the licensed area. Surface water should be intercepted and prevented from entering the excavation.

209. The drawdown of local groundwater levels may:
- affect local water resources
- affect surface water features
- consolidate superficial deposits and broken ground causing ground settlement
- activate subsidence from shallow mine workings or the collapse of unstable shaft infill
- mix previously separate bodies of groundwater
- degrade waterlogged archaeological sites
- affect licensed groundwater abstractions and private water supplies and other groundwater features such as springs and seepage.
- may affect groundwater dependant ecosystems
- may affect development in flood risk areas or increase flood risk
- cause movement of mine gases.

Baseline study, monitoring and mitigation

210. Predictions of impacts during coal working and following restoration, including minewater discharge, and proposals for effective mitigation, will be required in the ES. Baseline monitoring is likely to be necessary for at least twelve months, to provide seasonal groundwater information. In the absence of detailed data it may not be possible to assess the proposal and it may be necessary to refuse the application. Baseline studies will, for the surface and ground water establish the baseline conditions both in the immediate area around proposed coal working, and in neighbouring surface water catchments where the potential impacts from any coal working and subsequent minewater rebound may also occur.

211. Baseline studies will:
- include ground investigation, testing and interpretation to establish the hydrogeological and geochemical, chemical, biological, hydrological and surface water quality
- identify any vulnerable surface and groundwater receptors
- identify areas vulnerable to consolidation or renewed subsidence
- measure rainfall, evaporation and transpiration
- establish confidence limits for measurements.

212. Developers should submit a report to the MPA and EA(W) which draws together all the associated baseline data into a cohesive and robust conceptual hydrogeological and hydrological understanding, both at and in the vicinity of, a site prior to any subsequent modelling being undertaken.

213. The scale of modelling to be undertaken will include both the site and the surface and groundwater catchments to the proposed works. Modelling will, for all phases (before, during and post closure) of the operation:
- predict the volumes and qualities of water to be abstracted and discharged
- predict changes to baseline levels, flows and qualities of surface and groundwater
- identify the potential area of influence of the operations, and vulnerable features
- predict the impact of reduced permeability backfill on existing minewater flows
- assess any potential water quality impacts arising from post-closure mine-water rebound at a site, for ground and surface water
- assess any flood risk impacts arising from post-closure mine-water rebound at a site, taking ground subsidence into account.

214. The modelling should include risk evaluation, taking into account confidence in the data, sensitivity to specific factors, and the robustness of the modelling approach. The results of the initial and ongoing modelling exercise should be used as a basis to review the appropriateness of the surface and groundwater monitoring undertaken at, and in the vicinity of, a site. Where necessary the monitoring network will need to be augmented by the installation of additional monitoring points as deemed necessary. The monitoring scheme should pay particular attention to features, including habitats, at risk from direct and indirect changes to water flows, levels, and qualities. Indirect changes would include the consolidation and settlement of sediments. The monitoring scheme should relate to the proposed mitigation, set out indicators and establish thresholds to trigger required intervention and remediation.

215. Operational and post-closure monitoring will, for the area of influence:
- measure the volumes and qualities of water abstracted and discharged
- measure changes to baseline levels, flows and qualities of surface and groundwater
- measure the efficacy of mitigation.

216. Planning Obligations and/or legal agreements, rather than Conditions, are often required to enable monitoring and mitigation. Monitoring is likely to extend off-site and the management of water may be a necessary requirement beyond the “aftercare” period.

217. The ES will need to consider the characterisation of leachate from tailings and waste rock and to demonstrate proposals to control polluted drainage at source and to treat, manage and monitor emissions at the surface during operations and post closure. Lagoons are typically required to meet the Conditions required within discharge consents. Such treatment will enable full settlement of the minewater and allow precipitation of pollutants, for example metals, which are bound to particulate material. The areas, which must be of sufficient size, the locations, and potential impacts of lagoons and their sediments, are a land-use consideration. Lagoons will also be regulated to meet the Mining Waste Directive.

Mine water rebound

218. When pumping, at both surface and particularly underground coal working, ceases, the water table begins to re-establish. The final level is likely to differ from that prevailing before working, and may result in emissions of water of variable quality at the surface. Pyrite breakdown, in the absence of carbonates, results in acid waters and toxic elements in solution.

219. Changes from current coal working may be against a backdrop of more widely rising water tables resulting from the reduction of deep-mine pumping following closure of collieries. The Coal Authority has a responsibility to treat minewater discharges and prevent pollution of watercourses. Monitoring programmes, and where necessary pumping of minewater have been implemented, to hold underground water levels at a predetermined datum in order to prevent future pollution.

220. The steps for monitoring and mitigation identified above should address these matters, particularly when making provision for measures following closure. Depending on the location, geology, size and complexity of a site, minewater rebound may not occur for some considerable time. The applicant should assess when, where and the likely severity of any potential minewater rebound resulting from the site. This should include an assessment of the impacts of minewater rebound on licensed abstractions and private water supplies in addition to surface water features subsequent to mine closure. The ES should include modelling to provide a base-line geochemical understanding upon which future investigations of mediation and remedial systems can be based. The applicant should include proposals for water management in a closure plan. This should incorporate details of appropriate emergency mitigating measures should an unpredicted release of minewater occur during mining operations or thereafter, and recovery plans to restore water habitats to their natural state.

221. At each stage in the development, including a period following mine closure, the initial conceptual hydrogeological model of a mine should be reviewed, revised and updated where required to enable the long term risks from a mine in a catchment to be determined. Where the risk from minewater rebound is determined to be high appropriate mitigating measures to reduce such impact will need to be implemented. Operators should take appropriate action to avoid pollution when abandoning a mine, as required under the Water Resources Act 1991. The Mines (Notice of Abandonment) Regulations 1998 (SI No 1998/892) require operators to notify the EA(W) where it is proposed to abandon an underground mine.

Other regulators

222. Environment Agency Wales regulates the control of all discharges to surface and groundwater. This may be via Groundwater Regulations 1998 for listed substances or through Discharge Consents issued under the Water Resources Act 1991. The Groundwater Regulations 1998 control the discharge of listed dangerous substances that may be permitted or prohibited from entering groundwater - opencast operations have the potential to introduce List II substances (EU Directive on Dangerous Substances). Discharge consents will be required to ensure that water quality standards in the surface or groundwater are met and that there is no deterioration in the quality of that water. Environment Agency Wales also uses abstraction licenses to protect surface and groundwater resources. New arrangements will be introduced to implement the requirements of the Water Act 2003.

223. The Coal Authority has specific statutory responsibilities with respect to coal mine water discharge under the Coal Industry Act 1994 (as amended by the Water Act 2003).

Mine Gas

224. When mines close, methane and other mine gases, particularly carbon dioxide, continue to be emitted from the strata into the mine, potentially leading to surface emissions through mine entries and ground fractures. The rising water table following the cessation of pumping may force these gases ahead of it; opencast workings and backfilling can change the pathways. The manager and owner have statutory responsibilities in terms of mine ventilation and the control of mine gases. The ES should assess the potential for mine gas emission and, where necessary, include in the proposals for closure a scheme to control gas within the workings (in underground mines) and to manage and monitor emissions at the surface. Exploratory drilling and surface extraction can intercept mine voids with gas, requiring local precautions. Guidance for monitoring and controlling landfill gas is relevant (Environment Agency 2004). The prior consent of the Coal Authority is required for works involving coal mines or coal.

225. Seams extracted by surface workings themselves emit methane, although proportionately less than underground workings as the gas reduces towards the coal outcrop. The release of climate change gases, such as methane, from the extraction of coal, should be considered by the MPA. Applicants should mitigate the carbon produced by the extraction process, making the extraction operation itself carbon neutral. 0.5m^3/t may be typical average methane for shallow virgin coal, individual seams show lateral variations from 0.1 to 0.002 m^3/t per 100m distance, and deeper coal contains significantly greater quantities (Wardell Armstrong,1996). 1m^3 of methane has a mass of 680g, and this is therefore a reasonable assessment of the mass of carbon. It is estimated that growing temperate forest incorporates about 70 tonnes of carbon per hectare per year. Therefore, and in *very* broad terms, an opencast site producing 100,000 tonnes of coal per year could make this carbon neutral by planting an additional half-hectare of trees.

Underground coal working

226. In considering an application for coal working by underground mining, the MPA will need to be satisfied, in addition to other relevant considerations for coal working, that:

- the arrangements for the disposal of waste materials arising from the development are acceptable;
- the level of likely subsidence is acceptable;
- the methods of transporting coal and colliery waste are acceptable; and
- the siting and design of any surface development is acceptable.

227. Mining is also a material consideration when considering the granting of planning permission for surface development in mining areas. The MPA will need to consider the human, environmental and economic costs of subsidence. The effects must not be unduly deleterious, and may be a reason for refusal.

228. The Coal Authority, as a consultee on the LDP, notifies local planning authorities of the areas of past, present or possible future coal mining. Such areas should be identified in the development plan. Within these areas, policies should seek to minimise the impact of subsidence by ensuring best practice to design, control or restrict development where appropriate. It is material to consider whether a development will be affected by subsidence and to consider the acceptability of proposed mitigation measures.

229. Underground mining falls under Schedule 2 of the EIA Regulations, but all new underground mines will generally require EIA, and existing mines are likely to require EIA at the time of their Periodic Review. Applications for coal mining should be accompanied by a detailed assessment, prepared by a competent person, of the subsidence predicted, its potential impact on buildings, structures and surface land use and any proposed mitigation measures. Planning authorities should consider such an assessment in the light of statutory and common law rights to require support to be left and duties to maintain underground support when deciding whether planning powers should be used to control subsidence.

Land Instability and Subsidence

230. Subsidence is difficult to avoid with deep mining, but there are ways in which it can be predicted, measured and limited. The problems posed by subsidence can usually be overcome by ground treatment, design and construction. Subsidence can harm buildings, structures and services, and affect surface water with flood risk increased. Residents may also feel personal stress when their homes are damaged. The damage caused to buildings by subsidence may vary from very slight, with hairline cracks in plaster to very severe, requiring demolition of the building. Although the latter may affect a relatively small percentage of properties, the anxiety felt by those individuals affected and their neighbours can be intense. Heritage buildings may also be particularly vulnerable. Secondary effects of subsidence can include the triggering of landslides on steep slopes, effects on groundwater flow patterns and the opening of fractures through which mine gases can be emitted at the surface.

231. The options for mine layout and operations, monitoring and thresholds, and mitigation and remediation should be addressed in the ES and appropriate schemes submitted as part of the application. MPAs should consider, amongst

other considerations, the human, environmental and economic costs of subsidence taking into account the interests of owners and occupiers of land and property. They should evaluate the extent of damage that may be caused and the prospects of repair or mitigation, based on appropriate site investigation. The ES should show typical cross and longitudinal sections through the mining layout showing the expected amount of ground movement and the development of tensional and compressive strain. Where sensitive areas are identified, these will require further investigation. The MPA should assess the views of the applicant, HM Inspectorate of Mines, statutory consultees and, where appropriate, take expert advice, on the practicality and efficacy of proposed conditions to restrict the area or method of underground working. Conditions must not conflict with legal duties of the owner or operator under the Health and Safety at Work etc Act 1974. Planning controls should not duplicate the provisions of the Mines Working Facilities and Support legislation, the Coal Industry Act 1994 and the Mines (Working Facilities and Support) Act 1923 , the Mines (Working Facilities and Support) Act 1966 and the Mining Codes which stem from the Railway Clauses Consolidation Act 1845 including the Acquisition of Land Act 1981.

232. Most forms of subsidence can be overcome by engineering techniques in relation to built development, though these may be expensive. Where mitigation against subsidence might impose excessive costs for built development, consideration should be given to alternative proposals, such as open space, recreational and amenity uses.

233. Refusal of permission, in whole or in part, may be justified where:

- the potential adverse effects are unacceptable and cannot be successfully mitigated;
- land uses are particularly sensitive to movement; or
- the MPA is not satisfied that the potential for subsidence has been adequately considered.

Closure schemes

234. When granting permission for new mining, MPAs should consider what would happen when mining work ceases. To prevent a further legacy of potential problems due to voids at relatively shallow depths beneath the surface being left untreated, planning authorities should consider requiring a closure scheme, by conditions or legal agreement, whereby the mine or tunnel voids are treated to minimise the risks of future subsidence. Where dewatering has been undertaken to allow mining, consideration will need to be given to the potential effects of stopping pumping on stability, water quality and gas emissions. Under section 151 of the Mines and Quarries Act 1954 it is the duty of the owner of every abandoned mine and of every mine that has not been worked for a period of twelve months to secure the surface entrance to every shaft or outlet to prevent accidental or unauthorised access. This will need to be maintained and mine gas may need to be vented in a controlled manner. Conditions may be required to ensure further treatment of mine openings as part of the closure scheme to maintain their stability and prevent them from becoming uncontrolled pathways for acid mine drainage, mine gas or other contaminants which might be introduced - from landfill, for example.

235. Where a stability report submitted with the ES contains recommendations on layout, ground treatment or preventive design, conditions specifying such measures should be attached to the planning permission. To confirm that the works have been carried out and the risks adequately mitigated, local planning authorities should consider imposing conditions requiring the submission of a

completion report containing full information on the investigation and treatment of the site, including, where relevant, arrangements for longer-term monitoring and maintenance. The information should be copied to the Coal Authority.

Subsidence and support

236. Where minerals are extracted by underground working there is a risk of subsidence. This may result in damage in varying degrees to the land surface, land drainage, watercourses, roads, railways, buildings and other surface installations. The Common Law right of support from adjacent or underlying strata may have been modified by agreement between the surface and mineral owners or lessees or by statute, eg the Coal Mining (Subsidence) Act 1991, as amended by the Coal Industry Act 1994.

237. Generally the owner of the land surface has a Common Law right to support from adjacent or underlying strata necessary to preserve the surface intact. Any person carrying out operations likely to withdraw this support may be restrained from continuing or, if support has already been withdrawn, may be held liable for any damage caused to the land and any installations and buildings on it. This broad principle has been greatly modified in detail by agreements entered into at various times between owners of the surface and persons owning or acquiring rights in the underlying minerals. The right of support may have been surrendered altogether or replaced by an obligation to leave specified support, or to pay compensation for damage caused.

238. Generally, operators licensed by the Coal Authority have a right to withdraw support from coal bearing land and, under the Coal Mining (Subsidence) Act 1991, as amended by the Coal Industry Act 1994, they are required to make good or pay compensation for any subsidence damage. The Coal Mining (Subsidence) Act 1991 introduced new procedures relating to coal mining subsidence damage. The Act required British Coal, the statutory predecessor to the Coal Authority, to notify owners of any proposals to work coal that might cause subsidence damage, repeat such notification annually and to de-notify when mining operations ceased or were no longer likely to cause damage. Where subsidence damage occurred the owner of the property needed to serve a "Damage Notice" on British Coal who considered the claim and then made the necessary remedial action. The primary duty of British Coal was to carry out repairs, however payments in lieu could also be made.

239. The provisions of the Coal Mining (Subsidence) Act 1991 were modified slightly with the introduction of the Coal Industry Act 1994, which as a result of de-nationalisation of the coal industry established the Coal Authority to administer the coal estate. The most significant change under the Coal Industry Act 1994 was the introduction of the term "responsible person." In active coal mining the mining companies became the responsible person" with responsibility for dealing with coal mining subsidence claims, and the Coal Authority became the "responsible person" dealing with claims in old coal mining areas. In accordance with the provisions of the Coal Industry Act 1994 any prospective coal-mining operator must obtain a coal mining licence from the Coal Authority The operator must satisfy the Coal Authority that they have sufficient security to meet any future subsidence liabilities.

240. Legal obligations to maintain support or rights to require support to be left will not always be sufficient to ensure that no subsidence takes place. Reliance on existing rights and duties may therefore be unwise in some circumstances and it may be necessary to consider the use of planning powers to reduce the impact of

subsidence. Conditions should not, however, duplicate or modify existing rights and liabilities and, in particular, should not conflict with legal obligations under a mining lease or health and safety legislation. A balance needs to be struck between the rights of surface owners to enjoy support and those of the mineral operator to work the mineral in question.

241. In some cases, subsidence predictions may indicate that damage would be widespread and serious, or a surface installation may be so important that it would be wrong to incur any risk of damage. In such cases of major conflict between mineral development and existing use of the surface, it will be appropriate for planning powers to be used to control subsidence by restricting working or even preventing it taking place at all.

242. Conditions which simply provide that support is not to be withdrawn or subsidence allowed to take place would be difficult to enforce and should not be imposed. It may be that potential subsidence damage cannot be reduced to an acceptable level by preventative measures. Subsequent repair of subsidence damage may not represent the best land use planning solution. Then the only effective way of preventing subsidence may be to withhold permission to work within prescribed areas or to restrict working to a particular seam.

243. The pumping of water from surface or underground workings may in some opinion withdraw hydrostatic support from adjacent or overlying land and may also lead to subsidence. Since dewatering may be essential to the mineral operation, its limiting by condition may be difficult. However, a condition requiring monitoring of the effects of dewatering and the carrying out of remedial action if damage should occur may be appropriate in some cases.

Land Instability and Subsidence

244. The consideration of coal-related subsidence is also required:

- in areas of past shallow underground mining or recent longwall mining;
- where proposals are made, such as the abstraction of methane, that may affect the existing stability;
- where the water table in a coal mining area may alter because of minewater rebound or abstraction;
- where action is proposed to mitigate known subsidence; and
- to reduce the potential impact of subsidence on current or future land uses

245. The long history of working the Welsh coalfields has left a legacy of mine workings. These can be associated with subsidence, cavities, shafts and adits, combustion, mine gases and acid mine water. Remedial or preventive action may be required to protect public safety:
    - as emergency action following the collapse of a mine entry, shallow mine workings or combustion cavities; or
    - to prevent such a situation arising.

246. The level of treatment will vary according to circumstances and may involve no change in land use or development. Development required for the maintenance or safety of a mine or disused mine or for the purposes of ensuring the safety of the surface of the land at or adjacent to a mine or disused mine is permitted, generally with the prior approval of the MPA, under the General

Permitted Development Order 1995 (GPDO Part 19 Class C and Part 20 Class E). Permitted development rights are not applicable where an EIA is required.

247. In areas of shallow mine workings, where instability or subsidence may threaten the existing use of land and buildings and people on it, treatment of the underground voids to reduce the risk of subsidence to an acceptable level may be necessary. . Stability and emission risks are also associated with development in the vicinity of disused shafts and adits. Such treatment works may be of such a scale that EIA is required. Owners or prospective developers of land and property affected in this way should consult the MPA and the Coal Authority before commencing any remedial works. A full assessment is needed to consider alternative treatments and their environmental impacts. Coal working may be one way to make safe and restore such damaged ground.

248. A full assessment is needed to consider alternative treatments such as grouting and their environmental impacts. Grouting requires site preparation, the drilling of a large number of boreholes, and the delivery of large volumes of grout often based on pulverised fuel ash. The disposal of wastes into mines as a means of stabilisation may require a waste permit from the EA(W). Treatment of underground voids to stabilise land or prevent subsidence may pose a hazard to underground water sources or divert, interrupt or affect the quality or quantity of underground or surface flows of water or mine gas. Planning authorities should consult the mine owners, where they can be identified, the Coal Authority and the EA(W) in respect of potential impacts on groundwater and mine gas flow patterns and quality. Grouting can have a significant adverse impact upon the water environment, whilst the displacement of methane, carbon monoxide and carbon dioxide into populated areas can be a significant hazard. NetRegs[8] and Environment Agency guidance in relation to grouting, should be referred to.

249. The prior consent of the Coal Authority is required for any ground works involving coal mines or coal. The Environment Agency should be consulted when the proposed development involves or includes mining operations. Conditions to limit the potential adverse effects of remedial works should be imposed where required. MPAs should require the submission at the end of the works of a "completion report" that describes the works undertaken and their effect in mitigating the apprehended subsidence, together with any future monitoring and maintenance that may be required. Completion reports should be passed to the Coal Authority.

