

Extractive Industries Dredging and Other Extraction in Riparian and Coastal Areas

E I S G u i d e l i n e

**New South Wales
Department of Urban Affairs and Planning**

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Executive summary

This guideline identifies some important factors to be considered when preparing an environmental impact statement (EIS).

The preparation of the EIS should be preceded by early effective consultation and technical discussions with relevant government agencies and councils.

A high priority should be given to:

- considering environmental factors in site selection
- evaluating alternative sites
- ascertaining the suitability of the intended location.

There should be an early evaluation of alternatives, taking into consideration the factors in Part 4 of this guideline.

The analysis of alternative design, processing and management practices should consider the environmental implications of options. The justification for the selection of the preferred options should consider biophysical, social and economic factors, and the consistency with ecological sustainability principles.

The assessment process should focus on key environmental issues. These issues should be identified early in the environmental impact assessment (EIA) process, usually at a planning focus meeting and through consultation with the community. The assessment process should clearly identify the environmental (including biophysical, social and economic) costs and benefits of the proposal.

Key issues for dredging and other extraction in riparian and coastal zones usually include:

- ī water quality issues
- ī disturbance to water and sediment movement processes
- ī ecosystem disturbance.

The EIS should outline commitments to the ongoing environmental management of the proposal, including monitoring.

The level of analysis of individual issues in the EIS should reflect the level of significance of their impacts. The analysis should focus on key issues. The information in the EIS should be accurate and presented clearly and concisely. There should be emphasis on quality and not quantity. The EIS need not be long.

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1. Purpose and scope of the guideline

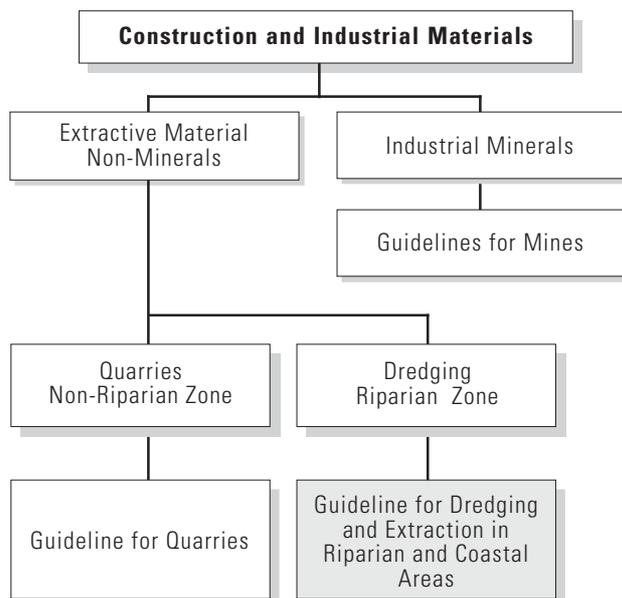
1.1 Background

The purpose of this guideline is to outline issues which may be relevant in the environmental impact assessment of dredging, and other extractive industries obtaining unconsolidated extractive material from riparian and coastal areas. These areas are defined as those:

- **associated with natural waterbodies** including the beds, banks, bars, shoals, islands and surrounding areas of perennial or intermittent streams or rivers, anabranches, billabongs, lagoons or lakes;
- **on floodplains** formed through deposition of material transported by the natural waterbody during times of flood;
- **in coastal localities** including nearshore and onshore marine material deposits, e.g. estuaries, harbours, bays, inlet and estuary channel deposits, estuary shoals or bars, tidal deltas, beaches, dune fields, coastal lagoons.

Figure 1 shows how these guidelines relate to other guidelines on mining and extraction.

Figure 1. Relationship of extractive industry guidelines



Not all matters outlined in this guideline will apply to every proposal. The environmental impact statement (EIS) should be tailored to suit the potential impacts of the proposal. It is essential to focus on key issues only. If the relevant matters identified in the guideline are addressed, there should be sufficient information for the appraisal of most proposals. Early identification of issues relevant to government agencies will also be facilitated by this guideline.

The issues in this guideline should also be considered for proposals that do not require an EIS, but for which a statement of environmental effects or review of environmental factors is being prepared.

1.2 What are extractive materials?

Construction sand, soil, gravel or similar materials (which are not prescribed as minerals within the meaning of the *Mining Act 1992*) are defined as 'extractive materials'. Extractive materials are used principally as construction material in pre-mixed and bituminous concrete, road base, foreshore protection, land formation and landfill material.

Some materials, such as marine aggregate, which may be regarded as extractive materials, are not extractive materials for the purpose of this guideline (and Schedule 3 of the Environmental Planning & Assessment (EP&A) Regulation 1994), as they are defined as minerals in the Mining Act. A separate guideline will apply to the mining of minerals.

1.3 Extractive industries covered by this guideline

The definition of extractive industries for the purpose of this guideline (and in Schedule 3) is as follows:

Extractive industries are those which obtain extractive materials by methods including excavating, quarrying, dredging or tunnelling or that store, stockpile or process extractive

materials by methods including washing, crushing, sawing or separating.

This guideline applies only to extractive industries which obtain unconsolidated material from riparian or coastal areas by excavating or dredging. Some proposals have only one purpose, such as the obtaining of extractive material for sale or use. Others may have multiple purposes. For example, as well as winning extractive material, the proposal may involve:

- the restoration or improvement of navigability or river flow
- reclamation or bank restoration works
- flood mitigation or stormwater management works
- the construction of drainage or water channels or
- the renovation of oyster leases.

Proposals may range in size from small operations such as the removal of less than 1000 tonnes of material from the bars on a river bend through to large-scale operations with many employees, producing more than a million tonnes of material per year, supplying regional markets.

Extractive industry proposals usually involve:

site preparation:

- a) site preparation which may include works exclusively on land or a combination of land-based and water-based activities, including:
 - i) land clearing, removal of overburden, storage of overburden and topsoil for rehabilitation
 - ii) for dredging, the establishment of a dredge site including pipelines or docking facilities

extraction of material:

- a) extraction, including mechanical and hydraulic land or water-based methods, using:
 - i) scrapers, excavators, bulldozers, rippers, front-end loaders
 - ii) suction, bucket or dipper dredges or draglines;
- b) material which may be stockpiled temporarily at the extraction site or conveyed directly to the processing site — with dredging proposals this will include dewatering with sedimentation ponds and water/fines management systems

loading and transport:

- a) transport to processor or market involving front-end loaders, excavators, trucks, elevators, conveyors, slurry pumps or pipelines

processing:

- a) processing equipment which may be permanent, (for the life of the operation) or portable and may involve:
 - i) dewatering for material pumped directly from a dredge
 - ii) a screening and washing plant for the removal of unwanted material
 - iii) crushing, screening, sieving or other equipment with vibratory feeders, and connecting conveyors for separating the material into size fractions and conveying it to stockpiles or storage bins
 - iv) blending with other extractive materials to achieve the required characteristics

progressive rehabilitation:

- a) rehabilitation programs which should be integrated into the extraction and processing sequencing plans.

1.4 When is an EIS required?

An EIS must be prepared for extractive industries which have the potential to significantly affect the environment.

Under Part 4 of the EP&A Act, extractive industries may require development consent under a local environmental plan or other planning instrument. If this is the case, then Schedule 3 of the EP&A Regulation applies. This defines thresholds based on volumes of material obtained, the extent of the area disturbed and sensitivity of the affected environment.

Extractive industries in sensitive locations such as in or near waterbodies, near the coastline or on steep land, are designated and an EIS must be prepared. Certain types of activities associated with extraction proposals, such as small-scale maintenance dredging or extraction undertaken under an approved rivercare or river management plan, are exempted from designation. For maintenance dredging covered by SEPP 35 — Maintenance Dredging of Tidal Waterways, the environmental assessment provisions of Part 5 of

the EP&A Act apply. (See Appendix 6 for the full description of designated extractive industries.) If a development is designated, then an EIS must be lodged with a development application.

Under Part 5 of the EP&A Act, a government authority prior to determining an application for an extractive industry activity which does not require development consent, must first consider whether that activity has the potential to cause significant environmental impacts.

If significant impacts are likely to result, then an EIS must be prepared and assessed prior to any

approval being granted. In deciding whether an extractive industry proposal has the potential to significantly affect the environment, determining authorities should refer to *Is an EIS required?* (Department of Planning, 1995). (Appendix 2 shows the approval process under Parts 4 and 5).

When an EIS is not required, this guideline is equally applicable for identifying the range of issues which may need to be addressed in a statement of environmental effects (SEE) under Part 4 of the EP&A Act or review of environmental factors (REF) under Part 5 of the EP&A Act.

2. Factors to consider when preparing an EIS

The aim of environmental impact assessment (EIA) is to enable the approving authority, the public, the local council, government authorities and the proponent to properly consider the potential environmental consequences of a proposal. It is important to provide sufficient information for the approving authority to make a decision on whether to approve a proposal and if so, under what conditions. The EIS provides the basis for sound ongoing environmental management.

It is the proponent's responsibility to identify and address, as fully as possible, the matters relevant to the specific proposal and to comply with the statutory requirements for EIS preparation. The following factors are important when preparing an EIS.

2.1 Early consideration of the strategic context

The need for the proposal should be clearly identified along with its relationship to broader strategic plans and goals. Consideration of the strategic context is essential when selecting options for the proposal. Strategic mechanisms such as policies and plans which illustrate how the proposal has been developed, should be discussed in the EIS so that the information is available and relevant. It is not the role of the project EIS to undertake an environmental assessment of strategic mechanisms related to the proposal. However the EIS should report upon and apply them to the proposal.

Any existing relevant cumulative or strategic environmental studies should be considered when formulating and justifying undertaking a proposal. Air and water quality studies, state of the environment reports and local and regional environmental studies should also be taken into consideration as applicable.

2.2 Early assessment of options

The objectives for the proposal should be developed to fulfil any identified need and should encompass the principles of ecologically sustainable development (ESD). ESD principles (outlined in Appendix 1) should be considered when identifying options for all aspects of the proposal. All feasible alternatives that could satisfy the objectives of the proposal should be considered. When weighing up options, the biophysical, economic and social costs and benefits throughout the whole life cycle of the proposal should be considered. The 'do nothing' option should also be included in these considerations.

Careful option selection can lower community concerns and reduce potential costs of mitigation and management required to control environmental (including social) impacts. Early adoption of ecologically sustainable strategies can reduce possible conflicts, and additional costs and delays at later stages of the approval process.

2.3 Identifying issues

The general framework for an EIS is prescribed in Schedule 2 of the EP&A Regulation (see Appendix 1). The Director-General's requirements provide specific matters to be addressed in an EIS. In addition to the specific legal requirements, the proponent has a broader responsibility to consider all potential environmental issues in relation to the proposal.

As a precursor to identifying potential environmental issues, the proponent must be able to outline:

- the important characteristics of the project which will determine the scope of the potential impacts
- the proposed site and a preliminary assessment of the sensitivity of the site.

If either the project characteristics or the site should change, then the potential impacts may also change. If at any time changes occur, the scoping process for the EIS should be reviewed. If major changes occur, the Director-General may need to be reconsulted to amend their requirements.

