Marine Mineral Guidance 1: Extraction by dredging from the English seabed

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Summary

Marine Mineral Guidance 1 (MMG1) provides a statement of the Government's policies on the extraction of marine sand and gravel and other minerals from the English seabed.

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Note: The above publication was issued by our former department, the Office of the Deputy Prime Minister (ODPM). ODPM became Communities and Local Government **on 5 May 2006** - all references in the text to ODPM now refer to Communities and Local Government.

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Preface

Marine Minerals Guidance Notes (MMGs) set out the Government's policies and procedures on the extraction of minerals by dredging from the seabed in English marine waters.

This Note provides a statement of the Government's policies on the extraction of marine sand and gravel and other minerals from the English seabed. It applies both to applications for dredging licences made under the Government View (GV) procedure and for Dredging Permissions made under a new statutory system when it is introduced.

This guidance will be followed by the Secretary of State and his advisers. It will also be used by the Department for Environment, Food and Rural Affairs (DEFRA) and its scientific advisers when considering marine minerals dredging matters. It should be used by the industry when considering any marine minerals dredging proposal, especially when preparing and submitting any application to dredge for minerals. It should also be used by all consultees in the decision-making process, including other government departments, local authorities, other statutory bodies and fishing organisations. The contents may be a material consideration in respect of dredging matters that come to the Secretary of State for determination, including any that are considered at public hearings or inquiries. Separate guidance on the statutory procedures for the control of dredging activities will be published in due course.

The National Assembly for Wales and the Department of Environment in Northern Ireland are preparing separate guidance for use in respect of Welsh and Northern Irish waters. Separate Regulations and guidance will apply to Scottish waters.

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Introduction

Background

1. There are very extensive deposits of sand and gravel on the seabed in English marine waters. Their distribution is uneven and they may vary in thickness from thin veneers over the bedrock or clays to many tens of metres, reflecting the complex geological history of the seabed. **Sands** lie within ancient river systems that are now submerged and occur as preserved coastal landforms, as well as forming localised banks. Whilst the majority of the dredged sand deposits are immobile, there is movement of sand across the seabed transported by wave and tidal currents. **Gravel** deposits (defined as material greater than 5mm in diameter) exploited by the dredging industry usually lie within ancient river systems or represent preserved coastal landforms, such as beaches, deposited during times of lower sea level. They are, for practical purposes, immobile in the depths of water that dredging takes place. Some potentially marketable resources may be covered by thin layers of fine material (overburden).

2. Marine sand and gravel makes an important contribution to meeting the nation's demand for construction aggregate materials. It is particularly important in London and the South East of England, where it accounts for almost a third of the total regional demand for sand and gravel. Using marine sources reduces the pressure to work minerals on land where resources are constrained in areas of agricultural, environmental or development value. As dredged material can often be landed close to the point of demand, this can also secure an environmental advantage by reducing the need for onward transport on the road network. In recent years there has been a gradual increase in the amount of material exported for use by the construction industry in countries such as the Netherlands, Belgium and France.

3. Marine sand and gravel is also used for flood and coastal defence purposes. It can match closely the material naturally found on beaches and is therefore generally considered to be more suitable from an environmental, nature conservation, amenity and technical point of view than land-won sand and gravel or other materials. Marine sourced materials can often be transferred directly from dredging vessels to beaches making such operations more economical. In some cases, materials suitable for beach nourishment may be different to those sought for construction purposes, but may both be found within the same extraction area. Careful design and planning of minerals dredging operations can contribute to a more efficient use of the whole resource.

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Control Over Mineral Dredging Activities

4. To ensure that extraction does not cause unacceptable adverse impacts, a range of controls have been imposed on dredging activities. Currently, dredging licences are issued by the Crown Estate. A non-statutory "Government View" (GV) procedure was introduced in 1968, under which a licence is only issued if the Government has indicated that it is content that the impacts on the environment of the proposed dredging activity are acceptable. The GV procedure was amended in 1998 with the introduction of 'Interim Procedures', to make the application and determination process faster and more transparent. Guidance on the Interim

Procedures was published in May 1998 (DETR, 1998).

5. The revised GV system will itself be replaced shortly by a statutory system which will transpose the provisions of the Environmental Impact Assessment and Habitats Directives, insofar as they relate to marine minerals dredging, into UK law. The statutory procedures will require dredging operators to obtain a Dredging Permission from the Secretary of State. Separate guidance will be provided in due course.

Scope Of This Note

6. The policy guidance contained in this Note applies only to dredging for minerals in English territorial waters. It applies both to applications for dredging licences considered under the Government View (GV) procedure and for Dredging Permissions granted under the forthcoming statutory system. Subject to paragraph 7, this guidance applies to the extraction of minerals by dredging in:

- tidal waters and parts of the sea adjacent to the United Kingdom from the mean high watermark up to the seaward limits of territorial waters, and
- waters in any area for the time being designated under section 1(7) of the Continental Shelf Act 1964.

7. This guidance does not apply to:

- extraction specifically described in, or authorised to be carried out by, an enactment;
- extraction authorised by an order under section 3 of the Transport and Works Act 1992;
- extraction specifically described in, or authorised to be carried out by -
  - a harbour revision order made pursuant to section 14 of the Harbours Act 1964,
  - a harbour empowerment order made pursuant to section 16 of that Act, or
  - a provisional order as defined in section 57 of that Act; or
- extraction to which any of the following Regulations apply -
  - the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 (SI 1999/293),
  - the Harbour Works (Assessment of Environmental Effects) (No 2) Regulations 1989 (SI 1989/424),
  - the Harbour Works (Environmental Impact Assessment) Regulations 1999 (SI 1999/3445).