250. Emergency action following surface subsidence above shallow mine workings or the collapse of a mine shaft usually comprises filling of the collapse depression from the surface and appropriate capping and/or cement grouting operations. In coal mining areas, the Coal Authority provides a 24-hour emergency call-out procedure to deal with surface hazards and to ensure that the site is made safe as quickly as possible. Such emergency action can generally (but not inevitably) be taken to be permitted development under the GPDO. So too can the treatment of mine openings to meet the statutory requirements to provide "an efficient enclosure, barrier, plug or other device so designed and constructed to prevent anyone from accidentally falling down the mine shaft or entering the mine opening accidentally" (Mines and Quarries Act 1954, Section 151) or to abate a statutory nuisance under Part III of the Environment Protection Act 1990.

[8] http://www.netregs.gov.uk

Development on unstable land and land liable to coal mining subsidence

251. Paragraphs 13.9.1 and 13.9.2 of PPW state: Planning decisions need to take into account:

- the potential hazard that instability could create to the development itself, its occupants and the local environment; and
- results of a specialist investigation and assessment by the developer to determine the stability of the ground and to identify any remedial measures required to deal with any instability.

252. Where acceptable measures could overcome instability, planning permission may be granted subject to conditions specifying the necessary measures. If instability cannot be overcome satisfactorily, the authority may refuse planning permission. When planning permission is granted, a notice should be issued to inform the applicant that the responsibility and subsequent liability for safe development and secure occupancy of the site rests with the developer and/or landowner. It should also advise the applicant that although the local planning authority has used its best endeavours to determine the application on the basis of the information available to it, this does not mean that the land is free from instability

253. When proposing development on land potentially unstable or liable to subsidence, applicants should provide such information as is necessary to assess the effects of possible ground movements and the measures proposed to mitigate them. This may require the submission of a stability report, prepared by a competent person. Where development proposed in an area of potential subsidence is subject to an environmental impact assessment, that assessment should have regard to the potential for subsidence, its effects and the effects of any proposed mitigation measures. This should consider whether the effects of subsidence will be unacceptably adverse or can be minimised through appropriate site layout, ground treatment or foundation/superstructure design. Stability and mine gas reports should be required for all development on sites previously subject to shallow coal mining. Applicants should consult the Coal Authority for all development in areas of past, present or possible future coal mining and seek their prior approval for any works affecting a disused coal mine entry or any site investigation or treatment of shallow coal workings.

Colliery Spoil

254. Appendix P relates to colliery spoil

255. Colliery spoil is the material above, below and interspersed with the coal seams that is extracted in the process of mining coal. Most frequently, the coal is separated from this mixture at the surface to produce a marketable product..

256. Potential options for spoil include use as aggregate, in engineering and construction, stowing underground, the backfilling of voids such as quarries as well as surface tips. Full account should be taken of the environmental consequences and the need for any environmental permits before a particular option is selected. Surface tipping gives rise to spoil heaps that may exceed 100 hectares and rise to over 50 metres above ground level. Whilst visual intrusion is the most obvious impact, noise, dust and water contamination can occur, as well as the loss of the underlying habitat. The stability of coal tips is a particular issue.

Achieving a high standard of restoration, aftercare, and afteruse

257. Advice on best practice in reclamation is in Appendix Q

258. Coal developments must meet the restoration and aftercare requirements of MPPW and ensure that land is restored to a sustainable and beneficial afteruse. They should obtain all necessary permits to meet the requirements of the Mining Waste Directive or other waste legislation. If there is any significant doubt about whether satisfactory reclamation can be achieved at a site, planning permission should be refused. Afteruse and reclamation methods should be addressed and set out in a reclamation scheme that should be agreed at the time that planning permission is granted together with measures to be taken to mitigate dust, noise and visual impacts on the landscape. The agreed schemes will be included in Conditions or planning obligations (and also cover off-site works, water areas, amenities or, if appropriate, extended periods of aftercare). The schemes should seek to maintain or enhance the environment for the benefit of local communities and the long-term quality of the land for the intended afteruse.

Reclamation schemes

259. Early (pre-application) consideration of the reclamation proposals and potential afteruse should inform the overall site design, and be agreed before planning permission is granted. The MPA should hold discussions with the applicant, the landowners, tenants, statutory consultees and the community, seeking specialist advice from NGOs such as Wildlife Trusts and the RSPB as well as those with landscape interests.

260. Reclamation schemes should be considered in the EIA and be available for pubic consultation and specified in the application. They should cover the proposed final landform, afteruse, field boundaries, associated planting, site drainage, stripping, storage and re-instatement of soils and be specified in the application, with Conditions and Agreements as appropriate.

261. Progressive restoration should be integrated into operations, except for sites of short duration or where the standard of reclamation would be compromised.

262. The reclamation scheme should:

- propose a final landform in keeping with the natural character of the area
- demonstrate the suitability of the scheme for the proposed afteruse
- set out clearly how site working and reclamation will be phased including how landscape and planting will be phased through the life of the site
- include progressive restoration wherever appropriate
- explain how uncertainties such as shortfalls in soil will be tackled.

263. Inevitably the planning process has to include some flexibility to take account of operational, geological and safety considerations. If significant alterations are required, the agreed scheme will need to be varied and provisions to achieve this should be built into the planning permission. However, conditions should make clear that any such changes should not prejudice achievement of a sustainable and beneficial afteruse or adversely affect the environment or quality of the reclamation to be achieved. Changes must be agreed with the MPA before they occur.

264. A restoration-led approach will facilitate planned provision for biodiversity and conservation, accessible greenspace and open spaces with other environmental functions, such as wetlands for flood-control; woodland to improve soil water-retention, and biomass for fuel-production and absorbing carbon dioxide.

Reclamation of tips

265. Coarse discard is taken to the tip and graded into the required landform to blend with the natural topography. Once the desired contours are reached, soils should be replaced and the site restored. Reclamation can be phased so that only a small active tipping area is used at any one time. Priority should be given to the early construction and reclamation of the external, visible faces to minimise impact.

266. Certain characteristics of colliery spoil materials can present problems for the establishment and successful longer-term performance of vegetation on reclaimed colliery spoil tips. The key factors include:

- acidity;
- salinity;
- infertility;
- steep slopes;
- surface compaction; and
- extreme surface temperature

267. Reclamation practices for colliery spoil tips have developed over the years. The Forestry Authority has published guidance "Reclaiming Disturbed Land for Forestry" [Forestry Commission Bulletin 110, by A Moffat and J McNeill, HMSO 1994], which includes advice on tree planting for both colliery spoil and opencast coal sites. Advice on the restoration and revegetation of colliery spoil waste tips and lagoons was published in the Department for Environment, Transport and the Regions research report "Restoration and revegetation of colliery spoil tips and lagoons" [Richards, Moorhead and Laing Ltd, 1996, HMSO ISBN 0 11 753315 7].

Reclamation of opencast

268. Wherever possible, land will be re-instated to contours and levels similar to original ground surface and schemes should ensure that in all circumstances that all overburden and soil materials are fully utilised with none remaining unused. Allowance will need to be made for compaction of material that occurs with time.

Reclamation of colliery sites

269. Reclamation of colliery sites normally involves the removal of plant, buildings and machinery, followed by grading and soiling, or other treatment to allow an appropriate afteruse. Abandoned mineshafts must be filled or capped. Advice is contained in MPG12 Treatment of Disused Mine Openings and Availability of Information on Mined Ground (DoE/WO: April 1994). Environment Agency advice on grouting should be consulted.

270. Collieries may include buildings, equipment and other features of historic interest, that may justify preservation. Cadw and or archaeological trusts should be consulted. The 1995 General Permitted Development Order requires any pithead development to be removed within two years of cessation of working, unless otherwise agreed by the MPA. Many old colliery sites also contained gasworks and coking plants, with the potential for contaminants, and specialised assessments should be made.

Restoration and Aftercare Conditions

271. Where an operator fails to comply with restoration or aftercare Conditions, the MPA may take enforcement action. If the operator fails to remedy the situation, the MPA may carry out the necessary works and recover its costs from the landowner. At the outset consideration needs to be given to the likelihood of a landowner having sufficient financial resources to secure re-instatement in the case of default by the mineral operator. The section entitled finance for reclamation schemes gives guidance where this is in doubt.

272. A Restoration Condition requires that after operations for the winning and working of minerals have been completed, the site shall be restored by the use of any or all of the following, namely, subsoil, topsoil and soil making materials. Conditions should require this to be completed in a timely way. There should be formal notification, as a restoration certificate, by the MPA that restoration has been completed, to initiate the period of aftercare. Standards for restoration should be set by the MPA in Conditions, so that remedial work can be required if necessary.

273. An aftercare Condition should always be included, to require that the land be brought to the required standard and ensure satisfactory long-term reclamation. It should be applied to all land to be restored to agriculture, forestry or amenity, including nature conservation. Operations should promote soil recovery, site drainage and revegetation. This should enable the land to be treated for an appropriate number of years after restoration to improve the structure and stability of the soil, to establish the site drainage, and to promote the initial establishment and subsequent management of vegetation for several years. The length of the aftercare scheme should be determined by the MPA. The aftercare scheme should be included in the permission, for certainty, although it can if necessary be revised at a later date. The eventual scheme needs to be agreed with the MPA at least six-months prior to completion of restoration for that part of the site covered by the aftercare scheme.

274. Works such as the construction of paths and management of retained features should be dealt with under planning obligations, as should fencing, plant-protection and water supply, which should be introduced in the early stages, to assist in establishing vegetation.

275. Before imposing an aftercare Condition, the MPA must consult the Welsh Assembly Government where the afteruse is agriculture and the Forestry Commission for a forestry afteruse. The MPA may wish to consult a range of bodies, including the Countryside Council for Wales where the afteruse involves the creation of nature conservation features. The Environment Agency should be consulted where it is intended to impound water, to create or divert a river or stream, or for groundwater monitoring and management. The impact of mine gas and mine drainage control systems, where these are required, should be considered when planning for restoration and aftercare.

276. The aftercare period should be 5 years, or other such maximum period as may be prescribed, beginning when compliance with the restoration Condition is notified. An aftercare period of 5 years is likely to be adequate if the afteruse is for agriculture, although a longer period will be necessary for afteruse where tree or hedge planting is involved, or where nature conservation is important. Any extension of the aftercare period beyond 5 years should be agreed at the outset

between the MPA and operator, and such agreement included in a planning obligation. If an owner or operator fails to comply with a condition providing for aftercare the MPA may serve an enforcement notice or a breach of condition notice which has to specify the period at the end of which any steps are required to have been taken. Such notices can stipulate a date by which steps have to be undertaken that extends beyond a date stipulated in the permission.

277. The long-term success of restoration and aftercare requires continued close liaison. Site meetings will be required during key stages in the reclamation programme to agree final contours, and upon completion of overburden replacement, subsoil replacement and finally topsoil replacement. Annual aftercare meetings should also be arranged, and reports prepared and supplied to the MPA by the operator, to state the progress of the scheme and the work programme for the subsequent year. The MPA should include in Conditions dates and/or timings for site inspections and the submission of the annual aftercare report and future years' programme. The local community should be kept informed of progress. Formal and standardised record-keeping will assist aftercare reporting. For greenfield sites, a baseline survey report of pre-working conditions may provide an appropriate standard against which progress can be assessed.

Soils

278. Advice on best practice for soils is in Appendix R

279. After-uses that require the growth of vegetation depend upon the conservation and satisfactory re-instatement of soil profiles and appropriate drainage. The SEA/SA and LDP or SPG should emphasise the importance of conserving soil resources and include broad principles covering both losses and minimisation of damage to soil resources.

280. At site level care is needed to strip and separately store topsoil and subsoil and keep soils safe from contamination and unnecessary trafficking by motorised equipment. Soils need to be stripped and re-instated in dry conditions and, as appropriate, treated, to remove excess stones and compaction. Preference should be given to soil handling methods that minimise compaction risks, for example, re-instatement using dumpers and buckets rather than use of earth scrapers since, once caused, mitigation of compaction is rarely fully effective. The development control process, including the use of Conditions, schemes and agreements, should provide adequate safeguards to cover these issues and prevent soil resources being exported, lost or unnecessarily damaged on site.

Restoring coal sites containing contaminated and derelict land

281. Previous industrial activity and dereliction leading to loss or contamination of soils may mean that there is a shortfall of suitable surface soils to fully restore all areas of opencast workings, collieries or tips. In such circumstances careful consideration needs to be given at the outset to planning suitable and sustainable afteruses for the entire post-working site including previously derelict and contaminated areas. Attention needs to be given to agreeing "fit for purpose" re-instatement profiles for soils, quantifying soil deficits and agreeing how to make good shortages in soil resources e.g. by using suitable on-site geological materials or importing materials. If materials are to be imported it is important to identify what will be imported and when and for the MPA to satisfy itself that commitments made are realistic and enforceable.

Afteruse

282. In reinstating land following opencast working the opportunity exists to improve the local environment, enhance landscape and biodiversity and make provision for public access and recreation. Although the choice of afteruse is made by the applicant in consultation with the landowner, the MPA and consultees have influence. In recompense for the disturbance caused by opencast mining the MPA should seek to ensure that, so far as reasonably practicable, environmental opportunities are identified and taken.

283. A separate planning permission is likely to be required for any afteruse except agriculture, forestry, nature conservation or informal recreation. The approved restoration and aftercare schemes must ensure satisfactory and suitable reclamation to agriculture, forestry, nature conservation or amenity will take place and without delay if such separate planning permission is not granted or implemented within the life of the coal permission.

284. In considering reclamation proposals the MPA should ensure that the proposed afteruse is both beneficial and sustainable over the longer term. Where a scheme includes proposals to set aside land for nature conservation and recreation it is, particularly, important to ensure that adequate arrangements and funding exist to ensure the long-tern management of this use beyond the statutory aftercare period. Also, for all after-uses it is important that land be re-instated to a standard that is 'fit for purpose'. National Park Authorities would wish to be consulted when reclamation is adjacent to or within view of a National Park.

Definitions, Informatives and Glossary	
Acid rock drainage	Tailings and waste-rock from coal operations often contain metal sulphides, particularly pyrites, which oxidise when exposed to oxygen and water to create an acid leachate. In South Wales, alkali waters are also emitted from carbonate rich horizons.
Aftercare	Steps specified in a planning condition or scheme that are to be taken to bring land to the required standard suitable for its subsequent or proposed use; agriculture, forestry or amenity use, including planting, cultivating, fertilising, watering, draining or otherwise treating the land.
After-use	The ultimate use after mineral working for agriculture, forestry, amenity (including nature conservation), industrial or other development.
Agriculture	Section 336(1) of the Town and Country Planning Act 1990 defines agriculture as including: horticulture, fruit growing, seed growing, dairy farming, the breeding and keeping of livestock (including any creature kept for the production of food, wool, skins or fur, or for the purpose of its use in the farming of land), the use of land as grazing land, meadow land, osier land, market gardens and nursery grounds, and the use of land for woodlands where that use is ancillary to the farming of land for other agricultural purposes.
Air overpressure	A pressure wave in the atmosphere produced by the detonation of explosives, consisting of both audible (noise) and inaudible (concussion) energy. As the waves pass, the air pressure rises very rapidly to a value above the atmospheric pressure and returns to the ambient value after a series of oscillations. The lower, inaudible, frequencies are much less attenuated by distance, and can excite secondary vibrations of a higher, audible, frequency within a property. Air overpressure is usually measured in decibels (dB).
Air Quality Objectives	Air Quality Objectives are set out in the Air Quality Strategy Those included in the Local Air Quality Management Regime, which is implemented by the Local Authority, are set out in the Air Quality Regulations.
Air Quality Management Areas	The Air Quality Regulations set levels for the purposes of local air quality management (LAQM). Where it is found Air Quality Strategy's Objectives (AQOs) are unlikely to be met by the prescribed date, and there is public exposure, the LA is required to designate Air Quality Management Areas (AQMAs) and draw up Air Quality Action Plans. There is a statutory duty on local authorities to review air quality in their area.
Air Quality Strategy	The Environment Act 1995 requires the government to publish an Air Quality Strategy, which lays out the policies and objectives for protecting human health and vegetation from the effects of air pollutants.
Air Quality (Wales) Regulations 2000	Air Quality (Wales) Regulations 2000 set new objectives for pollutants, including particles, in the Air Quality Strategy.
Amenity	The term 'amenity' relates to the qualities, characteristics and attributes people value about a place and which contribute to their quality of life. Amenity use includes recreation, landscape and nature conservation. For example, open grassland for informal recreational use, basic preparations for formal sports facilities,

	amenity woodland, and lagoons for water recreation or nature conservation purposes.
Ancient Monument	As described in the Ancient Monuments and Archaeological Areas Act 1979, any scheduled monument; and any other monument which in the opinion of the Secretary of State is of public interest by reason of the historic, architectural, traditional, artistic or archaeological interest attaching to it.
Baseline studies	Studies of existing conditions and trends which are designed to establish the baseline against which any future changes can be measured or predicted.
Bell pits	Shallow shafts that were sunk and widened out where the coal seam (or ironstone) was reached. Once the danger of collapse was too great, the pit was abandoned and a new shaft sunk as close as possible, resulting in clusters of tens or more along coal outcrops. These must be filled or excavated if development is to take place.
Blasting	Rock blasting is the controlled use of explosives to excavate or remove rock. In the immediate vicinity of the blast, the stress wave distorts and breaks the rock. Beyond this, the stress wave generates ground vibration, with the rock particles returning to their original position. Ground vibration is measured, using seismographs, as particle velocity in three dimensions – longitudinal, vertical and transverse. The peak particle velocity (ppv) and the frequency content are the accepted standard of measurement. British Standard 7385 discusses the measurement of vibration in buildings; BS 6472 considers human perception.
Building on fill	The extent to which areas of previously opencast land or on spoil from underground workings will be suitable for development depends on a number of factors. Unless placed under stringent engineering conditions, it is unlikely to ensure an adequate and uniform support for structures until sufficient time has elapsed for consolidation. The time depends on the nature and thickness of the fill. Although the rate of consolidation decreases with time, it might take ten to twenty years before movements are within tolerable limits. Any edges or steps in the floor of the opencast can cause differential settlement to foundations. It will also be necessary to consider potential leachate, particularly with respect to pyrite and sulphate, and the possibility of spontaneous combustion of carbonaceous material in colliery spoil.
Burden	The distance measured at right angles between a row of holes and the free face, or between rows of holes.
Coal recovery	Past coal processing was generally very inefficient and substantial quantities of coal often remained in the spoil especially in slurry ponds. Coal (or aggregate) recovery involves the re-excavation of spoil which may require screening and/ or washing to remove the coal, before the spoil is re-deposited within the original tipping area.
Coal working	A coal working site is defined by the planning site boundary of coal development.
Coarse discard	Coarse discard is waste material between 0.5mm and 150mm. This constitutes over 80% of colliery spoil and is produced in the separation of coal and dirt by a coarse washery. It is relatively free draining.
Concussion	The energy within the air overpressure generated by the detonation of explosives which has a frequency below the normal audible range.