In addition to the issues outlined in this guideline, other sources of information which may assist in the identification of potential issues include:

- any relevant guidelines produced by other NSW government authorities, e.g. *Environmental Noise Control Manual* (EPA, 1994a), other States or overseas
- EISs for similar projects, and any relevant commission of inquiry report, determination report and conditions of approval
- relevant research and reference material on similar proposals.

There are a number of approaches or mechanisms which help identify issues relating to a particular proposal in a particular location. They may involve fairly unstructured mechanisms with a low level of consultation or a structured process with a high level of consultation with all stakeholders. The choice of the approach should depend on the scale and type of proposal and the sensitivity of the environment. These may include:

- consultation outlined in Part 3
- checklist, matrix, network, GIS or overlay methods or similar approaches such as the tables in *Is an EIS required?* (Department of Planning, 1995)

2.4 Prioritising issues

The EIA process generally will benefit from focusing attention on key issues of concern. Not all issues identified will have the same degree of relevance for all proposals. The relative importance placed on different issues will vary from case to case, and is a function of the type and size of the proposal and the sensitivity of the receiving environment. Issues should therefore be prioritised according to their importance in the decision-making process.

When prioritising issues, consideration should be given to the potential severity, temporal and spatial extent of any beneficial and adverse

effects; their direct impacts as well as any indirect, secondary, tertiary or cumulative impacts; and whether the effects are continuous or intermittent, temporary and reversible or permanent and irreversible.

The outcome of the identification and prioritisation process should result in:

1. a list of all issues with a preliminary estimate of the relative significance of their impacts
2. identification of the key issues
3. an explanation as to why other issues are not considered to be key.

The EIS should address the key issues as fully as practicable. However the level of analysis should reflect the level of significance of the impacts and their importance for the proposal. Lesser attention should be given to those issues which have lesser significance. For these latter issues, there should be sufficient analysis to develop a sustainable mitigation strategy for any potential adverse impacts.

2.5 Impact analysis, prediction and presentation

Discussion of likely impacts should include predictions of the nature and extent of potential impacts and the effectiveness of mitigation strategies. This information is fundamental to deciding the potential ecological sustainability and hence the acceptability of a particular proposal.

a) Presentation

Information provided should be clear, succinct, objective and where appropriate, supported by maps or other descriptive detail. Repetitive or general non-specific data is distracting and is not relevant to the decision-making process. The use of jargon should be avoided. It is recommended that the EIS be edited to ensure consistency of style and accuracy of transference of information from any appendices to the main document. External review of technical analysis will help ensure that the information to be included is relevant.

The EIS should make reference to all relevant studies and investigations that have been carried out in support of the proposal or other studies, reports or literature used in the EIS. These should be made available during the public display of the EIS.

b) Baseline information

Where baseline data is to be collected first-hand, careful consideration must be given to the design of the sampling program. Matters to consider include:

- the degree of understanding of the processes in question
- the reasons for the data collection program
- sampling program design
- data collection procedures
- data analysis methodologies
- relevant quality assurance procedures.

The need for long-term sampling to discern the variability of the environment should also be assessed as early as possible so that it is not overlooked or avoided due to time constraints. Assumptions and extrapolations used to draw conclusions from the data should be justified.

In some circumstances, there may be sufficient existing data available for assessment purposes without the need for additional data collection. Where existing data is used, its adequacy and appropriateness for impact assessment of the proposal should be reviewed and discussed, taking into consideration the above points for first-hand data collection. Shortfalls or uncertainty in knowledge should be clearly identified.

In all cases, sampling programs and analysis procedures should reflect current scientific approaches. Peer review of study design, sampling methodology, data analysis and interpretation of results may help identify inadequacies.

c) Predictions of impacts and mitigation

Impact prediction should consider magnitude, duration, extent, direct and indirect effects, beneficial and adverse effects and whether impacts are reversible or permanent. All predictions of impacts and the likely success of mitigation strategies have an element of uncertainty associated with them. The proponent should identify and, where possible, indicate the

level of uncertainty associated with these predictions and mitigation measures. This information is fundamental in developing appropriate management strategies and informs the proponent, community, government agencies and the decision-maker of the degree of risk associated with the proposal and the importance of that risk.

When predicting impacts, a clear distinction must be made between those impacts which can be assessed quantitatively and those for which only a qualitative assessment can be made. Predictive models used should be justified in terms of appropriateness for the task, outlining its strengths and weaknesses. Whenever conclusions and recommendations have been made based substantially on judgements instead of facts or objective analytical results, the basis of the judgements should be clearly identified. A precautionary approach should be adopted where there is a significant chance a proposal may lead to irreversible consequences.

d) Reference to standards or indicators

Where possible, discussion of impact assessment and mitigation measures should make reference to recognised standards or indicators for sustainability. Standards such as the *Australian Water Quality Guidelines for Fresh and Marine Waters* (ANZECC, 1992) will provide a useful reference against which to measure the acceptability of potential outcomes. In some cases, indicators may have been developed for a region or area, for instance by the Healthy Rivers Commission for specific catchments. In other cases they may be developed as a result of regional strategic environmental or cumulative studies. Some indicators for sustainability may relate to the specific characteristics of the location and can only be developed as a result of the analysis undertaken in the EIS.

e) Mitigation strategies

Mitigation strategies must be considered both in relation to individual impacts and collectively for all impacts. This helps to avoid conflict between mitigation strategies and ensures that measures applied with respect to one (or more) potential impacts do not increase the magnitude or significance of other likely impacts. The mitigation strategy should include the

environmental management principles which would be followed in the planning, design, construction and operation of the proposal and include:

- a compilation of locational, layout, design or technology features described in the EIS
- an outline of ongoing environmental management and monitoring plans.

Predictions made in the EIS should be monitored in an environmental management plan (EMP). With projects with potentially controversial environmental impacts, it may be appropriate to:

- consult with government authorities, council and the community when preparing the EMP
- establish a community committee to consult in relation to the ongoing management of the proposal
- exhibit an annual environmental management report outlining the environmental performance of the proposal.

It is not expected that a detailed EMP be prepared for the EIS. However an outline of the content and structure and commitment to prepare an EMP is required.

2.6 A question of adequacy

The NSW Land and Environment Court has made a number of observations about the adequacy of EISs during its judgements (see Gilpin, 1995). Gilpin's summary of the Court's observations includes:

- The purpose of an EIS is to bring matters to the attention of members of the public, the decision-maker, and the Department of Urban Affairs and Planning so the environmental consequences of a proposal can be properly understood
- The purpose of the EIS is to assist the decision-maker. An EIS is not a decision-making end in itself, but a means to a decision-making end

- The EIS must be sufficiently specific to direct a reasonably intelligent and informed mind to possible or potential environmental consequences
- The EIS should be written in understandable language
- The EIS should contain material which would alert both lay persons and specialists to potential problems
- An EIS would be unacceptable if it was superficial, subjective or non-informative
- An EIS would be acceptable if it was objective in its approach and alerted relevant parties to the environmental effects and community consequences of carrying out or not carrying out the proposal.

2.7 Ecologically sustainable development

Under the EP&A Regulation, it is necessary to justify the proposal having regard to biophysical, economic and social considerations and the principles of ecologically sustainable development (ESD).

Ecological sustainability requires a combination of good planning and an effective and environmentally sound approach to design, operation and management. The proponent should have regard to the principles of ESD throughout the whole project life cycle, and especially:

- when developing the objectives for the project
- during project formulation, planning and design
- when considering project options and alternatives
- during construction
- for the operational life of the proposal
- afterwards during decommissioning, site rehabilitation and reuse.

Continual reference should be made to the question 'Is this proposal ecologically sustainable?'

3. Consultation

Early consultation with the local community, industry, councils and government agencies can be of great assistance in making a preliminary assessment of the potential viability of a proposal at a particular site. It can also assist in ensuring that the EIS is focused on those matters which will add value to the decision-making process.

Effective consultation should enable an applicant to:

- clarify the objectives for the proposal in terms of community needs and concerns, and the relationship of the proposal to any relevant strategic plans, government policy directions and statutory or planning constraints
- identify feasible alternatives (in particular alternative sites) and clarify their relative merits in terms of biophysical, social and economic factors
- identify environmental issues to:
 - prioritise the issues and identify those key to the decision-making process
 - establish the scope of the studies for key issues so that there will be adequate information for the decision-making process
 - where possible, identify performance objectives or indicators for key issues
 - when appropriate, identify experts (in government agencies or from other sources) who can assist in guiding the assessment of a key issue or peer review the assessment
- if appropriate, identify processes for continued community involvement.

The following consultation procedures are recommended:

3.1 Consultation with government agencies

It is intended that this guideline should replace the need to undertake routine consultation with government agencies on general matters to be included in an EIS, statement of environmental effects (SEE) or review of environmental factors (REF).

However, consultation with councils and relevant government agencies is recommended to help identify alternatives and to provide a preliminary view on their acceptability within the strategic context. To maximise the benefits of consultation with government authorities, requests for advice should be accompanied by adequate information on the proposal and proposed locations. The consultation request should be targeted towards identifying key issues, and should specifically relate to the particulars of the location, design and operation of the proposed facility.

To facilitate consultation with relevant government agencies, it may be appropriate to hold a planning focus meeting (PFM). The Department recommends that PFMs be held for all major or potentially controversial proposals. The principal approval authority would usually be responsible for organising the PFM. In addition to including government authorities which have an approval role, other agencies with expertise in the area, catchment management committees or independent technical experts may also need to be included depending on the location, site characteristics and management options.

For dredging or other extraction in riparian and coastal areas, the following organisations should be invited to a PFM or otherwise consulted:

- the relevant local council
- Department of Urban Affairs and Planning
- Environment Protection Authority
- Department of Land and Water Conservation

Appendix 4 lists other organisations who may need to be consulted to identify key issues for particular proposals.

For smaller projects, less formal meetings or discussions with relevant authorities, particularly the local council, should be undertaken. Issues such as whether a proposal is consistent with the council's strategic plan for the area and is permissible at the particular site should be clarified at the outset.

3.2 Formal consultation required under legislation

Under the provisions of the EP&A Regulation, an applicant or proponent must formally consult the Director-General of the Department of Urban Affairs and Planning (DUAP) regarding the content of an EIS. It is recommended that the PFM or preliminary discussions with council occur before the proponent consults the Director-General and that the minutes of the PFM or issues canvassed in the discussions be forwarded to DUAP when the Director-General's requirements are requested.

If a proposal is on land that contains a 'critical habitat' or is likely to significantly affect threatened species, populations or ecological communities or their habitats, the Director-General of National Parks and Wildlife should be consulted regarding the contents of a species impact statement (see Appendix 3 for further information).

3.3 Consultation with the community

The community likely to be affected, whether directly or indirectly, should be informed of the proposal and consulted early in the EIA process. Consultation should aim to include affected individuals, community groups and groups with special interests such as local Aboriginal Land Councils.

For major or controversial projects, a program of community consultation may need to be undertaken as part of the preparation of the EIS. This program would usually include two phases, one seeking to inform the community (for instance involving public meetings, public displays or newsletters) and one seeking to gain input on issues of community concern, to identify community values and to identify and evaluate alternatives (for instance involving community focus meetings, 'issues' workshops and community surveys).

4. Site selection procedures

Principles of site selection for dredging proposals

Consideration must be given to whether:

- the land use is permissible
- environmentally sensitive areas are avoided
- the use is compatible with nearby land uses
- initial site investigations indicate the site is fundamentally suitable for dredging or other extraction.