8. As sand and gravel constitute most of the minerals dredged from the sea, these are the main focus of this Note. However, the guidance is also generally relevant to other minerals which may be dredged from the seabed, such as maerl (calcified seaweed), coal and

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metalliferous minerals.

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Policy Objectives

Introduction

9. The Government wishes to see the continued use of marine dredged sand and gravel to the extent that this remains consistent with the principles of sustainable development. To achieve this, the dredging industry requires sufficient access to suitable long-term resources to meet its varied and fluctuating markets and to provide it with sufficient confidence to invest in new ships and wharves. At the same time, it is important that dredging activities do not significantly harm the environment or fisheries or unacceptably affect other legitimate uses of the sea.

10. The Government believes this can be achieved by:

- minimising the total area licensed/permitted for dredging;
- the careful location of new dredging areas;
- considering all new applications in relation to the findings of an Environmental Impact Assessment (EIA) where such an assessment is required;
- adopting dredging practices that minimise the impact of dredging;
- requiring operators to monitor, as appropriate, the environmental impacts of their activities during, and on completion of, dredging; and
- controlling dredging operations through the use of conditions attached to the dredging licence or dredging permission.

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Minimising The Area Authorised For Dredging

11. Large areas of the seabed that are currently licensed for dredging are not dredged either because they do not contain economically viable reserves, or because they have reached, or are reaching, commercial exhaustion. This has led in some cases to the unnecessary exclusion of certain activities, such as fishing, from these areas. The Government therefore wishes to minimise the total area of the seabed authorised for minerals dredging.

12. Where practicable, the grant of a licence or permission in one area will be linked to the relinquishment of existing worked-out areas, which are licensed to that company, and which serve similar markets. This could involve phasing-in extraction in the new permitted area, as existing areas to be relinquished are phased out (for example, so that the total rate of extraction from the two (or more) areas remains broadly constant). Therefore, all applications for a GV or Dredging Permission should:

a) indicate the proposed date for commencement of dredging and the way in which this relates to the completion of dredging elsewhere; and

b) demonstrate that the application area is no larger than is necessary to provide the quantity of material that it is proposed will be removed over the life of the GV or Dredging Permission. When calculating the size of such an area, it is recognised that a certain degree of flexibility is required to take account of uncertainty about the quantity and quality of particular sand and gravel deposits. Applicants should therefore demonstrate the need for the material and set out the assumptions made in identifying the area of seabed required.

13. The maximum duration of GVs and Dredging Permissions will normally be 15 years.

Identifying New Locations For Marine Minerals Dredging

14. The Government will pursue a precautionary approach in the consideration of applications for marine minerals dredging. The Secretary of State will only issue a favourable GV or grant permission for new areas for marine minerals extraction where he is satisfied that all environmental issues, including coastal impacts, have been satisfactorily resolved. In cases where there is insufficient knowledge to fully assess the potential environmental impacts of a dredging proposal, it may be possible to submit an application for trial dredging that, subject to approval by the Secretary of State, would help to assess the possible environmental implications of a full dredging proposal. Conversely, there will normally be a presumption in favour of extensions to existing dredging areas where no adverse effects have been detected through monitoring programmes and where no significant effects are likely to arise as a result of additional dredging.

15. Particularly careful consideration will be given to proposals which might impact adversely on:

- areas that are, in the view of DEFRA, important for fish spawning, migration routes, or as nursery and over-wintering grounds;
- areas within, adjacent to, or likely to impact upon, Sites of Special Scientific Interest (SSSIs); National Parks, Heritage Coast, Areas of Outstanding Natural Beauty (AONBs), European sites (Special Areas of Conservation (SACs) and Special Protection Areas (SPAs)), Marine Protected Areas (MPAs), Ramsar sites, Marine Nature Reserves and other nationally designated conservation areas; and
- war graves, wrecks and other remains of archaeological interest.

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Environmental Impact Assessment (EIA)

16. An EIA is required if a project is likely to have significant effects on the environment by virtue of factors such as its size, nature or location. An EIA is already required for every GV application. The statutory system will allow the potential applicant for a Dredging Permission to request a determination from the Secretary of State as to whether an EIA is required (a step known as "screening"). Guidance on the issues the Secretary of State will need to consider, when determining whether an EIA is required will be contained in separate guidance to be published in due course. However, in view of the size and nature of dredging proposals and

the potential for uncontrolled dredging activities to impact unacceptably on the environment, it is Government policy that all applications for Dredging Permissions in previously undredged areas will require an EIA.

17. Once the statutory system comes into force, if a dredging company applies to the Secretary of State to vary conditions attached to a licence granted under the GV procedure, the need for an EIA (and hence a Dredging Permission) will be considered on a case-by-case basis. When making his decision the Secretary of State will consider whether the conditions to be modified relate to activities that control, or may have significant effects, on the environment (as opposed to conditions affecting the commercial arrangements with the owner of the seabed). Account will also be taken of the scale of the proposed changes and any environmental information already available (for example, from an earlier EIA and subsequent environmental monitoring). Guidance on obtaining a Screening Direction from the Secretary of State will be published in due course.

18. In most cases, prospecting and bulk sampling are unlikely to have significant effects on the environment if these operations remove no more than 5,000 tonnes of material. However, an EIA may be required where the proposed sampling operation may impact on a European site or could affect other sensitive areas such as designated shell fisheries or marine archaeological sites. The Secretary of State will consider each proposal on its merits.

19. Guidance on the topics to be considered as part of the EIA is provided in Annex A.

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Minimising The Impacts Of Dredging Activities

Introduction

20. The Secretary of State will consider very carefully the potential of a dredging proposal to cause unacceptable impacts on the environment and on other legitimate uses of the sea. Each application will be considered on its merits. Where there are potential concerns, the applicant should identify appropriate mitigation measures to address these. If the Secretary of State considers that the proposed mitigation measures are appropriate, they will be reflected in conditions attached to the GV or Dredging Permission as appropriate. These may, for example, require:

- working within discrete sub-areas;
- optimising the distance between other dredging areas;
- delaying implementation of the permission until dredging in adjacent areas has ceased;
- restricting the times when dredging is allowed;
- limiting extraction rates;
- limiting the total quantity of material that can be removed;
- restricting the type of dredger that operates; and/or
- prohibiting the screening of sediments at sea.