Controlled wastes	Controlled Waste is defined by both the Control of Pollution Act 1974 and the Environmental Protection Act 1990 as household, industrial and commercial waste or any such waste.
Decibel (dB)	Decibel, a unit of measure on a logarithmic scale used to quantify pressure fluctuations such as those associated with air overpressure.
Decibel (dB(A))	Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with an individual's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to doubling or halving the loudness of a sound.
Deck loading	Dividing the borehole to be charged with explosives into two or more sections usually to reduce the instantaneous explosive charge. The space between the separate charges or decks is filled with stemming material.
Deep mined coal	Deep mined coal is extracted by adits or shafts to the coal seams. The longwall system means that as the seam is worked, the void is allowed to progressively collapse behind the worked area, causing subsidence at the surface. This mechanised method of extraction creates large volumes of waste. Most pithead development falls under the 1995 General Permitted Development Order, which provides only very limited controls over siting and appearance.
Designations of International and National environmental and cultural importance	Natura 2000 and Ramsar sites; Areas of Outstanding Natural Beauty and National Parks; Sites of Special Scientific Interest; Conservation Areas and Scheduled Ancient Monuments; National Nature Reserves and Ancient Woodlands; World Heritage Sites, Listed Buildings and Historic landscapes, parks and gardens
Designations of regional or local importance	Areas of high landscape or historic value; areas of prime agricultural land; Country Parks; Areas of Special Protection; Sites identified as critical to Biodiversity Action Plan targets, Regionally Important Geological and Geomorphological Sites, Sites of Importance to Nature Conservation and Groundwater Protection Zones
Development Plans	Unitary Development Plans, now being replaced by Local Development Plans, prepared by local planning authorities in accordance with the Planning and Compensation Act 1991, to describe the policies and proposals for the development of the area. All local planning authority decisions on planning applications must be in accordance with the development plan unless material considerations indicate otherwise.
Dewatering	The action of removing water from the ground or surface. Dewatering may be by pumping from a sump at the bottom of an excavation or from dewatering wells around the excavation. It depresses the water table around the site, and may drain mine workings. For environmental and safety reasons it is generally preferable to dewater in advance of excavation by pumping from boreholes. Underground mine dewatering may be very extensive, and affected by past mining activities.
Discharge consents	Water that is discharged from opencast sites is via discharge points consented by EA(W). Water management plans will include an inspection and monitoring regime aimed at compliance with consents. Consents normally have fixed parameters for suspended

	solids, pH and iron content as well as maximum flow rates, and prohibit visible traces of oil in the discharge. Refer to the Water Resources Act 1991.
Drill fines	Material displaced from the borehole during drilling
Drift mining	The working of relatively shallow coal seams by drifts from the surface. The drifts are generally inclined and may be driven in rock or in a seam. Drift mining may be viewed as intermediate between opencast coal mining and shaft or deep mining.
Emissions factor	A representative value that attempts to relate the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. These factors are usually expressed as the weight of pollutant divided by a unit weight, volume, distance, or duration of the activity emitting the pollutant (e.g., kilograms of particulate emitted per megagram of coal burned). Such factors facilitate estimation of emissions from various sources of air pollution. In most cases, these factors are simply averages of all available data of acceptable quality, and are generally assumed to be representative of long-term averages for all facilities in the source category (i.e., a population average).
Environmental capacity	The amount of use the area or resource is able to sustain without harm or damage to its key environmental features in a given time period. To operate within the environmental capacity of a locality is to operate within its ecological limits and protect the critical natural capital.
Environmental Impact Assessment	A process which identifies the environmental effects of development proposals. It aims to prevent, reduce and offset any adverse impacts. The statutory requirement for environmental impact assessment is the 1985 European Council Directive (No. 85/337/EEC) "on the assessment of the effects of certain public and private projects on the environment". This was amended in 1997 by Council Directive 97/11/EC. Statutory Instrument 1999 No. 293 The Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 as amended by The Town and Country Planning (Environmental Impact Assessment) (England and Wales) (Amendment) Regulations 2000 (SI 2000/2867) transposes the directive for minerals.
Environmental management plan	A system which integrates environmental mitigation and monitoring measures throughout an operation.
Environmental management system	The primary purpose is to help secure continuous improvement in the environmental performance of an operation, activity or organisation. It is a means of ensuring implementation of an environmental management plan and compliance with environmental policy objectives and targets. A key feature is the preparation of documented procedures and instructions to ensure effective communication. It is a structured approach which defines all legal and other requirements, including those in planning conditions. It establishes responsibilities, the monitoring procedures and performance standards, plus review mechanisms to ensure that the system is functioning correctly.
Environmental statement	The report of the applicant's assessment of environmental issues including consultations, data collection and environmental studies to identify the effects and propose mitigation measures to prevent, reduce and offset them and which is submitted in conjunction with

	an application for planning permission..
Face shovel	An excavator which digs away into a bank or face with a toothed bucket fixed to a rigid arm supported by a boom.
Fine discard	Fine discard has a nominal maximum size of 0.5mm although a large proportion is less than 10 microns. Because it is so fine, the material is not free draining, has reduced shear strength and presents greater handling and disposal problems. In addition to the risk of failure there is a risk of pollution, in particular of surface and groundwater.
Flyrock	The projection of material from the blast site to any area beyond the designated danger zone.
Frequency	The number of cycles per second of a vibration usually expressed in units of Hertz, Hz
Goodquarry	The University of Leeds project to develop a major new national resource for the UK aggregates sector. The website covers the effects of Air Pollution (Dust & Odour), Blasting, Cultural Heritage, Ecology, Mineral Wastes, Noise, Restoration & Rehabilitation, Social & Community, Traffic, Visual & Landscape Amenity, and Water.
Grouting	Grouting involves filling in the cavities by injecting an inert material, such as a sand/cement/pfa mix, as a liquid. Perimeter boreholes are grouted to provide a barrier to contain the infill grout. Infill boreholes are drilled at, for example, 3m spacing on a diamond pattern. As a rule of thumb, grouting can be used if old workings are within 15m depth of the foundations or where the rock cover is less than 10 times the thickness of the coal extracted. Grouting needs to be sufficient to ensure that any cavities or broken ground overlying old mine workings will be fully grouted and not a hazard to the surface development. Bulk grouting will result in a significant change in mass permeability and consideration must be given to the potential impacts on the movement of water and gas.
Hertz (Hz)	Unit of frequency, equal to one cycle per second. Frequency determines the pitch of a sound
LA max:	the highest A weighted noise level recorded during a noise event. The time weighting used (Fast or Slow) should be stated.
$LA_{10}T$	the A weighted level of noise exceeded for 10% of the specified measurement period (T). It gives an indication of the upper limit of fluctuating noise such as that from road traffic. LA_{10}, 18h is the arithmetic average of the 18 hourly LA_{10}, 1h values from 06.00 to 24.00.
LA_{90} T	the A weighted noise level exceeded for 90% of the specified measurement period (T). In BS 4142 it is used to define background noise level.
LAeqT	the equivalent continuous sound level - the sound level of a notional steady sound having the same energy as a fluctuating sound over a specified measuring period T.
Landscape character and LANDMAP	The Countryside Council for Wales has produced guidance on landscape character appraisals in LANDMAP, which integrates Earth Science, Biodiversity, Visual & Sensory, History & Archaeology and Culture and incorporates public perception as an important element.
Maximum Instantaneous Charge Weight	The maximum amount of explosive detonated at any one precise time
Mining	“Total extraction” removes all the coal, allowing the roof to fail and

subsidence	causing surface subsidence. A panel of coal 200m or so wide is advanced a metre slice at a time, or pillars removed when retreating, with only the working face and the access supported. At the surface a wave of subsidence migrates at the same rate as the face, causing at first strain and then compression as the ground subsides, with the main impact on pipes and drainage. The amount of subsidence is determined by the depth of the working, the width of the panel and the thickness of coal extracted, and movement is generally complete within a year. Subsidence follows a well defined pattern and in simple ground conditions can be accurately predicted. It can be reduced by stowing waste or leaving in pillars.
Mining Waste Directive	The Directive 2006/21/EC on the management of waste from extractive industries (the Mining Waste Directive) was issued on 15 March 2006. It regulates the disposal of mining waste at active mines and quarries to protect human health and safety and the environment. The proposal is for the Environment Agency to be the competent authority for England and Wales regulating through amended Environmental Permitting Regulations; to be finalised in 2009.
Mitigation	A process, action, schedule or any other procedure designed to prevent, reduce or offset adverse environmental impacts likely to be caused by a development project.
Natura 2000 sites	Special Protection Areas (SPAs) under the EC Wild Birds Directive (79/409/EEC) Special Areas of Conservation (SACs) under the EC Habitats Directive (92/43/EEC) sites designated under the Ramsar Convention on Wetlands of International Importance, should be protected to the same extent as if they had the status of designated SPAs or SACs.
Non-Technical Summary	The key points of the environmental statement including the findings of the studies and the mitigation measures proposed written in a form readily understood by non-experts and decision makers.
Nuisance	The Environmental Protection Act 1990 places a duty on every local authority to inspect for nuisance, or an individual can secure a remedy. Statutory nuisance includes noise and vibration. If nuisance levels are breached, the operator can be served with an abatement notice and legal action can be taken.
Opencast working	Excavation of minerals from surface extraction sites. Opencast sites vary in size and duration. Soils are stripped and stored in mounds, which may serve as noise and visual screens. The rock overlying the coal seams is then removed creating a series of working benches at coal horizons. This overburden, in a significant earth moving operation, is stored in mounds. Subsequent overburden is replaced behind the working as the excavation advances, providing for progressive restoration. The final void is filled with overburden from the mounds. The soils are progressively replaced as the site is restored.
Other minerals	Extraction of coal may facilitate the working of other minerals such as fireclay and aggregates. This avoids minerals being sterilised, but can cause delays to the reclamation of the site, access and traffic problems. Sandstone with the potential to be used as aggregate may be present in significant quantities.
Overburden	Material which has to be removed before a mineral can be worked.
Particulate	Atmospheric particulate matter (PM) consists of a wide range of

matter	particles with PM_{10} (ie that fraction less than ten microns in size) that is most likely to be deposited in the lung. It includes inhalable dust, which can be deposited in the trachea or bronchial section of the lung and respirable dust (less than 2.5 microns) which penetrate to the lungs unciliated airways. The main sources are road transport (annual mean PM_{10} concentrations are highest at roadside sites) stationary combustion and industrial processes, which include mining and quarrying.
Pathways	The routes by which impacts are transmitted through air, water, soils or plants and organisms to their receptors.
Peak particle velocity	A measure of ground vibration magnitude, which is the maximum rate of change of ground displacement with time, usually measured in millimetres/second.
Pulverised Fuel Ash	Pulverised Fuel Ash (PFA) is classified as a waste. The use of PFA to produce a grout would require an environmental permit from the EA(W).
Polluter Pays Principle	The principle by which the polluter should bear the cost of carrying out pollution prevention and control including the environmental as well as the direct financial costs.
Potential impacts	Impacts which could occur in the absence of appropriate design modifications or preventative measures.
Precautionary Principle	The principle by which, where there are threats of serious or irreversible damage, lack of scientific certainty should not be posed as a reason for postponing cost-effective measures to prevent environmental degradation. Authorities should act prudently to avoid the possibility of irreversible environmental damage in situations where the scientific evidence is inconclusive but the potential damage could be significant. It applies particularly where there are good grounds for judging either that action taken promptly at comparatively low cost may avoid more costly damage later, or that irreversible effects may follow if action is delayed.
Predicted impacts	Those impacts which are predicted as a consequence of the development although the nature and severity of their effect will be conditioned by the scope for mitigation.
Preventative Principle	The principle by which prevention of environmental, social and ecological harm should be the primary aim. It will be preferable, and cheaper in the long term, to prevent negative environmental and social harm and ecological damage from happening than having to restore or rectify that harm after the event, if restoration or rectification is possible at all.
Public Participation Directive	One of the legislative instruments that transpose the Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (the Aarhus Convention) into European Community law.
Ratio	The proportion of overburden to coal. This can be in situ, or based on the recovered coal. The economic ratio of overburden to coal depends on the price of coal and many other variables, but does not often (at the time of writing) exceed 30:1.
Resubmission of a previous application	Councils currently have the power to decline to determine an application for planning permission which is a resubmission of a previous application which was called in and refused by the Secretary of State, or was dismissed at appeal, within the previous two years. A new power is introduced for the local planning authority to decline to determine an application which is similar to one refused

	by the authority within the proceeding two years, unless there has been a significant change in any relevant considerations.
Receptor	A component of the natural, created or built environment such as a human being, water, air, a building, or a plant that is affected by an impact.
Reclamation	All operations that are necessary to return the land to an acceptable environmental condition for the resumption of the former land use or for a new use. These operations can take place during mineral extraction, including soil stripping and storage, and after extraction, including filling and contouring, or the formation of water areas. It includes both restoration and aftercare.
Restoration condition	A condition requiring that after operations for the winning and working of minerals have been completed, the site shall be restored by the use of any or all of the following, namely: subsoil, topsoil and soil making materials.
Scheduled monument	Archaeological remains that receive statutory protection under the terms of the Ancient Monuments and Archaeological Areas Act 1979.
Scoping	An initial stage in determining the nature and potential scale of the environmental impacts arising from the proposed development, and assessing what further studies are required to establish their significance.
Scraper	A load-haul-dump machine in which the bowl is towed behind a tractor unit, fills by a planing action, hauls the spoil to the dump site and empties by means of an internal ejector blade pushing forward. Used in soft ground or in ground that easily fragments after ripping or blasting.
Screening	The process of determining whether a project requires an environmental impact assessment.
Secondary aggregate	The description of minerals other than coal or fireclay extracted at a site where the extraction of that material for aggregates purposes is technically, environmentally and economically acceptable. The commercial use of mine wastes to substitute for crushed rock or sand and gravel aggregate where this is technically, economically and environmentally acceptable is encouraged. Colliery spoil is excluded from the Aggregates Levy and its role as a substitute for primary materials is considered in the Aggregates MTAN.
Sensitive development	Sensitive development is any building occupied by people on a regular basis and includes housing areas, hostels, meeting places, schools and hospitals where an acceptable standard of amenity should be expected. Sensitive development could also include specialised high technology industrial development. Authorities may also wish to include other developments or uses (such as places of recreation) within this definition, depending on local circumstances and priorities. This should be explained in the development plan.
Shafts	Shafts are extremely numerous, records are incomplete and not always accurate, and they form a widespread hazard. They vary in diameter and depth; may be unlined or lined; capped, partly or fully filled or void; stable or unstable. Wooden scaffolds used historically to cap shafts can collapse unexpectedly. Adits are horizontal or inclined shafts. For development nearby, shafts should be filled or grouted, and capped.
Shallow coal areas	Coal resources that can be extracted by opencast mining are found principally along the margins of the South Wales coalfield between

	Kidwelly in the west and Pontypool in the east. In north Wales, the coal is centred on Wrexham. Small areas of shallow coal are found in Pembrokeshire and Anglesey.
Site investigation	Site investigation requires a review of the relevant literature, ordnance and geological maps, and photographs, followed by site investigation at and below the surface. Even where no records are held, in areas of productive coal measures, it cannot be assumed that no mining has taken place. In particular, mine plans of workings beneath older urban areas are likely to be lacking.
Slurry lagoons	Impounded water areas into which tailings and other aqueous discharges are pumped to enable treatment of suspended solids. Coarse discard is used to construct the banks of lagoons and the tailings are pumped into the impounded area and allowed to settle. The water is drawn off and once the tailings have dried sufficiently the lagoon can be overtipped with coarse discard prior to restoration. Lagoons can cover several hectares and normally two or three are required at any one time.
Spoil heaps	Spoil heaps and lagoons which contain quarry refuse are tips and are subject to the Mines and Quarries (Tips) Act 1969 and the Mines and Quarries (Tips) Regulations 1971. Stockpiles are not tips within the meaning of the relevant legislation. The principal statute relating to stability and safety of mineral waste in the UK is the Mines & Quarries (Tips) Act 1969. Part 1 deals with tips, active and closed, on land where mining or opencasting is still going on. They must be made and kept secure. The primary duty falls on the owners and managers of the mine or opencast, with powers to inspect and enforce vested in the Health and Safety Executive. Part II deals with “disused” tips, on land where extraction is not continuing. The duty to ensure the integrity and safety of the tip lies with the landowner, the duty to enforce any remedial action lies with the local authority. Local authorities may undertake work to determine condition of disused tip. Where, by reason of instability, the tip is a danger to the public, they can serve notice on owners to undertake the necessary works as specified in the notice.
Stemming	An inert material, typically stone chippings, used to separate explosives loaded into a borehole and to confine the gases resulting from detonation.
Stockpile	A pile of extracted mineral or mineral product stored prior to further processing or sale.
Strategic Environmental Assessment	European Directive 2001/42/EC (the SEA Directive) requires a formal environmental assessment of certain plans and programmes which are likely to have significant effects on the environment. The SEA Directive is transposed into United Kingdom law by the Environmental Assessment of Plans and Programmes (Wales) Regulations 2004.
Structures on unstable land	Where ground displacements can be foreseen, design and construction can minimise the effects. Compressive and tensile ground strains can have serious adverse effects. Dams, reservoirs, retaining walls and bridges need special consideration for design, construction and monitoring. Communications such as road and rail need to be assessed to evaluate preventative and, if necessary, remedial works.
Subsidence and land	Lowering of moderately flat land lowers water levels relative to surrounding areas and can reverse the gradient of drainage

drainage	channels, potentially leading to intermittent or even permanent flooding. The effect of subsidence on main rivers has, in the past, been addressed by channel regrading or the building of embankments, or by the construction of pumping stations where drainage by gravity is not effective.
Subsidence over old mines	Most underground coal working before 1940 was by pillar and stall mining. Pillars of coal were left in place to support the roof, often randomly in the older mines or in a regular grid in more modern mines. Collapse of the roof leads to a cavity which gets closer to the surface with progressive collapse of the rock above. Such cavities are unlikely, although not unknown, to reach the surface from more than 30m depth or ten times the extracted seam thickness. Where pillars are too small, perhaps because of further extraction as the mine was abandoned, multiple failures can lead to collapse. This may be delayed 100 years or more. The risk of ground collapse because of pillar failure is small where the mine is more than 50m deep, although the loading from deep building foundations, from piles for example, can result in renewed collapse.
Sustainability Appraisal	Sustainability appraisal (SA) is to promote sustainable development through the integration of social, environmental and economic considerations into the preparation of LDPs.
Tonal noise	Tones have a narrow sound frequency composition, and can be identified subjectively by listening. An objective measurement of tonal content employs frequency analysis, where a noise signal is electronically separated into various frequency bands. The tonal audibility or annoyance factor is then calculated by comparing the tone level to the level of the surrounding spectral components.
Vibration dose value (VDV)	BS6472, 1992 Guide to evaluation of human exposure to vibration in buildings gives base curves of vibration for minimum adverse comment and VDVs at which complaints are probable. VDVs may be used to assess the severity of impulsive and intermittent vibration, such as experienced from vibration at quarries.
Vibration sensitive building:	A vibration sensitive building is any building or structure where occupancy or condition may be prejudiced by the effects of vibration from blasting (for example, residential property, school, offices, industrial premises, church, village hall, or fragile ancient monument).

