



**EAGLE BAY RESOURCES NL**  
**STATEMENT OF ENVIRONMENTAL**  
**OBJECTIVES (SEO-EPT)**  
FOR  
**EXTENDED PRODUCTION TESTING (EPT)**  
IN PEL182

Rev. v.2 July 2006

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## 1. INTRODUCTION

### 1.1 Purpose

This Statement of Environmental Objectives ( SEO) has been prepared to meet the requirements of Sections 99 and 100 of the South Australian *Petroleum Act 2000* (the Act) and Regulations 12 and 13 of the *Petroleum Regulations 2000*.

The intent of this SEO is to outline the environmental objectives that Eagle Bay Resources NL ('EBR'), as operator within those parts of PEL182 impinging on or connected with specific Control Zones of the Coongie Lakes district, is required to achieve during **production testing operations**, and the criteria upon which these objectives are to be assessed. Environmental objectives have been developed from the extended production testing SEOs already in force for other areas, and from the provided in the Environmental Impact Report for drilling and production testing in western PEL182 ("Western Wells EIR"). PEL 182 location is given in Figure 1.

**Drilling operations** for the same area are the subject of a separate SEO

The Petroleum Act broadly defines the environment to include natural, social, cultural and economic aspect. The environmental objectives outlined in the SEO incorporate all of these elements.

### 1.2 Relation to other Cooper Basin SEOs

The current SEO covers objectives which apply regardless of the extent or nature of oil production, processing and transportation, and accordingly has elements in common with smaller, initial production testing, extended production testing and production taking place in minor fields in the Cooper Basin. Hence this SEO contains objectives and assessment criteria also contained in other existing SEOs.

The SEO has a layout similar to the *South Australia Cooper Basin Operators Statement of Environmental Objectives: Production and Processing Operations* (Santos October 2003) but also draws on the Extended Production Test SEO for Acrasia Field (Stuart Petroleum February 2003) and the Production SEO for the same field (Stuart Petroleum 2003). Environmental objectives are generally similar to existing SEOs, but there are specific differences in assessment criteria which reflect the special constraints on Eagle Bay Resource's operations in the western part of PEL 182.

### 1.3 Scope

This SEO is intended to cover both Initial and Extended Production Testing. Whilst most of the objectives and assessment criteria should remain appropriate to full commercial production, there are likely to be additional aspects, for example high pressure pipelines, which would require additions or revision for a suitable full production SEO.

The SEO applies to EBR's production testing and related operations in the western portion of PEL182, Cooper Basin (Figure 1). Drilling and well operations are covered under a separate SEO (Eagle Bay Resources July 2006).

Additional to normal constraints within the Cooper Basin, petroleum and associated activities in the western portion of PEL182 have additional regulatory requirements, under gazetted Special Management Zones associated with the Coongie Lakes National Park and surrounds (Figure 2). However, the SEO may be extended to operations elsewhere in PEL182 or elsewhere in the Cooper Basin.

