

Derby Tidal Power Project – Recommended Conditions

Derby Hydro Power Pty Ltd

**Report and recommendations
of the Environmental Protection Authority**

**Environmental Protection Authority
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Summary and recommendations

Derby Hydro Power Pty Ltd proposes to construct and operate a tidal power station in Doctors Creek near Derby and construct 450 kilometres (km) of new transmission lines to supply the power requirements of Broome, Derby, Fitzroy Crossing and Blendevalle.

The EPA reported to the Minister on this proposal in Bulletin 942, June 1999 and provided its advice and recommendations to the Minister for the Environment on the environmental factors relevant to the proposal.

The EPA determined in Bulletin 942 that the environmental impacts, uncertainties and risks associated with the proposal at the proposed location were significant and were of such nature that the proposal should not be implemented. As a consequence the EPA did not develop recommended conditions and procedures at that time. However, the EPA advised that if Government was of the view that the proposal by Derby Hydro Power Pty Ltd should proceed, the EPA would provide further advice in relation to the proposal, including the environmental conditions and procedures to which the project should be subject.

Following a decision by the Minister for the Environment that the proposal could gain environmental approval provided additional work is carried out, this Bulletin provides the EPA's recommended environmental conditions and procedures to which the project should be subject, in accordance with Section 44 of the *Environmental Protection Act (1986)*.

Recommendations

The EPA submits the following recommendations to the Minister for the Environment:

- 1) that the Minister notes that the EPA has provided recommended environmental conditions and procedures as requested; and
- 2) that in the event the proposal proceeds, the Minister imposes the recommended environmental conditions and procedures presented in Appendix 2 of this report.

Conditions

Having considered the Minister for the Environment's determination of appeals on Bulletin 942, the information presented in Bulletin 942 and the proponent's commitments, the EPA has developed a set of conditions which it recommends be imposed if the proposal by Derby Hydro Power Pty Ltd to develop the Derby Tidal Power project, is approved for implementation.

The recommended environmental conditions are presented in Appendix 2. Matters addressed in the conditions include the following:

- a) that the proponent be required to fulfil the commitments in the Consolidated Commitments statement set out as an attachment to the recommended conditions in Appendix 2;
- b) preparation of an Environmental Management System;
- c) mangroves;
- d) geo-heritage;
- e) proposed nature reserve;
- f) groundwater;
- g) water quality;
- h) sedimentation;
- i) transmission route;
- j) fauna;
- k) dust;
- l) auxiliary power supply; and
- m) decommissioning.

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1. Introduction and background

EPA's previous report to the Minister – Bulletin 942

The EPA reported to the Minister on this proposal in Bulletin 942, June 1999 and provided its advice and recommendations to the Minister for the Environment on the environmental factors relevant to the proposal.

The EPA did not provide final advice on the factor of sedimentation or its assessment of the power transmission lines as it was of the opinion that further information would be required on the potential impacts of the proposal on sedimentation and visual amenity to finalise its advice. In addition, the EPA did not provide draft conditions and procedures.

The EPA determined in Bulletin 942 that the environmental impacts, uncertainties and risks associated with the proposal at the proposed location were significant and were of such nature that the proposal should not be implemented. Accordingly, the EPA did not develop recommended conditions and procedures at that time.

However, the EPA advised that if Government was of the view that it was desirable for the proposal by Derby Hydro Power Pty Ltd to proceed, the EPA would provide further advice in relation to the proposal, including the environmental conditions and procedures to which the project should be subject.

Appeals on Bulletin 942

Appeals were received by the Minister for the Environment against the EPA's Bulletin 942. In determining the appeals, the Minister noted that she was satisfied that the EPA provided a sound environmental report and properly identified the important issues. After considering all advice, the Minister allowed the appeals to the extent that the proposal could gain environmental approval provided additional work is carried out.

The Minister requested that the EPA provide a set of conditions and procedures to apply to the proposal. Through the appeals process, the Minister determined the nature of the environmental conditions in relation to three of the environmental factors reported on in Bulletin 942 as well as the transmission system and requested that these be included in the set of conditions.

“1. Mangroves

The proponent provide the following:

- clear objectives for mangrove rehabilitation work, ie. rehabilitation work for mangrove density, diversity or biomass or a combination;
- information on the present soil condition and the predicted soil condition and 'ripeness' for mangrove colonisation of newly available areas after construction of the barrages, including soil properties such as moisture, texture, chemistry and compaction;
- demonstrate a good understanding of flowering and fruiting times of target species to optimise the chances of re-establishment;
- strategies for the protection of juvenile plants from effects that reduce viability, eg. contamination, siltation, wind and tidal erosion, excessive temperature, excessive evaporation and insolation; and
- an Environmental Management Plan for mangrove rehabilitation including research, monitoring and management as presented in proponent commitment 3 in the Consultative Environmental Review (CER) document.

2. Geo-heritage

The proponent be required to identify a site (or number of sites) in King Sound that may possess similar geo-heritage values so that a similar type-site can be used to continue geologic/ecologic research in tidal flats in high-tidal, semi-arid deltaic areas.

3. Sedimentation

Further detailed modelling work be undertaken through the conditions of environmental approval to assess the long-term implications of sedimentation.

4. Transmission System

The assessment of the transmission system be undertaken through the development of a Route Transmission Plan.”