Acronyms

AAC	Absolute Area Coverage
AONB	Area of Outstanding Natural Beauty
AQMA	Air Quality Management Area
AURN	Automatic Urban and Rural Network
AWRIG	Association of Welsh Regionally Important Geodiversity Site Groups
BAT	Best Available Technology
BGS	British Geological Survey
CA	Coal Authority
CAfE	Clean Air for Europe
COMAH	Control of Major Accidental Hazards
CPP	Coal Processing Plant
DEFRA	Department of Environment Food and Rural Affairs
DETR	Department of Environment, Transport and the Regions
DfT	Department for Transport
DoE	Department of the Environment
DoH	Department of Health
DTI	Department of Trade and Industry
EAC	Effective Area Coverage
EA(W)	Environment Agency (Wales)
EFPAC	Emissions Factors and Policy Applications Center
EHO	Environmental Health Officer
EIA	Environmental Impact Assessment
ES	Environmental Statement
EU	European Union
FFG	Freight Facilities Grant
HIA	Health Impact Assessment
HMSO	Her Majesty's Stationery Office
Hz	Hertz
IEH	Institute for Environmental Health
LAPPC	Local Authority Pollution Prevention and Control
LDP	Local Development Plan
LIDAR	Light Detection and Ranging
MPA	Minerals Planning Authority
MPG	Mineral Planning Guidance
MPPW	Minerals Planning Policy Wales
MTAN	Minerals Technical Advice Note
PM	Particulate Material
ODPM	Office of the Deputy Prime Minister
PPC	Pollution Prevention Control
RIGS	Regionally Important Geological and Geomorphological Sites
SA	Sustainability Appraisal
SEA	Strategic Environmental Appraisal
SIA	Social Impact Assessment
SPG	Supplementary Planning Guidance
SSSI	Site of Special Scientific Interest
TA	Traffic Assessment
UDP	Unitary Development Plan
UNESCO	United Nations Educational, Scientific and Cultural Organisation
USEPA	United States Environmental Protection Agency
WHO	World Health Organisation
WO	Welsh Office

References

Air Quality Expert Group	2005	Particulate matter in the United Kingdom, DEFRA
Arup Environmental	1995	The Environmental Effects of Dust from Surface Mineral Workings HMSO ISBN 0 11
Bate and Coppin	1991	Dust impacts from mineral workings, Mine & Quarry 20 (3)
British Geological Survey	2004	Mineral Profile Coal
British Standards Institute BS 5228	1997	Noise and vibration control on construction and open sites
British Standards Institute BS 7385	1993	Evaluation and Measurement for Vibration in buildings Part 2: Guide to damage levels from groundborne vibration
CADW	1988	Register of Landscapes, Parks & Gardens of Special Historic Interest in Wales
Countryside Council for Wales	2001	The LANDMAP Information System
County Planning Officers Society	1995	Good practice guide for mineral planning conditions
DEFRA	2005	Particulate Matter in the United Kingdom
Department for Transport	July 2007	Update of UK Port demand forecasts to 2030 and economic value of transhipment study. MDS Transmodal
Department of the Environment, (Land Use Consultants and Wardell Armstrong)	1996	Reclamation of Damaged Land for Nature Conservation
Department of the Environment		Minerals Planning Guidance 5: Stability in surface mineral workings and tips (MPG5, England).
DETR	2000	The Air Quality Strategy – Working Together for Clean Air
DETR (Vibrock Ltd)	1998	The Environmental Effects of Production Blasting from Surface Mineral Workings
DETR, (Aspinwalls)	2000	Effectiveness of Provision for the Aftercare of Mineral Workings

DETR, (Wye College, University of London and the Forestry Commission)	2000	Soil Forming Materials: Their Use in Land Reclamation
DoE (Freeman Fox Ltd)	1988	Treatment of disused mine openings
DoE, (Arup Environmental / Ove Arup and Partners)	1995	Environmental Effects of Dust from Surface Mineral Workings
Entec UK Ltd,	1998	Environmental Impact of Traffic Associated with Mineral Workings
		The Stationery Office, ISBN 0 11 753476 5
Environment Agency	2004	Guidance on monitoring landfill gas surface emissions. www.environment-agency.gov.uk
European Commission Directorate General XI, Environment, Nuclear Safety and Civil Protection	1999	Final Report on the Study on the Assessment of Indirect and Cumulative Impacts, as well as Impact Interactions within the Environmental Impact Assessment (EIA) Process. NE80328/D3/2 Volume 2: Research Study and Findings Hyder.
European Commission	2004	Reference document on Best Available Techniques for management of tailings and waste rock in mining activities.
Expert Panel on Air Quality Standards	2001	Airborne Particles: What is the most appropriate measurement on which to base a standard?
Forestry Commission, Handbook 11, HMSO, London.	1995	Creating and managing woodland around towns
ForestryCommission Bulletin 112	1995	Creating new native woodlands
ForestryCommission Handbook 110	1994	Reclaiming disturbed land for forestry
Geoffrey Walton	1988	Stability and hydrogeology of deep mineral workings DoE
Geoffrey Walton Practice	2004	Low Cost, Directional Monitoring of Nuisance Dust around mineral workings. MIST
Goodquarry		Mineral Industry Sustainable Technology (MIST)
Greensite technical report	1992	Environmental management in the minerals industry
Institute for Environment	1997	Report R10 the non-auditory effects of noise

and Health

MAFF FRCA, Cambridge 2000 Good practice guide for handling soils

Ministry of Agriculture Fisheries and Food 1998 Code of good agricultural practice for the protection of soils

National Assembly for Wales 1999 Better Health Better Wales: Developing health impact assessment in Wales

NAW Circular 3/2001 2001 New Guidance for Local Planning Authorities on European Protected Species and Changes in Licensing Procedures

Office of the Deputy Prime Minister 2003 The Costs and Benefits of Financial Guarantees and Securities in the UK Extractive Industry GHK

RPS Clouston and Wye College 1996 The reclamation of mineral workings to agriculture

Schwar, M.J.R 1994 A dust meter for measuring dust deposition and soiling of glossy surfaces. Clean Air, 1994, Vol. 24, pp. 164–169.

SI No 1994/2716 1994 Conservation (Natural Habitats &c) Regulations

SI No.1999/2024 1999 The Quarries Regulations

Symonds Travers Morgan 1998 Environmental Geology and Land use planning DETR

UK Minerals Forum 2008 Living with minerals

University of Aberystwyth and British Coal 1994 Restoring farmland after coal the Bryngwyn Project

Vibrock Limited, in association with University of Leeds, Department of Mining and Mineral Engineering and Swift Research Partners 1998 The Environmental Effects of Production Blasting from Surface Mineral Workings. DoE

Wardell Armstrong 1996 Methane and Other Gases from Disused Coal Mines. DoE.

Welsh Assembly Government 2002 Planning Policy Wales

Welsh Assembly Government 2000 Minerals Planning Policy Wales

Welsh Assembly Government	2006	Environmental Impact Assessment: A guide to good practice and procedures consultation draft.
Welsh Office	1988	Results of the Survey of Land for Mineral Workings in Wales
Welsh Office Circular 60/96		Planning and the Historic Environment: Archaeology Welsh Office Circular
Welsh Office Circular 60/961/98		Planning and the Historic Environment: Directions from the Secretary of State for Wales
Welsh Office Circular 61/96		Planning and the Historic Environment: Historic Environment: Historic Buildings and Conservation Areas.
Welsh Office Planning Guidance (Wales)	1997	Technical Advice Note (Wales) 11 Noise
W S Atkins	1990	The control of noise at surface mineral workings DoE

Appendix A: Coal resources

(extract from the British Geological Survey)

South Wales Coalfield

Opencast activity has been largely confined to the exposed Lower and Middle Coal Measures which reach the surface around the edge of the coalfield. Low dips in the north result in conditions open to large-scale opencast extraction. The cover of thick Pennant sandstone in the centre of the coalfield, together with the steep-sided, deeply cut valleys, prevents major opencast activity in much of this area.

Structurally, the coalfield is a broad, asymmetric east–west trending basin. Structures are highly complex on the south and north-west outcrops, with much thrust faulting. Even in areas of relatively simple structure, the abundance of small-scale faults created problems for underground mechanised long-wall mining.

The main concentration of coals of current economic interest lies between and includes the Five Feet-Gellideg and Two Feet Nine seams (Figures 1a & b). Deep mining was traditionally concentrated on the seams in this interval. However, many other seams, particularly in the interval from the Two Feet Nine up to the Brithdir, have been mined, largely from surface adits and drifts, as well as by opencast methods. In addition, coals higher in the Pennant Sandstone Formation have been mined and opencast on a small-scale and continue to constitute a workable resource. The lower boundary of opencast coal resources is defined in this study as the outcrop of the Garw seam, although a few thin coals below may be of local interest and one of these (the Lynch) is taken as the lower limit in the Swansea district.

The base of the thick development of Pennant sandstones is generally taken as the upper limit of opencast resources shown on the Coal Resource Map. This lies at the Brithdir in the east of the coalfield, falling to the No 2 Rhondda in the west. However, coal-bearing units are present in the upper part of the Pennant Sandstone Formation, with several thick coals, resulting in strips of opencast resources.

The coals have generally low sulphur values, the average total sulphur content of the main producing seams being about 1 per cent compared with 1.6 per cent for Britain as a whole. Higher sulphur contents are found in the coals of the Pennant Sandstone Formation, as well as in the seams which underlie the marine bands.

Figure 1 gives two generalised sections of the Coal Measures of the South Wales Coalfield. They show the thinning of the South Wales Coal Measures succession from west to east across the coalfield. The rank of the coal, that is the degree of coalification, increases north-westwards, from bituminous, high volatile coals in the east to anthracites (with less than 8 per cent volatiles) in the north-west. These anthracites are the only important anthracite resource in Britain. The cause of the high geothermal gradient which produced them remains the subject of debate.

Opencast coal resources
The opencast resources shown on the coal resource maps are divided into resource zones. These zones define areas within which coals of potential economic interest may occur. This potential is not uniform but depends on many factors, including coal quality and coal to overburden ratios at specific sites.

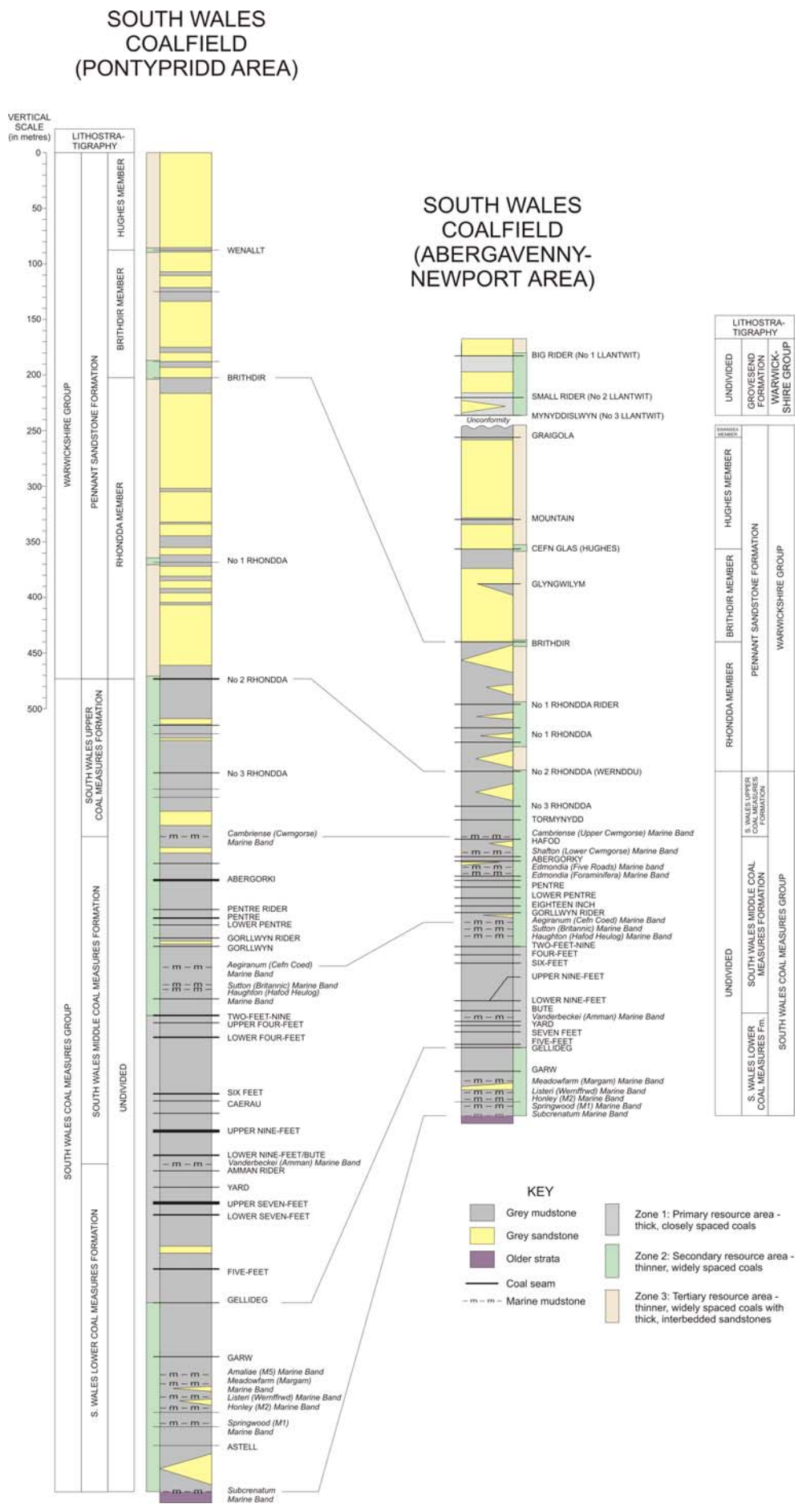
A primary resource zone constitutes the main target for opencast coal extraction and has been much exploited in the last thirty years. It comprises a closely spaced succession of thick coals, from the Gellideg seam and its correlatives at the base to the Two Feet Nine and its correlatives at the top. Where these two coals are thin or unmapped, the boundaries of the zone are placed at the thickest overlying (in the case of the Gellideg) and underlying (in the case of the Two Feet Nine) coals respectively.

A secondary resource zone represents the areas which contain opencast coal resources, but in which the coals are generally thinner and less concentrated in vertical and areal distribution.

Nevertheless, the zone constitutes an important resource and its coals have been exploited and continue to be worked, albeit on a smaller scale than the primary area coals. The zone spans several stratigraphical intervals. The lowest lies between the Garw and the Gellideg coals and their correlatives. The Garw is the only coal in this interval. Lower coals are mainly thin, except in the Swansea area, where the Lynch Coal is taken as the base of the resource zone. The main secondary resource area lies between the Two Feet Nine and its correlatives and the base of the thick Pennant sandstones of the Upper Coal Measures. Small areas of secondary resources occur within the Upper Coal Measures. These are zones where generally small areas of coal have mudstone roofs and may be extractable by opencast mining. Smaller areas of thin locally extractable coal may lie outwith these zones.

The areas of opencast resources include those where coal-bearing strata crop out in the bottoms of the main South Wales valleys. There, they are extensively covered by superficial alluvial, glacial, glaciofluvial and landslip deposits, as well as urban development, which would preclude their exploitation. Similarly, the resources in the coastal areas are buried below drift deposits, and locally the resource area is covered by Triassic strata on the southern crop of the coalfield.

A tertiary resource zone represents the remaining areas of the coalfield, which have significant, locally thick, but widely spaced, coal seams. Coals in the Pennant Sandstone Formation have which have been worked but are separated by thick Pennant sandstone beds.


SOUTH WALES COALFIELD (PONTYPRIDD AREA)
VERTICAL SCALE (in metres)
LITHOSTRA-TIGRAPHY
0
50
100
150
200
250
300
350
400
450
500
SOUTH WALES COAL MEASURES GROUP
WARWICKSHIRE GROUP
PENNANT SANDSTONE FORMATION
HUGHES MEMBER
BRITHDIR MEMBER
RHONDDA MEMBER
SOUTH WALES UPPER COAL MEASURES FORMATION
SOUTH WALES MIDDLE COAL MEASURES FORMATION
S. WALES LOWER COAL MEASURES FORMATION
UNDIVIDED
WENALLT
BRITHDIR
No 1 RHONDDA
No 2 RHONDDA
No 3 RHONDDA
Cambriense (Cwmgorse) Marine Band
ABERGORKI
PENTRE RIDER
PENTRE
LOWER PENTRE
GORLLWYN RIDER
GORLLWYN
Aegiranum (Cefn Coed) Marine Band
Sutton (Britannic) Marine Band
Haughton (Hafod Heulog) Marine Band
TWO-FEET-NINE
UPPER FOUR-FEET
LOWER FOUR-FEET
SIX FEET
CAERAU
UPPER NINE-FEET
LOWER NINE-FEET/BUTE
Vanderbeckei (Amman) Marine Band
AMMAN RIDER
YARD
UPPER SEVEN-FEET
LOWER SEVEN-FEET
FIVE-FEET
GELLIDEG
GARW
Amaliae (M5) Marine Band
Meadowfarm (Margam) Marine Band
Listeri (Wernffrwd) Marine Band
Honley (M2) Marine Band
Springwood (M1) Marine Band
ASTELL
Subcrenatum Marine Band
SOUTH WALES COALFIELD (ABERGAVENNY-NEWPORT AREA)
BIG RIDER (No 1 LLANTWIT)
SMALL RIDER (No 2 LLANTWIT)
MYNYDDISLWYN (No 3 LLANTWIT)
Unconformity
GRAIGOLA
MOUNTAIN
CEFN GLAS (HUGHES)
GLYNGWILYM
BRITHDIR
No 1 RHONDDA RIDER
No 1 RHONDDA
No 2 RHONDDA (WERNDDU)
No 3 RHONDDA
TORMYNYDD
Cambriense (Upper Cwmgorse) Marine Band
HAFOD
Shafton (Lower Cwmgorse) Marine Band
ABERGORKY
Edmondia (Five Roads) Marine band
Edmondia (Foraminifera) Marine Band
PENTRE
LOWER PENTRE
EIGHTEEN INCH
GORLLWYN RIDER
Aegiranum (Cefn Coed) Marine Band
Sutton (Britannic) Marine Band
Haughton (Hafod Heulog) Marine Band
TWO-FEET-NINE
FOUR-FEET
SIX-FEET
UPPER NINE-FEET
LOWER NINE-FEET
BUTE
Vanderbeckei (Amman) Marine Band
YARD
SEVEN FEET
FIVE-FEET
GELLIDEG
GARW
Meadowfarm (Margam) Marine Band
Listeri (Wernffrwd) Marine Band
Honley (M2) Marine Band
Springwood (M1) Marine Band
Subcrenatum Marine Band
LITHOSTRA-TIGRAPHY
UNDIVIDED
GROVESEND FORMATION
WARWICK-SHIRE GROUP
HUGHES MEMBER
BRITHDIR MEMBER
RHONDDA MEMBER
PENNANT SANDSTONE FORMATION
WARWICKSHIRE GROUP
S. WALES UPPER COAL MEASURES FORMATION
UNDIVIDED
SOUTH WALES MIDDLE COAL MEASURES FORMATION
S. WALES LOWER COAL MEASURES Fm.
SOUTH WALES COAL MEASURES GROUP
KEY
Grey mudstone
Grey sandstone
Older strata
Coal seam
Marine mudstone
Zone 1: Primary resource area - thick, closely spaced coals
Zone 2: Secondary resource area - thinner, widely spaced coals
Zone 3: Tertiary resource area - thinner, widely spaced coals with thick, interbedded sandstones

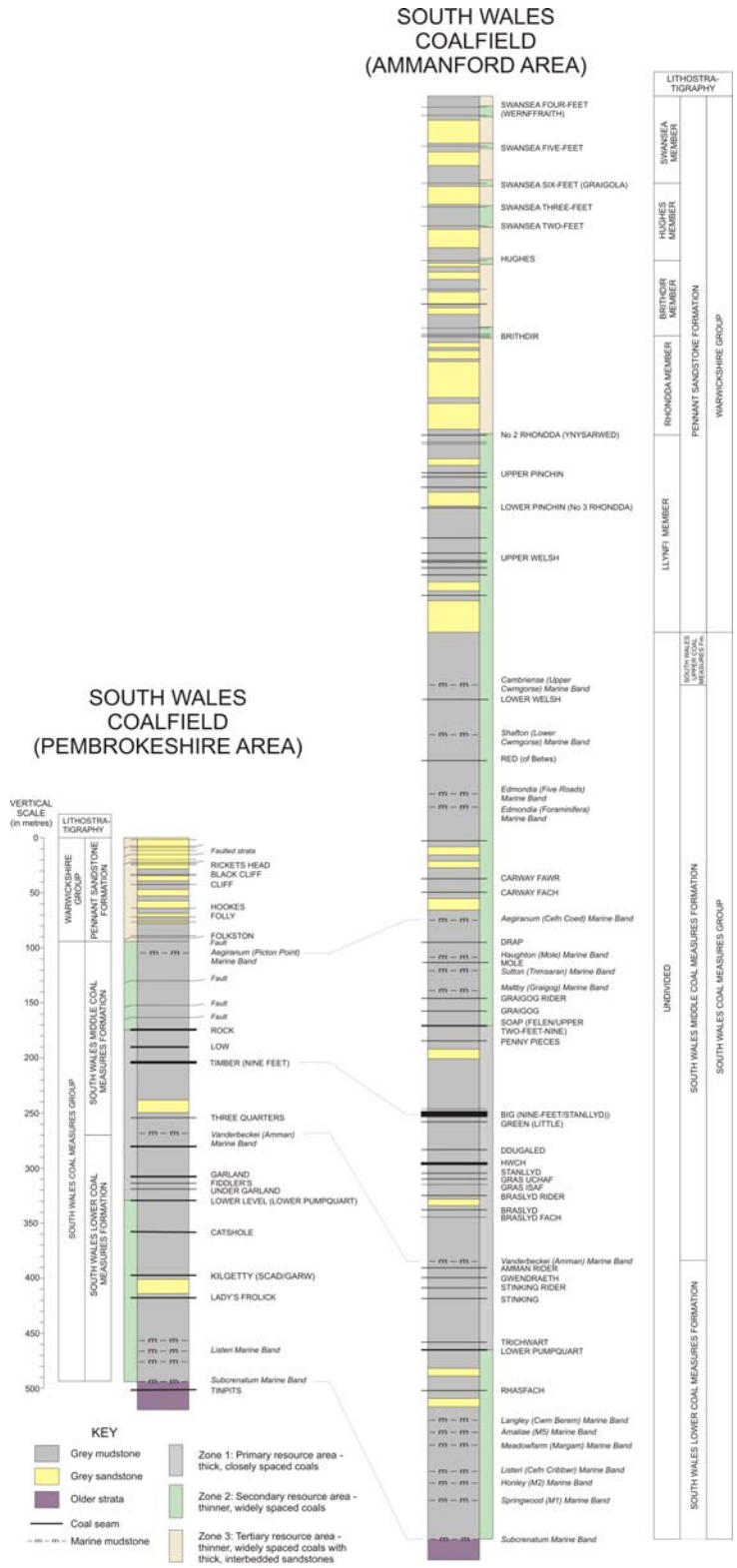


Figure 1 a & b Generalised vertical sections of the Coal Measures succession of the South Wales Coalfield

North Wales Coalfield

The succession in this coalfield can be divided into a lower productive coal-bearing succession, known as the Pennine Coal Measures Group and an upper, less-productive group of largely red-bed units, with few coal seams, known as the Warwickshire Group.