21. Monitoring and review may be required to assess the effectiveness of dredging conditions. Where it is not possible to mitigate the major impacts of proposals effectively through the use of conditions, the application will be refused.

Cumulative impacts

22. The impact of aggregate dredging at one site has the potential to interact with impacts from other sites in close proximity, or with other human activities such as fishing, pipeline discharges, or the disposal of harbour dredgings. The potential for a new Dredging Permission to contribute to any unacceptable cumulative impacts, should be carefully considered as part of the EIA.

23. Research to examine the potential cumulative impacts of dredging on fisheries and the marine environment was commissioned in 1998 and is expected to report in 2002. Complementary work on the recovery of the seabed habitats following dredging commenced in 2000 and is expected to report in 2004. Relevant information should become available when these projects report. These and other studies will help to inform future reviews of policy guidance and consideration of marine minerals dredging applications.

24. The Secretary of State will carefully consider whether the potential for cumulative impacts has been adequately addressed when determining applications.

Minimising the areas concurrently affected by dredging within Dredging Permissions

25. Where practicable, Dredging Conditions will be used to require areas licensed or permitted for dredging to be sub-divided into a number of discrete zones. Each zone will be as small as is reasonably compatible with providing dredging operators with sufficient flexibility to meet the quality requirements of the construction industry and demand for flood and coastal defence projects. Dredging Conditions will also be used to require the sequential working of zones so as to limit the active operational area within individual permitted areas.

26. Conditions will normally require dredging operators to give appropriate notice of their intention to move from one zone into another. In some cases this will not preclude the return to a previous dredged zone at a later date, so long as sufficient advance warning (for example, 3 months) is given to fishermen or other relevant users of the sea. Where dredging is permitted in the vicinity of more sensitive locations (for example, adjacent to designated conservation areas, or areas which, in the view of DEFRA, are important for fisheries) conditions attached to the permission will set either clear end dates for operations in specific zones, or require the dredging company to work the zone to the extent allowed by the permission before moving into the next. This will both reduce the area being worked at any one time and will allow the seabed where dredging has ceased to rehabilitate without further disturbance. However, the Secretary of State will normally wish to be satisfied that dredging companies do not leave unworked, commercially viable permitted resources simply to obtain permission to dredge, larger, new reserves.

27. The extent of, and programme for, zoning of extraction within the permitted area should take account of the nature and distribution of the resource within the licence area and the

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importance of the area for fishing and/or for its nature conservation value. It may also need to take account of the types of gear used by local fishermen as some forms of fishing can go on at the same time as dredging while others are incompatible, for instance, those using fixed gear.

28. The Government will continue to seek the agreement of the Crown Estate and the dredging industry to bring forward, on a voluntary basis, schemes for zoning existing licensed dredging areas so that dredging activity is concentrated, overall, into less extensive areas. Co-operation between dredging companies to optimise the zoning arrangements on adjacent areas can help minimise the potential cumulative impacts in areas where there are numbers of licences in close proximity.

Seasonal and tidal restrictions

29. Where necessary, conditions will be imposed to restrict dredging activities at critical times of the year or states of the tide, in order to, for example, allow access by fishermen, or to minimise damage to the marine environment. The effectiveness of such restrictions should be monitored and should be carefully considered when the monitoring results are periodically reviewed.

On-board screening

30. On-board screening is used to exclude particular sizes of dredged material at sea, in order to obtain a cargo that meets the needs of a particular market. Screening can be used to remove either the sand fraction to provide a predominantly gravel material, or the larger fraction to provide a cargo of the required grade of sand. If screening is properly managed it can extend the life of an area by avoiding the waste of potentially useful material and thus reducing the need for new areas to be permitted.

31. However, screening does result in substantial quantities of dredged material being discarded. If this includes very fine material, it may stay in the water column for some time and be visible as a sediment plume (see endnote 1). However, most is redeposited rapidly within the dredging area and is available for re-extraction at a later date. A review of the potential environmental impacts of plumes was published by the Construction Industry Research and Information Association (CIRIA) in 2000. The coarser material may move over the seabed (as 'bedload'). Both sediment plumes and increased bedload movement of sand have the potential to impact adversely on the environment and careful consideration should be given to this as part of the EIA.

32. Screening will not be permitted where it is considered likely to have unacceptable environmental impacts. However, in some cases it may be possible to impose appropriate conditions to mitigate the effects. Monitoring may be required to assess the effectiveness of the mitigation measures.

The removal of overburden

33. The dredging industry generally seeks to exploit areas of the seabed which contain only relatively small amounts of fine material (fine sands, silts and clays). However, there may be instances where the resource is overlain by a layer of fine material. In such cases, it may be

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necessary to remove the overburden to expose the resource. Where this is likely to be the case, the EIA should carefully consider the potential effects of both the removal and disposal of such material. Where it is proposed to dispose of such material at sea, it will be necessary to obtain a licence from DEFRA under the Food and Environment Protection Act 1985.