This Bulletin

The information provided in this Bulletin is supplementary to that provided in Bulletin 942 in that it provides a recommended set of environmental conditions to which the implementation of the proposal by Derby Hydro Power Pty Ltd should be subject.

The number and scope of recommended environmental conditions reflects the significance of the issues that the EPA considers need to be addressed by the proponent. These include issues identified in Bulletin 942 which the EPA believes contain substantial uncertainty.

Further details of the proposal are presented in Section 2 of this report. The Conditions and commitments to which the proposal should be subject are set out in Section 3 and Section 4 presents the EPA's Recommendations.

2. The proposal

The proposal is described in detail in EPA Bulletin 942 (EPA 1999) and in the proponent's CER document (1997). A summary description of the key elements of the proposal is presented in Table 1. The EPA has not been advised of any changes to the proposal since the EPA reported in June 1999.

Derby Hydro Power Pty Ltd, the proponent, proposes to construct and operate a tidal power station in Doctors Creek near Derby (Figure 1). The proposal involves the construction of barrages across the mouth of East and West Doctors Creek with sluice gates installed in the barrages to control the flow of water into and out of the creeks. West Doctors Creek will be the "high basin" and East Doctors Creek the "low basin".

A turbine channel will be constructed between the two creeks. The flow of water from the high basin to the low basin through the channel will drive the turbines. Approximately 26 kilometres of levee banks will be constructed to increase the water holding capacity and 450 kilometres of power lines will distribute the power to major centres in the West Kimberley, including Derby, Broome, Fitzroy Crossing and Blendevalle.

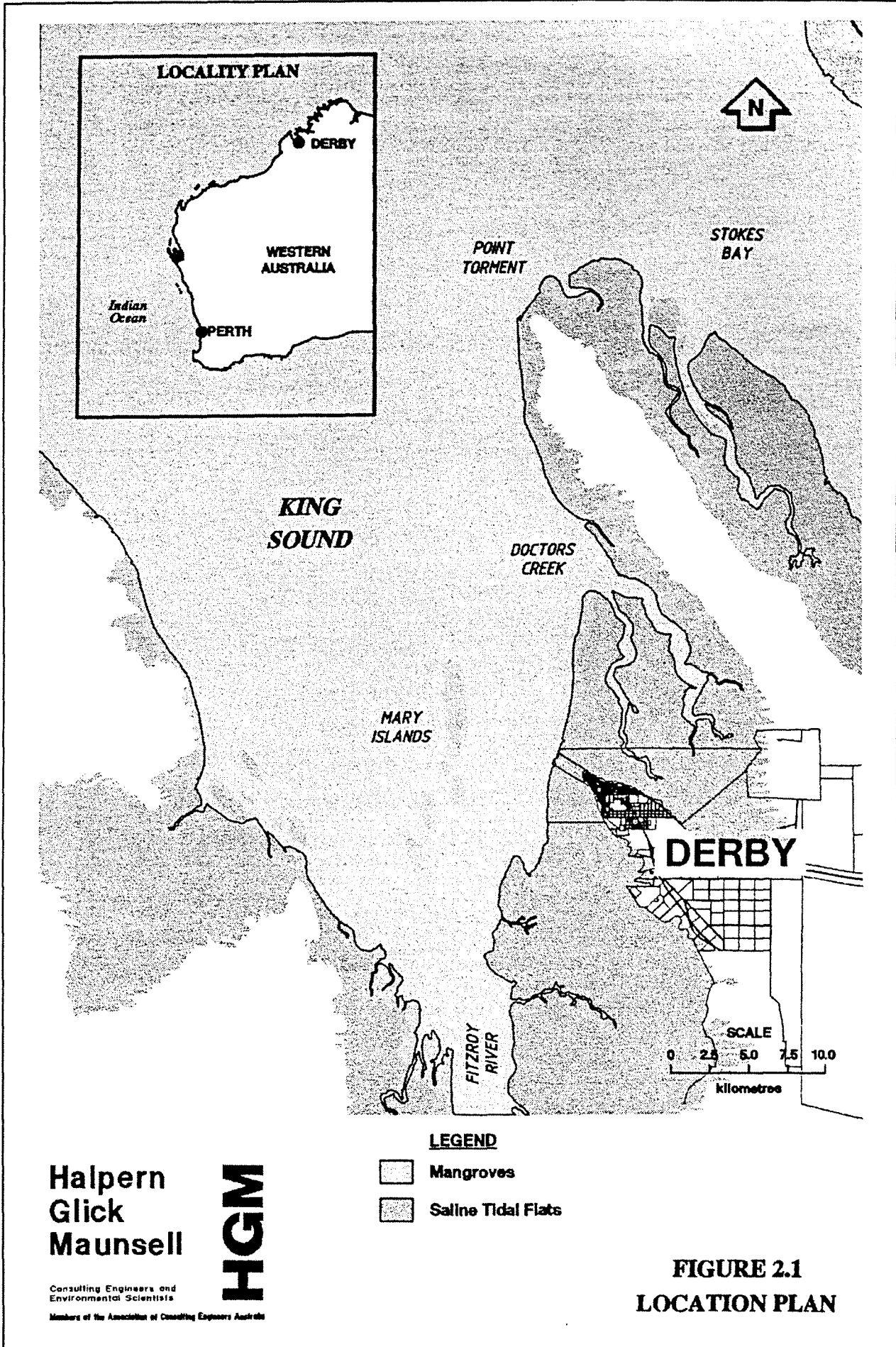


Figure 1. Locality map, East & West Doctors Creeks, Derby.