Geographically the coalfield can be divided into:

- The Flintshire Coalfield in the north (approximately 125 km^2 in area), located between Point of Ayr and Caergwrle in the south,
- Denbighshire Coalfield (55 km^2 in area), separated from the Flintshire Coalfield by a narrow outcrop of Dinantian and Namurian strata

In these coalfields the main coal seams occur within the Pennine Lower and Middle Coal Measures formations. The succession as a whole thickens northwards towards Point of Ayr and eastwards into the Cheshire Basin. This is associated with an increase in the thickness of coals towards the north and north-east. The coal is mainly medium-volatile coking coal. Although the rank increases towards the east under the Permo-Triassic cover rocks there are no high rank, anthracite coals in the coalfield area.

The North Wales Coalfield comprises a narrow belt of Pennine Coal Measures cropping out from Point of Ayr in the north to Wrexham in the south. The North and South Dee prospects were investigated as part of the NCB Plan 2000 phase of exploration and potential exists in these areas for new underground mining along the north-south length of the North Wales Coalfield in areas downdip of former workings.

As in other coalfields, exhaustion of reserves at shallow depth was followed by the progressive migration, by deep mining, down dip into areas concealed by younger strata. Coal-bearing strata of the Flintshire and Denbighshire coalfields extend eastwards under the Permo-Triassic cover, particularly under the Dee Estuary.

Structurally the coalfield is intensely faulted, with north-south trending faults dominant, although many faults are slightly sinuous, with NW- and NE-trending elements. There is also an important set of WNW- ESE-trending faults in this area, e.g. the Bala (Llanelidan) Fault System which divides the Flintshire from the Denbighshire Coalfield.

The Vale of Clwyd is a NW-SE-trending block that has moved downward to form a depression, with a major fault on its eastern side. NNW-SSE-trending faults cut across it. Little is known about the coal-bearing strata.

Opencast Coal Mining

There are still opportunities for opencast mining in the coalfield. In the north, the Flintshire Coalfield forms a fringe of Coal Measures that flanks the coastline. There is potential for opencast mining here, although the outcrop area locally forms steep slopes down to the coast and may not be suitable. Further south, the area between Mold and Connah's Quay is much larger and there are theoretically better opportunities for opencast sites. In the Denbighshire coalfield there is probably more potential for opencast mining because the area is more rural. There are no opportunities for opencast mining in the Vale of Clwyd.

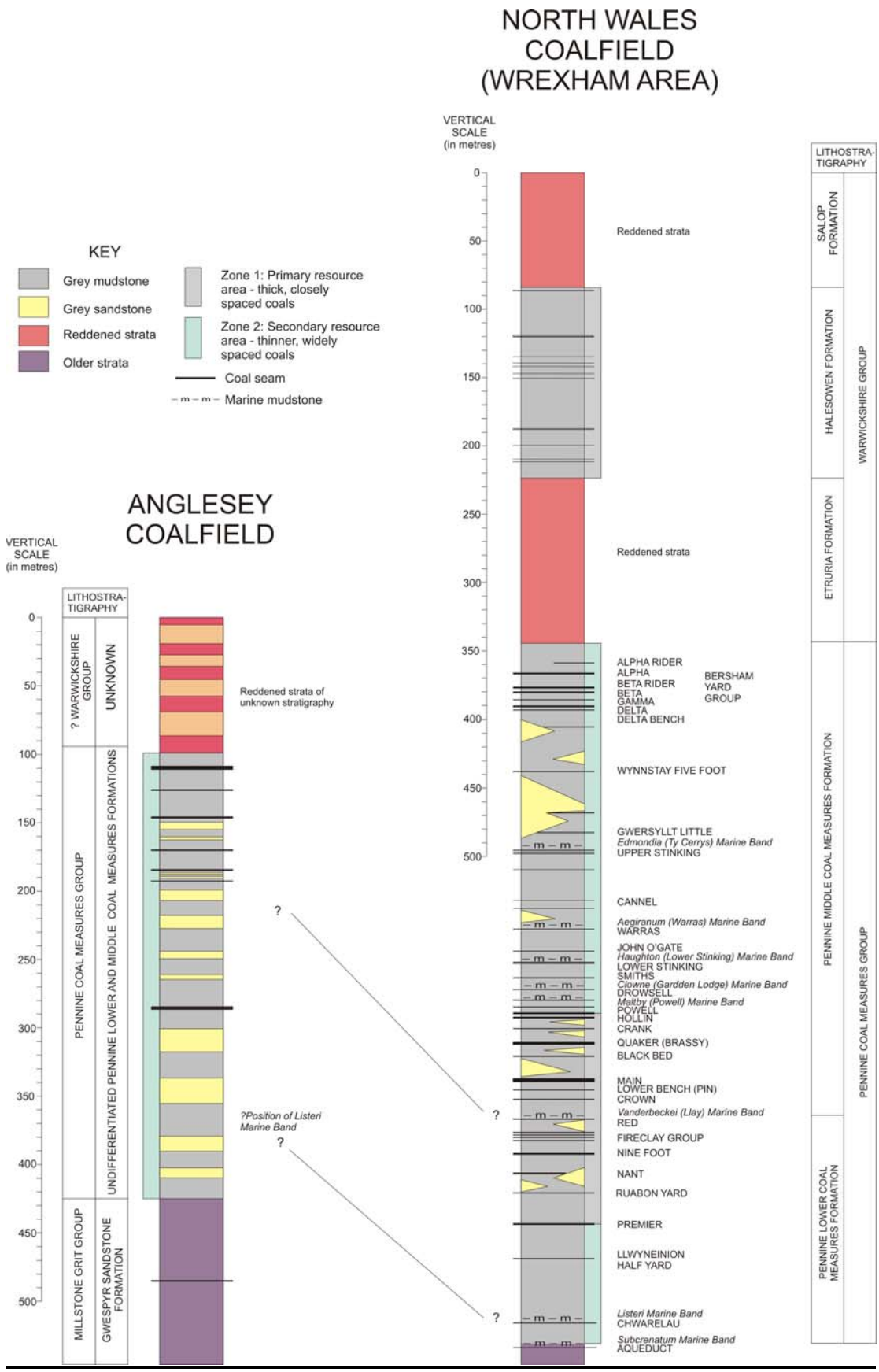


Figure 2 Generalised vertical sections of the Coal Measures succession of the North Wales and Anglesey coalfields

Anglesey Coalfield

The Anglesey Coalfield comprises a narrow strip of Pennine Lower and Middle Coal Measures on the south west side of the island, The exposed coalfield covers an area of approximately 25 km^2, mostly under the wetlands of the Malltraeth Marsh. The main structure within the coalfield is an asymmetrical, southwest-plunging syncline. A few faults are known but none are thought to have throws in excess of 30 m.

There are at least 8 proven seams (Figure 4). Borehole information indicates that only 3 seams are greater than 0.4 m in thickness and there is no information on their coal rank or methane content.

Opencast Coal Mining

In this coalfield borehole records are old and of poor quality but appear to show the first significant seam (i.e. >0.1 m in thickness) at a depth of 70 m. This would indicate that the potential for opencast mining is this area is low. In addition, the area of outcropping Coal Measure mainly coincides with Malltraeth Marsh, which has wet meadow environments that are protected as Sites of Special Scientific Interest (SSSI) and as an RSPB reserve.

Underground Coal Mining

There are no working deep mines presently active in the Anglesey Coalfield. Mining is thought to have ceased in about 1875, with workings in the Yard seam known. There is no potential for future large-scale underground mining, as this would be limited by the size of the coalfield and the low thickness of coal.

Areas of opencast and deep mine coal extraction

The extensive nature of these former opencast coal sites does not imply that the coal resource has been exhausted. The economics of coal extraction have changed with time, allowing coals with higher overburden ratios to be extracted. Some sites, or parts of sites, have been worked on more than one occasion and may be worked for deeper coal in the future. However, modern sites worked within the last 20 years are likely to have exhausted the currently economically recoverable coal resources. Extensive areas of the coalfield have been worked by deep mining, but some areas of deep coal resources also remain which are of economic interest.

Appendix B: Best practice for liaison and complaints in relation to coal working

B1. During the application, the MPA should set out an explanation of:

- how and where information on the application is available
- what rights the public has to comment
- how these comments will be dealt with
- what types of decisions will be made, for example screening and scoping
- an outline of the different regulators and consents, with different obligations
- a list of contacts
- a regular update on progress

This information should also be available by request at the MPA's offices.

B2. Where a permission is granted, Site Liaison Committees provide a forum for discussion and explanation. Most opencast sites have such groups, which can be very constructive in providing local communities with a better understanding of the impacts. The liaison committee acts as a forum for local representatives, to discuss with the operator, site matters and any impact of site operations beyond the site boundary. For it to be other than a talking-shop, the roles and responsibilities of individuals must be clear and based on a formal protocol, the framework of which might be included as a legal agreement. The operator should appoint a liaison officer, with a widely publicised name and telephone number.

B3. A Site Liaison Committee should:

- be established with agreed, balanced, representation
- be chaired by a member of the LPA
- hold quarterly or more frequent meetings as determined by the committee
- have a core agenda for each meeting
- have agreed minutes in the public domain

B4. The site liaison officer will present:

- a summary of the previous three-months' monitoring data
- a list of complaints and how they have been dealt with
- an outline of imminent site activity, in particular of activities which might cause complaint

B5. The MPA, and other regulatory bodies, will:

- report any breaches of Conditions and the actions taken
- explain specific site operations
- investigate incidents, offer analysis of events and respond to complaints

B6. In addition to community, operator and MPA representatives, SLC composition should be open, as and when appropriate, to:

- cross-authority interests
- Environmental Health
- The Environment Agency (Wales)
- The Local Health Board
- Countryside Council for Wales
- The Local Highway Authority
- Special interest groups.

B7. Complaints

- Complaints should be made to the site operator and/or the MPA, who should ensure that each is informed. They should be clear, specific and precise.
- Complaints should be dealt with promptly by the operator (the Site officer), following procedures that have been previously agreed, according to the severity and frequency of the problem
- Management plans should be drawn up indicating the measures to be taken in the short term where there is a risk of an exceedence of one or more relevant standards, to reduce that risk and to limit the duration of such an occurrence

- Reports on incidents that have occurred should be publicly accessible and highlight the lessons learned to prevent the same incident occurring again
- It is necessary to distinguish between actions that are required by Condition and enforced by the MPA and those that are proposed as goodwill gestures by the operator.
- Actions prompted by the liaison group should supplement, not replace, those necessary to meet Conditions.

B8. The MPA should (subject to their own authority's procedures), on being advised of the complaint by the Site officer:

- log complaints to cover:
    - the date and time that the complaint was received;
    - the nature of the complaint;
    - the name, address and telephone number of the complainant; and subsequent follow-up details.
- contact the complainant as soon as is practicable to arrange a meeting to discuss the complaint
- have regard to the possibility that site activities may be wrongly identified as the prime source of concern
- discuss the complaint with the site operator to explore the possibility of minimising all impacts irrespective of whether or not the site conditions are being met
- inspect site records to ensure compliance with Conditions. In the event of non-compliance, discuss with the operator the methods by which he intends to conform in future. Consider the necessity for enforcement action.
- arrange to monitor as appropriate, show the results to the complainant and relate all results to the site Conditions, relevant standards and guidelines.
- in the case of persistent complaints consider inviting the complainants to produce a regular log of perceived events, to be discussed with the site operator.

Appendix C: Best practice for Environmental Management Systems for operators

C1. Advice is contained in ISO 14001, first introduced in 1996 but updated 2004. The level of complexity and documentation necessary will be related to factors such as the site and the resources of the organisation. A well-implemented Environmental Management Systems (EMS) should integrate environmental management into a company's daily operations, long-term planning and other quality management systems. Alternatively, the EU Eco-Management and Audit Scheme (EMAS) is a management tool for companies and other organisations to evaluate, report and improve their environmental performance.

C2. The selection of techniques to protect the environment should:

- Achieve an appropriate balance between the environmental benefits they bring and the costs to implement them.
- Define the objective of the assessment and the options for emission control
- Quantify the emissions from each option
- Quantify the environmental impacts of each option (including harm to human health or quality of the environment, offence to human senses, damage to material property, impairment or interference with amenities or other legitimate use of the environment)
- Compare options and rank in order of lowest environmental impact
- Evaluate the costs to implement each option

C3. An EMS for mineral working should contain the following elements:

- organisational commitment
- objectives and targets
- documentation and records
- responsibility and reporting structure
- training, awareness and competence
- regulatory and legal compliance, and environmental performance review audits
- emission and performance monitoring, and measurement
- operational and emergency procedures
- community consultation and involvement

C4. Environmental audits can help the minerals industry fulfil its environmental responsibilities and demonstrate this to the community. They involve a systematic evaluation of evidence to determine whether or not the EMS is effective and appropriate. They should:

- help the company to meet its own environmental objectives and ensure compliance with regulatory requirements
- provide a practical tool to improve environmental performance with a focus on what is succeeding and where more could be achieved
- allow greater control of operations and costs
- demonstrate trends in environmental performance
- improve a company's public image and improve relations with regulatory authorities

C5. This is achieved through:

- interviews and inspections of site activities
- gathering and evaluating evidence
- recommendations, documentation and reporting of the findings
- periodic internal review
- independent validation and audit

C6. Guidance on the operation of non-certified systems of environmental management is provided through the British Standards Institution's *Project Acorn*3 www.emea.bsi-global.com/sustainability/acorn

Appendix D: Best practice for monitoring

D1. In developing and implementing effective monitoring, applicants, regulators and the MPA should follow an approach that:

- measures conditions, emissions and levels in receiving environments; and reports the results to demonstrate compliance with planning conditions or planning obligations (and laws, regulations, permits or injunctions)
- gives assurance that mitigating measures are implemented and environmental standards are safeguarded
- encourages the improvement of prediction techniques and mitigation measures
- optimises processes
- protects sensitive ecosystems
- informs the public of the effectiveness of environmental protection measures
- helps to ensure that unforeseen eventualities are tackled effectively
- complements other environmental controls such as those relating to Integrated Pollution Prevention and Control and authorisations under the Environmental Protection Act
- records all relevant details, including equipment calibration and the necessary competencies of the operator
- adheres to relevant British Standards
- evaluates initial assumptions of predicted performance or emissions

D2. Monitoring responsibilities:

- there should be clear understanding of any split responsibility for monitoring emission sources between the operator, the MPA, EA(W) and the LA, and monitoring which may be assigned to external contractors by the operator or MPA
- the MPA can inspect the operators' self-monitoring arrangements and carry out more limited monitoring programmes themselves to provide independent checks
- self-monitoring can use operators' knowledge of their processes and can be relatively cost-efficient
- self monitoring encourages operators to take responsibility for their emissions
- responsibilities should be assigned in Conditions for the making of measurements, and the evaluation, assessment and reporting of results
- the specific methods, safeguards and reporting requirements that are required should be clear
- may be enhanced by an environmental management system such as ISO 14001, with full public reporting and clear performance benchmarks and indicators
- A letter of agreement relating to the regulatory responsibility for sources of emissions on each site is advised.

D3. Monitoring should be in a formal context, setting out:

- a programme of locations, timing and time-scales
- confirmation of feasibility
- general descriptions of methods, detailed specifications of types of monitoring, compliance assessment procedures and reporting, and quality considerations

D4. Reporting of monitoring should:

- compare predicted against actual effects
- include assessment of monitoring results with respect to limit values and quality considerations
- Be clear as to the audiences, responsibility for reporting, scope and categories of report

D5. The operator should supply the MPA, to the MPA's satisfaction, with clear reports on:

- the overall plan and system of monitoring
- the operator's management of the monitoring system
- particular detailed monitoring activities
- maintenance and calibration of monitoring instruments and equipment,
- the process operating conditions at times of monitoring

- the use of standard methods for testing, sampling and analysis
- the use of certified instruments and personnel and accredited laboratories
- the selection and application of statistical methods
- statements of uncertainties in sampling and analyses

Appendix E: Best practice on working with other regulators

E1. Local Authorities and the Environment Agency share joint responsibility for various aspects of the IPPC regime. A protocol has been drawn up between the Agency, the Welsh Local Government Association and the Local Government Association, which recognises areas of expertise, and sets out a broad framework describing the interactions. This sets out the high-level arrangements, but local working arrangements recognising local commitments, constraints and workloads and the informal exchange of information, are encouraged. MPAs may wish to develop these arrangements for IPPC proposals into a protocol for major coal planning applications.

E2. Parallel applications allow a co-ordinated response, and a form of accord between regulators and consultees will be needed to avoid or minimise duplication. It is good practice to consult the PPC regulators whenever an application for coal development is made, including changes to existing facilities. Joint applications for planning permission and environmental authorisations are encouraged. The applicant should identify the consents that are required in their pre-application discussions. The Environmental Statement will necessarily provide some of the information required by the licensing authorities, but ideally scoping will enable all the relevant information needed for all consents to be included in the ES.

E3. It is in the interests of the MPA to establish at an early stage whether an objection indicates that the application will have an unacceptable impact; whether major change would be needed to make it acceptable, or whether Conditions would be able to overcome it. The regulators can use an iterative approach to ensure that the proposals will achieve environmental standards whilst also complying with other planning issues, such as visual amenity. This will avoid overlap and duplication. Mitigation to meet PPC conditions may require additions or changes to developments considered by the MPA.

