

**DRAFT GUIDELINES FOR THE PREPARATION OF A
PUBLIC ENVIRONMENTAL REPORT**

**ALICE SPRINGS WATER REUSE SCHEME:
SOIL AQUIFER TREATMENT SCHEME AT
ARID ZONE RESEARCH INSTITUTE
HORTICULTURE ADDENDUM**

JUNE 2004

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Project Description

The Alice Springs Water Reuse Scheme broadly involves:

1. additional treatment of effluent from the Waste Stabilisation Ponds to produce high quality recycled water (by use of a Dissolved Aeration Flotation (DAF) system);
2. developing underground storage (water banking) of recycled water by using suitable geological formations (aquifer); and
3. recovery of “banked” water for irrigation or other high value use on or near the Arid Zone Research Institute.

Introduction

The purpose of the Public Environmental Report (PER) is to provide the Government with concise and comprehensive information regarding the design, construction and operation of the proposed Alice Springs Water Reuse Scheme. It should contain sufficient information to enable understanding and assessment of the scope and environmental implications of the proposal. The PER should clearly identify the main environmental impacts associated with the development and should contain a management strategy to minimise these impacts.

Information should be presented in a concise format, using maps, overlays, tables and diagrams where appropriate to clarify the text.

Content of a PER

1. *Executive Summary*

The Executive Summary is to include a brief outline of each section within the Public Environmental Report (PER). The summary should be a concise outline of the matters discussed in the main body of the document, to allow the reader to quickly obtain a clear understanding of the proposal, its environmental implications and management objectives.

2. *Description of the proposal*

This section should describe the development proposal to allow a detailed understanding of infrastructure design and engineering and all stages of construction, operation and management of the Scheme and include relevant plans, photos and maps.

The PER should provide a history of the proposal and provide a full description of the Alice Springs Water Reuse Scheme.

The PER should provide information of where this technology has been used elsewhere, giving an indication of its success (compared to conventional treatment and disposal), describing monitoring and environmental management techniques and outlining the performance measures used. If possible, the PER should use examples of where aquifer recharge schemes have been used for the injection of treated effluent or wastewater rather than to provide storage capacity for "clean" water.

The PER is to provide justification for the proposal (using the examples of where the technology has been applied elsewhere) including the chosen design (e.g. the location of infiltration ponds and extraction sites), environmental management measures, monitoring criteria as well as proposed performance measures. The PER is to demonstrate how the aquifer was selected for this purpose (referencing interstate or overseas guidelines on aquifer selection for recharging purposes).

This section should also examine alternatives to the proposal. This includes alternatives to the water banking component of the proposal as well as alternatives to the end use of the extracted groundwater.

Aspects to be covered include:

General

- (a) Description of the proposal and all its components (including proposed use of treated effluent for irrigation that has not undergone soil aquifer treatment – quantities and locality).
- (b) Project schedule, including staging of development and the timing of the stages.
- (c) Location and design criteria for each component of the project including design limitations imposed by site characteristics.
- (d) Land requirements, land tenure, acquisition requirements (permits, rezoning and native title), and the tenures under which the project would be held including details of relevant legislative processes required to grant proposed tenure.

- (e) Infrastructure requirements and specifications (permanent and temporary) and ancillary activities (e.g. storage/laydown areas etc).
- (f) The layout of the proposal, including all elements such as ponds, extraction wells, agricultural land, buildings, roads etc.
- (g) Waste management. Outline plans for waste management including prevention, treatment and disposal.
- (h) Outcomes of any public consultations for the proposal.

Soil Aquifer Treatment

- (i) Design and engineering details of infiltration ponds and any associated ancillary facilities.
- (j) The process of geopurification, that is, the physical and biological processes that enhance water quality.
- (k) Proposed construction methods.
- (l) Describe the texture, structure and properties of the soils in the floor and walls of the infiltration basins, including their permeability and infiltration capacity.
- (m) Describe proposed amount of treated effluent to enter infiltration basins per annum and its quality, including salinity levels. Provide justification for proposed water quality standards to be used to determine acceptability of treated effluent for infiltration.