Table 1 - Summary of key proposal characteristics

| Element | Quantities/Description |
|---|--|
| Life of project | Up to 120 years |
| Barrages | Approximately 0.5 and 1.3 kilometres long, comprising 1.0 million cubic metres of earth fill |
| Rock armour | Approximately 60,000 cubic metres |
| Rip-rap | Approximately 70,000 cubic metres |
| Levees | Approximately 26 kilometres |
| Turbine channel | Excavation of approximately 1.0 million cubic metres |
| Dredging <ul style="list-style-type: none"> • initial low basin dredging • maintenance dredging | <ul style="list-style-type: none"> • approximately 10 million cubic metres • ongoing |
| Sluice gates x 2 <ul style="list-style-type: none"> • high basin • low basin | <ul style="list-style-type: none"> • 60 to 70 metres wide • 100 to 160 metres wide |
| Turbines x 4 to 6 | Total capacity 48 megawatts |
| Transmission lines | Approximately 450 kilometres of 132 kilovolt lines |
| Associated buildings | Office and control room Switchyard Public ablutions block Visitor centre |
| Access road | Approximately 20 kilometre causeway |

3. Conditions and commitments

The recommended environmental conditions presented in Appendix 2 incorporate the Minister's determination on appeals, and these are highlighted in bold text. As the conditions highlighted in bold text result from the Minister's determination of previous appeals, they are final and without appeal. However, the recommended environmental conditions (Appendix 2) that are not in bold text are subject to appeal.

3.1 Proponent's commitments

The proponent's commitments as set in the CER and subsequently modified to meet current expectations of environmental performance, as shown in Schedule 2 of Appendix 2, should be made enforceable through the setting of appropriate conditions.

There is overlap between a number of the proponent's commitments and the recommended environmental conditions. Some commitments will therefore not be applicable, as the conditions will take precedence.

3.2 Recommended conditions

Having considered the Minister for the Environment's determination of appeals on Bulletin 942, the information covered in Bulletin 942 and the proponent's commitments, the EPA has developed a set of conditions which it recommends be imposed as part of the Ministerial Statement that the proposal by Derby Hydro Power Pty Ltd to develop the Derby Tidal Power project may be implemented.

The conditions are presented in Appendix 2. Matters addressed in the conditions include the following:

- a) that the proponent be required to fulfil the commitments in the Consolidated Commitments statement set out as an attachment to the recommended conditions in Appendix 2;
- b) preparation of an Environmental Management System;
- c) mangroves;
- d) geo-heritage;
- e) proposed nature reserve;
- f) groundwater;
- g) water quality;
- h) sedimentation;
- i) transmission route;
- j) fauna;
- k) dust;
- l) auxiliary power supply; and
- m) decommissioning.

4. Recommendations

The EPA submits the following recommendations to the Minister for the Environment:

1. that the Minister notes that the EPA has provided recommended conditions and procedures as requested; and
2. that the Minister imposes the conditions and procedures recommended in Appendix 2 of this report.

Appendix 1

References

Environmental Protection Authority (June 1999). *Bulletin 942: Derby Tidal Power Project*, Proponent: Derby Hydro Power Pty Ltd.

Halpern Glick Maunsell (1997) Derby Tidal Power Project Doctors Creek, Kimberley: Consultative Environmental Review, for Derby Hydro Power Pty Ltd, December 1997.

Appendix 2

Recommended Environmental Conditions and Proponent's Consolidated Commitments

RECOMMENDED ENVIRONMENTAL CONDITIONS
STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED
(PURSUANT TO THE PROVISIONS OF THE
ENVIRONMENTAL PROTECTION ACT 1986)

**TIDAL POWER STATION AND TRANSMISSION LINES, DOCTORS CREEK,
DERBY**

Proposal: The proposal involves the construction of barrages across the mouth of East and West Doctors Creeks with sluice gates installed in the barrages to control the flow of water into and out of the creeks. West Doctors Creek will be the "high basin" and East Doctors Creek the "low basin".

A turbine channel will be constructed between the two creeks. The flow of water from the high basin to the low basin through the channel will drive the turbines.

Approximately 26 kilometres of levee banks will be constructed to increase the water-holding capacity and 450 kilometres of power lines will distribute the power to major centres in the West Kimberley.

Proponent: Derby Hydro Power Pty Ltd

Proponent Address: 34 Colin Street, West Perth WA 6005

Assessment Number: 1073

Reports of the Environmental Protection Authority: Bulletin 942 and Bulletin 984

The proposal to which the above reports of the Environmental Protection Authority relate may be implemented subject to the following environmental conditions and procedures:

Procedures

1 Implementation

- 1-1 Subject to these conditions and procedures, the proponent shall implement the proposal as documented in schedule 1 of this statement.
- 1-2 Where the proponent seeks to change any aspect of the proposal as documented in schedule 1 of this statement in any way that the Minister for the Environment determines, on advice of the Environmental Protection Authority, is substantial, the proponent shall refer the matter to the Environmental Protection Authority.