4.1 Site selection

When the dominant purpose of an extractive industry proposal is supply of the material to a construction market, distribution and proximity to markets or construction sites (e.g. major infrastructure projects) are the prime factors which attract extractive industries into certain areas, often close to urban expansion. Transportation costs are a critical factor in the economic viability of these types of extractive industries, as the materials which are high in volume are relatively low in value. With other extraction proposals, the dominant purpose may be the restoration of navigability of river flows or flood mitigation works. Site selection options will vary depending on the primary purpose of the proposal. In all cases, environmental factors, particularly those related to hydraulics, hydrogeology and ecology, are often the most important in deciding where dredging or other extraction proposals should take place.

The appropriate location of a dredging or other extraction proposal is an important environmental management tool in ensuring that the facility operates in an environmentally acceptable manner. Careful site selection will:

- reduce the potential environmental impacts and consequently, the need for impact mitigation and ongoing management measures
- reduce levels of public controversy
- avoid potential delays in the approval process.

It is recommended that the following matters be considered when selecting a site for a dredging or other extraction proposal.

4.2 Permissibility of land use

At a very early stage in the site selection process, it is essential to consult with the local council to ensure that the proposal is a permissible use under the relevant planning controls. If the proposal is not permissible under the zoning, then discussions should be held with councils about the appropriateness of changing the zoning, or seeking an alternative site.

4.3 Initial site assessment

An initial assessment of the intended location can help ensure that the proposal can be operated in an environmentally acceptable manner. An initial site assessment can provide a basis for the comparative evaluation of potential sites. It is recommended that an initial assessment be undertaken before committing to a particular site or proceeding with a more detailed assessment in an EIS, a statement of environmental effects (SEE) or review of environmental factors (REF).

This initial site assessment should focus on the characteristics of the site itself, as well as the surrounding environment. Matters to consider in an initial locational assessment are shown in Table 1. The list is not necessarily exhaustive. In addition to biophysical factors, the locational assessment should also consider community amenity. Conflicts often arise when the community perceives that its amenity is being threatened by particular impacts such as water quality impacts. Any potential conflicts and possible options for resolving them should be considered as early as possible. In general, if dredging and other extraction proposals are designed to control water quality impacts and ecosystem disturbance, there will be wider locational options.

In assessing the acceptability of a proposed site, consideration should be given to its compatibility with surrounding land uses. Consideration may need to be given to acquiring sufficient land to provide adequate on-site separation from nearby sensitive land uses. Such separation can help minimise impacts and maintain the amenity of

Table 1. Matters to be Considered in Initial Site Assessment

Operational requirements	<ul style="list-style-type: none"> • Does the site provide sufficient land area for present and future requirements? • Is there easy access and transport networks of an appropriate standard? • Does the site provide for safe truck entry and exit and on-site queuing of trucks? • Is this an efficient site relative to the market? • Can services be efficiently supplied to the site (e.g. power, water)?
Topographic and meteorological assessment	<ul style="list-style-type: none"> • Are the rainfall patterns or prevailing wind directions likely to cause management difficulties? • Are the local climatic conditions (e.g. air movement, rainfall) in combination with the topography likely to result in microclimatic conditions which will adversely increase impacts on the community?
Water issues	<ul style="list-style-type: none"> • Are there any site constraints which make on-site water management difficult (including both process water and stormwater)? • Are there risks of surface water pollution because of the proximity or pathways to waterbodies? • Can any required separation distances from waterbodies under any existing legislation or guidelines be complied with? • Are there risks of groundwater pollution because of shallow or rising groundwater tables, or proximity to groundwater recharge areas or areas with a high vulnerability to pollution? (This will require consultation with the Department of Land and Water Conservation.) • Is the proposal likely to impact on the existing sediment or flow movement regimes? • Is the proposal likely to impact on existing infrastructure or require new infrastructures such as groynes or weirs?
Flora and fauna issues	<ul style="list-style-type: none"> • Is there sufficient separation from environmentally sensitive areas such as national parks, nature reserves, SEPP 14 wetlands, SEPP 26 littoral rainforests, protection zones in LEPs and REPs? • Can clearing of natural vegetation be avoided? • Can clearing of vegetation of high significance be avoided (e.g. vegetation used for visual screening, riparian vegetation, vegetation used as corridors for the movement of fauna)? • Are threatened flora or fauna species, populations and ecological communities or their habitats likely to be affected? Will an SIS be required? • Will a development application for vegetation clearing be required under SEPP 46?
Geological or soils issues	<ul style="list-style-type: none"> • Are there any topography or geological characteristics which will cause difficulties in managing impacts (subsidence, slippage, seismic)? • Are the soils highly erodible? Identify any potential sediment management problems. • Are there existing soil problems (e.g. contaminated soils, acid sulfate or saline soils)?
Transport issues	<ul style="list-style-type: none"> • Is the proposal likely to affect navigation or boat safety? • Can the standard and capacity of the road network accommodate traffic likely to be generated by the proposal? • Can truck traffic avoid residential areas, hospitals, schools and commercial areas? • If inadequacies exist, can the road network or traffic management be changed to minimise any impacts, particularly on residential areas?
Community issues	<ul style="list-style-type: none"> • Is the proposal likely to be compatible with surrounding existing or proposed land uses, particularly any residential, special uses (such as schools, hospitals, community buildings) and any sites of outstanding natural or environmental value? • Is there likely to be a problem in meeting sustained compliance with dust, noise or water quality requirements due to the proximity and nature of nearby land uses? • Is the proposal likely to pose health risks? • Is the proposal likely to affect the heritage significance of any Aboriginal or non-Aboriginal heritage items found or likely to be found on the site? • Is the site highly visible? Will there be significant visual impacts?
Cumulative issues	<ul style="list-style-type: none"> • Is the proposal at this site likely to contribute to any existing cumulative problems?

the surrounding areas. Factors to consider in determining appropriate separation distances include:

- the character of the surrounding environment and its sensitivity to impacts
- the characteristics of the impacts, in particular their predictability
- proposed impact mitigation and management strategies and their predictability.

However, separation distances should not be viewed as the primary means of ameliorating impacts as this can lead to unnecessary land sterilisation. Instead, separation distances should be thought of in the context of a locational attribute, ensuring that the amenity of existing land uses can be maintained. The EPA does not accept impact reduction solely by separation distances for air or water pollution. Therefore, the role of site separation as an impact mitigation measure should simply reinforce the impact mitigation measures provided by other means.

5. Summary of EIS requirements

The statutory requirements for an EIS are prescribed in Schedule 2 of the EP&A Regulation (Appendix 1).

A summary of the specific requirements for an EIS for a dredging or other extraction proposal are provided in the box on the right. These requirements are discussed in detail in Part 6. All issues nominated will not have the same degree of relevance for all proposals. Depending on the characteristics of the proposal, some of the requirements may be more relevant than others, while others will not be applicable at all. The EIS should be tailored to the specific proposal and should focus on the key issues.

Summary of requirements

A. Executive summary

B. The proposal

1. Objectives of the proposal
2. Characteristics of the resource
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F. List of approvals and licences

G. Compilation of mitigation measures

H. Justification for the proposal

6. Specific requirements for an EIS

A. Executive summary

An executive summary should be provided at the front of the EIS and be available separately for public information. This should give a short overview of the proposal and the potential environmental impacts, and be written in non-technical language to facilitate understanding of the assessment by the general public.

B. The proposal

1. Objectives of the proposal

There should be a clear statement of the proposal, having regard to the following characteristics:

- a) the extent of dredging or extraction;
- b) navigation safety or environmental flow issues;
- c) the quantity and types of material to be extracted and processed;
- d) products to be marketed;
- e) duration of the proposal;
- f) the proposed future of the site following cessation of the proposal;
- g) proposals for any future expansion including staging and timing.

2. Characteristics of the resource

The following information should be provided:

- a) sedimentological characteristics of the resource; silt/sand/gravel ratios; sediment grain size analysis; soil type and depth; geomorphic history of the deposit
- b) the size and quality of any proven or probable reserves and distribution patterns; the depth of overburden; any constraints on extraction (locations of bedrock and outcrops relative to unconsolidated material)
- c) a description of sediment transport mechanisms; the significance of the resource in terms of the local/regional sediment budget
- d) a summary of exploration methods and results obtained
- e) the economic significance of the resource.

3. Description of extraction operations

A description of the proposal should include:

- a) the removal of any overburden
- b) the extent and depth of extraction; the dredging envelope (depths and underwater batters);
- c) staging of extraction; the rate of extraction; estimated daily, weekly or annual volumes of material to be extracted and transported; the monitoring schedule including quantity auditing and the ongoing survey
- d) extraction and processing methods; the size and type of equipment; details of processing to be undertaken on-site
- e) quantities and management of extractive material, overburden, tailings or fines to be stockpiled or stored; the management and disposal of fines resulting from extraction in saline environments
- f) methods of loading and transport of material from the point of extraction to any on-site processing facilities or storage locations; the loading and transport of material from the site; any conveyors, loaders or rail links
- g) identifying constraints on increased volumes including equipment, market demand, or geological features
- h) quantities and method of storage of fuels, chemicals and other materials; pollution control measures for containing and recovering any oil, diesel or petrol spillages
- i) the security of the dredging platform during periods of high flow, including consideration of impacts of floating debris; a flood emergency management plan including flood preparedness, and warning and evacuation procedures for plant and personnel
- j) employment details (establishment and operation)
- k) the hours of operation (establishment, extraction, processing, transport, maintenance)
- l) sanitary and waste disposal arrangements
- m) drainage, erosion, sediment and debris control systems.

4. Site layout plans

A plan or plans should be provided, clearly indicating locations of the following:

- a) the maximum area affected by the proposal including buffer zones; cross-sections and details showing extraction limits with respect to natural features such as banks and vegetation; high and low water lines, flood levels
- b) access roads; linkages with public roads
- c) any vegetation communities to be cleared or affected by the proposal
- d) where applicable, the pipeline from dredge to processing/stockpiling areas, pumps and related facilities
- e) the processing, storage, loading or transport plant
- f) the storage areas for extractive material, stockpiled overburden or topsoil
- g) storage of waste, fuels, or chemicals
- h) refuelling facilities for diesel, petrol or gas powered equipment
- i) wastewater treatment facilities, sedimentation basins (including locations of discharge points), bunding and all other erosion/sediment control structures, drainage lines
- j) parking, queuing and turning areas, weighbridge, truck wash-down areas
- k) where applicable, mooring/docking facilities; boat lanes; navigational markers
- l) safety fencing and other safety mechanisms
- m) landscaping.

5. Site preparation

Describe works prior to commencement of extraction, including:

- a) land clearing, including any burning, chipping or mulching, and stockpiling of topsoil to maximise seed stock
- b) the construction of access roads; mooring/docking facilities; drainage and sediment control systems
- c) the construction of the processing, loading or storage plant.

6. Infrastructure considerations

The following factors should be considered:

- a) the electricity supply; measures to protect any easements, cables or pipelines which may be impacted by the proposal
- b) energy conservation measures

- c) water requirements, proposed supply or storage, water recycling and reuse options;
- d) waste disposal requirements including for disposal of fines if saline; proposed methods and locations for disposal
- e) transport requirements including mooring and refuelling facilities.