Monitoring Of Marine Minerals Dredging Licences And Permissions

Introduction

34. Aggregate dredging inevitably disturbs the marine environment. The extent of the disturbance and its environmental significance will be site specific. In all cases where an EIA is required the information provided in the EIA must be adequate. However, it is possible that dynamic changes which could not have been foreseen or predicted at the time the EIA was prepared will occur in the marine environment after the licence or permission has been granted. A programme of monitoring will, therefore, be needed to assess the effectiveness of the conditions imposed, to ensure the absence of unacceptable impacts on the marine environment, fisheries and other uses of the sea and, where necessary, to trigger corrective action. However, the Government recognises that environmental monitoring is expensive, and must therefore be carefully targeted to address specific matters of concern. To ensure that the monitoring programme is cost effective, it is essential that it has clearly defined objectives derived from the potential impacts predicted by the EIA.

35. Monitoring should normally start before dredging commences, to provide a baseline of environmental information against which later results can be assessed and to ensure that the measures taken in the formulation of the conditions are achieving their aims. It may also form an input to future EIAs if, for instance, an application is submitted to dredge in an adjacent area. The amount of monitoring is likely to reflect the nature and sensitivity of the surrounding area. Monitoring requirements may initially be more intensive in order to provide an adequate baseline against which to assess later, possibly more focussed surveys. In a limited number of cases, it may be appropriate to start a monitoring programme several years before dredging starts, to provide a picture over time of natural fluctuations in the local environment.

36. Monitoring conditions will be imposed on all licences and Dredging Permissions and will reflect the circumstances at each site. Conditions will require either specified monitoring activities, or a scheme or programme of monitoring to be prepared and agreed with the Secretary of State. The latter approach will provide more flexibility and, subject to the Secretary of State's approval, allow changes to be made to the monitoring programme in the light of earlier findings, without the need to modify dredging conditions. A condition will normally also be imposed requiring the periodic review of monitoring information (see paragraphs 44 - 47).

Monitoring compliance with dredging conditions restricting the location and timing of dredging activities

37. Every vessel dredging on a Crown Estate licence is fitted with an Electronic Monitoring System (EMS). This automatically records the date, time and position of all dredging activity and enables the Crown Estate and the Secretary of State to determine that dredging is confined to the licensed area, and in appropriate cases, complies with other conditions such as

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seasonal restrictions.

38. This procedure will continue under the statutory system, and all Dredging Permissions will include a condition requiring the installation and operation of an EMS. The output from the EMS must be supplied to the Secretary of State (or his agent as indicated on the Dredging Permission) for analysis within 30 working days from the end of each month.

Monitoring environmental effects

39. Requirements for monitoring the environmental effects of the dredging activity will be site specific, and will be based on the outcome of the EIA, and take account of comments from the statutory consultees as well as any other relevant considerations.

40. It is likely that in most, if not all, cases it will be necessary to monitor:

> **(i)** the effect of dredging on seabed morphology;
> **(ii)** that dredging is no deeper than permitted; and where appropriate
> **(iii)** that underlying sediments are not unacceptably exposed.

41. It may also be necessary, in appropriate cases, to demonstrate that:

> **(i)** an adequate depth (normally at least 50cm) of suitable material has been left as a 'capping layer' to provide a substrate for recolonisation; and
> **(ii)** sensitive features in the vicinity of the dredging area (e.g. *Sabellaria* reefs) are not being unacceptably affected.

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42. Shoreline monitoring may be required where the coastal impact study identifies that, while no adverse effects are expected, there remains some uncertainty about the effects of permitted dredging on the coastline. Guidance on the assessment of the effects of aggregate dredging on the coastline has been published by the Construction Industry Research and Information Association (CIRIA, 1998). Guidance on monitoring the effects of aggregate dredging on the historic environment is available in the Code of Practice for Seabed Developers, produced by the Joint Nautical Archaeology Policy Committee. The British Marine Aggregate Producers Association and the Royal Commission on the Historical Monuments of England are preparing updated guidance.

43. The outcome of monitoring programmes required by conditions will normally be made available to interested parties to encourage good practice, and to provide useful information for other EIAs. Guidance on the conduct of biological and physical surveys of the seabed has been prepared by CEFAS (DTLR, 2002).

Periodic review of monitoring information

44. Periodic reviews of monitoring information provide an opportunity for the Secretary of State to assess whether the dredging activity is progressing according to the predictions made in the EIA. They will be undertaken as specified in conditions but usually at 5 yearly intervals from commencement of the dredging activity. For some monitoring requirements, more frequent reporting and review will be necessary.

45. The issues to be considered at the review stages will be identified in the schedule of conditions, and will be informed by data from the prescribed monitoring programme. Where practicable, the monitoring programme will set threshold values against which to judge unacceptable effects, although it is recognised that this is not always possible. The dredging operator will be required to prepare reports on the outcome of the monitoring programmes which should be sent to the Secretary of State in accordance with the requirements of the scheme of conditions. It should provide a record of the monitoring programme up to that time and consider the need for any changes to the mitigation measures covered by conditions or to the monitoring programme.

46. The review will be used to determine whether it is:

(i) acceptable for dredging to continue as before;
(ii) necessary to modify the monitoring programme;
(iii) necessary to introduce new, or modify existing, conditions; or
(iv) necessary to terminate dredging activities early.

47. Where monitoring indicates that the marine environment outside the dredging area is being unacceptably affected as a direct result of the dredging activity, the Secretary of State will consider carefully what action is needed to minimise further damage or, if considered necessary, to restore the area. In appropriate cases, dredging will need to stop while the situation is investigated.

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Dredging Conditions

48. As indicated throughout this Note, dredging conditions will be imposed to control dredging activities in order to mitigate adverse effects on the environment and/or to require specified monitoring to ensure that unforeseen effects do not arise, and to make provision for the review of the results of monitoring.

49. Conditions will be appropriate to the application site and will be based on the findings of the EIA, subject to any amendments made by the Secretary of State, or in the case of applications considered at an inquiry or hearing, in the light of the Inspector's recommendations. A **guide** to the key issues most likely to be covered by conditions is contained in Box 1.