- 1-3 Where the proponent seeks to change any aspect of the proposal as documented in schedule 1 of this statement in any way that the Minister for the Environment determines, on advice of the Environmental Protection Authority, is not substantial, those changes may be effected.

2 Proponent Commitments

- 2-1 The proponent shall implement the consolidated environmental management commitments documented in schedule 2 of this statement.
- 2-2 The proponent shall implement subsequent environmental management commitments which the proponent makes as part of the fulfilment of conditions and procedures in this statement.

3 Proponent

- 3-1 The proponent for the time being nominated by the Minister for the Environment under section 38(6) or (7) of the Environmental Protection Act 1986 is responsible for the implementation of the proposal until such time as the Minister for the Environment has exercised the Minister's power under section 38(7) of the Act to revoke the nomination of that proponent and nominate another person in respect of the proposal.
- 3-2 Any request for the exercise of that power of the Minister referred to in condition 3-1 shall be accompanied by a copy of this statement endorsed with an undertaking by the proposed replacement proponent to carry out the proposal in accordance with the conditions and procedures set out in the statement.
- 3-3 The proponent shall notify the Department of Environmental Protection of any change of proponent contact name and address within 30 days of such change.

4 Commencement

- 4-1 The proponent shall provide evidence to the Minister for the Environment within five years of the date of this statement that the proposal has been substantially commenced.
- 4-2 Where the proposal has not been substantially commenced within five years of the date of this statement, the approval to implement the proposal as granted in this statement shall lapse and be void. The Minister for the Environment will determine any question as to whether the proposal has been substantially commenced.
- 4-3 The proponent shall make application to the Minister for the Environment for any extension of approval for the substantial commencement of the proposal beyond five years from the date of this statement at least six months prior to the expiration of the five year period referred to in conditions 4-1 and 4-2.
- 4-4 Where the proponent demonstrates to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority that the environmental parameters of the proposal have not changed significantly, then the Minister may grant an extension not exceeding five years for the substantial commencement of the proposal.

5 Compliance Auditing

- 5-1 The proponent shall submit periodic Compliance Reports, in accordance with an audit program prepared in consultation between the proponent and the Department of Environmental Protection.
- 5-2 Unless otherwise specified, the Chief Executive Officer of the Department of Environmental Protection is responsible for assessing compliance with the conditions, procedures and commitments contained in this statement and for issuing formal, written advice that the requirements have been met.
- 5-3 Where compliance with any condition, procedure or commitment is in dispute, the matter will be determined by the Minister for the Environment.

Conditions

6 Environmental Management System

- 6-1 In order to manage the environmental impacts of the project, and to fulfil the requirements of the conditions and procedures in this statement, prior to any ground-disturbing activity, the proponent shall demonstrate to the requirements of the Environmental Protection Authority on advice of the Department of Environmental Protection that there is in place an environmental management system which includes the following elements:
- 1 An environmental policy and corporate commitment to it;
 - 2 Mechanisms and processes to ensure:
 - (1) planning to meet environmental requirements;
 - (2) implementation and operation of actions to meet environmental requirements;
 - (3) measurement and evaluation of environmental performance; and
 - 3 Review and improvement of environmental outcomes.
- 6-2 The proponent shall implement the environmental management system referred to in condition 6-1.

7 Mangroves

- 7-1 Prior to ground-disturbing activity, the proponent shall prepare a Mangrove Management Plan to achieve the following objectives:
- identification of the environmental values of the current mangrove community of East and West Doctors Creeks, including regional and local biodiversity values;
 - quantification of the extent of impacts from the implementation of the proposal on the current mangrove community of East and West Doctors Creeks;
 - quantification of the greenhouse gas offset as a result of the implementation of the proposal;

- demonstration, on a scientific basis, that the environmental values of the impacted area of mangroves can be replaced on a sustainable basis; and
- following demonstration that environmental values can be sustainably replaced, implementation of an agreed course of action to maintain the environmental values of the mangrove community.

This Plan shall be prepared to the requirements of the Environmental Protection Authority on advice of the Department of Conservation and Land Management and Fisheries Western Australia, and shall include:

- 1 clear objectives for mangrove rehabilitation work, i.e. rehabilitation work for mangrove density, diversity or biomass or a combination of density, diversity or biomass;**
 - 2 information on the present soil condition and the predicted soil condition and 'ripeness' for mangrove colonisation of newly available areas after construction of the barrages, including soil properties such as moisture, texture, chemistry and compaction;**
 - 3 demonstration of a good understanding of flowering and fruiting times of target species to optimise the chances of re-establishment;**
 - 4 methodology and results of a scientifically based approach which demonstrates whether the environmental values of the impacted mangrove community can be sustainably replaced;
 - 5 strategies for the protection of juvenile plants from effects that reduce viability, eg. contamination, siltation, wind and tidal erosion, excessive temperature, excessive evaporation and insolation;**
 - 6 strategies for mangrove community rehabilitation, including research, monitoring and management as detailed in commitment 3 in the CER document; and**
 - 7 a contingency plan to be implemented if the objectives for mangrove rehabilitation work or the strategies detailed above in requirements 5 and 6 are not being met. The contingency plan shall detail the timing of its implementation.
- 7-2 The proponent shall implement the Mangrove Management Plan required by condition 7-1.
- 7-3 The proponent shall make the Mangrove Management Plan required by condition 7-1 publicly available, to the requirements of the Environmental Protection Authority.