Horticulture/Agricultural Site

- (n) Design and engineering details of extraction wells and pumping systems and irrigation systems.
- (o) Application methods of treated effluent.
- (p) Proposed crops to be irrigated and their end use.
- (q) Amount of banked water to be used for irrigation purposes per annum.
- (r) Detail any proposed vegetation clearance.
- (s) Identify and justify water quality standards that are to be met before extracting water for irrigation purposes.
- (t) Fire control. Details of control measures, in the event of a fire outbreak, should be included. As per the *Bushfires Act 1996*, any landholder is required to ensure a four metre firebreak is installed and maintained along all boundaries.

3. *Environmental Constraints and Issues, Potential Impacts and Proposed Safeguards*

This section examines those aspects of the existing biophysical and socioeconomic environment that may be affected by the proposal, including site capability and suitability.

Management practices or safeguards should be expressed as a series of commitments. These commitments and any associated discussion of impacts should be included in appropriate sections and subsections. Each commitment should be numbered consecutively and highlighted to stand out from the surrounding text. These commitments will form the basis for the Environmental Management Plan (EMP) for the site.

Aspects to be covered include (but are not limited to):

3.1 Soil Disturbance and Salinity

Existing Environment

- Describe the salinity of soils that may receive the recovered groundwater for agricultural and horticultural use.
- Describe the texture, structure and properties of the soils in the floor and walls of the infiltration basins.

Potential Impacts

- Describe the potential for increase in salinity of soils as a result of using recovered groundwater.
- Assess the potential for the salinisation of soils to the degree where they are no longer fit for use for horticulture and agriculture and calculate the number of cropping years before salinity prevents further cropping.
- Assess the potential for soil erosion to occur at both the infiltration ponds and the land used for horticultural purposes.

Safeguards

- Describe in detail the methods that will be used to prevent salinisation of agricultural and horticultural soils;
- If soil leaching is an option for reducing salinisation then describe the salinity of the water that will be used for the leaching process. Account for the quantities of leaching water required and their source. Describe the recharge or replenishment characteristics of the source of leaching water.
- Outline the Erosion and Sediment Control Plan to be used when constructing infiltration ponds and clearing land for agricultural/ horticultural purposes. Vegetation Clearing Plan to be developed as part of EMP.

3.2 Hydrogeology

Existing Environment

- Describe the geology and hydrogeology of the region.
- Identify all aquifers and describe their existing use.
- Describe the groundwater flow paths and water quality under existing conditions.
- Describe the characteristics of the aquifer chosen for water banking, including:
 - the criteria used for selection; and
 - capacity of the aquifer to receive and store additional recharge.
- Identify any potential pollution sources upstream.

Potential Impacts

- Describe the changes in aquifer properties due to artificial recharge, including (but not limited to):
 - expected mixing of the treated effluent with existing groundwater and the likely water quality changes that will occur as a consequence of mixing;
 - expected chemical processes between the infiltrated waters, the native groundwater and the aquifer (that is the rock matrix) and likely resulting water quality changes;
 - If appropriate, use modelling to predict and illustrate changes to aquifer and resulting water quality.
- Describe the potential impact of flood events, including the management of the scheme during flooding of the Todd River.
- Describe the effects of extended residence time on recharged water quality.
- Describe the movement of groundwater in the aquifer following artificial recharge. This should include a description of hydrogeological investigations and groundwater modelling used to determine groundwater flows during scheme operation.
- Identify the potential for impact on adjacent aquifers or water sources.
- Identify the potential impacts on adjacent and downstream groundwater users, and how they will be managed.

Safeguards

- Describe the monitoring program to be implemented. The program should include monitoring of the following:
 - quality and quantity of effluent received from the pipeline;
 - groundwater quality and standing water levels;
 - changes in water quality due to soil aquifer treatment; and
 - suitability of groundwater for reuse (e.g. horticulture/agriculture).