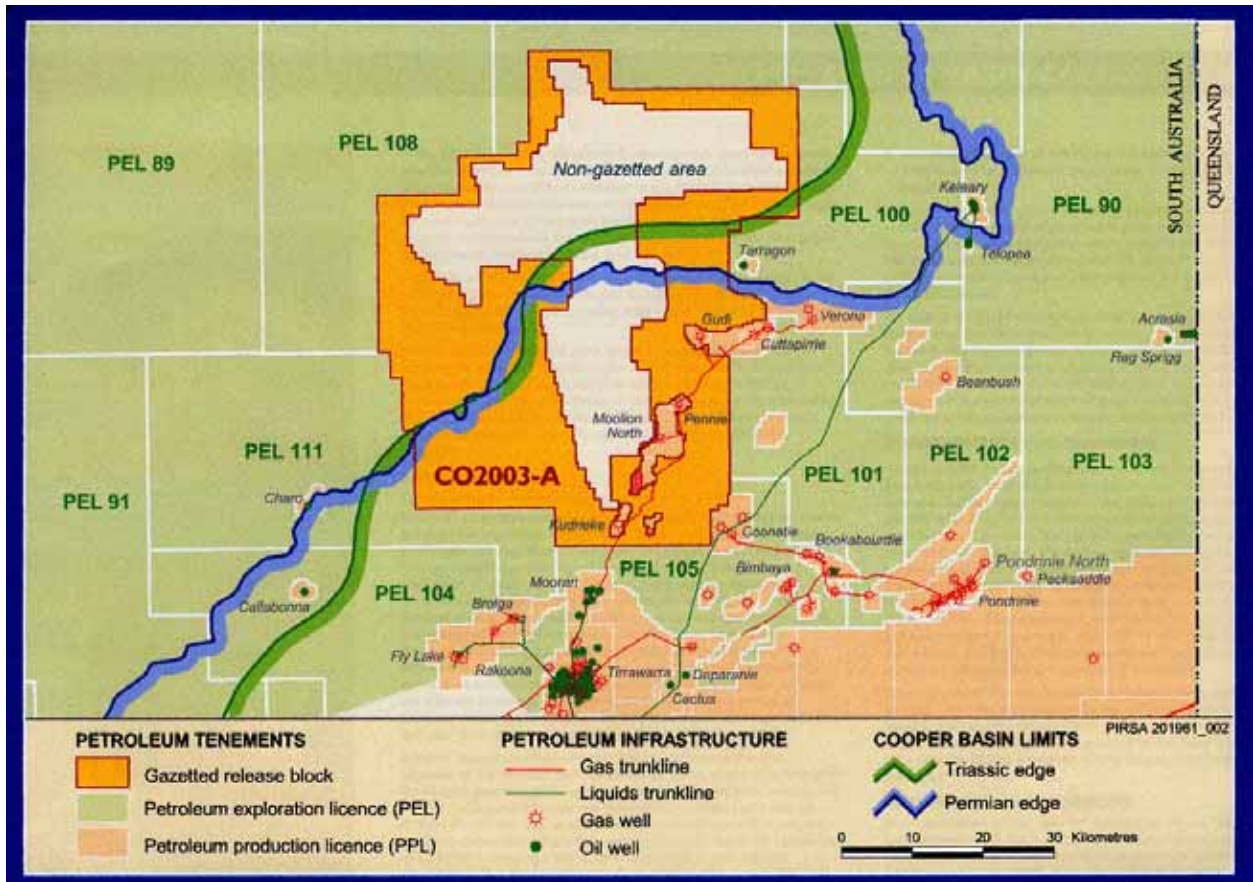
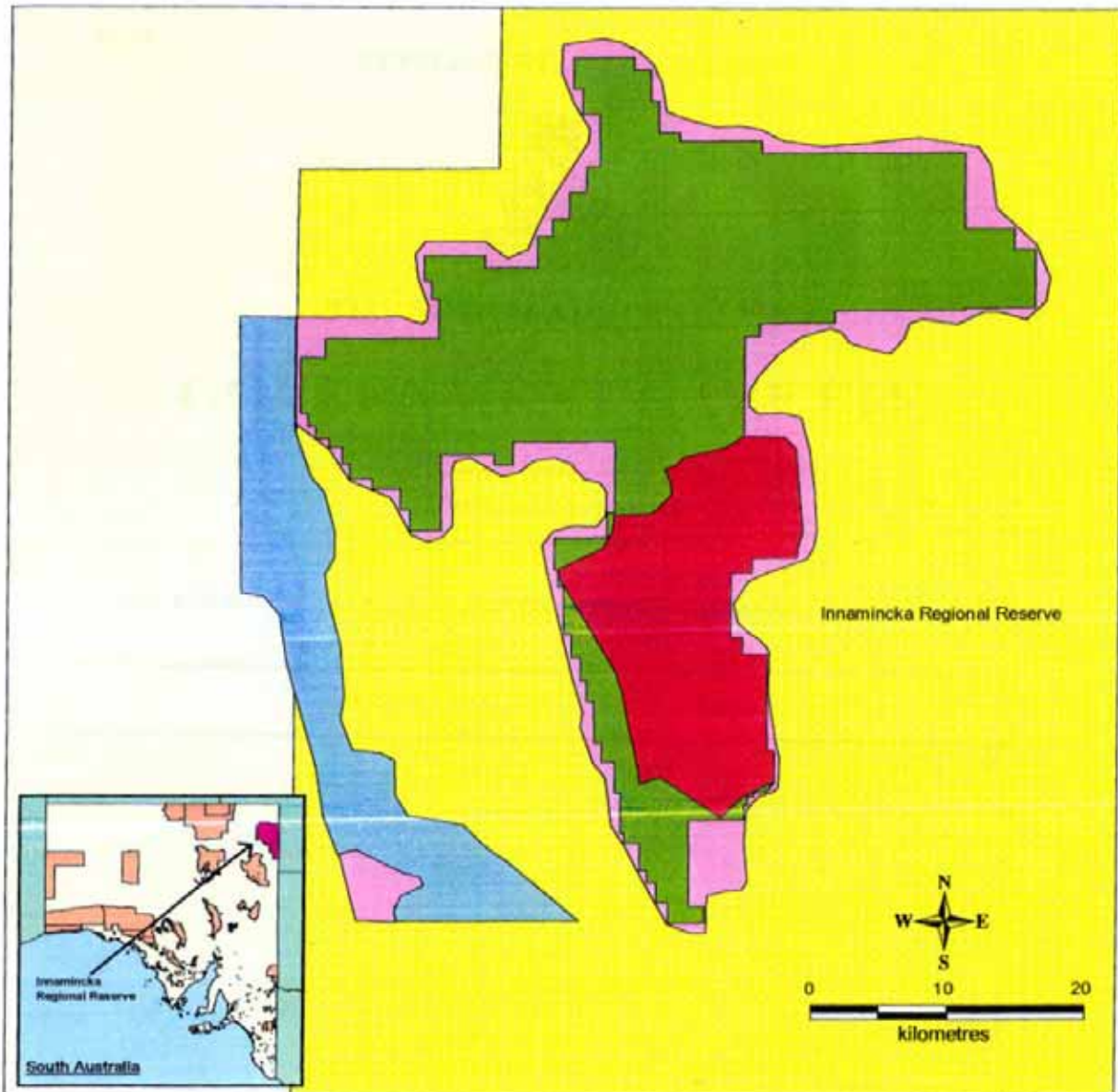