8 Geomorphological Processes

- 8-1 Prior to ground-disturbing activity, the proponent shall prepare a Geoheritage Monitoring Program to document the following:
- changes to the inundation patterns occurring in East and West Doctors Creeks;
 - the long-term changes to the erosional processes occurring in the creeks;

- changes to the tidal flat to hinterland groundwater relationship; and
- **identification of a site or a number of sites in King Sound that may possess similar geo-heritage values so that a similar type-site can be used to continue geologic / ecologic research in tidal flats in high-tidal, semi-arid deltaic areas.**

This Program shall be prepared to the requirements of the Environmental Protection Authority on advice of the Department of Environmental Protection and the Department of Conservation and Land Management.

- 8-2 The proponent shall implement the Geoheritage Monitoring Program required by condition 8-1.
- 8-3 The proponent shall make the Geoheritage Monitoring Program required by condition 8-1 publicly available, to the requirements of the Environmental Protection Authority.

9 Proposed Nature Reserve

- 9-1 Prior to ground-disturbing activity, the proponent shall prepare a Nature Reserve Management Plan to achieve the following objectives:
- identification of the environmental values of the proposed Nature Reserve;
 - detection of any changes to the agreed environmental values of the proposed Nature Reserve;
 - demonstration that the environmental values of the proposed Nature Reserve can be replaced; and
 - implementation of an agreed course of action to replace the environmental values if they are shown to be impacted.

This Plan shall be prepared to the requirements of the Environmental Protection Authority on advice of the Department of Conservation and Land Management and shall include:

- 1 the process of how the environmental values were identified;
 - 2 details of the monitoring program that will detect changes to the environmental values;
 - 3 criteria that define unacceptable changes to the environmental values;
 - 4 a contingency plan to be implemented if the criteria are not met, which will include identification of an area of land with similar environmental values, in consultation with the Department of Conservation and Land Management, acquisition of this area of land and offering this area of land to the Department of Conservation and Land Management for inclusion in the Conservation Estate.
- 9-2 The proponent shall implement the Nature Reserve Management Plan required by condition 9-1.
- 9-3 The proponent shall make the Nature Reserve Management Plan required by condition 9-1 publicly available, to the requirements of the Environmental Protection Authority.

10 Groundwater

10-1 Prior to ground-disturbing activity, the proponent shall prepare a Groundwater Management Plan to achieve the following objectives:

- identification of the area and beneficial uses of the groundwater potentially affected by the proposal;
- ensure that the beneficial uses of the groundwater are not adversely impacted by the operation of the proposal;
- prevention of the contamination of the groundwater in excess of appropriate guideline levels recognised by the Environmental Protection Authority, such as those in the NHMRC / ARMCANZ Australian Drinking Water Guidelines (1996).

This Plan shall be prepared to the requirements of the Environmental Protection Authority on advice of the Water and Rivers Commission, the Water Corporation, the Shire of Derby-West Kimberley and the Department of Environmental Protection, and shall include:

- 1 detailed modelling of the aquifers beneath the Derby peninsula;
- 2 a monitoring program to detect changes in the freshwater / saltwater interface;
- 3 criteria that specify maximum levels of contamination (by saltwater), dependent on the groundwater use for that area;
- 4 a contingency plan to be implemented if criteria are not met. This may include a staged action plan requiring additional monitoring if one or more criteria are not met and identification of alternative supplies and/or provision of alternative supplies.

10-2 The proponent shall implement the Groundwater Management Plan required by condition 10-1.

10-3 The proponent shall make the Groundwater Management Plan required by condition 10-1 publicly available, to the requirements of the Environmental Protection Authority.

11 Water Quality

11-1 Prior to ground-disturbing activity, the proponent shall prepare a Water Quality Management Plan to achieve the following objectives:

- identification of the environmental quality objectives of the waters of Doctors Creek; and
- maintenance of agreed environmental quality criteria for the waters of Doctors Creek.

This Plan shall be prepared to the requirements of the Environmental Protection Authority on advice of the Water and Rivers Commission, Fisheries WA, the Department of Conservation and Land Management and the Department of Environmental Protection, and shall include:

- 1 the rationale for environmental quality objectives and criteria;

- 2 a monitoring program to detect changes in criteria, including monitoring for the generation of acid sulfate soils;
- 3 detailed water circulation studies for both arms of Doctors Creek to determine areas of potential water quality concern;
- 4 a contingency plan if agreed criteria are breached, including a component on the management of acid sulfate soils. The plan may include management of sluice gates to flush creeks.

11-2 The proponent shall implement the Water Quality Management Plan required by condition 11-1.

11-3 The proponent shall make the Water Quality Management Plan required by condition 11-1 publicly available, to the requirements of the Environmental Protection Authority.

12 Sedimentation

12-1 Prior to ground-disturbing activity, the proponent shall prepare a Sediment Management Plan to achieve the following objectives:

- minimises adverse effects on natural sedimentary patterns;
- ensure that sedimentation does not significantly impact on navigation channels or water movement in King Sound; and
- ensure that sedimentation does not detrimentally affect water quality in Doctors Creek.