7. Rehabilitation

The following issues should be addressed:

- a) the proposed final use of all areas affected by the proposal, including any stockpiling, processing or maintenance sites or access roads; the proposed use of any waste from the operation in land reclamation; the compatibility of the proposed use with surrounding land uses
- b) the rehabilitation plan including staging and;
 - i) progressive terrain re-establishment with final topography including gradients; if dredging, the formation and stabilisation of river, estuary and sea bed and bank; in the marine environment, the wave climate and nearshore circulation patterns; an assessment of the suitability of the land formation (terrestrial and aquatic) for the natural re-establishment of native flora and fauna habitat, and of natural hydrological processes
 - ii) the progressive revegetation of any disturbed terrestrial and aquatic areas during extraction and after decommissioning, including surface preparation, propagation techniques, species, rates and staging of propagation program; any requirement for fertiliser; the need for any temporary vegetation; the justification for the use of non-local indigenous species in rehabilitation works
 - iii) progressive erosion control strategies during and after rehabilitation; the consideration of final drainage patterns
- c) monitoring and maintenance programs.

It should be noted that assessment of the success of many rehabilitation measures will depend on the availability of adequate information obtained prior to commencement of the proposal. The quality of this information will in turn be dependent on factors such as sampling program design and data collection procedures. All these matters must be taken into consideration in formulating the most appropriate rehabilitation measures.

8. Previous and existing operations within the general locality

Where applicable outline:

- a) the history of any previous extraction from the site, or current and previous extraction from other sites within the general locality
- b) past environmental performance including the impacts of the operation on the environment and the effectiveness of any site rehabilitation
- c) previous controls which applied on the site
- d) the integration of the proposed development with existing and previous operations
- e) restoration or rehabilitation works proposed for areas previously disturbed, and the integration of these works into rehabilitation plans for the proposed operations.

9. Consideration of alternatives and justification for the preferred proposal

Consideration should include an assessment of the environmental impacts or consequences of adopting alternative:

- a) resource sources or locations
- b) extraction methods or technology
- c) management of fines and water associated with dewatering or washing
- d) site layout and access roads
- e) management or administrative practices
- f) transport systems both on-site and off-site
- g) alternative rehabilitation options.

Consideration should also be given to the consequences of not carrying out the proposal, that is, the 'do-nothing' option.

The selection of the preferred option should be justified in terms of:

- a) type, quality and quantities of products in relation to market demand
- b) environmental factors, including biophysical, economic and social factors
- c) the present and future management of the catchment, waterbody or coastline
- d) the principles of ecologically sustainable development (ESD), namely:
 - i) the precautionary principle
 - ii) inter-generational equity

- iii) conservation of biological diversity and ecological integrity
- iv) improved valuation and pricing of environmental resources.

C. The location

1. Planning context, site description and locality information

The following information should be provided:

- a) zonings, permissibility and any land use constraints
- b) compatibility of the proposal with:
 - i) any regional strategy such as management plans for rivers, estuaries, floodplains, coastal areas, or a resource plan of management for extractive industries in the area
 - ii) provisions of any state environmental planning policy, regional or local environmental plans or development control plans for existing and proposed development
 - iii) existing land and water uses
 - iv) any heritage items or environmental protection areas (including classified waters, wilderness areas and Protected Lands) or areas affected by conservation or international agreements
- c) title details; land tenure; owner's consent if not the proponent
- d) where Crown land is involved, any constraints associated with the form of lease or tenure; where appropriate, the Native Title status of the land should be addressed and an outline provided of the procedures to be followed to satisfy the requirements of the Commonwealth's *Native Title Act 1993*
- e) site description and maps, plans or aerial photographs clearly identifying the location of the proposal relative to adjacent:
 - i) waterbodies, wetlands, dominant vegetation communities (in particular any SEPP 14 Coastal Wetlands or SEPP 26 Littoral Rainforest mapped areas)
 - ii) infrastructure such as roads, utilities including transmission lines, pipelines, cables or easements (if applicable),

- bridges, weirs, boat ramps, jetties, navigation lanes, ferry services
- iii) recreation or conservation areas, residential areas or dwellings.

2. Overview of the affected environment

A general description of the environment should be provided in order to place the proposal in its local and regional contexts. Discussion should be broad; specifics should be provided later when assessing the environmental impacts of the proposal.

General information to be provided includes:

- a) meteorological factors (prevailing wind and intensity; monthly and seasonal distribution of rainfall, storm magnitude and frequency) which may affect erosion, flooding, air or noise impacts
- b) geomorphological factors, including major landform features, site contours, terrain stability, slope gradient and length, drainage pattern, evidence of historical morphological changes
- c) the condition and uses of waterbodies likely to be affected by the proposal, flow characteristics, the flood liability of the site and surrounding land
- d) the depth to and condition of groundwater likely to be affected; the location of any nearby bores, recharge areas, seeps or springs, the location and nature of any rising water table problems in the area
- e) predominant vegetation communities (aquatic and terrestrial), their habitat and conservation values
- f) the capability and suitability of affected lands for agricultural purposes
- g) any buildings, items and places of conservation or heritage significance likely to be affected.

D. Identification and prioritisation of issues

1. Overview of the methodology

Outline the procedures or methodology used to identify and prioritise issues. Factors to consider may include:

- a) the outcome of a review of relevant sources of information on potential issues including:
 - i) DUAP guidelines and any relevant guidelines by EPA or other government authorities

- ii) the provisions of any relevant environment protection legislation
 - iii) any industry guidelines
 - iv) EISs for similar projects, any relevant commissions of inquiry reports, determination reports and conditions of approval
 - v) relevant research or reference material
 - vi) relevant strategic plans or policies
 - vii) relevant preliminary studies
- b) the outcome of consultation with stakeholders, including:
 - i) planning focus meetings, community focus meetings, community workshops or issues groups
 - ii) meetings with stakeholders (e.g. government agencies, particularly EPA, councils, major market representatives)
 - c) the use of methodology such as *Is an EIS required?* (Department of Planning, 1995) or checklists or similar approaches.

2. Outcomes of the process

Summarise the outcome of the identification and prioritisation process including:

- a) all the issues identified
- b) the key issues which will need a full analysis in the EIS (including comprehensive baseline assessment)
- c) the issues which will not need a full analysis in the EIS, though they may be addressed in the mitigation strategy; the justification for the proposed level of analysis.

E. The environmental issues

The following issues are nominated as being potentially important when assessing impacts, and for decision-making in relation to dredging and other extraction. The outline of the issues is not exhaustive and the degree of relevance of each will vary. The EIS should only deal with relevant issues as applicable to the particular proposal.

Assessment of potential impacts

The following should be included for any potential impact which is relevant for the assessment of a specific proposal:

- a description of the existing environmental conditions (baseline conditions)
- a detailed analysis of the potential impacts of the proposal on the environment; the analysis should indicate the level of confidence in the prediction of outcomes and the resilience of the environment to cope with impacts
- the proposed mitigation, management and monitoring program, including the level of confidence that the measures will effectively mitigate or manage the impacts.

With each issue, the level of detail should match the level of importance of the issue in decision-making.

- ii) channel hydraulics; potential channel adjustments and instability (including change in morphology, contraction or lateral movement); the potential for channel flow split; the potential for channel diversion during major flood events
- iii) sediment transport rates
- iv) potential aggradation or bank erosion, both at the site, and upstream and downstream of the site; potential for bed armouring
- v) turbidity and water quality; potential thermal, nutrient or salinity stratification; the accumulation of pollutants in the extraction void
- d) if in tidal rivers, the potential to impact on tidal hydraulics including:
 - i) alterations to tidal range or discharge; alterations to salt intrusion limits; changes to tidal levels in fringe marshes, wetlands or mangroves
 - ii) changes to tidal velocities, flushing rates and sediment transport rates;
 - iii) effects on fisheries, aquaculture and other water users
- e) the potential impact on navigability and safety; changes to the location or depth of channels; mobilisation of shoals and bars
- f) potential impacts on infrastructure such as bridges, crossings, groynes, weirs, dams, boating facilities, flood mitigation or rivercare works
- g) compatibility of the proposal with any river or estuary management plans.

1. Fluvial systems

For proposals located where they are likely to affect river systems, issues to consider include:

- a) the identification of relevant hydrological and geomorphic processes; an analysis of recent and historical data on the main sedimentary processes in the vicinity including:
 - i) site contours, main terrain features and drainage paths from the surrounding land
 - ii) flow characteristics (patterns and velocities) including eddying or thalweg variations, flood flow or local tidal flow patterns (where relevant)
 - iii) sediment movement and transport rates
- b) an assessment of the magnitude of the total sediment supply in the vicinity; the potential for the proposal to adversely affect the existing sediment budget over both space and time
- c) an assessment of the potential impact of the extraction location, depth, void shape and rate on:
 - i) bed dynamics including potential upstream and downstream aggradation or erosion; the potential for migration of dredge hole; the potential for the bed to armour; possible bend, bar or island erosion, aggradation or general degradation

2. Floodplain issues

If extraction proposals are located in flood-prone areas, issues to be considered include:

- a) existing flood status; the consideration of the local designated flood standard; the vulnerability of any facilities or storage areas to flooding; the degree of flood-proofing of facilities; potential impacts of inundation both on- and off-site; measures to minimise these impacts; the safety of personnel; emergency evacuation plans for personnel and equipment
- b) if the proposal has the potential to significantly affect local flooding behaviour:
 - i) the hydraulic modelling of likely major flood flows

- ii) the potential impacts of the proposal on existing flooding behaviour of the river or the flood liability of surrounding lands in the vicinity of the proposal; an assessment of the potential to alter:
 - flood flow patterns (levels, velocities, flow direction)
 - flood scour and deposition behaviour
 - flood sediment transport
- iii) the potential for the proposal to change the existing flow regime through creation of side or cut-off channels, to increase sediment mobility or to encourage overbank scour downstream of the site; the potential for adjustments in channel cross-section, both within and away from zone of extraction; the impact of extraction on local drainage pattern;
- c) the potential for the proposal to provide flood mitigation benefits; the consideration of any proposed flood mitigation schemes that may influence the impact of the proposal on the environment
- d) the compatibility of the proposal with *Floodplain Development Manual* (NSW Public Works, 1986) and any local council flood policy.
- iii) beach, dune and bank erosion or aggradation
- d) where significant impacts are likely on sediment budgets, an assessment of the potential risks to coastal processes (with, where appropriate, a coastal hazard or shoreline recession analysis)
- e) if dredging is adjacent to or in estuaries or bays, assessing the potential hydrodynamic impacts, including:
 - i) changes to the tidal prism, tidal velocities, circulation and flushing in estuaries
 - ii) swell penetration into estuaries or bays; wave action on shoreline stability
 - iii) salt intrusion and increased tidal range in river systems; the potential impacts of changes to the salinity regime
 - iv) identifying and assessing impacts on industries likely to be affected (fisheries, aquaculture and other water users)
- f) the potential impact on navigability and safety from short- and long-term changes to the entrance bar (where present), and the location and depths of channels; the mobilisation of sand shoals and bars
- g) the potential impacts on infrastructure such as harbour facilities, breakwaters or groynes, boating facilities, foreshore or dunecare works;
- h) the assessment of the compatibility of the proposal with the Coastal Policy for NSW, *Estuary Management Manual* (NSW Government, 1994), the Coastline Hazard Policy and any other relevant estuary and coastal management plans.