Figure 1. Offer document for CO2003-A, now PEL182, in the Cooper Basin, showing Non-gazetted areas which incorporate Coongie Lakes National Park and zones excluding petroleum activity.



**Legend**

-  New National Park - no mining, no grazing
-  No access for Petroleum or Minerals but Pastoral activities permitted zone
-  Special management zone under Regional Reserve - exclusion from mining activities except for walk-in geophysical surveys and subsurface access in appropriate seasons
-  Special management zone under Regional Reserve Control Zone - controlled access

**Figure 2. National Park, No-Access buffer zones, and Special Management Zones associated with core Ramsar intermittent wetlands. PEL182 includes the Special Management Zones within its licence area, and surrounds the National Park and the No-access zones.**

## **2. ENVIRONMENTAL OBJECTIVES**

### **2.1 Objectives**

The objectives of the Act include:

- to minimise environmental damage from activities involved in exploration for, or the recovery or commercial utilization of, petroleum and other resources
- to minimise environmental damage from activities involved in drilling and well operations.

Environmental hazards and risks of petroleum production up to the level of an Extended Production Test (EPT) and associated activities have been identified in the EBR Western Wells EIR. The purpose of the SEO is to provide the environmental objectives which to which drilling and related activities, including transportation, must conform, and the criteria upon which achievement of those objectives can be assessed, for consideration under Section 101(1) of the Act. A condition of approval of the activity is that Eagle Bay Resources is liable for meeting the environmental objectives and assessment criteria.

Environmental objectives for petroleum production up to the level of an Extended Production Test are:

- 1) Minimise public and third party risks
- 2) Minimise fire risk at facility and prevent the spread of any fires to wellheads
- 3) Avoid disturbance to sites of Aboriginal and non-indigenous heritage significance
- 4) Avoid impacts on high biological value or wilderness value areas
- 5) Avoid significant drainage alterations and minimise minor alterations
- 6) Minimise soil impacts of construction and routine use
- 7) Minimise disturbance to vegetation and habitat
- 8) Avoid disturbance to rare, endangered, vulnerable species
- 9) Prevent introduction of pest plants and animals
- 10) Avoid storage and loading facility spills;
- 11) Rapid cleanup and impact minimisation following spills
- 12) Avoid transportation spills
- 13) Minimise impacts of fire from any transportation spill
- 14) Minimise impacts of fire from any transportation spill
- 15) Avoid contamination of surface waters and groundwater
- 16) Minimise visual impacts
- 17) Prevent cross-connection between aquifers, and between aquifers and reservoirs
- 18) Minimise air pollution and greenhouse gas emissions
- 19) Minimise adverse impact on Regional Reserve operations