This Plan shall be prepared to the requirements of the Environmental Protection Authority on advice of the Department of Environmental Protection, and shall include:

- 1 identification of the portion on King Sound where sedimentary patterns are likely to be influenced by the proposal;
- 2 **detailed modelling work to assess the short- and long-term implications of sedimentation**, potential high erosion areas (to assist in management of mangrove colonisation), changes in water circulation patterns (sediment distributions), effects of storm events, and to estimate sediment disposal loads over the life of the project;
- 3 description of sedimentation management strategies to avoid adverse environmental impacts resulting from the proposal;
- 4 a contingency plan if sedimentation is found to be causing an adverse environmental impact, for example through smothering of mangroves down-current of Doctors Creek.

12-2 The proponent shall implement the Sediment Management Plan required by condition 12-1.

12-3 The proponent shall make the Sediment Management Plan required by condition 12-1 publicly available, to the requirements of the Environmental Protection Authority.

13 Transmission Line

13-1 Prior to finalisation of detailed design, the proponent shall prepare a **Route Transmission Plan** to demonstrate how the following objectives will be achieved:

- avoid, minimise and mitigate the visual impact from the transmission lines;
- prevent disturbance to significant vegetation communities; and
- minimise or avoid impacts on areas of cultural significance.

This Plan shall be prepared to the requirements of the Environmental Protection Authority on advice of the Department of Aboriginal Affairs, the Tourism Commission, the Department of Conservation and Land Management, the Shire of Derby-West Kimberley, relevant affected Aboriginal groups, and the Department of Environmental Protection, and shall include:

- 1 examination of alternate routes, including vegetation and environmental values of the landscape;
 - 2 a detailed map of the preferred route alignment;
 - 3 a detailed description of infrastructure;
 - 4 clear evidence that current best practice design principles and siting guidelines have been used to minimise visual impacts from major tourist routes in finalisation of route alignment; and
 - 5 description of the construction methods to be employed.
- 13-2 The proponent shall implement the Route Transmission Plan required by condition 13-1.
- 13-3 The proponent shall make the **Route Transmission Plan** required by condition 13-1 **publicly available**, to the requirements of the Environmental Protection Authority.

14 Fauna Management Plan

14-1 Prior to ground-disturbing activity, the proponent shall prepare a Fauna Management Plan to achieve the following objectives:

- identification of the current avifauna, marine fauna and vertebrate fauna which inhabit the Doctors Creek area on a permanent and seasonal basis;
- identification of the significant habitat areas (eg. receding tidal water off the mudflats may be used by a species of wader bird protected under a migratory bird agreement);
- detection of changes in community structure;
- identification of significant species and minimises impacts on the abundance of these species; and
- demonstration that effects on significant species and habitat areas can be managed.

This Plan shall be prepared to the requirements of the Environmental Protection Authority on advice of the Department of Conservation and Land Management, Environment Australia, Fisheries Western Australia and the Department of Environmental Protection, and shall include:

- 1 detailed marine fauna and fish usage study;
- 2 detailed avifauna survey including identification of significant species and seasonal variations of visitation over the long-term;
- 3 detailed terrestrial vertebrate monitoring program to identify the occurrence of any endangered species; and
- 4 an on-going monitoring program to detect changes in community structure and composition, including seasonal populations, over time;

14-2 The proponent shall implement the Fauna Management Plan required by condition 14-1.

14-3 The proponent shall make the Fauna Management Plan required by condition 14-1 publicly available, to the requirements of the Environmental Protection Authority.

15 Dust Management Plan

15-1 Prior to ground-disturbing activity, the proponent shall prepare a Dust Management Plan to achieve the following objective:

- ensure that dust levels resulting from the construction and operation of the proposal does not adversely impact the welfare and amenity or cause health problems by meeting statutory requirements and acceptable standards.

This Plan shall be prepared to the requirements of the Environmental Protection Authority on advice of the Shire of Derby-West Kimberley and the Department of Environmental Protection, and shall include:

- 1 identification of acceptable standards;
- 2 identification of background levels and monitoring methods to identify project related dust generation;
- 3 a contingency plan to be implemented if dust levels exceed acceptable standards.

15-2 The proponent shall implement the Dust Management Plan required by condition 15-1.

15-3 The proponent shall make the Dust Management Plan required by condition 15-1 publicly available, to the requirements of the Environmental Protection Authority.

16 Auxiliary Power Supplies

16-1 Prior to ground-disturbing activity, the proponent shall prepare an Auxiliary Power Supply Plan to achieve the following objectives:

- design and operate proposed power plants based on best practice environmental principles; and
- demonstrate measures to minimise adverse environmental impacts (eg. noise, emissions).

This Plan shall be prepared to the requirements of the Environmental Protection Authority on advice of the Shire of Derby-West Kimberley and the Department of Environmental Protection, and shall include:

- 1 identification of appropriate sites;
- 2 demonstration of compliance with appropriate standards and regulations (eg. noise regulations, National Environmental Protection Measures);
- 3 description of links to transmission lines; and
- 4 documentation of greenhouse gas emissions.

16-2 The proponent shall implement the Auxiliary Power Supply Plan required by condition 16-1.