Box 1. Examples of matters that might be covered by conditions

Details of the operation

- Boundaries of the permitted area, including chart co-ordinates
- Maximum total quantity of material to be extracted
- Maximum annual extraction rate
- Start date of permission
- Duration of the permission

Control over dredging activities

- Maximum depth of dredging
- Type of dredger allowed (eg trailing suction hopper or anchor dredging)
- Zoning arrangements
- On-board screening
- Removal and treatment of overburden
- Seasonal and tidal restrictions
- Required notice before moving between zones
- Condition of the seabed at the cessation of dredging
- Protection of existing or proposed pipelines
- Protection of war graves, wrecks, or other remains of archaeological interest
- Other exclusion zones (eg to protect Sabellaria reefs)

Monitoring

- Requirement for electronic monitoring (EMS) of dredging activity
- Baseline monitoring of seabed sediment composition, benthos, bathymetry, fisheries, location of wrecks or other remains of archaeological interest
- Ongoing surveys repeated at defined intervals, or following the extraction of identified quantities of material
- Coastline monitoring
- Seabed stability
- Assessment of the seabed on the cessation of dredging

Navigation

- Conditions specified by the Maritime and Coastguard Agency to

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ensure navigational safety

- Notification to other shipping of dredging activities
- Reporting of collisions or near misses
- Protection of aids to navigation

Liaison

- Notification and liaison procedures with relevant fishing organisations
- Informing appropriate organisations of the discovery of significant archaeological features etc.

Reporting arrangements

- List of organisations to receive copies of reports, monitoring information etc.

Periodic reviews of monitoring information

- Requirement for periodic reviews of monitoring information
- Triggers for reviewing dredging activity
- Action to be taken in the case of unacceptable impacts being identified

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Safeguarding Resources For Specific Uses

50. Research has been undertaken to assess the availability of marine-won sand and gravel resources to meet the predicted demand for the construction industry and for beach nourishment schemes to 2015 (CIRIA, 1996). The results indicated that, while extensive resources of sand exist, there might be shortfalls of gravel (shingle), required to meet the local demand for beach nourishment schemes, in some sea areas. While these future shortfalls can be met by other resources within the range of the present dredging fleet operating in English waters, the benefits of obtaining materials locally need also to be recognised (including the time taken by dredgers to reach and return from dredging areas, the type of materials available and the price of the product). Since publication of that report, large additional resources of sand and gravel have been identified, particularly in the Eastern English Channel. The Government does not propose, at present, to introduce a general policy to protect reserves for specific uses, but will have regard to the need for beach nourishment material when considering applications. This may include permitting the extraction of particular resources in

appropriate areas for beach nourishment purposes only, where the EIA indicated that there were net beneficial effects in terms of coastal protection (subject to the other environmental and fisheries criteria being met).

51. In the longer term, the Government may consider whether it is feasible to address issues such as sources of supply within a strategic framework for marine dredging of sand and gravel. Research has been commissioned and is expected to be completed in late 2002.

Endnotes

1. Screening is not undertaken to remove the finer silt fraction. Silt is lost through ships' spillways whether, or not, screening is used.

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Annex A: Guidance on Environmental Impact Assessment in Relation to Marine Minerals Dredging Applications

Introduction

A1. The extraction of marine minerals has the potential to impact unacceptably on the coastal environment, commercial fisheries, marine ecosystems, navigational routes, wrecks and other archaeological remains and other uses of the sea. It is therefore important that dredging is only undertaken at locations and in ways that do not have unacceptable impacts.

A2. As indicated in paragraph 16 of this Note, an Environmental Impact Assessment (EIA) is already required for every GV application and it is likely to be a requirement for all applications for new Dredging Permissions. The applicant will therefore need to show that a full EIA has been undertaken by preparing and submitting an Environmental Statement (ES) as part of the application process. This should include such of the information set out in Part I of Schedule 4 of the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 (which will also apply to the forthcoming statutory system) as is reasonably required to assess the environmental effects of the relevant project and which the applicant can reasonably be required to compile, having regard in particular to current knowledge and methods of assessment. However, it must include at least the information set out in Part II of Schedule 4. The text of Parts I and II are reproduced in Box 2.

A3. Guidance on the procedural steps to be taken when preparing an ES will be explained in separate guidance to be published in due course. The following text provides guidance on issues that should be considered when assessing the environmental effects of the proposed project. It is in four sections:

- Description of the proposed activity and environment
- Assessment of the potential effects of the dredging activity
- Measures to avoid, reduce or remedy significant adverse effects
- Monitoring of environmental effects

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Box 2: Schedule 4 To The Town And Country Planning (Environmental Impact Assessment) (England And Wales) Regulations 1999

Information Referred To In The Definition Of Environmental Statement

Part I

1. Description of the project, including in particular -

(a) a description of the physical characteristics of the whole project and the land-use requirements during the construction and operational phases;
(b) a description of the main characteristics of the production processes, for instance nature and quantity of the materials used;
(c) an estimate, by type and quantity, of expected residues and emissions (water, air and soil pollution, noise, vibration, light, heat, radiation, etc) resulting from the operation of the proposed project.

2. An outline of the main alternatives studied by the applicant and an indication of the main reasons for his choice, taking into account the environmental effects.

3. A description of the aspects of the environment likely to be significantly affected by the proposed project including, in particular, population, fauna, flora, soil, water, air, climatic factors, material assets, including the architectural and archaeological heritage, landscape and the inter-relationship between the above factors.

4. A description of the likely significant effects of the proposed project on the environment, which should cover the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the project, resulting from:

(a) the existence of the project;
(b) the use of natural resources;
(c) the emission of pollutants, the creation of nuisances and the elimination of waste, and a description by the applicant of the forecasting methods used to assess the effects on the environment.

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5. A description of the measures envisaged to prevent, reduce and where possible offset any significant adverse effects on the environment.