E4. Applicants may be reluctant to process PPC consents before they have planning permission, because of the costs involved in obtaining the information. However, if the licensing authorities request further information, this is likely to be defined as Further Information within EIA procedures, as the ES should include all the information necessary to assess the land use implications of pollution. The Draft Town and Country Planning (Environmental Impact Assessment) (Wales) (Amendment) Regulations 2005 will make " any other information" (that which relates to the Environmental Statement) subject to the publicity requirements. Competent authorities are required to take the "environmental information" into consideration when determining planning applications. This would require public consultation, with the exception of the full technical details of plant or processes required for BAT. Planning authorities will need to consider whether it would be appropriate to grant permission for a development when the decision on a licence relating to environmental and health issues is still waiting information. A lack of objection from the regulators at the planning stage does not necessarily mean that a PPC permit will be granted. A single consultation procedure to cover all systems will be clearer and simpler.

E5. For new IPPC plant, the EA(W) will normally conclude that Conditions are required to protect the environment. The Conditions imposed by the planning regime would remain in the remit of the MPA, who would be responsible for regulation. The IPPC requirements would need to be clearly communicated to the MPA from the outset. Case Law (*AFP Lewes District Friends of The Earth Ltd & Dove 2000 Ltd (R on the application of) v East Sussex County Council 22/7/2008*) has determined that planning permission and pollution control, although both concerned with environmental matters, raised separate issues and did not stand or fall together.

Appendix F: Best practice Environmental Impact Assessment

F1. The authority must obtain all the information it needs to assess and evaluate the likely significant environmental effects of the proposal before it reaches its decision. It cannot impose a Condition requesting further work to identify the likely environmental effects after permission has been granted. The MPA is also required to be cautious where the applicant proposes to supply information to another regulator after planning permission has been granted. Such information may be pertinent to the land use decision.

F2. The planning authority is responsible for evaluating the ES. It should be prepared to challenge the findings of the ES if it believes they are not adequately supported by scientific evidence. If it believes that key issues are not fully addressed, or not addressed at all, it must request further information. The MPA needs to have detailed discussions with the statutory consultees, to be aware where issues fall outside the statutory consultees' remit, and if necessary seek specialist advice elsewhere.

F3. **The process of EIA should begin when a project is initiated and monitor the impacts of the development, the mitigation measures and site restoration. The process includes the preparation of an environmental statement by the developer to accompany a planning application, consultation with expert bodies and the public, and scrutiny by the planning authority. In this way the available information about the environmental effects of a project is collected and evaluated before being taken into account in the determination of the planning application.**

- environmental issues should be considered at the earliest stages of a project, alongside other technical factors
- site design should be informed by environmental constraints and issues
- information can be used to choose a site or modify boundaries to avoid environmentally sensitive features.
- the environmental issues should influence the alternatives considered and chosen (different sites, site design, or processes)

F4. Baseline studies

- the issues and the methods and criteria for evaluating the significance of the effects should be identified and agreed in the scoping exercise.
- where existing records are inadequate, new surveys will need to be undertaken.
- the method and level of survey will be determined by the nature of the project and the sensitivity of the environment
- some surveys can only be carried out at a certain time of the year or must be undertaken over a lengthy period of time. Applicants should be aware of such time constraints when programming projects
- for some projects the environmental effects will extend considerably beyond the application site
- the survey should identify relevant natural and manmade processes which may already be changing the character of the site, so that any changes which are predicted to occur due to the project can be distinguished from those which are expected to occur in its absence

F5. Predicting and Assessing Impacts

- consider the possible interactions between the proposed development and both existing and future site conditions
- identify and evaluate the effects (positive as well as negative) for each stage
- cover direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects
- the inter-relationship between impacts is an important consideration
- feedback into the design process, in order that adverse environmental impacts can be addressed at an early stage

F6. Methods for predicting environmental effects and their magnitude are specific to the site environment and are a matter for expert consultants. The predictions are very likely to be subject to a degree of uncertainty and this should be explained together with any assumptions on which they are based. Once impacts have been identified then they must be evaluated.

F7. Mitigation

The ES should:

- introduce design modifications or other measures to avoid, minimise or mitigate adverse effects and enhance positive effects
- identify which potential effects have been prevented, which reduced, and which offset.
- acknowledge effects which cannot be mitigated
- when effects remain that cannot be prevented or reduced, consider compensatory action such as:
  - provision of environmental improvements
  - provision of new opportunities for access and informal recreation
  - creation of alternative habitats
  - prior excavation or study of archaeological features.

F8. For monitoring, the ES should:

- list mitigation measures (a Schedule of Environmental Commitments), to be updated as the evaluation proceeds and be used as the basis for specifying planning conditions
- specify the effects being mitigated
- identify the location, design and timing of the mitigation measures
- state the predicted effectiveness of the measures (i.e. the extent to which the impact will be reduced)
- explain the monitoring arrangements
- take account of any potential secondary impacts
- deal with the effects arising from each stage in the life of a development (construction, commissioning, operation, decommissioning, restoration and afteruse/aftercare)
- include alternatives in physical design and project management measures
- include schemes to monitor the actual impacts compared to those predicted
- include schemes to show whether any defined environmental standards are being met and specify what action will be triggered if the results of monitoring show that specified standards are not being achieved
- include proposals for who will carry out the monitoring
- how the monitoring is to be funded
- who will receive the results and be responsible for any necessary action.

F9. The Environmental Statement should:

- have a systematic approach to the gathering and analysis of information
- include the information specified in Schedule 4 of the Regulations
- be clear, comprehensive and objective, transparent and impartial
- include a main report which draws on the technical studies
- provide sufficient cross referencing between the non-technical summary, the main report, appendices, and separate studies
- focus principally on the significant environmental issues
- present mitigation measures as a hierarchy (prevent, reduce, and offset)
- describe mitigation measures in sufficient detail
- describe the means for monitoring
- explain the methods of analysis and state the credentials of the experts
- set out the development plan context
- contain detailed technical studies in appendices

- delineate the responsibilities of each consent regime

F10. If granted, the planning permission should implement matters contained in the environmental statement, including mitigation measures, explicitly:

- as Conditions, or
- including them in a planning agreement

Appendix G: Best Practice for assessing cumulative impact within the EIA

G1. The environmental sensitivity of geographical areas likely to be affected by development must be considered, having regard, in particular, to:

- the existing land use;
- the relative abundance, quality and regenerative capacity of natural resources in the area;
- the absorption capacity of the natural environment;
- areas in which the environmental quality standards have already been exceeded;
- sensitive receptors and stress factors
- densely populated areas; and
- landscapes of historical, cultural or archaeological significance.

G2. A comprehensive approach uses both the sustainability appraisal of the LDP and the project EIA. Project-level assessment of cumulative impacts should be carried out within the context of plans that have assessed the carrying capacity of the environment.

G3. A scoping opinion is recommended to advise on the limits of the study area. The appropriate spatial boundaries should be defined in relation to the distance the environmental effects travel. The applicant needs access to the appropriate spatial baseline information in order to judge possible alternatives - regional, national or international sustainability indicators may be appropriate. Scales are at the community, watershed, or ecosystem levels, dependent on the particular criteria under consideration. Each impact area can be described then assessed for cumulative impacts.

G4. The assessment of cumulative impacts should be:

- based on available data, although further survey work may be needed where there is no available data or they are out of date;
- focused on the most important environmental features and processes; and
- linked to criteria for assessing the significance of predicted effects.

G5. The assessment should:

- establish the environmental baseline;
- identify past projects and their environmental effects;
- identify future projects and potential environmental effects;
- assess interactions between the environmental effects of the project and of past and future projects; and
- establish ecosystem functions and thresholds as necessary.

G6. Where appropriate, the assessment will consider:

- the source of environmental change;
- pathways or processes of accumulation;
- type of effect;
- links from local to regional systems;
- how these impacts interact with the resources;
- magnitude of effect;
- additive and non-additive effects;
- beneficial or adverse impact;
- duration of effect (short, medium or long term);
- reversible or irreversible effect;
- an indication of uncertainty;

- historic and projected trends
- effects which would not be significant for each scheme individually but would be significant in combination; and
- effects which would be significant for each scheme individually but would not be significant in combination.

G7. Impacts are not only on physical resources, such as air and water quality, but also the ones that are less obvious, for example visual amenity. Where possible, significance should be quantitative and linked to environmental quality standards and environmental objectives.

Appendix H: Best practice for Health Impact Assessment

H1. Health impact assessment is designed to enable people's health to be taken into account as part of decision-making processes. It is a systematic yet flexible approach. It uses a combination of methods and procedures to consider the potential impacts on people's health and well-being of policies, programmes or other developments, and the distribution of those impacts across different parts of the population. The impacts may be positive and/or negative The overall aim is, where possible, to remove or mitigate any potential negative effects on people's health of a proposal or development and to recognise and, if possible, to enhance any positive impacts and benefits.

H2. The use of health impact assessment is another way in which organisations can respond to *Health Challenge Wales*, as the national focus for action to protect and improve people's health. It can also help to make connections between sectors and can facilitate effective partnership working.

H3. The health impact assessment approach provides a way of:

- assessing the potential impacts of proposed policies, plans and projects on the social, psychological and physical health of people.
- appraising the potential positive and negative impacts on people's health and well-being .
- identifying the possible different impacts on different groups of people within the population.
- helping to involve the public in the process.

H4. Health impact assessment can also:

- address perceived health issues that are not necessarily recognised in terms of being a possible technical risk to the local community
- help to establish partnership and co-operation in the early stages of a development between the local planning authority, health services, , licensing authority (where relevant), and the developer.
- build on the formal consideration of health impacts as part of other requirements, for example, IPPC.
- help to make use of the best available evidence within the context of time and other resource constraints.
- facilitate a process of discussion and engagement with key stakeholders which is grounded in a clear understanding of their different perspectives

Guidance on the use of health impact assessment is available and can be accessed via the following link:
http://www.cmo.wales.gov.uk/content/work/health-impact/improving-health-e.pdf

H5. The 'Practical Guide to Health Impact Assessment' explains the background to the approach , the benefits of using it, and a step-by-step route through the five key stages of assessment. These are:

- Step 1: Screening - to identify a proposal's relevance to people's health, and the extent to which the health impacts need to be assessed.
- Step 2: Scoping – if a health impact assessment is to take place, this section helps to clarify issues such as the timescale and resources involved, and stakeholder involvement.
- Step 3: Establishing the health impacts –guidance on how to use information and knowledge and how to describe potential impacts.
- Step 4: Reporting –guidance on options for collating and presenting the outcome of a health impact assessment.
- Step 5: Monitoring and evaluation –consideration of the need to evaluate the health impact assessment process and outcomes.

H6. It is recommended that whether or not the developer seeks a scoping opinion for the ES, the developer should seek advice from the MPA as a matter of course for the health element of the ES. The MPA should seek advice from relevant health authorities and may choose to be advised by an independent body. Early scoping will ensure that the studies address all the relevant issues. Other interested parties and the general public should be given an opportunity to comment.

H7. It is important that the people involved have sufficient information about the proposed development and the area that may be affected. This will allow them to identify potential impacts and possible alternatives, and ensure that they understand the decision making process so that the issues which can be considered by the MPA are taken into account. The scope must be flexible enough to allow new issues which emerge during the course of the studies or as a result of design changes or through consultations, to be incorporated. The MPA can request additional information at a later stage in the process.

H8. Scoping is primarily focused on identifying the health impacts to be assessed and which of these are most important, but it may also address some or all of the following:
- the types of alternative which ought to be considered
- the baseline studies which are required to characterise the existing environment
- any special requirements for baseline studies regarding their geographical extent or timing
- the level of detail of investigations required
- the methods to be used to predict the possible presence and magnitude of health effects
- the criteria against which the significance of effects should be evaluated
- the types of mitigation to be considered
- any further consultations to be carried out during the health studies

H9. The health summary should identify the sources of health impact that could arise from the development, its closure and reclamation and to consider these alongside the characteristics of the surrounding environment that could be affected, to identify where there could be interactions between them.

H10. The scoping opinion should consider:
- what activities or features is the proposed development expected to involve?
- what effects could this proposed development have on health?
- for these, which characteristics of the surrounding environment could be affected by that activity?
- which of these issues are important for decision-making on this particular proposed development?
- which of these effects are likely to be significant and therefore need particular attention?
- which alternatives and mitigating measures ought to be considered?

Guidance on EIA Scoping June 2001 – possible considerations for health

Possible development characteristics

- Will the proposed development involve use, storage, transport, handling or production of substances or materials which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health?
- Will the proposed development involve use of substances or materials which are hazardous or toxic to human health or the environment (flora, fauna, water supplies)?
- Will the proposed development affect the welfare of people eg by changing living conditions?
- Are there especially vulnerable groups of people who could be affected by the proposed development eg children, hospital patients, the elderly?
- Are there contaminated soils or other material?
- Will the proposed development release pollutants or any hazardous, toxic or noxious substances to air?
- Will the proposed development cause noise and vibration or release of light, heat energy or electromagnetic radiation?

- Will the proposed development lead to risks of contamination of land or water from releases of pollutants onto the ground or into sewers, surface waters, groundwater, coastal waters or the sea?
- Will there be any risk of accidents during construction or operation of the proposed development which could affect human health or the environment?
- Will the proposed development result in social changes, for example, in demography, traditional lifestyles, or employment?
- Are there any other factors which should be considered such as consequential development which could lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality?

Environmental Characteristics
For each characteristic identified, consider whether any of the following environmental components could be affected.

- Is the proposed development in a location where it is likely to be highly visible to many people?
- Are there existing land uses on or around the proposed location which could be affected by the development?
- Are there any areas on or around the location which are occupied by sensitive land uses which could be affected by the proposed development?
- Are there any areas on or around the location of the proposed development, which are already subject to pollution or environmental damage e.g. where existing legal environmental standards are exceeded, which could be affected by the proposed development?
- Is the proposed development location susceptible to earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions e.g. temperature inversions, fogs, severe winds, which could cause the proposed development to present environmental problems?
- Are releases from the proposed development likely to have effects on the quality of any environmental media?

Is the proposed development likely to affect human or community health or welfare?

- the quality or toxicity of air, water, foodstuffs and other products consumed by humans?
- morbidity or mortality of individuals, communities or populations by exposure to pollution?
- occurrence or distribution of disease vectors including insects?
- vulnerability of individuals, communities or populations to disease?
- individuals' sense of personal security?
- community cohesion and identity?
- cultural identity and associations?
- minority rights?
- housing conditions?
- employment and quality of employment?
- economic conditions?
- social institutions?

- Is there a high probability of the effect occurring?
- Will the effect continue for a long time?
- Will the effect be permanent rather than temporary?
- Will the impact be continuous rather than intermittent?
- If it is intermittent will it be frequent rather than rare?
- Will the impact be irreversible?
- Will it be difficult to avoid, or reduce or repair or compensate for the effect?

H11. The health summary should also identify the issues which were identified as not significant and explain the reasons.

H12. At the scoping stage it may be necessary to carry out specific studies to help determine what the significant impacts of the proposed development are likely to be. These might involve data collection and analysis, studies and consultations. The aim is not to undertake the full EIA studies but to obtain sufficient information to allow a reasonable programme to be drawn up for those studies. This information can only be requested if the developer can reasonably be expected to have it at the stage in the proposed development that has been reached. Where there are gaps and uncertainties these will be identified and taken into account.

H13. Health is primarily covered in the section of the ES as 'Characteristics of the Potential Impact', which includes impacts on people, human health, fauna and flora, soils, land use, material assets, water quality and hydrology, air quality, climate, noise and vibration, the landscape and visual environment, historic and cultural heritage resources, and the interactions between them.

H14. Effects can occur not only permanently and over the long term but also temporarily, during certain phases of proposed development, or only intermittently, for example during certain periods of activity or times of year or as a result of abnormal events affecting the proposed development.

H15. Health impact assessment can be used as a stand-alone tool or as an integrated part of other forms of impact assessment. The MPA should:

- understand the key elements of the proposal
- use the guidance to consider the relevance of the proposal to people's health and any action that needs to be taken to consider potential health impacts
- take an initial view of the potential impacts on people's health and the extent to which impacts may differ for different groups within the population
- consider any existing evidence and data sources, including, where available, other health impact assessments on similar subjects
- involve stakeholders and decision makers
- document the initial assumptions that have informed the chosen approach

H16. When health impact assessment is needed for a coal application, the MPA will need to decide:

- who will lead the process
- who will undertake the assessment and stakeholders that need to be involved
- the objectives and timescales
- the skills and resources that are required, and what is available
- the scale of the assessment in terms of time, population and area
- the level of detail required

H17. The ES, based on the Guidance on EIA Scoping, should be the first step in collecting health information to:

- collect and collate qualitative and quantitative evidence
- provide a community profile
- identify significant gaps in the evidence base
- report on the potential impacts (positive and negative)
- present decision makers with enough information to consider the options

H18. Analysis and prediction should:

- compare alternative proposals
- identify the magnitude of change in the environment without the development, in comparison to the situation with it
- assess projected impacts within the regulatory and policy framework
- provide comprehensive coverage of impacts, including social and economic

- consider impacts in the context of the area's carrying capacity
- include estimates of risk, probability and uncertainty
- propose stepped thresholds linked to focused monitoring and specific mitigation
- include restoration and afteruse

H19. The assessment should inform decision-making. It should:

- recommend changes to a proposal (if necessary) to maximise opportunities to improve people's health and mitigate or remove potentially negative impacts
- attempt to reconcile different viewpoints when a specific concern held by a local residents' group is not borne out by the evidence, or when stakeholder views differ

.

H20. Other sources of information on health impact assessment include:

- Health Impact Assessment Gateway (http://www.publichealth.nice.org.uk)
- World Health Organisation (http://www.who.int/hia)
- Guidance on EIA Scoping June 2001 Environmental Resources Management Office for Official Publications of the European Communities

Appendix J: Best practice for Social Impact Assessment

J1. Social impact assessment (SIA) seeks to assess whether a proposed development alters quality of life and sense of well-being, and how well individuals, groups and communities adapt to change caused by development. It is an approach to analysing, monitoring and managing the social consequences of development. It is suggested as an approach that the MPA may consider appropriate to assess the benefits and disbenefits to the community.