- Describe the precautions and safeguards in the event that the effluent received from the Alice Springs Waste Stabilisation Ponds is of unacceptable quality, and the contingencies in the event that contaminated water is applied to the infiltration basins. *[This dot point refers to events where the Dissolved Air Flotation (DAF) plant trips or treated effluent fails to meet acceptable criteria for injection to the aquifer]*
- Contingencies for use or disposal of effluent in the event that the soil aquifer treatment scheme cannot receive the entire supply. *[This dot point refers to the situation where the aquifer is unable to receive the full load of treated effluent. What other disposal methods are being considered? And how will associated impacts be managed?]*
- Contingencies for treatment of effluent in the event that the DAF is unable to receive all or part of effluent. *[This dot point is seeking to clarify that only treated effluent will be injected into the aquifer and that contingencies and/ or alternatives will be in place to dispose of/ store effluent not treated through the DAF plant]*

3.3 Heritage/ Cultural Issues

In relation to the Heritage Conservation Act and sites protected under this Act, it is recommended that the proponent seek advice from an archaeologist on the following matters:

- define the precise location of heritage sites in relation to the proposal and undertake an archaeological survey;
- assess the significance of the sites which are to be impacted by the proposal;
- provide options for mitigation of loss of heritage value of sites which lie within the area of impact; and
- undertake a further survey to ensure that other unrecorded sites, which are also protected by the Act, are not included in the development area.

This section should also include the results of the inspection of the Register of Sacred Sites maintained by the Aboriginal Areas Protection Authority. Also, details of the application lodged with the Aboriginal Areas Protection Authority for an Authority Certificate within the meaning of Part 3, Division 1 of the *Northern Territory Aboriginal Sacred Sites Act* and a copy of the Certificate issued by the Authority as a result of that application containing conditions (if any) relating to the protection of sacred sites on, or in the vicinity of, the project area.

3.4 Pests

The potential for the creation of mosquito breeding sites should be addressed.

Outline weed management techniques and control of feral animals. Prepare a weed management plan for inclusion in an EMP.

3.5 Socio-Economic

Describe potential for impact to surrounding residents, particularly with regard to increased noise from operations, use of pesticides, herbicides and inorganic fertilisers and increased vehicle movements.

The PER is to provide information on the appropriate health standards that are to be met when using treated effluent for irrigation purposes (both pre and post soil aquifer treatment). Consideration needs to be given to both surrounding residents as well as workers at the Arid Zone Research Institute site. The PER is to outline contingency plan for when treated effluent does not meet appropriate standards and cannot be used for irrigation purposes.

The PER is to outline the approvals required for the proposal, including all approvals under the *Public Health Act* by the Department of Health and Community Services. This should be provided for all components of the Alice Springs Reuse Scheme (not just the subject application).

3.6 Environmental Management Plan

A summary table listing potential impacts, environmental management practices and safeguards, monitoring and management methods and other commitments, cross-referenced to the text of the report, should be provided together with the outline of an EMP. An EMP should:

- Provide details of proposed measures to prevent or minimise adverse impacts and assess the likely effectiveness of these safeguards.
- Ensure that safeguards are being effectively applied.
- Enable remedial action for any impacts that were not anticipated in the PER.
- Determine the differences between predicted and actual impacts (via monitoring); and provide for the periodic review of the management plan itself.

An EMP will be required for both the construction and operational phases of the proposal.

Administrative Requirements

- (a) 6 copies of the PER should be submitted to the Office of Environment and Heritage together with 2 CD-rom copies, which will provide for circulation to government advisory bodies for comment. CD-rom copies should be in ADOBE®.pdf format for placement on the Internet.
- (b) Arrangements for the public display and review, including locations and number of copies will be made at the time when these Guidelines are finalised. It is the responsibility of the proponent to advertise the public availability of the PER for public comment.
- (c) The action officer for the proposal is Mr Peter Bannister (telephone 8951 9201).