- 20) Minimise adverse impact on livestock
- 21) Avoid contamination of stockwaters with hydrocarbons
- 22) Minimise waste handling and disposal impact
- 23) Remediate and rehabilitate surface facilities or suspended wellsite and access
- 24) Undertake long-term planning for rehabilitation for potential producing wellsite
- 25) Maintain partnerships in community

## 2.2 Assessment Criteria

The criteria for measuring the achievement of these environmental objectives are given in Table 1. Criteria generally can be split into the following forms:

- 1) *Defined conditions*. Defined conditions apply where the achievement of an objective can be judged through ensuring that those particular conditions are met or carried out. Examples are:
  - Prohibitions of specific actions where the prohibition directly eliminates potential impacts. The best example is the objective "Avoid disturbance to sites of Aboriginal and European heritage significance", for which one assessment criterion is compliance with the *Aboriginal Heritage Act 1988* and with Eagle Bay Resources' Native Title agreements.
  - Requirements to undertake actions in accordance with approved procedures or industry accepted standards. For example, multiple aspects of the construction and operation of production, storage and loading facilities, and the safe transportation of oil are required to meet stated Australian Standards.
  - Requirements to undertake actions or develop procedures to actively limit particular risks or minimise impacts where they do occur.
- 2) *Goal Attainment Scaling (GAS) criteria*. GAS criteria are applied where assessment has to deal with a range of outcomes rather than the relatively straightforward "yes/no" assessment possible in dealing with defined conditions, and where uncertainties of subjective judgement are involved. Examples are visual assessments of minimisation of disturbance to vegetation and soil, where the level of disturbance may range from major to nil, and assessments of the level of success of well site and track rehabilitation.

In this SEO, most of the objectives of most importance can be assessed using Defined Conditions, and Defined Conditions are preferred where possible. However, some aspects including development of access cannot be assessed on a yes/no basis: equivalent GAS scales to those in the basin-wide drilling SEO (Santos November 2003) are given in Tables 2 to 5, with modifications appropriate to the circumstances of western PEL 182.

- 3) *Monitoring and/or studies* - In some cases the assessment of the environmental objectives may not be possible in the shorter term and may require longer term monitoring and scientific evaluation. In such cases, the assessment criteria may be in the form of longer-term data and information gathering.

### 3. AUSTRALIAN STANDARDS

The following Australian Standards are applicable to the proposed operation. Their application also has some bearing on environmental risks and hazards.

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AS 1271	Safety Valves for Boilers and Unfired Pressure Vessels
AS 1692	Tanks for Flammable and Combustible Liquids
AS 1940	The Storage and Handling of Flammable and Combustible Liquids
AS 2381	Electrical equipment for Explosive Gas Atmospheres
AS 2430	Classification of Hazardous Areas
AS 2885	Pipelines Gas and Liquid Petroleum – Design and Construction
AS 3000	SAA Wiring Rules
AS 4041	Pressure Pipes
AS 4360	Risk Management
ANSI B31.3	Chemical and Petroleum Refinery Piping

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### 4. INCIDENTS

#### 4.1 Serious incidents

Section 85(1) of the Act defines "serious incident" to mean:

"an incident arising from activities conducted under a licence in which-

- (a) a person is seriously injured or killed; or
- (b) an imminent risk to public health or safety arises; or
- (c) serious environmental damage occurs or an imminent risk of serious environmental damage arises; or
- (d) security of natural gas supply is prejudiced or an imminent risk of prejudice to security of natural gas supply arises."

Pursuant to Regulation 12(2) of the Act, the incidents listed below are considered to be those which could arise and, if not properly managed or avoided, cause a serious incident:

- Explosion or fire at facilities, including flowlines;
- Failure of containment systems at any stage of production or processing, including containment systems at storage and loading facilities;
- Spills of oil outside bunded and other defined areas intended to contain spillages *within* Special Management Zones of Figure 2.
- Transportation accident resulting in injury or death;
- Transportation accident involving oil spillage;
- Transportation accident resulting in fire;
- Failure of the produced water handling and cleaning system resulting in the release of uncleaned water (>30ppm hydrocarbons);
- Disturbance to sites of Aboriginal and non-indigenous heritage significance;
- Removal of rare, vulnerable or endangered flora and fauna species.

- Any operation, spillage or fire extending into the "No Access for Petroleum" Zone and/or Coongie Lakes National Park (Figure 2)
- New road construction within "Walk-In Zone" of Figure 2
- Removal of rare, vulnerable or endangered flora and fauna species without appropriate permits and approvals.

