7 ENVIRONMENTAL FACTORS AND PRINCIPLES

7.1 Key environmental factors

The key environmental factors identified in the ESD include:

- Flora and vegetation.
- Terrestrial environmental quality.
- Terrestrial fauna.
- Inland waters environmental quality.
- Human health.
- Heritage.
- Offsets (integrating factor).
- Rehabilitation and decommissioning (integrating factor).

In addition, amenity (in relation to noise, dust and visual impacts) as well as the water source and viability of the water source and cumulative impacts was considered relevant to the Proposal.

The assessment of potential environmental risks on the above factors are discussed in Chapter 10 and Chapter 11.

7.2 Principles of sustainability and environmental protection

The principles of the *Environmental Protection Act 1986* (Section 4A) and other principles adopted by the EPA as outlined in *Environmental Assessment Guideline for Environmental Principles, Factors and Objectives (EAG 8)* (2015a) guide the EPA's decision making on the environmental acceptability of the proposal. These principles have been considered in the preparation of this PER, as outlined in Table 7-1.

Table 7-1 Principles of sustainability and environmental protection

Principle	Application	PER reference
The precautionary principle *Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.* *In the application of the precautionary principle, decisions should be guided by:* *(a) Careful evaluation to avoid, where practicable, serious or irreversible damages to the environment;* *and* *(b) An assessment of the risk-weighted consequences of various options.*	Throughout the design of the Proposal, the precautionary principle has been applied, where potential impacts could cause serious or irreversible damage. The main example of the application of the precautionary principle is the threat of contamination of an aquifer. An aquifer has not been identified beneath the proposed development envelope, however, regardless of this, the following management and mitigation measures would be implemented to protect groundwater: • Installation of groundwater monitoring bores, and continual monitoring of these bores during the life of the Proposal. • Containment of wastes within cells designed to exclude water to prevent the generation of leachate. • Operational bunding and V drains around the cells to prevent water ingress into the cells. • Minimum separation distance of 5 m between the base of a cell and the underlying granite, which is more permeable. • Spill response procedures. • Subsidence monitoring and remedial measures to respond to slumping or erosion of the clay cap. These measures would be implemented to minimise the risk of groundwater contamination and demonstrate the application of the precautionary principle.	Section 10.5
The principle of intergeneration equity	LLW would be monitored during the institutional control period to ensure by the end of the ICP, radioactivity on the surface of the development	Section 5.13 Appendix A.14

Principle	Application	PER reference
The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.	envelope is equivalent to background concentrations, thereby ensuring future generations would not be exposed to human health risks. Records of waste isolation would be held by key regulatory agencies and the State Archive to ensure future generations have access to information regarding the wastes isolated at Sandy Ridge.	Appendix A.17
The principle of the conservation of biological diversity and ecological integrity *Conservation of biological diversity and ecological integrity should be a fundamental consideration.*	The location for the Proposal has been chosen as it has the characteristics appropriate for a near surface geological repository. It is not proposed to remove or affect any conservation significant flora or fauna, communities or ecological linkages. The proposed clearing would not cause any of the vegetation communities present to become threatened in any way.	Section 1.3 and 10.2.5
Principles in relation to Improved valuation, pricing and incentive mechanisms *Environmental factors should be included in the valuation of assets and services.* *The polluter pays principle – those who generate pollution and waste should bear the cost of containment, avoidance or abatement.* *The users of goods and services should pay prices based on the full life cycles costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any wastes.* *Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, which enable those best placed to maximise benefits and/or minimise costs to develop their own solutions and responses to environmental problems.*	The Proposal would provide waste generators with a cost-effective option to dispose of their hazardous and intractable waste. The only available option at present is cost prohibitive. The restrictive regulatory framework for the IWDF means that it is operated as a site of last resort for receiving waste and the onus is on the waste holder to demonstrate that they have exhausted all other potential options for handling the waste materials before they can be directed to the IWDF. This, coupled with the very high cost structures associated with each waste isolation campaign and the infrequent basis on which it operates means that the IWDF is a very unattractive disposal option for most waste generators. This is particularly so for those with smaller quantities of waste where the waste holder wishes to achieve permanent isolation in a reasonable timeframe. The Proposal would provide a cost-effective option, by offering significantly lower gate charges than the IWDF. This would encourage the correct permanent isolation of high risk hazardous and intractable wastes, eliminating a significant environmental risk to the community.	Section 2.4

Principle	Application	PER reference
The principle of waste minimisation *All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.*	Approximately 3.2 million tonnes of legacy waste are estimated to be temporarily stored in over 200 locations across Australia, awaiting an appropriate long-term storage option. The Proposal would minimise waste that is currently stored in temporary and often inappropriate storage locations, by providing a suitable near surface geological repository for permanent waste isolation.	Section 2.4.3.
Best practice *When designing proposals, and implementing environmental mitigation and management actions, the contemporary best practice measures available at the time of implementation should be applied.*	Best practice has also been implemented in the design of the waste cells by reviewing practices at international LLW disposal facilities and adhering to international and national codes for permanent isolation of LLW. It is considered best practice to prepare an outline Safety Case for a LLW disposal facility that would be developed into a detailed Safety Case after detailed design has been completed. The outline Safety Case is provided in Appendix A.15. Recommendations for environmental mitigation and management actions specified by technical experts have been included in this PER to eliminate or reduce the potential environmental impacts associated with the Proposal. An example of this is the need for surface water levees on the north and east boundaries of the proposed cell area, as recommended by Rockwater (2016b). The construction of levees is considered best practice to divert surface water runoff away from cells, and hence avoid the potential for leachate generation. Levees have thus been incorporated into the design of the Proposal.	Appendix A.10, A.12 and A.15
Continuous improvement *The implementation of environmental practices should aim for continuous improvement in environmental performance.*	Continuous improvement and corrective actions are of paramount importance, and are a fundamental part of the EMS. *	Section 12.

** Environmental management system*