3. Coastal issues

For proposals in coastal areas (nearshore, onshore or in locations such as estuaries or the entrances to rivers or inlets), issues to consider include:

- a) identifying relevant coastal processes; an analysis of recent and historical data (including winter and summer beach profiles) concerning the main sedimentary processes in the area, including wind, wave and current regimes, tidal flow characteristics, and storm and flooding behaviours to assess the magnitude and frequency of sediment movement, patterns of natural erosion (including bed, bank and slope stability, and dune blowout)
- b) assessing the magnitude of the total sediment supply, and the potential for the proposal to adversely affect the existing sediment budget over both space and time
- c) assessing the potential impact of the dredging location, depth, void shape and rate on:
 - i) tidal propagation
 - ii) tidal hydraulics; shoreline and seabed stability; waterbody stratification (thermal, nutrient, salinity)

4. Lake or lagoon issues

If dredging is undertaken in or near lakes or lagoons, issues to consider include:

- a) identifying relevant hydrological and geomorphic processes; an analysis of recent and historical data on the main sedimentary processes in the vicinity, including:
 - i) site contours, main terrain features and drainage paths from surrounding areas
 - ii) flow characteristics (patterns and velocities) including wind circulation patterns, flood flow, fluvial or tidal flow patterns (where relevant)
 - iii) sediment movement and transport rates
- b) assessing the size of the total sediment supply in the vicinity, and the potential for the

- proposal to adversely affect the existing sediment budget
- c) assessing the potential impact of the extraction location, depth, void shape and rate on:
- i) bed dynamics (including potential erosion, aggradation or general degradation); possible bar or island erosion or aggradation
 - ii) potential foreshore adjustments and instability (both in the vicinity of the extraction site and away from it)
 - iii) potential channel adjustments and instability
 - iv) turbidity and water quality; the potential thermal, nutrient or salinity stratification; the accumulation of pollutants in the extraction void
- d) if in tidal lakes or lagoons; the potential to impact on tidal hydraulics, including:
- i) alteration of tidal range or discharge, salt intrusion limits; changes to tidal levels in fringe marshes, wetlands or mangroves
 - ii) changes to tidal velocities, flushing rates and sediment transport patterns
 - iii) effects on fisheries, aquaculture or other water users
- e) the potential impacts on navigability and safety; changes to location or depth of channels; the mobilisation of shoals and bars;
- f) the potential impacts on infrastructure such as bridges, groynes, boating facilities, flood mitigation or foreshore works.

5. Erosion and sedimentation

Issues to consider include:

- a) the soil properties of areas to be disturbed to determine the erosion potential and suitability of topsoil for rehabilitation (such as soil depth, particle size distribution, permeability, clay dispersibility, nutrient deficiencies and pH)
- b) integrated erosion and sediment control measures considering:
 - i) measures to minimise any area denuded at one time; the selection of appropriate techniques for removing topsoil and subsoils to minimise erosion
 - ii) any proposed water diversion banks and channels; stabilisation works for cuttings, embankments and open channels
 - iii) stockpile management measures including:
 - wind, water and flood erosion control measures, including appropriate surface stabilisation measures and stockpile batter grades
- c) maintenance programs for all erosion control works.
 - minimising the stockpiling of soil through direct use of soil and biomass in progressive rehabilitation programs

6. Water quality

Issues to consider include:

- a) the condition of any natural waterbody or wetlands likely to be affected by a change in water quality, flow regimes or water quantity as a result of the proposal
- b) a description of potential sources of water pollution, and assessment of the potential impacts on water quality from:
 - i) increased turbidity from dredging or other extraction operations; an assessment of the effectiveness of silt curtains and of other methods to reduce impact, including procedures to minimise quantities of fine particles disturbed
 - ii) erosion from stockpiles, roads or other disturbed areas; discharge from dewatering or sedimentation ponds
 - iii) release of nutrients, metals, incidental minerals, sediments or other leachates from the extracted material, disturbed areas or sedimentation ponds
 - iv) sewage
 - v) workshop and maintenance areas, vehicle wash facilities, plant and equipment, fuel storage and refuelling facilities
- c) drainage and sediment management systems, including:
 - i) drainage systems to:
 - divert uncontaminated stormwater or run-off around or away from stockpiles and other disturbed areas
 - control water within the disturbed area to design rainfall events of a specified intensity, frequency and duration
 - ii) sediment traps or sedimentation ponds to contain run-off from any dewatering or processing areas; an assessment of:
 - the adequacy of the system to minimise the risk of discharge of contaminated water

- the need to treat (chemically or by other methods) stormwater or process water because of the level of fines or other pollutants prior to reuse or discharge
 - the impact of flocculating agents on receiving waters
- iii) maintenance, dewatering and desilting of sedimentation ponds; proposals for use or disposal of fines or slimes; an assessment of the potential impacts of the use of this material; if in estuarine areas, an assessment of the level of salt or acid sulfate material in the fines, any measures to mitigate potential impacts of salinity or acidity
 - iv) wastewater storage and reuse including, if appropriate, irrigation of landscaping, truck wash down, demonstration of the ability to avoid dry-weather discharge
 - v) temporary sediment controls, including sediment traps or filters during site establishment
 - vi) controls such as bunding to prevent contamination of water from accidental spillages of petroleum products or other potentially hazardous materials; response strategies should spillages occur; containment and recovery facilities
 - vii) proposed monitoring of water quality controls to ensure effective implementation and operation.

7. Groundwater

If located on a floodplain, in an area of rising or high groundwater levels, or where there is local reliance on the groundwater resource, issues to consider include:

- a) potential impacts on groundwater:
 - i) from usage rates or dewatering of any pits to facilitate extraction resulting in the drawing down of groundwater levels
 - ii) from transference of pollutants to groundwater
 - iii) from any adverse effects on groundwater recharge areas
- b) the adequacy of measures to prevent adverse impacts on aquifers during extraction and after the proposal has ceased.

8. Flora

If terrestrial or aquatic flora or their habitat are likely to be disturbed, issues to consider include:

- a) identifying terrestrial and aquatic plant habitats, ecological communities and where appropriate, populations and species in areas that may be directly or indirectly affected by the proposal
- b) indicating the local and regional scarcity of these habitats, ecological communities, populations and species — if relevant identify the following, indicating their incidence on the site:
 - i) threatened species, populations or ecological communities listed in Schedule 1 or 2 of the *Threatened Species Conservation Act 1995* (see Appendix 3)
 - ii) protected species listed in Schedule 13 of the *National Parks and Wildlife Act 1974*;
 - iii) rare species listed in *Rare or Threatened Australian Plants* (ROTAP) (Briggs J.D. 1988);
 - iv) areas protected under SEPP 14 — Coastal Wetlands, SEPP 26 — Littoral Rainforest, SEPP 44 — Koala Habitat Protection or other environmental planning instruments
 - v) vegetation protected under the *Fisheries Management Act 1994*
 - vi) trees listed in councils' Significant Tree Registers
- c) potential impacts on flora:
 - i) indirectly through removal by clearing or dredging
 - ii) indirectly by:
 - sedimentation, access to light, induced bank collapse, a change in substrata, the effects of boat wash
 - changes in water quantity, quality, movement or groundwater regime
- d) the sensitivity of species or communities to disturbance, the potential impacts of disturbance on biodiversity, the potential for recolonisation following any disturbance
- e) the significance of flora for other biota, including biota not directly affected by the proposal but which interact with potentially disturbed flora
- f) landscaping proposals, including compensatory planting of indigenous species, details of proposed mitigation methods to protect

indigenous species including the seed stock in topsoil stockpiles

- g) identifying potential weed and introduced species (including marine seaweeds) and describing measures to control and prevent infestations at the site, and to control spread into localities adjacent to the proposal
- h) the proposed monitoring measures to determine the effectiveness of mitigation and to verify predictions.

Note: Appendix 3 provides guidance on determining when a species impact statement (SIS) is required. A SIS must accompany any proposal in critical habitat or where there is likely to be a significant effect on threatened species, populations or ecological communities or their habitats.

9. Fauna

If terrestrial or aquatic fauna or their habitat are likely to be disturbed, issues to consider include:

- a) identifying terrestrial and aquatic animal habitats, ecological communities and where appropriate, populations and species in areas that may be directly or indirectly affected by the proposal
- b) indicating the local and regional scarcity of these habitats, ecological communities, populations and species — if relevant identify the following, indicating their incidence on the site:
 - i) threatened species, populations or ecological communities listed in Schedule 1 or 2 of the *Threatened Species Conservation Act 1995* (see Appendix 3)
 - ii) species protected under the *Fisheries Management Act 1994*
 - iii) the economic significance of any potentially affected species
- c) potential impacts on fauna:
 - i) directly through removal by clearing or dredging;
 - ii) indirectly by:
 - sedimentation, access to light, induced bank collapse; changes in substrata; the effects of boat movement, noise
 - changes in water quantity, quality, movement or groundwater regime, e.g. impacts on the distribution and lifecycles of fauna

- impacts on the number, distribution and size of aquatic habitats such as seagrasses, mangroves, saltmarshes, sand flats and mud flats
- d) the sensitivity of species or communities to disturbance; the potential impacts of disturbance on biodiversity; the potential for recolonisation following any disturbance — if relevant assess the significance of the area for koalas under the provisions of SEPP 44 — Koala Habitat Protection
- e) the significance of fauna for other biota, including biota not directly affected by the proposal but which interact with potentially disturbed fauna
- f) mitigation proposals such as compensatory restocking of indigenous species; provision of new appropriate habitats, opportunities for colonisation, considered timing of major disturbances
- g) identifying potential vermin, feral and introduced species (including those from ballast water); measures to control and prevent infestations at the site and to control spread into localities adjacent to the proposal
- h) compatibility with the provisions of NSW Fisheries' *Habitat Protection Plans*
- i) proposed monitoring to determine the effectiveness of mitigation and to verify predictions.

Note: Appendix 3 provides guidance on determining when a species impact statement (SIS) is required. A SIS must accompany any proposal in critical habitat or where there is likely to be a significant effect on threatened species, populations or ecological communities or their habitats.

10. Air quality

If the proposal is likely to significantly affect air quality, issues to consider include:

- a) identifying fixed and mobile sources of air pollution relating to extraction, processing, handling, storage or transport activities
- b) the likely impact of the proposal on air quality, including:
 - i) baseline data on the ambient quality of the air
 - ii) projected dust emission and deposition rates
 - iii) frequency and times of emissions

- iv) meteorological conditions under which nearby dwellings and sensitive land are likely to be affected
- c) mitigation and management measures to control the generation of dust and to ensure compliance with air quality standards, including:
 - i) ceasing dust-generating activities during certain meteorological conditions
 - ii) sealing or watering roads
 - iii) dust control measures on open stockpiles, processing and loading areas
 - iv) planting or landscaping to reduce the wind impacts
- d) a proposed dust monitoring program.

11. Noise

Issues to consider include:

- a) existing acoustic environment, including consideration of prevailing meteorological conditions and topographic features which may influence noise impacts
- b) the proposed hours of operation and traffic movements
- c) noise levels from fixed and mobile noise sources
- d) predicted noise levels at potentially affected dwellings
- e) mitigation and management measures to control the generation of noise and to ensure compliance with relevant noise standards, including details of noise control measures such as:
 - i) suppressors or silencers on equipment;
 - ii) any bunding (size, type and location) or noise shield proposals
 - iii) the alternative locations of plant, mooring/docking facilities, parking, queuing or truck routes to reduce noise
 - iv) the alternative grading of roads to reduce sharp transitions of gradient and reduce the impacts from brake and gear change noise
 - v) management strategies to reduce impacts
- f) the proposed monitoring program.