16-3 The proponent shall make the Auxiliary Power Supply Plan required by condition 16-1 publicly available, to the requirements of the Environmental Protection Authority.

17 Decommissioning

17-1 Within five years following commissioning, the proponent shall develop a Decommissioning Management Plan to the requirements of the Environmental Protection Authority on advice of the Department of Land Administration, the Department of Conservation and Land Management, the Shire of Derby-West Kimberley and the Department of Environmental Protection.

The objectives of this Plan are:

- to return the area, as far as is practicable, to its pre-disturbance state, or to a state agreed to by the Environmental Protection Authority; and
- to minimise the environmental impacts caused by decommissioning and removal of infrastructure.

This Plan shall address:

- 1 the removal of infrastructure;
- 2 rehabilitation of disturbed areas;
- 3 preparation of a post-project Environmental Management Plan that identifies on-going monitoring and management for at least 10 years following the decommissioning of the project and removal of infrastructure;

- 4 changes in community structure that have been detailed in the Fauna Management Plan over the life of the project; and
- 5 decommissioning completion criteria.

17-2 The proponent shall implement the Decommissioning Management Plan required by condition 17-1.

17-3 The proponent shall make the Decommissioning Management Plan required by condition 17-1 publicly available, to the requirements of the Environmental Protection Authority.

18 Performance Review

18-1 Each six years following the commencement of construction, the proponent shall submit a Performance Review report to the Department of Environmental Protection:

- to document the outcomes, beneficial or otherwise;
- to review the success of goals, objectives and targets; and
- to evaluate the environmental performance over the six years;

relevant to the following:

- 1 environmental objectives reported on in Environmental Protection Authority Bulletin 942;
- 2 proponent's consolidated environmental management commitments documented in schedule 2 of this statement and those arising from the fulfilment of conditions and procedures in this statement;
- 3 environmental management system environmental performance targets;
- 4 environmental management programs and plans; and/or
- 5 environmental performance indicators;

to the requirements of the Environmental Protection Authority on advice of the Department of Environmental Protection.

Note: The Environmental Protection Authority may recommend changes and actions to the Minister for the Environment following consideration of the Performance Review report.

Schedule 1

The Proposal

Construction of a 48 megawatt double basin tidal power station in the two arms of Doctors Creek near Derby, as shown in Figure 1. The power station is designed to supply the requirements of Derby, Broome, Fitzroy Crossing, and some Kimberley industrial developments, such as the Pillara mine east of Fitzroy Crossing.

The proposal involves the construction of barrages across the mouth of East and West Doctors Creek with sluice gates installed in the barrages to control the flow of water into and out of the creeks. West Doctors Creek will be the "high basin" and East Doctors Creek will be the "low basin". A channel will be constructed between the two creeks in which the turbines will be placed. The flow of water from the high basin to the low basin via the turbine channel will drive the turbines. Approximately 26 kilometres of levee banks will be constructed around West Doctors Creek to increase the water containment, and East Doctors Creek will be dredged to increase its water storage capacity. A diagrammatic representation of the main components of the proposal is shown in Figure 2.

This proposal also includes the installation of approximately 450 kilometres of high tension power lines to Derby, Broome and Fitzroy Crossing.

Key Characteristics Table

| Element | Quantities/Description |
|---|--|
| Life of project | Up to 120 years |
| Barrages | Approximately 0.5 and 1.3 kilometres long, comprising 1.0 million cubic metres of earth fill |
| Rock armour | Approximately 60,000 cubic metres |
| Rip-rap | Approximately 70,000 cubic metres |
| Levees | Approximately 26 kilometres |
| Turbine channel | Excavation of approximately 1.0 million cubic metres |
| Dredging <ul style="list-style-type: none"> • initial low basin dredging • maintenance dredging | <ul style="list-style-type: none"> • approximately 10 million cubic metres • ongoing |
| Sluice gates x 2 <ul style="list-style-type: none"> • high basin • low basin | <ul style="list-style-type: none"> • 60 to 70 metres wide • 100 to 160 metres wide |
| Turbines x 4 to 6 | Total capacity 48 megawatts |
| Transmission lines | Approximately 450 kilometres of 132 kilovolt lines |
| Associated buildings | Office and control room Switchyard Public ablutions block Visitor centre |
| Access road | Approximately 20 kilometre causeway |