6. A non-technical summary of the information provided under paragraphs 1 to 5 of this Part.

7. An indication of any difficulties (technical deficiencies or lack of know-how) encountered by the applicant in compiling the required information.

Part II

1. A description of the project.

2. A description of the measures envisaged in order to avoid, reduce and, if possible, remedy significant adverse effects.

3. The data required to identify and assess the main effects which the project is likely to have on the environment.

4. An outline of the main alternatives studied by the applicant and an indication of the main reasons for his choice, taking into account the environmental effects.

5. A non-technical summary of the information provided under paragraphs 1 to 4 of this Part

Description Of The Proposed Activity And Environment

Description of the proposed activity

A4. The following issues should be covered:

- the location of the proposed dredging area should be specified by a list of chart coordinates together with a map showing its location in relation to the surrounding sea area, other dredging areas and adjacent coastlines;
- the size of the area specified in square kilometres;
- the total volume of material to be extracted together with an indication of the maximum depth to which material will be removed;
- a description of the material to be extracted including the particle size distribution of the material found within the proposed dredging area. This should be presented as the percentage of gravel, sand and finer material, at representative locations within and adjacent to the application area;
- the type of dredgers to be used (eg trailing suction hopper dredger), together with details of the vessels' load capacity, overflow arrangements and operating methods. It should be made clear whether on-board screening (ie rejection of particular size fractions) is to be used, and the likely nature and quantity of material to be returned to the seabed as a result of screening;
- the proposed annual extraction rate and the predicted lifetime of the deposit;
- estimates of the likely number of shipping movements on an annual, and where appropriate, seasonal basis, and the number of vessels likely to be operating within the area at any one time. The routes likely to be taken by dredgers to and from the application area should also be specified;
- details of proposed operational control procedures to ensure that dredging only takes place in the permitted area and that interference with other uses of the sea is minimised both within and outside the proposed extraction area. Applicants should consider

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appropriate notification and liaison arrangements with other relevant users of the sea (eg fishermen) to ensure harmonious working relationships between the different parties;

- the need to exploit the resources in question through careful, comparative consideration of local, regional and national need for the material in relation to the identified impacts of the proposal and the relative environmental and social costs of provision from other marine and terrestrial sources.

Description of the physical nature of the seabed

A5. The physical aspects that should be considered include:

- a description of the geology and geomorphology of the application area and its surrounds, including the nearby coast, indicating where possible, its recent evolution;
- bathymetry of the seabed in the area proposed for dredging together with a surrounding strip of at least 1km outside;
- assessment of the hydrodynamics of the general area including tidal regime, wave conditions and residual water movements. Notable features on the seabed and indicators of tidal current strength and direction should be identified. Assessment of the mobility of the seabed and sediment transport pathways should be based on direct observations, numerical modelling, or inferred from bedform asymmetry and type;
- the characteristics of seabed sediments in and around the site should be identified using side-scan sonar, shallow seismic and grab sample data. The mineral resource characteristics including particle size and lithology, origin and composition, thickness, and nature of underlying deposits should be identified;
- a baseline assessment should be undertaken of water quality in the area prior to dredging. This should include an assessment of suspended sediment load and, where appropriate, any chemical contamination. An indication of seasonal variability may also be appropriate.

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Description of the biological status of the proposed area

A6. A benthic survey of invertebrate fauna and flora should be undertaken by properly qualified and experienced personnel. The sampling strategy, including the number of sampling stations, the method used to collect samples and the method of sorting and recording should be agreed beforehand with DEFRA, and English Nature where conservation interests are concerned. Further guidance on appropriate procedures for undertaking benthic surveys has been produced by the Centre for Environment, Fisheries and Aquaculture Science (CEFAS) on behalf of the Secretary of State (DTLR, 2002).

The ES should provide the following:

- a summary of the techniques used, and records of all species identified and their

abundance at each sampling station;

- a description of the benthic communities present within and adjacent to the application area. This should include evaluation of the typical assemblages of species, covering diversity, abundance, extent, species richness, representativeness, naturalness, rarity and fragility in and around the proposed dredging area;

- an indication of the sensitivities of particular habitats and species, for example *Sabellaria* reefs, or *Modiolus* beds;

- an assessment of known predator-prey relationships, and measures of abundance of dominant species likely to be influenced by dredging, including temporal and spatial population dynamics of the benthic assemblages.

A7. The ES should also include an assessment of the importance of the general area for fisheries, sea birds, marine mammals and other large mobile species such as sharks. Effort should focus on species that require a specific sediment type or habitat for use, for example, when feeding, or burying or depositing eggs. In view of the variability in the distribution of fisheries, seabirds, marine mammals and other large mobile species, the applicant is encouraged to seek the most recent sources of information from English Nature, Joint Nature Conservation Commitee, DEFRA and other appropriate experts. The ES should describe:

- the seasonal use of the area for feeding and overwintering by adults;

- any migration routes that may pass through or near the site;

- the location and importance of spawning and breeding grounds; and

- the extent to which the area includes nurseries occupied by juveniles.

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Other uses of the sea

A8. There are many legitimate uses of the sea. It is important that dredging does not cause unacceptable disturbance to them. The ES should identify the extent to which the following activities may be affected by dredging.

(a) Commercial fishing activity.

- The ES should include an overall assessment of the nature and level of commercial fishing activity in the vicinity of the application area. This should be obtained by consultation with fishermen and fishermen's organisations at all ports likely to be affected, and analysis of published statistics on fish landings from the vicinity of the proposed dredging site and from the surrounding region.