12. Transport

Land

A traffic impact study should be undertaken for all proposals involving significant numbers of truck movements, including:

- a) estimated average and maximum hourly, daily, weekly and seasonal truck movements;

- proposed truck types and sizes; indicating if trucks will arrive or leave in convoy, queue to enter the site or need to wait outside
- b) proposed truck routes and possible alternative routes or transport modes, e.g. conveyer belts, rail
- c) the physical condition of the roads and any bridges on the proposed routes; any upgrading proposals
- d) measures to prevent sediment transport off-site via transport vehicles, including shakedown areas or properly controlled truck wash facilities
- e) the potential impact on road maintenance programs
- f) road safety issues, including:
 - i) identifying other major road users, peak periods of use and potential conflicts; the use of truck routes by school buses and the location of schools and bus stops
 - ii) identifying any sight distance constraints for:
 - turning traffic into or from the loading area
 - any uncontrolled intersections, road junctions or railway crossings
 - iii) proposed measures to improve safety, including:
 - any possible realignment of roads
 - intersection improvements such as holding bays, traffic signals, or grade-separated access
 - any need to improve sight distance for intersections or crossings
 - any need to restrict hours of truck movements, the number of trucks per day or the load size on certain routes.

Water

For dredging proposals, issues to consider include:

- a) commercial and recreational vessel use of the waterway affected by the dredge proposal; the location of navigation lanes
- b) dredge and support vessel movements; the methods for transporting dredged material to processing facilities (pipeline, barges); frequency and routes used in the extraction proposal
- c) an assessment of the impacts of the location and sequencing of both the dredging proposal and transport of the material on the use of the river
- d) safety issues associated with the location of

the dredge or pipeline and the dredging proposal, including:

- i) the marking of dredge or pipeline for daylight or night time operations; appropriate lighting of dredge during hours of darkness and times of restricted visibility
- ii) the relocation of navigation markers;
- iii) the effect of dredging on the navigability of the water body.

13. Economic issues

Issues to consider include:

- a) market demand for the extracted materials in both local and regional contexts, an analysis of regional supply; future demand for the types of material present on the site
- b) the total economic value of the resource and potential revenue (e.g. royalties, taxes);
- c) any additional employment at the site and in the community as a result of the proposal
- d) potential economic impacts:
 - i) as a result of the availability and cost of building or construction material
 - ii) as a result of changing the navigability of the river
 - iii) on other industries in the community such as fisheries or agriculture.

14. Visual impacts

For extraction proposals in areas where visual impacts may be of concern, issues to consider include:

- a) the location of the proposal in relation to any landscapes of local or regional significance, considered from a range of different localities in the landscape; the visibility from adjoining properties and surrounding areas
- b) potential visual impacts from:
 - i) clearing of vegetation
 - ii) the shape, location or size of stock piles
 - iii) the form, bulk or colour of extraction, dredging, processing, loading plant, mooring, docking and refuelling facilities
 - iv) the location of access roads and fences
 - v) the location of waste dumps or derelict equipment
 - vi) lighting from security requirements and night operations
- c) proposed landscaping to reduce visual impacts; the location, layout and composition of intended screening species.

15. Heritage issues

This section is relevant if land clearing, earthworks, disturbance of existing items (buildings, works, relics or places) or reduction of the heritage curtilage will occur as a result of the proposal. Issues which may need to be considered include:

- a) identifying any items of heritage significance on the site (including underwater) and in the area affected by the proposal. This should include two steps:

Step 1: collate information from any relevant heritage study or conservation plan for the site or area — this source may need to be supplemented with information from the following:

- i) relevant historical research on the area
- ii) consultation with the Aboriginal Land Council, local historical societies and the local council
- iii) inspection of heritage registers, schedules, databases or lists, Heritage Council Register, heritage and conservation registers (various government agencies), local or regional environmental plans, archaeological zoning plans, Aboriginal Sites Register (National Parks and Wildlife Service (NPWS)), National Estate Register (Australian Heritage Commission), other registers (National Trust, Institution of Engineers Australia, Royal Australian Institute of Architects)

Step 2: survey the area likely to be affected, to identify any items of potential heritage significance.

For non-Aboriginal heritage:

- a) assess the significance of any non-Aboriginal heritage items identified on the site, using criteria for assessing heritage significance published in the *NSW Heritage Manual 1996*
- b) assess the potential impacts of the proposal on the heritage significance — non-Aboriginal heritage items, protected under the *Heritage Act 1977* or a conservation instrument, require approval from the Heritage Council before disturbance can be undertaken; items identified in planning instruments require the consent of the nominated consent authority (usually council); shipwrecks protected under the *Historic Shipwrecks Act 1976* require the approval of the Director of the NSW Heritage Office
- c) propose measures to mitigate impacts to

conserve items of heritage significance — if items of significance are to be disturbed a conservation management plan may need to be prepared in consultation with the Heritage Office.

For Aboriginal heritage:

- a) assess the archaeological and anthropological significance of any Aboriginal relic or place identified on the site in consultation with the Land Council, Department of Aboriginal Affairs and NPWS
- b) assess the potential impact of the proposal on the heritage significance; Aboriginal relics or places cannot be disturbed without written consent from the Director-General of National Parks and Wildlife
- c) propose measures to mitigate impacts or to conserve the heritage significance of the area, relic or place — if items of significance are to be disturbed, a conservation management plan may need to be prepared in consultation with the NPWS, Land Councils, the Department of Aboriginal Affairs and the Heritage Office.

For natural heritage:

- a) assess the heritage significance of any natural areas including geological or palaeontological features or ecological communities
- b) assess the potential impact of the proposal on the heritage significance (note: items identified in planning instruments or in conservation areas require the consent of the nominated approval authority)
- c) propose measures to mitigate impacts or to conserve the heritage significance — if natural areas of heritage significance are to be disturbed a conservation management plan may need to be prepared in consultation with the relevant authorities.

Consider the acceptability of impacts on heritage significance and assess the adequacy of the measures to mitigate impacts during all stages of the proposal.

16. Social and health issues

For extraction proposals located to result in potential impacts on residential communities, the following issues should be considered:

- a) impacts as a result of changes in employment patterns

- b) impacts resulting from changes in the amenity of the area, including access to recreational areas or damage to heritage items
- c) impacts on the health of the community from any potential changes in the air or water quality, noise regime or safety on roads or waterways.

17. Acid sulfate material

For extraction proposals located where acid sulfate soils, potential acid sulfate soils, sulfidic clays or sulfidic sands are likely to occur (usually in tidal rivers and surrounding areas at locations within 3 metres of current sea level), the issues to be considered include:

- a) identifying the likely presence and extent of sulfidic material in accordance with EPA's *Assessing and Managing Acid Sulfate Soils* including:
 - i) field observations and peroxide effervescence test
 - ii) surface water and groundwater analyses
 - iii) soil analyses, including determination of the pyritic sulfur content and the net acid generating potential
- b) assessing of potential impacts from:
 - i) the disturbance of sulfidic material or extractive material containing sulfidic material (in the fines)
 - ii) impacts from the alteration of watertable levels (water use, drainage works, change of the bed of rivers, dewatering as component of extraction operation)
 - iii) acid run-off from stockpiles or the acidification of sulfidic fines
 - iv) the sale or use of material containing sulfidic material
- c) the proposed management program to mitigate potential impacts — this should include a clearly defined monitoring program and response strategies should deleterious impacts be observed.

18. Contaminated soils

For proposals in areas likely to be contaminated with chemicals from past industrial or agricultural activities or receiving urban, industrial or agricultural run-off, or where organic sediments on the bed of water bodies are likely to be disturbed, consideration should be given to possible contamination of the material

to be extracted. Issues to consider include:

- a) identifying any possible contamination by pesticides, faecal pollution, heavy metals or sulfidic material
- b) the proposed methods of isolating any contaminated material, and safe handling, treatment or disposal of the material.

19. Bushfire hazards

For extraction proposals located in areas of high bushfire hazard, the following issues should be considered:

- a) measures to reduce the risks of bushfire during establishment and operation
- b) the effects of any change in the bushfire regime on flora and fauna on the site
- c) provisions for on-site firefighting, including access.

20. Hazards issues

For extraction proposals where significant quantities of fuels and other hazardous materials are kept on site, the following issues should be considered:

- a) a list of dangerous goods or materials likely to be used; anticipated rates of usage; details of quantities stored; storage and transport arrangements; safeguards proposed to minimise adverse environmental impacts
- b) procedures involving all dangerous goods
- c) potential risks from the use, storage or transport of the materials and the adequacy of management procedures.

21. Cumulative impacts

Cumulative impacts may result from various activities with similar impacts interacting with the environment in a region over both space and time. They also result from the repetitive impact of the same activity over a long period of time.

Issues to consider that relate to extraction proposals include:

- a) identifying existing or past extraction operations that have occurred either in the same location or the immediate vicinity within at least the last five years; identifying other similar activities in the vicinity

- b) identifying any likely cumulative impacts having regard to:
 - i) river, lake or coastal morphology; bed, bank or beach erosion, aggradation or general degradation; tidal or wave patterns; water quality; water depth
 - ii) vegetation, fauna or fauna habitat (including fishing grounds and fish breeding areas)
 - iii) vehicular movements, dust, noise, visual impacts, and loss of heritage items
- c) identifying advantages or disadvantages of clustering similar extraction operations in the area; the compatibility of the proposed mitigation measures with management of other operations;
- d) the compatibility of the proposal with constraints identified in any cumulative impact study associated with any estuary, river or floodplain management plans or flood mitigation works.

F. List of approvals and licences

All approvals and licences required (under any legislation) must be identified. This is to alert other relevant authorities as early as possible to their potential involvement in the project, and ensure an integrated approach to the granting of approvals (Appendix 4).

G. Compilation of mitigation measures

The EIS should include in a single section a full description of all the measures proposed to mitigate any adverse effects of the development or activity on the environment. This would include specific layout or operational features of the proposal described under each of the key issues as well as ongoing management and monitoring strategies. Mitigation strategies for the construction and operation stage of the project should be distinguished.

An environmental management plan (EMP)

A description of the management and monitoring strategies identified in the various sections of the EIS should provide an outline of an

environmental management plan (EMP). The plan should demonstrate how the proposal will be capable of complying with statutory obligations under all likely licences and approvals.

An EMP is a mechanism for managing a proposal once it is approved and is usually a comprehensive technical document. This level of detail is not considered necessary for the EIS. However, at this stage of the process, it is essential that the proponent can demonstrate that the environmental impacts can be managed in an integrated, feasible manner.

The outline should provide a framework for managing or mitigating environmental impacts for the life of the proposal, and for rehabilitation of the site during operation as well as upon completion of the operation. Consideration should be given to any existing plan of management for the resource in the area.

Mechanisms to facilitate ongoing community involvement during both the operational and post-operational phases of the proposal should be identified. This may be necessary only for those extraction proposals of high community concern.