J2. SIA helps to:

- ensure positive outcomes for communities and other stakeholders
- maximise the benefits of development and minimise its costs, especially those borne by the community
- ensure that development is generally acceptable to the local community and will improve the wellbeing of the wider community
- improve awareness of the differential distribution of impacts on different groups in society
- identify the impacts experienced by vulnerable groups in the community

J3. The MPA will need to consider:

- who benefits and who suffers the impacts, including local communities, the region and the developer
- the consequences of the development on community structure and infrastructure
- whether there will be reduced or enhanced employment, impacts on the local economy, and other opportunities
- mental and physical health

J4. The MPA should, through the SEA and SA processes for the LDP:

- identify interested and affected people
- coordinate the participation of stakeholders
- collect social baseline data on the communities
- identify the activities which are likely to cause impacts
- predict likely general impacts and how different stakeholders are likely to respond

J5. The ES for an application should, under “impacts on people”:

- identify and describe interested and affected stakeholders and other parties
- develop baseline information of local and regional communities
- identify the key social and cultural issues
- select social and cultural variables which measure and explain those issues
- describe aspects of social impacts related to the proposal
- describe cumulative social effects related to the proposal
- ensure that methods are robust transparent and replicable
- select forms and levels of data collection analysis which are appropriate to the significance of the proposal
- collect sufficient qualitative and quantitative social, economic and cultural data
- analyze all reasonable alternatives to the action
- consider under-represented and vulnerable stakeholders and populations
- consider the distribution of all impacts (whether social, economic, air quality, noise, or potential health effects) on different social groups

J6. In deciding the proposal, the MPA should consider:

- where there are unavoidable impacts, ways to turn communities into beneficiaries
- whether the coal proposal is broadly acceptable to the members of those communities likely to benefit from, or be affected by, the operations
- the opinions and views of experts, although these should not be the sole consideration

- even where communities approve the operation and where they may be regarded as beneficiaries, potential mitigation of social and environmental impacts

Appendix K: Best practice for dust

K1. The applicant should:

- establish baseline conditions by a dust-monitoring programme
- record ambient conditions over a period sufficient to identify seasonal variations
- identify the principal existing dust sources from urban and industrial areas, mineral operations, agricultural activities and construction activities
- locate residential areas, schools and other dust-sensitive land uses in relation to the proposed site
- identify likely sources of dust emission at different times from within the site
- assess the potential to emit dust with respect to the duration of the activity or the potential of dust to become airborne and the likelihood of dust leaving the site
- explain how topography and woodland may affect the emission and dispersal of site dust
- provide an analysis of data from the UK Meteorological Office on wind conditions, local rainfall and ground moisture conditions
- use computer-modelling techniques to assess how nuisance dust could disperse from a site

K2. Mineral Planning Authorities should agree or specify Conditions relating to the layout and activities of the site, Dust Action Plans and monitoring schemes. Measures to control dust should be specified and described in terms of their potential to reduce dust and consequent impacts in the application. In planning to minimise dust, the following factors should be considered:

- the dust assessment should consider the materials, locations, plant and activities at different phases; identify potential high risk events and plan for mitigation accordingly
- there should be a sustainable water management system
- dust-generating activities move during different operational phases and the minimisation of dust through site design should consider each phase of the operation
- the distance between dust-generating activities and residential properties and sensitive uses should be maximised
- dust-generating activities should be placed where maximum protection can be obtained from topography, woodland or other features, and where prevailing winds will blow dust away from residential properties and sensitive uses
- the transport and handling of materials should be minimised by placing adequate storage facilities close to processing areas
- the layout, profile, construction and seeding of stockpiles, tips and mounds should minimise dust creation
- certain haul roads should be surfaced, using perhaps crushed stone from the site or concrete, for example between washing facilities and site exit
- processing plant air outlets should be fitted with cyclones, wet scrubbers or filters; conveyors, stockpiles and dust-collection equipment should be contained and lorries should be closed or sheeted
- dust mitigation through bowsers, sprays, vapour masts and sweepers should be used on haul roads and stockpiles (for chemical binders consult the Environment Agency)
- A wheel-washing system should be installed on site
- handling systems, linings in loading chutes and lorries, drop heights, wind-guards and loading points should be designed to minimise dust creation
- different options, for example the use of conveyors rather than haul roads
- There should be a planned response to forecast weather conditions, with temporary cessation of works such as soil stripping and reinstatement operations (taking account of the need to avoid moving soils during wet weather) and overburden handling during defined adverse (extended periods of dry and windy weather) conditions.
- an on-site weather station should be installed

K3. Operators should:

- use crushing and screening plant within its design capacity
- use appropriate chippings for stemming shotholes
- maintain all plant and equipment to manufacturers' specifications
- compact, grade, surface and maintain haul roads
- fit dust-extractors, filters and collectors on drilling rigs
- use windbreaks/netting screens/semi-permeable fences, trees and shrubs
- use wide concave belts and enclose, fit wind-boards or hoods to conveyors and transfer points
- limit speeds and limit movement of vehicles
- consider upswept exhausts
- limit spillage and facilitate its removal by the use of hard surfaces
- sweep haul roads and other dusty surfaces frequently
- use wet suppression (usually water sprays) at conveyor discharge points
- minimising the height of fall between the conveyor discharge points and stockpiles
- ensure an adequate supply of water and the ability to apply the required quantity of water to maintain the control of dust under all circumstances, particularly dry windy conditions
- carry out an assessment of water requirements based upon peak potential evaporation rates, the maximum area requiring control, i.e. width and length of site roads, and an allowance of three times the calculated quantity, in order to compensate for run off and uneven application
- calculate the necessary full time and stand-by bowser fleet, taking into consideration bowser capacity, delivery rate and cycle time.
- install on-site static water spray systems adjacent to permanent site roads
- monitor the condition of site roads on a daily basis to ensure that spillage is removed as quickly as possible

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Appendix L: Best practice for blasting

L1. The Quarry Section of the Health and Safety Executive is responsible for all health and safety enforcement issues relating to the quarrying and opencast coal industries.

L2. Best practice is needed to minimise effects, maximise efficiency and to establish and maintain good public relations. Once the threshold of perception is exceeded, the likelihood of complaints is largely independent of vibration magnitude but greatly influenced by the relationship between an operator and the local community. It is important to have a consistent approach to management, regulation and enforcement and to use monitoring and recording of vibration-levels from blasting, to ensure an operator's compliance with blasting conditions.

L3. The operator shall carry out blasting operations in such a manner as to minimise the environmental impact on residents in the vicinity of the opencast coal mine.
Under no circumstances shall blasting operations, including blasting tests, be undertaken without the written approval of the MPA nor, after blasting tests, before receipt of a blasting schedule.
Before routine blasting is commenced, the operator shall carry out blasting tests in conjunction with a recognised explosives expert approved by the MPA.
For the purpose of the blasting test (above), the maximum instantaneous charge weight shall be calculated using a Scaled distance of 47 (metric units, ie metres/kilogram$^{1/2}$) or any such lesser charge weight that is determined by the physical restraints of the blast proposed. The operator shall submit details of their proposals for the blasting test to the MPA for approval.
A copy of the blasting test report on each test shall be supplied to the MPA.
All blasting shall be in accordance with the proposals until a sufficient number of blasts have been monitored and the results analysed to have statistical confidence in increasing the maximum instantaneous charge weights employed in the blasting schedule.
Thereafter the operator shall routinely up date the blasting database and revise the blasting schedule on a regular basis as agreed by the MPA.

L4. Levels for blasting vibration
In determining the permitted vibration levels, the MPA may need to consider lower levels in proximity to sensitive facilities such as hospital operating theatres. Justification should be given when they impose a condition requiring vibration levels outside the recommended range. Applicants should provide a detailed vibration and air-overpressure monitoring exercise to determine exactly what vibration levels are being received at the specific premises and/or by residents. The limiting values should be determined for agreement by the MPA.

L5. Monitoring ground vibration
all blasts should be monitored at more than one location
for large sites, there should be a dedicated permanent blast monitoring system capable of relaying results from up to four monitoring locations located on the site boundary and adjacent to sensitive properties and structures
it would be unreasonable to extend the time before assessment to more than 12 months, even if the number of events is relatively small
blasting within opencast coal sites is within cuts which progress relatively quickly compared with quarry faces. A suitable time period for an opencast coal site may be the time for a cut to be fully worked. A minimum period of 3 months would generally be representative of blasting variations

L6. Ground vibration
Maximum instantaneous charges are typically of the order of 20 to 40 kg in opencast coal site blasts. The most practical method of reducing ground vibration, where rock conditions determine, is to lower the maximum instantaneous charge weight of explosive whilst maintaining the blast ratio:

- through reductions in the other parameters, such as loading density, burden and spacing
- by reducing the total amount of explosive placed into the boreholes
- by deck-loading (when a relatively small amount of the column of explosive is replaced by inert stemming material)

This increases the number of boreholes required and the drilling and detonator costs. A decrease in the number of holes drilled per blast will increase the number of blasts needed to fragment the same volume of material, leading to smaller but more frequent vibration impacts. It is necessary to determine whether the magnitude of the events or the frequency of their occurrence is of most concern to a potential complainant.

L7. Air overpressure
Air overpressure should be minimised at source, as required under the provisions of The Quarries Regulations 1999. In still air the air overpressure intensity will decrease as a function of distance reducing by 6 dB as the distance from source doubles

L8. Monitoring air overpressure

- all blasts should be monitored
- microphones must have an adequate low frequency response
- should take account of windy conditions that may mask the blast generated pressure wave
- should be at several locations simultaneously to cover variations
- should be evaluated to provide a clearer understanding
- site measurement of meteorological conditions (such as wind speed and direction, temperature, cloud cover and humidity) should be correlated

L9. Mineral operators should:

- ensure that the blast area is accurately surveyed and recorded according to The Quarries Regulations 1999
- ensure that the correct design relationship exists between burden, spacing, and hole diameter
- choose the correct burden with due regard to the local geological conditions and the face survey information
- drill accurately in order to maintain the intended blast pattern
- ensure there is an adequate dust collection system for each drill rig.
- bag and remove all collected dust from the immediate blast zone.
- make maximum use of existing free faces
- ensure that the maximum instantaneous charge is optimised by considering:
  - reducing the number of holes per detonator delay interval
  - reducing the instantaneous charge by in-hole delay techniques
  - reducing the bench height or hole depth
  - reducing the borehole diameter
- ensure that the detonator delay sequence optimises the internal free faces developed during the detonation sequence, particularly in multiple row blasting and in corners
- whenever practicable, ensure that the direction of detonation is away from the nearest vibration sensitive location
- have due regard for any local weaknesses in the strata, including back break from any previous shot, clay joints, and fissured ground
- if loading explosives through fissured or broken ground, or through cavities of any kind, consider only the use of pre-packaged explosives and/or check the hole depth regularly during loading
- whenever possible the use of unconfined charges should be avoided; also consider prohibiting surface lines of detonating cord and secondary blasting
- all surface detonators and explosives should be adequately covered with suitable material.
- stemming material should be of sufficient quantity and quality to confine adequately all explosives upon detonation. A coarse stemming material such as angular chippings should be considered for use; drill fines should not be used
- misfire procedures should have due regard to under-burdened charges
- if air overpressure levels are a problem, consider a reduction in the area to be blasted.
- blast at regular times, ideally on the hour
- monitor the ground and airborne vibration generated so the information can be employed in any necessary modification of future blast designs

- maintain good public relations with those who live and work near the site
- always attempt to minimise the environmental effects of blasting operations and recognise that blasting events are perceived at levels of vibration well below those necessary for even cosmetic damage

Appendix M: Best practice for noise

M1. The aims of BAT (EA Guidance) are:

- to underpin good practice
- noise levels should not be loud enough to give reasonable cause for annoyance to persons in the vicinity
- prevention of creeping ambient noise levels

M2. The information provided should include:

- the main sources of noise and vibration:
- whether noise is continuous or intermittent
- the type of emission and its characteristics
- the hours of operation
- the sources contribution to overall site emission
- the location of the source on a scaled map
- infrequent sources of noise and vibration, such as seasonal
- noise-sensitive sites and receptors:
- the local environment; a scaled map showing grid reference, nature of the receiving site, distance and direction from the source
- other conditions or legal notices
- any complaints within the last three years
- the noise environment:
- background noise level (day/evening/night) $L_{A, 90, T}$
- specific noise level (day/evening/night) $L_{A, eq, T}$
- ambient noise level (day/evening/night) $L_{A, eq, T}$
- vibration data (ppv) (mms^{-1}) or VDV in m $s^{-1.75}$
- details of environmental noise measurement surveys, noise modelling or other noise measurements
- specific local issues and proposals for improvements
- demonstration that the proposals comply with BAT

M3. The information should:

- be up-to-date
- meet the relevant British Standards for methodology
- provide details of the equipment used and the calibration
- set out prevailing meteorological conditions
- identify the model used and the inputs

M4. Emissions assessments
Applications are assessed via a risk assessment provided by the operator. Emissions assessments should:

- establish the level and character of the existing noise environment and the location of noise sensitive properties
- cover all sources of noise and for each source consider the location, procedure, schedule and duration of work for the life of the operation.
- consider what emissions are likely to arise
- indicate the efforts made to control mitigate or remove these at source, such as the enclosure of noisy plant, the use of acoustic screening and baffle mounds

M5. Site location and layout

- site lay out and sequencing operations should be designed to screen noisy activities
- buffer zones can help to mitigate noise emissions
- fixed plant and facilities including maintenance facilities should take advantage of shielding from natural topography
- the excavation face, or existing tips, overburden or soil mounds can be used to shield fixed plant and facilities
- plant that generates noise, including pumps operated at night, should be located as far as possible from noise-sensitive properties

- site buildings may be used to form a barrier
- haul roads should not be located along exposed locations, and should have as low a gradient and maintain as smooth a surface as possible.
- time restrictions can be placed on vehicles leaving site

M6. Operators' choice of equipment

- plant should not be more powerful than required, (as a general rule a doubling of plant engine power leads to an increase at source noise levels of 3dB)
- sound level output should be taken from the manufacturers specification for comparable working conditions
- the use of electrically powered plant with its power source in an acoustic enclosure should be considered
- the use of adjustable or directional audible vehicle reversing alarms or alternative warning systems should be considered
- plant should be properly regularly and effectively maintained and inspected to ensure it remains within noise limits
- management should ensure the lubrication of bearings, sharpness of cutting edges and the integrity of silencers and acoustic enclosures
- newer plant should be chosen (plant over ten years old is roughly 3 dB noisier than new plant, and plant over 20 years old is 6 dB noisier)

M7. Good practice includes:

- minimising the height from which material drops from lorries or other plant, careful operation of draglines
- use of rubber linings in chutes, dumpers, transfer points, etc
- use of simple baffles around washing drums, rubber mats around screening and crushing plants
- enclosing and cladding plant, covering conveyors, cladding the plant, keeping noise control hood closed
- limiting the use of particularly noisy plant, limiting the number of items in use at any one time, starting plants one-by-one and switching off when not in use.
- avoiding revving of engines, reducing speed of vehicle movement, keeping lorry tailgates closed where possible
- pointing directional noise away from sensitive areas where possible
- earlier operations should provide screening from noise generated by subsequent activities
- operators should liaise to ensure that noisy operations take place when they will have least impact on the occupants of noise sensitive properties

M8. Screening

- acoustic screening can be effective both near the source of noise and near the noise sensitive property. Reductions of 5–10db(a) can generally be obtained
- as far as reasonably possible, sources of significant noise should be enclosed. BS5228 provides advice on various types of acoustic enclosures.
- baffle mounds can make a significant reduction in the exposure to noise, but construction is one of the noisiest aspects
- acoustic secondary glazing or acoustic fencing can be used at noise-sensitive properties

M9. General

- the impact of noise on the surrounding environment should be considered as part of the routine site inspections
- controls, monitoring, and enforcement with respect to noise should be considered in consultation with other competent authorities.
- a Noise Management Plan may be beneficial to the operator and the MPA. It should be clear whether this is a management tool or whether there is the intention to enforce against its contents.
- there may be no reason to assume that harm or annoyance may be caused as a consequence of the remoteness of the site. However, the operator should still reduce

noise emissions and use BAT to implement and maintain appropriate preventative measures.

- noise may contain tonal elements that stand out against a background of general noise. Conditions can prohibit the emission of such distinctive characteristics, to be monitored at noise sensitive locations.

See also:
IPPC H3 Horizontal Noise Guidance. Part 1 outlines the main considerations relating to the Regulation and Permitting of noise. Part 2 describes the principles of noise measurement and prediction and the control of noise. Environment Agency
www.environment-agency.gov.uk
BS 4142 : 1997 Method for rating industrial noise affecting mixed residential and industrial areas
BS 7445 : 1991
Guidance for the Regulation of Noise at Waste Management Facilities, Version 3.0, July 2002 Environment Agency

Appendix N: Best practice for landscape and visual impact assessment

N1. Reference should be made to Guidelines for Landscape and Visual Impact Assessment Edition 2 (Spon Press, London 2002) Landscape Institute & Institute of Environmental Management & Assessment (LI-IEMA).

- visual impact assessment should be undertaken from various viewpoints including main settlements, major traffic routes, bridleways and footpaths, both close to the site and from greater distances, to reflect its landscape setting
- viewing corridors and visual characters should be identified
- for the landscape impact assessment, the assessment area should normally include all areas within 500m of the site boundary
- for visual impact assessment, the scoping exercise should consider an assessment area should be up to the visual envelope, which is generally formed by natural/man-made features, such as ridgelines
- the visual envelope, based on intervisibility studies as defined by cross-sectional drawings, must be shown on a scaled plan
- the applicant should show the location, phasing, and details of all structures and layouts by plans, sections and elevations. The excavation, haul road, and waste and soil mounds, temporary works, plant and construction with materials, finishes, colours and lighting should be annotated
- applicants should consider annotated illustrative materials such as computer-generated photomontages; oblique aerial photographs and photographs
- descriptive text should provide a concise and reasoned argument. The assessment should identify potential sources of impact on landscape and visual amenity, taking into account the magnitude and degree of effect.
- the opportunities for the integration of newer techniques such as LIDAR should be addressed
- A Geographic Information System (GIS) to create a Digital Elevation Model of the landscape's visual properties permits three-dimensional analysis
- The report should detail the mapping and modelling techniques used and the degree of accuracy or tolerance of the data

N2. Approaches to mitigation should be aimed at avoiding or reducing adverse effects or remedying unavoidable effects, whether on landscape or on views. Approaches may be based on Primary Measures built into the design of the development or Secondary Measures to address residual effects.

- the proposal should be integrated into the local surroundings
- maximum use should be made of existing landscape features such as woodlands, shelter-belts and hedges
- trees and shrubs of appropriate native species should be used to screen vehicle parking, sheeting bays, storage and loading areas, plant and machinery, accommodation and other fixed facilities
- tree and shrub planting should take place well in advance of development, and be maintained, to establish effective screens

Appendix O: Best practice for transport

O1. Planning authorities can require many good practice measures to mitigate the environmental impacts of traffic by means of Conditions or through legal agreements.

O2. The ES should include a Transport Assessment (TA) pre-application to:

- examine the wider transport implications and consider alternative modes of transport to road
- explain and quantify the traffic and transport aspects of the proposed development
- identify potential improvement measures at the site entrance and on the adjacent road network
- consider lorry routing proposals
- ensure all such mitigation measures to be funded by the developer in advance of the proposed development coming into operation can be brought into effect e.g. traffic regulation orders
- A Transport Audit should be part of any planning application/condition.

O3. Rail transport
Proposals based on rail transport should be more favourably considered. Those that are not should be accompanied by an explanation as to why it is not possible and the alternative arrangements to minimise impact on communities. Where alternative transport modes exist, limiting the amount of output dispatched by road should be considered.

O4. Rail transport should be particularly considered where traffic:

- regular large volume deliveries are required to specific locations
- flows are over a longer distance
- there is an existing rail line or coal depot reasonably close to the coal working
- conveyers could connect coal workings with railheads and wharf facilities
- the road network is unsuitable

O5. Lorry routing
The MPA may wish to consider the routing of vehicles away from sensitive places and inappropriate roads to help to reduce impacts.

- Planning Conditions and agreements are not appropriate means of controlling the right of passage over public roads.
- The appropriate mechanism is an Order under section 1 of the Road Traffic Regulation Act 1984. Traffic Regulation Orders restrict all traffic above a certain axle weight, not just coal traffic. The MPA may impose a Grampian condition making a mineral development contingent on the coming into effect of a Traffic Regulation Order. However, the MPA would need to be sure that the limitations would not unacceptably affect other businesses or residents, and that those who might be affected have been given an opportunity to make representations.
- Voluntary routing agreements between the MPA and operators are difficult to monitor and cannot be enforced. However operators should seek to ensure that drivers adhere to the agreed routes which should be clearly specified and distributed to each driver.
- Conditions can require site access to be angled such that vehicles are prevented from turning in a particular direction where regulations are in place to reinforce the direction
- Conditions can require signs clearly stating the direction to be taken by vehicles on leaving the site

O6. Road improvements
The MPA, in association with the relevant highway authority, may decide that road improvements are required to make a coal-working proposal acceptable in land use planning terms. These may include:

- new links to provide more direct access to a coal working
- bypasses to existing towns and villages
- major realignment and improvement of existing roads

- smaller scale junction improvements
- traffic management measures including traffic calming

O7. Where necessary the MPA may attach a Condition to require the provision of a service road or means of access even if such works are not included in the application, provided that they can be undertaken on the site in respect of which the application is made, or on other land which is under the control of the applicant, and relate to the proposed development.