#### 4.2 Reportable incidents

Pursuant to Regulation 12(2) of the Act, the incidents listed below are considered to be reportable incidents under Section 85(1) of the Act.

- Non-compliance with procedures defined or developed to implement environmental objectives
- Spills of oil outside bunded and other defined areas intended to contain spillages in areas *other than* Special Management Zones of Innamincka Regional Reserve
- Failure of the produced water handling and cleaning system resulting in the release of cleaned water (<30ppm hydrocarbons) outside recognised disposal areas;
- Transportation accidents other than those listed under "Serious incidents".
- Other non-compliance with SEO objectives as indicated by assessment criteria in Table 1.
- Any detected unauthorised access to production and processing facilities and associated infrastructure.

#### 5. REFERENCES

Eagle Bay Resources NL (July 2006) "Statement of Environmental Objectives: Drilling and Well Operations in Western PEL 182" Eagle Bay Resources NL, West Perth WA, July 2006. Rev 2.2

Fatchen TJ (March 2006) "Environmental Impact Report: proposed petroleum exploration drilling and production testing by Eagle Bay Resources NL IN Western PEL 182: Michelle 1 (27° 21' 34.4" S, 139° 53' 34.0" E); Jasmine 1 (27° 24' 33.7" S, 139° 53' 46.3" E)" Prepared for Eagle Bay Resources NL by Fatchen Environmental Pty Ltd, Adelaide, March 2006. EBR-05-04. Rev. 1.1.

Santos (October 2003) "South Australia Cooper Basin Operators Statement of Environmental Objectives: Drilling and Well Operations." Santos Ltd, Adelaide.

Santos (November 2003) "South Australia Cooper Basin Operators Statement of Environmental Objectives: Production and Processing Operations." Santos Ltd, Adelaide.

Stuart Petroleum Ltd (February 2003) "Statement of Environmental Objectives: Petroleum production at Acrasia Field, Cooper Basin". Stuart Petroleum Ltd, Adelaide, November 2003.

Stuart Petroleum Ltd (February 2003) "Statement of Environmental Objectives: Acrasia Field (PEL 90, Cooper Basin). Extended Petroleum Production Test". Stuart Petroleum Ltd, Adelaide, February 2003.

**Table 1: Environmental objectives and assessment criteria**

Environmental objective	Comment	Means for achieving objectives	Assessment Criteria
<p>1 <i>Minimise public and third party risks</i></p>	<p>Risks arise through combination and potential conflict of public and rig or oil transport moves on the same road, particularly the Walkers Crossing public access route. Also, facility failures and industrial safety issues may affect public and other parties</p>	<ul style="list-style-type: none"> <li>• Maintenance of Walkers Crossing road south of crossing.</li> <li>• Grading of existing Walkers Crossing road north of crossing.</li> <li>• Reconstruction of Walkers Crossing to allow emergency passing.</li> <li>• Low vehicle speed limits set at Walkers Crossing and approaches. Procedural “give-way” rules for rig and oil traffic</li> <li>• Repeated signage on Walkers Crossing road. Local signage on immediate approaches to each well prohibiting entry, warning against trespassing, and warning of truck movements.</li> <li>• At wellsites, regular integrity testing. Firefighting extinguishers for loading areas and pump bunded areas.</li> </ul>	<ul style="list-style-type: none"> <li>• No public or third party incidents</li> <li>• Procedures exist for trucking movements including “stop and scan” and give-way procedures at Walkers Crossing.</li> <li>• Signage present, including speed limits</li> <li>• Logs exist of integrity testing at wellheads</li> <li>• Extinguishers present at loading areas</li> <li>• Installations meet appropriate Australian Standards</li> </ul>
<p>2 <i>Minimise fire risk at facility and prevent the spread of any fires to wellheads</i></p>	<p>Fire risks from the combination of spillage with ignition sources; OH&amp;S considerations, potential loss of resource</p>	<ul style="list-style-type: none"> <li>• Containment and isolation of fires.</li> <li>• Maintenance of separation distances of facilities to avoid escalating events and to allow manual shutoff/isolation of fuel.</li> <li>• Manned attendance during road tanker filling/loading</li> <li>• Bunding for containment.</li> <li>• First attack extinguishers present.</li> <li>• Emergency response plan in place. Fire inductions and procedures.</li> <li>• Gas flare in cleared area with appropriate flare shield.</li> <li>• Minimisation of ignition potential through earthing facility and tanker in accordance with AS3000.</li> <li>• Tank fires, or fires where first attack failed, allowed to burn out (approval will be sought under AS1940)</li> </ul>	<ul style="list-style-type: none"> <li>• No wellhead fires</li> <li>• An Emergency Response Plan exists for the operation</li> <li>• Minimum separation distances observed</li> <li>• Extinguishers present</li> <li>• Bunding, earthing meet appropriate Australian Standards</li> </ul>

Table 1: Environmental objectives and assessment criteria (cont...)