The outline should include two sections: one setting out the program for managing the proposal (section [a] below) and the other, outlining the monitoring program, providing feedback on the effectiveness of the management plan (section [b] below).

a) Outline of an environmental management plan

The plan should demonstrate strategies for sound environmental practice during the establishment, operation, decommissioning and rehabilitation of the site, including:

- i) management of impacts and effects on surrounding land use, taking into consideration:
 - sediment transport loads and extraction strategies and methods
 - the vulnerability of banks, foreshore, beaches or infrastructure to erosion or accretion

- the vulnerability of the ecology of the system
- transport, air, noise, water quality, heritage and visual amenity
- energy and water management
- progressive rehabilitation of the site and final end use
- auditing procedures
- ii) identifying likely government licensing and approval requirements and demonstrating how the plan will facilitate compliance with these requirements.

b) Monitoring program

The monitoring program should outline:

- i) how specific information will be monitored
- ii) the monitoring intervals
- iii) procedures to be undertaken should the monitoring indicate an environmental problem
- iv) reporting procedures to relevant authorities and, where appropriate, to the approval authority and the community.

H. Justification for the proposal

Reasons justifying the carrying out of the proposal in the manner proposed should be outlined, taking into consideration potential biophysical, economic and social considerations and the principles of ecologically sustainable development.

The sustainability of the extractive industry proposal should be outlined in terms of:

- a) the short- and long-term health of any river, coastal or floodplain system affected by the proposal taking into consideration:
 - i) sediment transport loads and extraction strategies and methods
 - ii) the vulnerability of banks, foreshore, beaches or infrastructure to erosion and accretion
 - iii) the vulnerability of the ecology of the system
- b) the ability of the proposal to meet environmental performance objectives.

Appendix 1. Schedule 2 — Environmental Impact Statements

This appendix contains an extract from the Environmental Planning and Assessment Regulation 1994. Schedule 2 outlines the matters that must be addressed in an EIS pursuant to clauses 51 and 84 of the EP&A Regulation.

1. A summary of the environmental impact statement.
2. A statement of the objectives of the development or activity.
3. An analysis of any feasible alternatives to the carrying out of the development or activity, having regard to its objectives, including:
 - a) the consequences of not carrying out the development or activity; and
 - b) the reasons justifying the carrying out of the development or activity.
4. An analysis of the development or activity, including:
 - a) a full description of the development or activity; and
 - b) a general description of the environment likely to be affected by the development or activity, together with a detailed description of those aspects of the environment that are likely to be significantly affected; and
 - c) the likely impact on the environment of the development or activity, having regard to:
 - i) the nature and extent of the development or activity; and
 - ii) the nature and extent of any building or work associated with the development or activity; and
 - iii) the way in which any such building or work is to be designed, constructed and operated; and
 - iv) any rehabilitation measures to be undertaken in connection with the development or activity; and
 - d) a full description of the measures proposed to mitigate any adverse effects of the development or activity on the environment.
5. The reasons justifying the carrying out of the development or activity in the manner proposed, having regard to biophysical,

economic and social considerations and the principles of ecologically sustainable development.

6. A compilation (in a single section of the environmental impact statement) of the measures referred to in item 4 (d).
7. A list of any approvals that must be obtained under any other Act or law before the development or activity may lawfully be carried out.

Note: For the purposes of this Schedule, “**the principles of ecologically sustainable development**” are as follows:

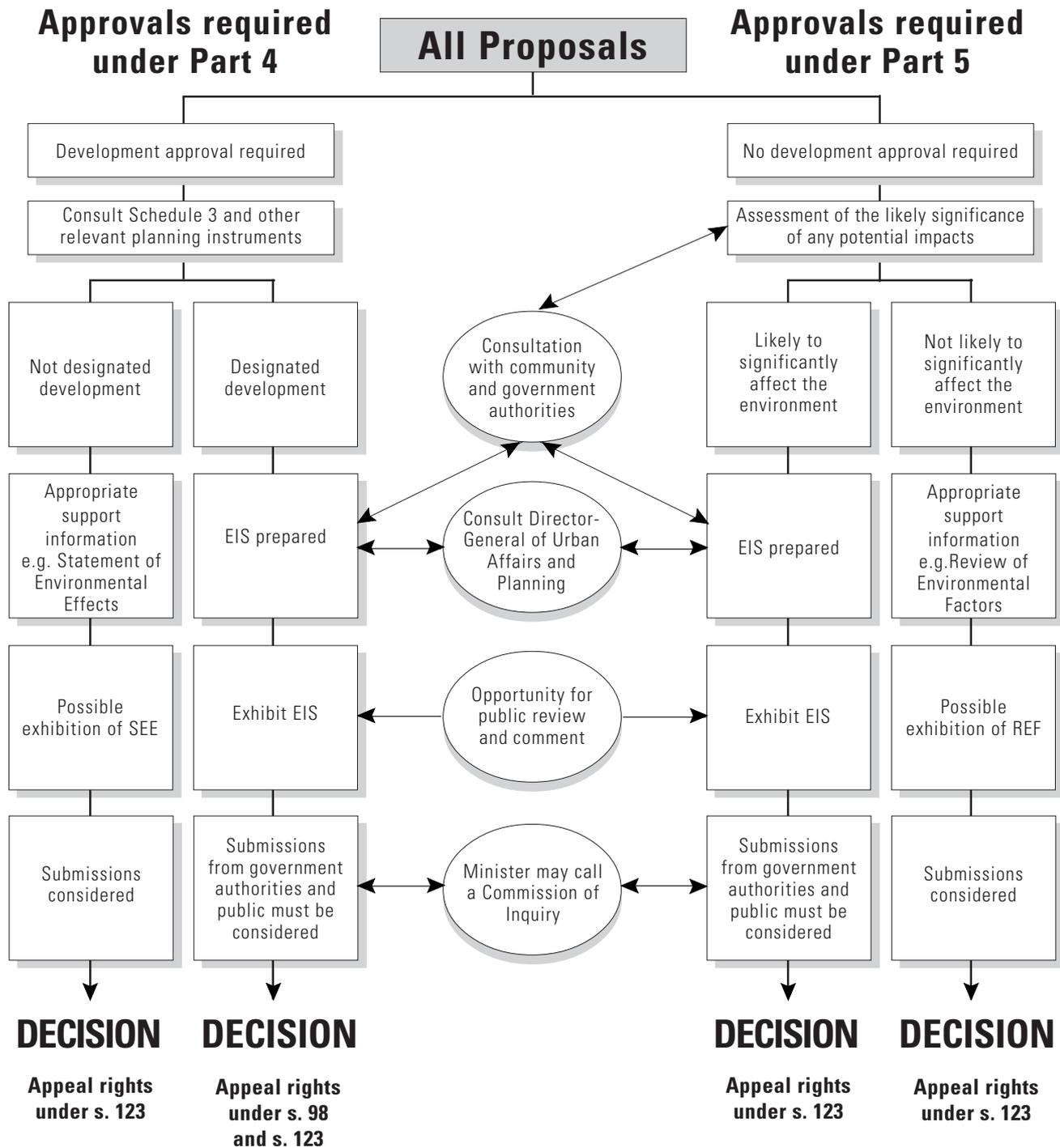
- a) The precautionary principle — namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.
- b) Inter-generational equity — namely, that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.
- c) Conservation of biological diversity and ecological integrity.
- d) Improved valuation and pricing of environmental resources.

Note: The matters to be included in item 4 (c) might include such of the following as are relevant to the development or activity:

- a) the likelihood of soil contamination arising from the development or activity;
- b) the impact of the development or activity on flora and fauna;
- c) the likelihood of air, noise or water pollution arising from the development or activity;
- d) the impact of the development or activity on the health of people in the neighbourhood of the development or activity;
- e) any hazards arising from the development or activity;
- f) the impact of the development or activity on traffic in the neighbourhood of the development or activity;

- g) the effect of the development or activity on local climate;
- h) the social and economic impact of the development or activity;
- i) the visual impact of the development or activity on the scenic quality of land in the neighbourhood of the development or activity;
- j) the effect of the development or activity on soil erosion and the silting up of rivers or lakes;
- k) the effect of the development or activity on the cultural and heritage significance of the land.

Appendix 2. EIA procedures under the EP&A Act



Appendix 3. Threatened Species Conservation Act

This appendix contains an extract from the *Threatened Species Conservation Act 1995* and the provisions for assessing impacts on the conservation of critical habitats and threatened species, populations or ecological communities and their habitats.

What are critical habitats, threatened species, populations or ecological communities and threatening processes?

Critical habitats are prescribed in Part 3 of the *Threatened Species Conservation (TSC) Act 1995*. Threatened species, populations or ecological communities and threatening processes are prescribed in Part 2 and Schedules 1 and 2 of the TSC Act.

When is a Species Impact Statement required?

Under section 77 (3) (d1) and section 112 (1B) of the EP&A Act, if a proposal:

- is on land that contains a “critical habitat” or
- is likely to significantly affect threatened species, populations or ecological communities, or their habitats,

a species impact statement (SIS) must be prepared in accordance with Division 2 of Part 6 of the *TSC Act*.

Factors when deciding if an SIS is required

The following factors must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats:

- a) in the case of a threatened species, whether the life cycle of the species is likely to be

disrupted such that a viable local population of the species is likely to be placed at risk of extinction,

- b) in the case of an endangered population, whether the life cycle of the species that constitutes the endangered population is likely to be disrupted such that the viability of the population is likely to be significantly compromised,
- c) in relation to the regional distribution of the habitat of a threatened species, population or ecological community, whether a significant area of known habitat is to be modified or removed,
- d) whether an area of known habitat is likely to become isolated from currently interconnecting or proximate areas of habitat for a threatened species, population or ecological community,
- e) whether critical habitat will be affected,
- f) whether a threatened species, population or ecological community, or their habitats, are adequately represented in conservation reserves (or other similar protected areas) in the region,
- g) whether the development or activity proposed is of a class of development or activity that is recognised as a threatening process,
- h) whether any threatened species, population or ecological community is at the limit of its known distribution.

Form and content of an SIS

Under section 110 of the TSC Act, the general requirements on the form and content of an SIS are as follows.

General information

1. A species impact statement must include a full description of the action proposed, including its nature, extent, location, timing and layout and, to the fullest extent reasonably practicable, the information referred to in this section.

Information on threatened species and populations

2. A species impact statement must include the following information as to threatened species and populations:
 - a) a general description of the threatened species or populations known or likely to be present in the area that is the subject of the action and in any area that is likely to be affected by the action,
 - b) an assessment of which threatened species or populations known or likely to be present in the area are likely to be affected by the action,
 - c) for each species or population likely to be affected, details of its local, regional and State-wide conservation status, the key threatening processes generally affecting it, its habitat requirements and any recovery plan or threat abatement plan applying to it,
 - d) an estimate of the local and regional abundance of those species or populations,
 - e) a general description of the threatened species or populations known or likely to be present in the area that is the subject of the action and in any area that is likely to be affected by the action,
 - f) a full description of the type, location, size and condition of the habitat (including critical habitat) of those species and populations and details of the distribution and condition of similar habitats in the region,
 - g) a full assessment of the likely effect of the action on those species and populations, including, if possible, the quantitative effect of local populations in the cumulative effect in the region,
 - h) a description of any feasible alternatives to the action that are likely to be of lesser effect and the reasons justifying the carrying out of the action in the manner proposed, having regard to the biophysical, economic and social considerations and the principles of ecologically sustainable development,
 - i) a full description and justification of the measures proposed to mitigate any adverse effect of the action on the species and populations, including a compilation (in a single section of the statement) of those measures,

- j) a list of any approvals that must be obtained under any other Act or law before the action may be lawfully carried out, including details of the conditions of any existing approvals that are relevant to the species or population.