The ES should provide information on the following:

- the recent and current numbers of vessels operating out of all the ports in the vicinity that are likely to be affected, and whether they are active for part or all of the year. It should indicate the seasonal fishing patterns of these vessels, their normal range and the size of the area they normally visit, together with a description of the fishing methods used and the species landed. In addition to providing valuable background information, this will also identify the most appropriate points for fisheries liaison, and likely sources of direct conflict, for example the need to allow adequate time for removal of fixed gear in advance of any dredging operation;

- the quantity and value of fish and shellfish landings by these fisheries, by port of landing and by season/year. Data should refer to each fleet that occupies the application area for part or all of the year. These data should describe the landings of each species, and any seasonal trends. Since published statistics are normally too general, data should be obtained from fishermen's logbooks, liaison with local DEFRA Fisheries Officers and local Sea Fisheries Committees. Special fisheries intensity studies should be undertaken by fisheries experts. Statistics should, wherever possible, cover a period before dredging starts to provide a baseline. Natural fluctuations in fish and shellfish populations from year to year mean that, a number of years of pre-dredging data are beneficial;

- an evaluation of the commercial impact of the proposed dredging programme on these fisheries. This can be done by comparing the geographical area of the proposed application with the total size of the area in which each fleet normally fish. The nominal 'resource value' of the application can be estimated from the value of the fishery and the proportion of the area that is likely to be affected by the application. This method assumes that resources are evenly distributed throughout the area, so care must be taken to include only those areas which fishermen normally visit. More sophisticated methods, which describe the fine scale distribution of fishing vessels can be used. This will give an indication of the relative contribution that the application area makes to the total catch, and therefore gives some indication of the commercial value of the application area for fishing:

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(b) other dredging activities in the area;

(c) waste disposal operations (by dumping or pipeline) in the region;

(d) offshore oil and gas activities which might impact on, or limit, dredging;

(e) wrecks and other archaeological remains;

(f) war graves;

(g) shipping and navigational hazards;

(h) location of military exercise areas;

(i) location and magnitude of recreational activities such as yachting, angling and scuba diving;

(j) location of pipelines, cables and other such features;

(k) location of nearby nationally and internationally designated conservation areas (eg Marine Nature Reserves, Marine Protection Areas SSSIs, SACs, SPAs and Ramsar sites) and National Parks, Heritage Coast and Areas of Outstanding Natural Beauty.

Assessment Of The Potential Effects Of The Dredging Activity

A9. When evaluating the potential effects of the proposed dredging programme the ES should identify and quantify the consequences of the proposal on the environment, fisheries and other uses of the sea. Ideally, this should be summarised as an impact hypothesis, drawing on the results of earlier studies. The assessment of some of the potential impacts will require predictive techniques, and it may be necessary to use appropriate mathematical models. Where such models are used there should be sufficient explanation to enable an informed assessment of their suitability for the particular modelling exercise to be undertaken.

Physical effects of dredging

A10. To assess the physical impact of aggregate extraction on the hydrographic and seabed environments, information should be provided on:

- likely production of a sediment plume (from the draghead at the seabed, from hopper overflow, or on-board screening) and its subsequent transportation within the water column or along the seabed. This should be considered together with the background suspended load.
- implications for coastal erosion (through a Coastal Impact Study), in particular whether;
  - the proposed dredging is far enough offshore for there to be no beach drawdown into the deepened area;
  - the proposed dredging will interrupt the natural supply of materials to beaches through tides and currents;
  - the likely effect on bars and banks which provide protection to the coast by absorbing wave energy, and the potential impact on local tidal patterns and currents which could lead to erosion;
    - likely changes to the height of waves passing over dredged areas and the potential effect on the refraction of waves which could lead to significant changes in the wave pattern;
- the likely effects on the seabed of removing material. In particular the nature of the sediment to be left once dredging ceases, and the likely nature and scale of the resulting topography (eg ridges and furrows);
- implications for local water circulation resulting from the removal or creation of

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topographical features on the seabed;

- assessment of the impacts in relation to other active or proposed dredging operations in the area.

A11. Further guidance on assessing the effects of dredging on the coastline is contained in '*Regional seabed sediment studies and assessment of marine aggregate dredging*' produced by CIRIA (1998).

Biological effects of dredging

A12. The principal biological impacts of dredging are direct disturbance, removal of benthic species, and alteration of the nature of the seabed upon which colonisation depends. This can affect the suitability of the seabed as a fish or shellfish food resource or habitat. Dredging should aim to leave the seabed in a similar physical condition to that present before dredging started in order to enhance the possibility of, and rate at which, the seabed recovers physically and biologically to its pre-dredging condition.

A13. The EIA should consider:

- the variability of benthic species and communities over time and space, and provide an indication of the likely rate of recovery following the cessation of dredging;
- the potential impact on the fish and shellfish resources, both within and outside the application area. Particular attention should be given to spawning and nursery areas and overwintering grounds for ovigerous crustaceans (for example, egg bearing lobsters and crabs) and known migration routes; and
- potential impacts on seabirds, marine mammals, and other large mobile species such as sharks.

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Effects on other uses of the sea

(a) Potential effects on commercial fisheries

A14. Dredging has two potential effects on commercial fisheries. The first is to modify the marine environment in such a way that it adversely affects fish stocks, for example, by interfering with fish spawning and nursery areas, or migration routes. The second is the direct effect on the activities of fishermen.

A15. Consideration should be given to the noise and the sediment plumes which dredgers may cause, which could result in the temporary movement of fish out of the area, and could therefore put some fisheries out of the reach of smaller vessels.

A16. Dredging may also affect fish stocks indirectly, by disturbing benthic communities which provide the food source for commercial fish. Depending on the size of the area affected, highly mobile fish species may be able to move to other feeding grounds. But this can affect local

fishermen. The ability of fishermen to avoid dredging areas will vary depending on the fishery they pursue and the size and complexity of their boats.

A17. DEFRA should be consulted on the availability of information on such matters as the location of spawning areas, important known feeding/nursery grounds, migration routes and over-wintering grounds for egg-bearing crustaceans.