O8. Haul routes

- The environmental impacts of the design and location of internal haul routes should be considered in detail during the initial design stages
- The benefits of the shortest practical route should be balanced against the benefits of reduced gradients
- Haul roads should be sited away from environmentally sensitive resources within and adjoining the site
- Haul roads should be screened from sensitive areas, preferably by mature vegetation, or alternatively by grassed bunds/mounds
- Restoration and landscaping of earlier phases should be integrated with the routing of haul roads in later phases
- Haul roads should be suitably surfaced, where appropriate using compacted gravel or crushed stone from the site, which has low rolling resistance. This reduces the possibility of tyre damage, and a high coefficient of adhesion is less likely to lead to the creation of dust
- Maintenance is required to reduce the impacts felt through noise, vibration, spillage or dust
- Mud and other material should not be carried onto the public road from the site
- The site entrance, weighbridge and lorry exit roads (loads out) and other permanent site roads should be surfaced and kerbed as well as adequately drained
- A vacuum road sweeper or other machine may be used on-site and off-site in the vicinity of the site entrance. The road sweeper should not itself create a hazard on the public road, and water films left by road sweepers should not ice over
- Pot holes should be filled in and worn areas of road repaired
- Water bowsers should be used on-site to damp down internal haul roads and surfaced access roads

O9. Private haul roads should be appraised to ensure that there is a net environmental benefit. They can:

- keep heavy lorries off public roads thus reducing conflict with other traffic, including pedestrians and cyclists,
- avoid environmentally sensitive and residential areas
- provide access to the road network at a suitable point
- link directly to railheads, processing plants or mineral distribution depots

At an early stage in the design of a site and throughout the life of a site, detailed consideration should be given to using landscape works to reduce the effects of traffic impact.

O10. Conveyors

- The design and location of conveyors should be carefully considered to avoid impact arising from dust and spillage
- Some installations may be permitted development and will only require planning permission where these rights have been removed by direction or condition
- Conveyors and cableways should be routed away from residential property and other sensitive land uses
- Screening or painting the conveyor cover may help to reduce visual impact
- Conveyors should be located to minimise its visual impact, for example close to field boundaries or along the edge of woodland.
- Where conveyors intersect public roads including public footpaths it is generally preferable for the conveyor to go under the road rather than over

- Where conveyors or cableways must cross rivers, public roads, footpaths and railways, the safety of the structure will need to satisfy the relevant responsible authority.

O11. Design of Site Entrance

- The design of the site access should be discussed and agreed with the road authority at the proposal stage
- The design should be compatible with any lorry routing agreements
- The layout will be determined by traffic flows and the speed of traffic on the main road
- Conditions should ensure that the access is constructed and suitably surfaced before the rest of the development proceeds
- Road signs warning motorists of a quarry entrance may be appropriate and should be discussed with the relevant highway authority
- the design of a site access to prevent lorry movements in certain directions requires careful consideration if manoeuvres which may be hazardous to other public road users could result

O12. On-site parking

- On-site lorry parking helps to minimise impacts from lorries queuing outside the mineral working, and allows regular hauliers to leave their lorries on-site overnight.
- The parking areas should have hard surfacing; be properly drained via oil interceptors; be well landscaped; and be positioned away from local communities.

O13. Fuel and Lubricant Storage and Handling

- Advice should be obtained from EA(W) as spillage of fuel can impact on ground and surface water as well as being a potential fire hazard. It is an offence to discharge or otherwise cause or permit the entry of polluting matter into controlled or other waters
- Fuel and oil should be stored in secure tanks positioned within a well landscaped (if appropriate), bunded area, the floors and walls of which should be impervious to both water and oil
- Full and empty lubricant drums should be stored in a bunded area
- No part of a fuel storage area should be within 10metres of any surface water features
- Oil interceptors should be designed into roads and hardstandings
- A copy of the Operator's Code of Practice for refuelling and emergency plans should be clearly displayed in the site office.

A Condition may require that the best practicable means shall be adopted to ensure that there is no leakage of oils or other pollutants to the quarry floor, to adjoining land or to adjoining water courses; to minimise risk of pollution of land, ground water and surface water.

014. Noise

- Ways of minimising noise levels from traffic should be considered during the design stage as well as during the operating life of a site.
- Acoustic barriers and screening mounds may be a condition to protect local residents from traffic operational impacts on-site.
- Audible warning systems to warn personnel of reversing vehicles or warning sirens can be a noise nuisance. The use of directional alarms, warblers, infrared sensors, flashing beacons, radar equipment or cameras is now a legal requirement in many circumstances and may allow for some re-examination of the noise level of bleepers.
- A traffic routing scheme which minimises reversing should be used on-site whenever possible.
- Physical screening of mobile plant laying up and parking areas will limit noise from engines turned on before the start of the working day

O15. Renewal and Maintenance of Vehicles and Plant

- Regular maintenance of all mobile plant on-site is effective in reducing noise generated by worn parts.
- Rubber linings and suspension systems should be fitted to all vehicles, chutes and hoppers
- Maintenance areas should be surfaced with concrete or other such hard surfacing
- Major maintenance in working areas should be avoided and minor maintenance should be covered in the operator's Code of Practice.

O16. Vehicle Wheel and Body Cleaning

- Mud deposited on roads by coal traffic may be dealt with under roads legislation
- Wheel and body cleaning facilities allow for removal of potential spillage material from road vehicles before they leave the site
- Road use vehicles should be kept on hard surfaced roads
- Where high pressure water jets at the side of the exit road are appropriate, the exit road should slope away from the public road
- Cleaning facilities should be positioned well inside the site exit (minimum 100m)

In the interests of public safety and amenity, a Condition can require that no commercial vehicles shall enter the public road unless their wheels and chassis have been cleaned to prevent material being deposited on to the road.

O17. Sheeting

- Sheeting of loaded road vehicles and rail wagons should be carried out where there is a risk of spillage and dust arising from the load
- Spot checks should be carried out by an operator to ensure that road haulage vehicles are trimmed and properly sheeted before leaving the site. At large sites CCTV cameras installed at the site exit can be used to monitor loads on leaving the site as well as helping in improving site security.

O18. Siting of Activities within Coal Workings

- Siting of activities should be considered during the design stages to minimise impacts from traffic.
- Loading areas, vehicle parking and sheeting bays should be located away from sensitive communities and environmental resources

O19. Site Management and Monitoring

On-site traffic management should be dealt with in the site management plan. It can include detailed measures for the control of traffic:

- one way systems
- speed limits - which may vary depending on weather and surface conditions
- priority at junctions
- special protection for environmentally sensitive areas
- standards for materials handling
- adequate measures for the disposal of vehicle related waste such as tyres, obsolete machinery and oil
- any necessary measures to protect on-site features such as walls, trees, and buildings
- monitoring arrangements and reporting mechanisms

Site entrance notices should include a contact name and telephone number for enquiries for members of the public. This and other public liaison measures can assist in resolving issues at an early stage.

Appendix P: colliery spoil

Composition of spoil

P1. Unburnt colliery spoil consists mainly of shale containing small amounts of bituminous and carbonaceous matter, sandstone, clay, ironstone and limestone. It may range in size from boulders to clay particles and can be divided broadly into coarse and fine discard, with different disposal characteristics.

P2. Coarse discard: Most spoil is coarse discard with a particle size between 0.5mm and 150mm. In general, it does not present a handling problem because it is relatively free draining and is dewatered to an acceptable standard by screening before it leaves the coal processing plant (CPP).

P3. Fine discard: This material has a nominal maximum particle size of 0.5mm although a large proportion can be of much smaller size being less that 10 microns. Because of the particle size distribution the material is not free draining and presents greater handling and disposal problems than coarse discard. It generally consists of fine clay and shale particles. Where a froth flotation process is used, the fine discard sinks to the bottom and is referred to as tailings. The tailings sludge can either be disposed of by liquid discharge to lagoons or be further dewatered.

P4. Slurry lagoons should be avoided whenever possible and new mines should be designed to prevent the discharge of untreated tailings. There is reliable equipment for the production of dry tailings. Filter-presses squeeze out excess moisture to leave a cake which can be mixed with, and disposed of alongside, coarse waste. The obstacle is cost, as the process requires substantial buildings, plant and extra operations. Such levels of investment will be justified at new collieries or coal processing plant where the avoidance of lagoons will have significant environmental benefits.

Disposal

P5. Disposal includes handling, transport and placement. Disposal locations are predominantly on adjacent land or in existing voids close to the colliery. Most is tipped on spoil heaps, including lagoons with a small proportion being used in local land reclamation. Spoil heaps and lagoons which contain refuse from a mine or quarry are tips, and are subject to the Mines and Quarries (Tips) Act 1969 and the Mines and Quarries (Tips) Regulations 1971. Where the material is defined as waste, it will also need to comply with the Mining Waste Directive

P6. Spoil tips can be constructed of either coarse discard or a mixture of coarse discard and dewatered treated fines. Given normal weather conditions, the construction of coarse discard tips is a relatively straightforward operation since the material is free draining due to its large particle size. Handling of dewatered fines in the form of semi-solids or solids is more difficult because the small grain size retains water and reduces the material's shear strength.

P7. There are two methods of constructing tips made from treated fines and coarse discard. The first method involves mixing the two materials at the CPP where it is then transported either by conveyor or dump truck to the tip. The second method involves transporting the materials separately to the tip where the pressed cake is laid and then capped by a layer of coarse discard. The latter method typically has better drainage and handling characteristics although marginally more land is active at any one time.

P8. When lagoons are incorporated in tips the two types of discard, coarse and fines, are handled separately. The coarse discard is used to construct the banks and the tailings are pumped in suspension to the impoundment formed by the banks where the particles are allowed to settle. The supernatant water is drawn off, usually for return to the CPP. When the lagoon is filled and the tailings have dried out sufficiently to support the weight of tracked

vehicles, the lagoon can be over tipped with coarse discard as a prelude to restoration.

P9. Many lagoons are between 1 and 2 hectares but can be much bigger. Normally, the use of lagoons has to be phased, with usually at least two or three being required at any one time, one being built, one being filled and one drying out, to allow the site to be restored progressively. Lagoons are only a practicable proposition when the topography is gentle and where the slopes do not exceed 1:12. Lagoon areas are usually close to the colliery to reduce pipeline and pumping costs.

P10. Tailings are pumped to lagoons in suspension in water or can be transported off site by road or rail tanker. As long ago as 1981, the Commission on Energy and the Environment (CENE) recommended to the Government that lagoons should be avoided whenever possible and that new mines should be designed to prevent the discharge of untreated tailings.

P11. It is possible to use spoil to backfill excavation voids. Such schemes can have positive environmental effects: returning derelict or degraded land to a positive afteruse, but consideration must be given to whether the voids have a particular ecological, scientific or historical importance. Hard rock quarries may have potential but will require protective measures to ensure that there is no pollution of ground water. The capacity of voids created through opencast mining is usually limited. However, opportunities to create a new land form with extra capacity for spoil disposal are sometimes possible. These activities will need to comply with the relevant waste legislation.

P12. Policy is to encourage the use of secondary materials in construction where they are technically, economically and environmentally acceptable as substitutes for primary aggregates. The most significant use of spoil is as bulk fill in civil engineering works.

Appendix Q: Best practice for reclamation

Q1. The MPA should consider through the SEA/SA process whether it is appropriate to develop strategies based on landscape character areas to provide a framework for individual site reclamation. Consultation is a critical element in the design of reclamation schemes.

Q2. A formal reclamation scheme should:

- be discussed with the MPA and the statutory consultees before submitting the planning application
- be subject to a feasibility study
- accompany the planning application
- be well-designed
- indicate how restoration and aftercare is to be integrated with the working scheme
- demonstrate the suitability of the proposed after-use
- give consideration to the potential impacts of the reclamation proposals on adjacent land
- be suitable for the intended after-use
- generally compatible in nature and scale with the natural landform of the area
- not be liable to slope instability or other ground movement
- include a management plan
- be agreed and included in Conditions and agreements, with a detailed specification of works to be submitted

Q3. The ES should include annotated Ordnance Survey plans, supported by reports, to show baseline survey information of the site (1:2500) and of the relevant surroundings (1:10,000) including:

- the topography, landscape character and land use
- habitats and ecology
- built, archaeological and landform features, woodland, trees and hedgerows, habitats and wildlife corridors to be retained
- geology and soils
- meteorological, hydrological and hydrogeological data over at least a twelve-month period
- analysis and, where appropriate, modelling of groundwater flows
- plotting and analysis of seam plans for recorded deep mine workings
- existing instability, contamination, combustion and shallow mine workings
- drainage characteristics, including field drainage systems, main outfall ditches and watercourses
- areas, volumes and description of any existing topsoil and subsoil mounds
- areas, volumes and description of contaminated land and derelict infrastructure
- site investigation to show areas, depths, and descriptions of topsoil, subsoil and drift
- geological information to identify and quantify potential soil-making materials
- geological information to quantify the bulking and settlement characteristics of the backfill
- site information to identify significant physical or chemical properties of the back fill

Q4. The applicant should submit schemes for:

- the restored landscape, gradients and drainage
- translocation of habitat of high nature conservation value
- stripping and storage of soils, sub-soils and soil-making materials
- excavation and storage of overburden
- overburden and soil replacement
- progressive restoration
- treatment of instability, contamination, combustion and shallow mine workings
- remediation of off-site adverse impacts from site operations

- restoration of surface flows and groundwater management
- planting and provision of surface features
- aftercare

Q5. The schemes in Q4, to be shown by annotated 1:2500 Ordnance Survey plans, supported by reports, should include:

- proposals for after-use
- operational and projected contours for final landforms
- phasing and time-scale of the working, restoration and aftercare
- site boundary, operational boundary, limit of excavation, operational and processing areas, haul roads, water treatment areas etc
- storage areas allocated for contoured baffle mounds, topsoil, subsoil, soil-making material, contaminated soils and waste, stock piles and overburden etc
- phased excavation voids, with maximum depths and seam areas
- volumes of topsoil, subsoil and drift to be moved from the excavation area, from beneath overburden and soil mounds, and from other operational and processing areas
- overburden volumes and estimates of materials bulkage
- estimated volumes of soil-making materials
- bunds and screening
- stripping, transporting, stocking and restoring soils and soil-making materials
- on- and off-site drainage, water storage and water features and outfalls
- remediation of altered groundwater flows and mine water drainage
- remediation of altered mine gas flows
- progressive restoration
- restoration profiles for soil-making materials, subsoil and topsoil
- assessment and remediation of ground settlement following restoration
- proposals for the treatment of residual areas of instability, combustion or contamination
- reinstatement of, and proposals for new, rights of way and access roads
- reinstatement of, and proposals for new, field boundaries
- mechanisms for protecting and/or recording site features such as geological exposures or historic structures
- aftercare for areas to be restored to agriculture, forestry and amenity
- retained and proposed planting and management
- proposals for enhanced habitat creation
- aftercare management plans

Q6. Advice on ***Reclamation to agriculture*****,** ***Soil and Planting*** **and** ***Seeding*** is contained in appendices B, C and D of the Aggregates MTAN.

Q7. Coal spoil-heaps

- The reclamation of older spoil-heaps may need to address:
- lack of soil, and spoil deficient in nutrients
- burnt or burning coal, with gas emissions and cavities
- steep slopes prone to erosion
- acid or alkali run-off
- high leachate concentrations of dissolved metals such as iron or aluminium, and elevated concentrations of sulphate
- iron (ochre) precipitation in watercourses
- compaction in the surface layers
- surface and buried slurry and tailings lagoons

Q8. Reclamation to an amenity afteruse, such as public open space, informal public reclamation area, community woodland, wildlife education centre

- has the potential to use the limitations of damaged land
- funding may be required for long-term management – long term management needs, costs and responsibilities should be established at the outset

- contributes to the diversification of rural land uses
- recognises the need to enhance biodiversity both nationally and locally in line with the UK Biodiversity Action Plan
- can incorporate exposed geological features which may be suitable for selection as RIGs, and local RIGS groups should be consulted

Q9. In realising the nature conservation potential of the site, a steering group, or more formally a trust, should be formed to guide the restoration. Professional ecologists and earth scientists should be included for survey, evaluation, design, management, monitoring and enforcement. Representatives should be drawn from CCW, the MPA ecologist, local biological records centre, wildlife trust, RIGs coordinator, EA(W) ecologist, British Trust for Ornithology, Wildfowl and Wetlands Trust

Q10. Reclamation to nature conservation should:

- incorporate existing nature conservation interest
- invest in the diversity of damaged land
- plan for different timescales
- consider multi-purpose use
- incorporate habitat creation techniques, by sowing, individual planting and using turves
- consider recreating vegetation types in accord with the National Vegetation Classification
- create areas of standing and running water
- concentrate particular activities in the best location
- ensure long-term management of the site
- monitor against the desired objectives
- take account of public safety
- consider public access

Q11. Management of nature conservation

- management objectives should be clear and structured
- the management plan shoul be reviewed annually with a major review every fve years
- legal agreement can ensure an extended aftercare period
- a trust fund can be provided, to be managed by a selected committee or a voluntary nature conservation organisation
- community involvement should be a site objective

Q12. Further guidance is available in "The reclamation of damaged land for nature conservation" and "Earth science conservation in Great Britain, a strategy".

Q13. Other end uses are likely to require separate planning permission. Reclamation to agriculture, forestry or amenity should nevertheless be included in Conditions and agreements in case the development does not proceed. If it is intended to build on a reclaimed site, there will be a need for compaction of the backfill. The impacts on mine drainage and mine gas flows, and the noise, dust and vibration impacts of the compaction process should be assessed and mitigated. Any scheme for compaction should be in accordance with best practice as advised for highway engineering specifications, with an agreed scheme for independent monitoring.

Appendix R: Best practice for soils

R1. Definition

Soil is defined here as material that has gone through the natural processes required to make a soil and is functioning as a soil, supporting plant growth and associated biological activity at the time of identification. Soil forming material can be regarded as any material (naturally occurring or manufactured) that has been selected and that would permit plant root growth, retain and provide water and nutrients, for use in restoration where there is a shortfall of natural soil.

R2. Principles

Soils are effectively non-renewable resources that are essential for human life. They are fragile – vulnerable to pollution, compaction and erosion by water or wind. Achievement of satisfactory restoration requires careful conservation, storage, management and reinstatement of soils. A number of principles should be followed:

- soils should be accorded the same priority in environmental protection as air and water
- conservation of soil and its re-instatement should be included in an integrated approach to environmental management and utilised in ways that minimise damage to soil function and support the intended after-use
- emphasis should be placed on minimising damage to soils. Mitigation should be viewed as the last resort; in particular, care should be taken to avoid contamination with other materials or causing compaction by unnecessary trafficking by motorised equipment
- soils must be conserved and not lost
- topsoil and subsoil should be stripped and stored separately and re-instated in sequence to agreed depths
- where damage to soil is unavoidable then appropriate mitigation should be carried out
- contaminated sites should be recovered for beneficial use
- soils must not be removed from the site if needed for reclamation and after use

R3. Practice

The applicant/operator should:

- establish, by site investigation and survey:
  - the distribution, areas, types, structure, and thicknesses of the existing soils
  - the existing drainage of the soil and its sub-base
  - the availability of soil-making material

- submit schemes for:
  - the stripping, handling, storage of soils and soil-making materials
  - separate stripping, storage and restoration of materials where sites contain significant variations of soils or different landowners
  - ensuring operations are carried out under suitable weather conditions
  - minimising compaction caused by motorised equipment or storage
  - the replacement, in correct sequence, of defined thicknesses, of topsoil, subsoil and soil-making materials
  - installation of field drainage following soil re-instatement
  - remediation of replaced soil, including stonepicking
  - the treatment of contaminated soils

R4. Information

Sources of background information that may be consulted in planning survey work include:

- The National Soil Map at 1:250,000
- A limited suite of more detailed maps and their associated memoirs
- Profile and analytical data in paper and digital form, the latter held on the NSRI LANDIS data base
- The ADAS Representative Soil Sampling Scheme, the National Soil Inventory and Forestry Commission soils maps