Information on ecological communities

3. A species impact statement must include the following information as to ecological communities:
 - a) a general description of the ecological community present in the area that is the subject of the action and in any area that is likely to be affected by the action,
 - b) for each ecological community present, details of its local, regional and State-wide conservation status, the key threatening processes generally affecting it, its habitat requirements and any recovery plan or any threat abatement plan applying to it,
 - c) a full description of the type, location, size and condition of the habitat of the ecological community and details of the distribution and condition of similar habitats in the region,
 - d) a full assessment of the likely effect of the action on the ecological community, including, if possible, the quantitative effect of local populations in the cumulative effect in the region,
 - e) a description of any feasible alternatives to the action that are likely to be of lesser effect and the reasons justifying the carrying out of the action in the manner proposed, having regard to the biophysical, economic and social considerations and the principles of ecologically sustainable development,
 - f) a full description and justification of the measures proposed to mitigate any adverse effect of the action on the ecological community, including a compilation (in a single section of the statement) of those measures,
 - g) a list of any approvals that must be obtained under any other Act or law before the action may be lawfully carried out, including details of the conditions of any existing approvals that are relevant to the ecological community.

Credentials of persons undertaking an SIS

4. A species impact statement must include details of the qualifications and experience in threatened species conservation of the person preparing the statement and of any other person who has conducted research or investigations relied on in preparing the statement.

State-wide conservation status

5. The requirements of subsections (2) and (3) [above] in relation to information concerning the State-wide conservation status of any species or population, or any ecological community, are taken to be satisfied by the information in that regard supplied to the principal author of the species impact statement by the NPWS, which information that Service is by this subsection authorised and required to provide.

Procedures for preparing an SIS

Under Section 111 of the TSC Act, the Director-General of National Parks and Wildlife must be consulted in writing for the requirements for an SIS. These requirements must be provided within 28 days from when a request is made.

Because of the circumstances of the case, the Director-General of National Parks and Wildlife may limit or modify the extent of matters prescribed in section 110. In other cases if the impacts are considered to be trivial or negligible, the Director-General of National Parks and Wildlife may dispense with the requirement for an SIS to be prepared.

An SIS may be prepared as a separate document or incorporated in an EIS. If the SIS is separate to the EIS, it must be exhibited concurrently with the EIS.

The SIS must be in writing and be signed by the principal author of the document and the applicant/proponent.

Appendix 4. Consultation and approvals

It is the responsibility of the person preparing the EIS to determine what approvals will be required as a result of the proposal and to demonstrate that the proposal can meet all approval and licensing requirements. In preparing the EIS, consultation with relevant parties should be undertaken early in the EIA process and their comments taken into account in the EIS.

Approvals or consultation which may be required include:

local councils for development approvals under Part 4 of the EP&A Act and any building approval under the *Local Government Act 1993*, also for any alteration to local roads or buildings or trees of local heritage significance

Department of Urban Affairs and Planning for concurrence if the proposal impacts on SEPP 14 — Coastal Wetlands, SEPP 26 — Littoral Rainforest, potential or actual koala habitat under SEPP 44 — Koala Habitat Protection

Environment Protection Authority for air, water and noise licences, approvals and certificates of registration under relevant pollution control legislation; regulation of waste generation, transportation and disposal; licences for transport of dangerous goods under the Dangerous Goods Act; licences for chemicals subject to chemical control orders under the Environmentally Hazardous Chemicals Act

Department of Land and Water Conservation Soil and Vegetation Management for information on soils; design and construction of erosion and sediment controls and rehabilitation; approvals on protected lands; State Lands Services regarding effect of development on any Crown land; for leasing, licence, or purchase; whether the land is subject to Aboriginal land claim or Native Title legislation; if Crown Reserves and dedicated lands exist, whether the proposal is compatible with the stated public purpose; State Water Management regarding impact on ground or surface water resources; clearing riparian vegetation; works within 40 metres of a stream;

Coastal and Rivers Management regarding flooding and coastal areas; Water Services Policy regarding approvals under the *Local Government Act 1993*

relevant service authorities such as water, electricity, gas, telecommunication, drainage, flood mitigation, sewerage or other utility organisations

National Parks and Wildlife Service if land clearing or impacts on natural vegetation are likely, particularly in relation to the provisions of the Threatened Species Conservation Act; or if sites of Aboriginal heritage significance or land managed by the Service are likely to be affected

NSW Fisheries if fish or fish habitat is affected (including dredging or reclamation works, impeding fish passage, damaging marine vegetation, desnagging, use of explosives or other dangerous substances in or adjacent to a waterway which may result in fish kills)

NSW Agriculture if the proposal is on land with high agricultural value or will cause dislocation to the agricultural industry

NSW Health Department with regard to the potential health hazard caused by the operation and siting of the facility

WorkCover for responsibilities regarding handling of dangerous goods and hazardous substances

Heritage Council of NSW if the proposal is likely to affect any place or building having State heritage significance or if the proposal is affected by Interim Conservation Orders (ICO) or Permanent Conservation Orders (PCO)

Department of Aboriginal Affairs if the proposal is in an area of significance to the Aboriginal community

Department of Mineral Resources if a resource management plan applies or if the proposal is in an area of important mineral resources, concerning its responsibilities under Sydney REP No 9 — Extractive Industry, and for safety and blasting

Mining Subsidence Board if the proposal is in an underground mining area

State Rail Authority (SRA) if the proposal impacts on SRA operations

Office of Marine Safety and Port Strategy on any activities on navigable waters

Roads and Traffic Authority if the proposal is likely to result in significant traffic impacts

State Forests of NSW in relation to impacts on State Forests

Department of Bushfire Services if the area is in a location of bushfire hazard

Catchment Management Committees or Trusts

Local Aboriginal Land Councils

relevant industry organisations

Commonwealth EPA, if Commonwealth land is likely to be affected or if Commonwealth funding applies

the owner or operator of any nearby airports and airport safety organisations.

Appendix 5. References

The following are some references that may be of assistance in preparing an EIS. This list is by no means exhaustive.

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NSW Soil Conservation Service (1985) *Guidelines to Meet Requirements for Information on Soil and Land Stability in Proposals for Open-Cut Mining and Rehabilitation*, Sydney

Victoria Rural Water Commission & the Standing Committee on Rivers and Catchments Victoria (1991) *Guidelines of Stabilising Waterways*, Armadale, Victoria

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Treatment and Containment of Potential Acid Sulfate Soils. Formation, distribution, properties and management of potential acid sulfate soils
CSIRO, Canberra

York, A., Binns, D. and Shields, J. (1991) *Flora and Fauna Assessment in NSW State Forests. Survey Guidelines. Procedures for sampling flora and fauna for Environmental Impact Statements*,
Forestry Commission of NSW

Appendix 6. Extract — Schedule 3

Designated development

The following excerpt from Schedule 3 defines designated development as it pertains to extractive industries. This designation only applies to proposals which require development consent under the provisions of a planning instrument.

Extractive industries that obtain extractive materials by methods including excavating, dredging, tunnelling or quarrying or that store, stockpile or process extractive materials by methods including washing, crushing, sawing or separating and:

1. obtain or process for sale, or reuse, more than 30,000 cubic metres of extractive material per annum; or
2. disturb or will disturb a total surface area of more than 2 hectares of land by:
 - a) clearing or excavating; or
 - b) constructing dams, ponds, drains, roads or conveyors; or
 - c) storing or deposition overburden, extractive material or tailings; or
3. are located:
 - a) in or within 40 metres of a natural waterbody, wetlands or an environmentally sensitive area; or
 - b) within 200 metres of a coastline; or
 - c) in an area of:
 - i) contaminated soil; or
 - ii) acid sulfate soil; or
 - d) on land that slopes at more than 18 degrees to the horizontal; or
 - e) if involving blasting, within:
 - i) 1,000 metres of a residential zone; or
 - ii) 500 metres of a dwelling not associated with the development; or
 - f) within 500 metres of the site of another extractive industry that has operated during the last 5 years.

This designation of extractive industries does not include:

- a) extractive industries on land to which the following environmental planning instruments apply:
 - i) Sydney Regional Environmental Plan

- ii) Western Division Regional Environmental Plan No. 1 — Extractive Industries; or
- b) maintenance dredging involving the removal of less than 1,000 cubic metres of alluvial material from oyster leases, sediment ponds or dams, artificial wetlands or deltas formed at stormwater outlets, drains or the junction of creeks with rivers provided that:
 - i) the extracted material does not include contaminated soil or acid sulfate soil; or
 - ii) any dredging operations do not remove any seagrass or native vegetation; or
 - iii) there has been no other dredging within 500 metres during the past 5 years; or
- c) extractive industries undertaken in accordance with a plan of management (such as river, estuary, land or water management plans) provided that:
 - i) the plan is:
 - prepared in accordance with guidelines approved by the Director of Planning and includes consideration of cumulative impacts, bank and channel stability, flooding, ecology and hydrology of the area to which the plan applies; and
 - approved by a public authority and adopted by the consent authority; and
 - reviewed every 5 years; and
 - ii) less than 1,000 cubic metres of extractive material is removed from any potential extraction site that is specifically described in the plan; or
- d) continued operations within the meaning of State Environmental Planning Policy No. 37 — Continued Mines and Extractive Industries in respect of which an application for development consent has been made before the end of the moratorium period prescribed under that Policy; or
- e) the excavation of contaminated soil for treatment at another site; or
- f) artificial waterbodies, contaminated soil treatment works, turf farms, or waste management facilities or works, specifically listed elsewhere in this Schedule.

Are alterations or additions designated development?

Is there a significant increase in the environmental impacts of the total development?

1. Development involving alterations or additions to development (whether existing or approved) is not designated development if, in the opinion of the consent authority, the alterations or additions do not significantly increase the environmental impacts of the total development (that is the development together with the additions or alterations) compared with the existing or approved development.

Factors to be taken into consideration:

2. In forming its opinion, a consent authority is to consider:
 - a) the impact of the existing development having regard to factors including:
 - i) previous environmental management performance, including compliance with:
 - conditions of any consents, licences, leases or authorisations by a public authority; and

- any relevant codes of practice; and
 - ii) rehabilitation or restoration of any disturbed land; and
 - iii) the number and nature of all past changes and their cumulative effects; and
- b) the likely impact of the proposed alterations or additions having regard to factors including:
 - i) the scale, character or nature of the proposal in relation to the development; and
 - ii) the existing vegetation, air, noise and water quality, scenic character and special features of the land on which the development is or is to be carried out and the surrounding locality; and
 - iii) the degree to which the potential environmental impacts can be predicted with adequate certainty; and
 - iv) the capacity of the receiving environment to accommodate changes in environmental impacts; and
 - c) any proposals:
 - i) to mitigate the environmental impacts and manage any residual risk; and
 - ii) to facilitate compliance with relevant standards, codes of practice or guidelines published by the Department of [Urban Affairs and] Planning or other public authorities.