**Proponent's Consolidated
Environmental Management Commitments**

March 2000

**TIDAL POWER STATION AND ASSOCIATED
TRANSMISSION LINES, DOCTORS CREEK,
DERBY**

DERBY HYDRO POWER PTY LTD

Proponent Commitments

| No. | Commitment | Objective (why) | Action (how / where) | Timing (when) | Whose advice | Measurement / compliance criteria |
|-----|--|---|---|---|---|---|
| 1 | The Proponent will prepare and implement an Environmental Management System (EMS) for the project. | To manage the relevant environmental factors and to fulfill the requirements of the Conditions and procedures in the Ministerial Statement. | <p>The EMS will include:</p> <ul style="list-style-type: none"> • an environmental policy and corporate commitment to the EMS; • planning to meet environmental requirements; • specification and implementation of actions to meet environmental requirements; • measurement and evaluation of environmental performance; • review and improvement of environmental outcomes; and • the EMP's identified under Commitments 2 and 3 will form part of the EMS and conform to EMS requirements. | An EMS for the construction phase components will be completed prior to construction commencing. An EMS for the operations phase components will be substantially completed prior to operations commencing. | DEP or any accredited assurance service. | Evidence of 1 st party audits annually and 2 nd and 3 rd party audits after three years or certification to ISO14001 or equivalent where the scope covers the EPA's environmental factors. |
| 2 | The Proponent will prepare and implement a construction phase Environmental Management Plan. | To manage the impacts of the construction phase of the project. | <p>The EMP will contain plans, guidelines and procedures to manage environmental issues associated with the construction of the power station, transmission lines and associated infrastructure, including:</p> <ul style="list-style-type: none"> • vegetation clearing and management; • surface water quality; • groundwater quality; • flora; • fauna; • Aboriginal heritage; • noise; • dust; • vehicle movements; • dredge spoil disposal; • sewage disposal; • waste and hazardous materials; • development and rehabilitation of borrow pits; • ongoing liaison with appropriate authorities; • monitoring; and • contingency planning. | Prior to the start of construction. | DEP, Western Power, MRD, WRC. (depending on the project component). | An approved Construction Phase Environmental Management Plan prepared and implemented. Review of final transmission line design by relevant authorities. Results provided in annual and triennial reports. |
| 3 | The Proponent will prepare, implement and regularly revise an operations phase Environmental Management Plan. | To manage the impacts of the operations phase of the project. | <p>The EMP will contain plans, guidelines and procedures to manage environmental issues associated with the operation of the power station, transmission lines and associated infrastructure, including:</p> <ul style="list-style-type: none"> • surface water quality; • groundwater quality; • flora including weed control; • fauna, including fish exclusion from the turbines; • Aboriginal heritage; • coastal processes and sedimentation; • dredge spoil disposal; • waste and hazardous materials; • ongoing maintenance; • ongoing liaison with authorities; • monitoring; • contingency planning; • rehabilitation; and • decommissioning; | Prior to the start of operations. | DEP, Western Power, MRD, WRC. (depending on the project component) | An approved Operations Phase Environmental Management Plan prepared, implemented and regularly revised. Results provided in annual and triennial reports. |
| 4 | The Proponent will prepare and implement a Programme of Research, Monitoring and Management to initiate research into mangrove | To document and manage ecosystem changes associated with the project. | <p>The programme will include, but not be limited to, the following:</p> <ul style="list-style-type: none"> • research and implement a programme to re-establish mangroves including the evaluation of such options as the recontouring of creek banks and creek bed to increase the intertidal area available | Programme developed prior to start of construction. Relevant sections implemented prior to start of operations. Programme | CALM, WRC and DEP. | Programme of Research, Monitoring and Management prepared and implemented. Results provided in annual and triennial reports. |

| No. | Commitment | Objective (why) | Action (how / where) | Timing (when) | Whose advice | Measurement / compliance criteria |
|-----|---|--|---|--|---------------------------------------|---|
| | biology and re-establishment, and to quantify and document ecosystem changes following construction of the barrages. | | <p>for recolonisation, and dredging of channels in the low basin to increase water penetration into the creek. This work will be directed towards an objective of increasing primary production in the medium to long term;</p> <ul style="list-style-type: none"> • research into mangrove biology including interactions between soil salinity, elevation, aspect, ground stability and soil type on mangrove distribution, productivity and ecological value; and • a monitoring programme, centred on Doctors Creek, to quantify changes in: <ul style="list-style-type: none"> - water quality including temperature, salinity, dissolved oxygen, turbidity and chlorophyll <i>a</i>; - sediment characteristics including oxygen demand, particle size and organic carbon; - phytoplankton and zooplankton density and species diversity; - infauna density and species diversity; - density and species diversity of benthic flora and fauna; - mangrove distribution, density and species diversity; - fish use; and - bird use. | ongoing. | | |
| 5 | The Proponent will prepare and implement a Groundwater Monitoring Programme. | To confirm the extent of seawater intrusion and to protect town water supplies. | To document any seawater intrusion as a result of the project in areas potentially affected by seawater intrusion. If a project induced adverse effect is identified, the Proponent will investigate and implement remedial action. | Programme developed prior to start of construction. Relevant sections implemented prior to start of operations. Programme ongoing. | WRC. | Groundwater Monitoring Programme prepared and implemented. No project induced, adverse effect on town water supplies. Results provided in annual and triennial reports. |
| 6 | The Proponent will maintain regular consultation with traditional land owners. | To ensure that any concerns of traditional landowners in relation to the project are identified and addressed. | Regular meetings. | As required. | | Results provided in annual and triennial reports. |
| 7 | The Proponent will ensure that the access road is appropriately constructed and signposted. | To ensure that the access road meets state and local government requirements. | Review of final road design by relevant authorities. | Prior to construction of the access road. | Shire of Derby / West Kimberley, MRD. | Sign off by the Shire and MRD. |
| 8 | The Proponent will document the proposed vesting of, and management objectives for, multiple use of the project area. | To promote effective management of the project area. | To be conducted in consultation with traditional owners. | Prepared to a timetable agreed with the Shire of Derby / West Kimberley. | Shire of Derby / West Kimberley. | Preparation of relevant documentation. |