(b) Other activities

- Careful consideration will need to be given to applications which may interfere with other uses of the sea eg shipping lanes, pipelines and cables, wrecks and Ministry of Defence sites; and
- The effect on sports fishermen, leisure craft and divers should also be carefully considered.

Potential effects on marine archaeological sites

A18. The Joint Nautical Archaeology Policy Committee has produced a Code of Practice for Seabed Developers (see endnote 2). This provides recommended procedures for consultation and cooperation between seabed developers and archaeologists. This is consistent with the Government's policy on archaeology as stated in PPG16 (see endnote 3), and should continue to be followed by the dredging industry. The British Marine Minerals Aggregate Producers Association and the Royal Commission on the Historical Monuments of England are preparing guidance on assessing, evaluating, mitigating and monitoring the effects of dredging on the historic environment.

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Cumulative Impacts

A19. The ES will need to demonstrate that a permission is unlikely to result in unacceptable cumulative physical and biological impacts through the combined effects of dredging and of other activities in other nearby areas as well as the proposed dredging area.

A20. An assessment of the cumulative impacts should extend beyond an evaluation of sitespecific direct and indirect impacts. It should consider the effects of a project in combination with the sum of individual impacts occurring over time (usually both recent changes and changes projected over the proposed period of dredging). Consideration should also be given to the impact of the project over broad geographical scales to encompass the effects on an ecological community, that extends beyond the immediate area of the proposed extraction area.

Measures To Avoid, Reduce Or Remedy Significant Adverse Effects

A21. The ES should include consideration of the practical steps that might be taken to mitigate the effects of the proposed mineral extraction. These should be site specific and closely linked to particular potential environmental effects identified during the EIA process. Mitigation

measures may include:

- modification of the dredging depth to limit changes to hydrodynamics and sediment transport patterns to acceptable levels;
- agreed dredger navigation routes to minimise interference with shipping, fishing and other uses of the sea;
- zoning of the permitted area to protect sensitive fisheries, optimise access to traditional fisheries, and to reduce the impact on sensitive benthic assemblages;
- exclusion zones to protect rare or stable communities identified as occurring in small areas within a much larger application area. Such exclusion zones also provide a refuge for species that may assist in the eventual recolonisation of the worked-out area. Where such an approach is considered appropriate, it is important that the exclusion zones are large enough to protect the area of critical importance;
- the choice of dredging technique and the timing and phasing of working may also assist in preventing disturbance. For example, it may be appropriate to allow dredging only at particular stages of the tide to ensure that disturbed sediments are transported away from exclusion zones by the tide, or to prohibit screening;
- seasonal restrictions, where appropriate, to minimise impacts on migratory fish stocks or on vulnerable life history stages of fish or the benthos;
- safety buffer zones around war graves, important wrecks or other marine archaeological sites, pipelines and cables.

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A22. It will often be necessary to seek expert advice to devise measures to protect species such as seabirds, and marine mammals, where these are at risk. Such advice may be available from English Nature and the Joint Nature Conservation Committee.

A23. When considering mitigating measures, a balance has to be struck between the ecological or other importance of the area and the level of protection afforded to it. If an area is identified to contain or, in some other way, to support (eg as feeding grounds) important species, this may be sufficient cause to prevent dredging (or other forms of seabed disturbance) altogether.

Monitoring Of Environmental Effects

A24. The ES should include a consideration of an appropriate monitoring programme. Aggregate dredging by its very nature causes disturbance to the marine environment. Conditions attached to permissions are aimed at minimising environmental effects by controlling the operation of dredging activity. However, in many cases it is not possible to predict all the environmental effects at the outset. A programme of monitoring can be used to assess the validity of the predictions made in the EIA as well as establishing whether the dredging conditions are adequately preventing unacceptable effects on the marine and coastal environment, fisheries and other uses of the sea. Monitoring will also be appropriate to

determine whether conditions are being properly implemented, and to improve the basis on which future applications can be assessed by improving knowledge of the effects of dredging.

A25. Monitoring should take account of natural variability within the marine environment. This can best be achieved by comparing the physical or biological status of the dredging area with previously defined and monitored sites located away from the influence of dredging activity.

A26. The spatial extent of sampling should include the area permitted for extraction and areas outside which may also be affected. In most cases there should also be monitoring within an area where 'no effect' is expected. This will give a better indication of the extent of any effects.

A27. The frequency of monitoring will depend upon the scale of the extraction activities and on the nature of the area of interest, including its sensitivity and the anticipated period of consequential environmental changes.

A28. Reports on monitoring activities should be prepared. These should provide details of the measurements made, results obtained, their interpretation and how the data relate to the monitoring objectives.

A29. Monitoring operations are expensive, as they require considerable resources both at sea and in subsequent sample and data processing. It is important, therefore, to ensure that a monitoring programme is properly designed so that it meets its objectives. The results should be reviewed at regular intervals against the stated objectives and the monitoring exercise should then be continued, reviewed or even terminated.

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Endnotes

2. Available from the National Monuments Record Centre, Kemble Drive, Swindon, SN2 2GZ

3. Archaeology and Planning

Annex B: Bibliography

CIRIA (1996) Beach recharge materials - demand and resources. CIRIA Report C154.

CIRIA (1998) Regional seabed sediment studies and assessment of marine aggregate dredging. CIRIA Report C505

CIRIA (2000) Scoping the assessment of sediment plumes from dredging. CIRIA Report C547.

DETR (1998) Government View: New Arrangements for the Licensing of Minerals Dredging.

DETR. DOE (1990) Archaeology and Planning. Planning Policy Guidance Note 16. HMSO.

DTLR (2002) Guidelines for the conduct of benthic studies at aggregate dredging sites. DTLR

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