Environmental objective	Comment	Means for achieving objectives	Assessment Criteria
3 <i>Avoid disturbance to sites of Aboriginal and non-indigenous heritage significance</i>	Intrusion or physical site damage to areas of Aboriginal and non-indigenous heritage significance can result from access and pad construction, vehicle and people movement.	<ul style="list-style-type: none"> <li>• Facility, camps, access, flowline and borrow areas inspected; any areas elsewhere requiring remediation also inspected</li> <li>• Inspections by or in association with signatories to indigenous heritage agreements for the licence area</li> <li>• Heritage report forms completed and lodged for any sites or artifacts identified</li> <li>• Survey records kept and available for audit</li> </ul>	<ul style="list-style-type: none"> <li>• Proposed wellsites, access and ancillary areas have been surveyed and any sites of Aboriginal and non-indigenous heritage identified.</li> <li>• Any identified cultural and heritage sites have been avoided or otherwise appropriately cleared and managed</li> </ul>
4 <i>Avoid impacts on high biological value or wilderness value areas</i>	Direct physical impact on high biological or wilderness value areas; fires started at pad; oil contamination; fires originating from oil spillages extending into high value areas. High value areas are effectively defined by the Special Management Zones and the fact that the intermittent wetlands nearby are the core of the Ramsar wetland areas.	<ul style="list-style-type: none"> <li>• EPT facility location outside the Control Zones and off floodplains, in interdune areas of adjoining dunefield</li> <li>• Main oil haulage roads constructed outside Control Zones and off floodplains as far as possible. No new road construction in Walk-In Zone; new road construction minimised in Controlled Access Zone.</li> <li>• Facility design and transport operations and procedures to prevent spills; procedures in place to minimise spill risks in wet conditions; procedures to limit the spread of fires associated with spills, and fire safety included in inductions.; limitation of movement to appropriately prepared access; minimised borrow use and utilisation of local borrow to minimise visual impact from permanent colour contrasts; prohibition of public access on dedicated haul road</li> <li>• Haul roads and facilities out of visitor sight as much as possible to maintain some wilderness attributes.</li> <li>• Total prohibition on oil and rig movement through Walkers Crossing when water is over the road formation at the Crossing.</li> </ul>	<ul style="list-style-type: none"> <li>• No new road construction or borrow sourcing in Walk-In Zone.</li> <li>• No movement through Walkers Crossing when water is over the road surface.</li> <li>• No unauthorised off-road movement</li> <li>• Spills, fires assessed under other objectives</li> <li>• No oil haulage on Walkers Crossing road through Walk-In Zone</li> </ul>

Table 1: Environmental objectives and assessment criteria (cont...)

Environmental objective	Comment	Means for achieving objectives	Assessment Criteria
<p>5 <i>Avoid significant drainage alterations and minimise minor alterations</i></p>	<p>Greatest risks are associated with access and facility construction, including flowlines, crossing floodplain and channels, and either impeding, blocking or redirecting water flows.</p> <p>Blocking or redirection of channels can have major repercussions on downstream habitat.</p> <p>Even minor changes to microtopography on floodouts may result in major redirection of water films and consequent redistribution of vegetation and habitat.</p> <p>Track construction and wellsite selection should aim to minimise impacts by avoiding sensitive areas where possible and by appropriate construction methods.</p>	<ul style="list-style-type: none"> <li>• EPT facility is out of active floodplain</li> <li>• Facility and flowlines constructed to avoid any significant water re-direction.</li> <li>• New access north of Walkers Crossing constructed using interdune corridors unconnected to active watercourses and floodplains:</li> <li>• Walkers Crossing reconstructed so as not to impede low flows. Crossings of other channels at grade, or with low road formation and piping to permit low or local flows.</li> </ul>	<ul style="list-style-type: none"> <li>• Facility including flowlines and access located and constructed to maintain pre-existing water flows</li> <li>• 0, +1 or +2 GAS criteria are attained for drainage-related objectives as listed in Tables 2 and 3, during facility, flowline and access site selection, construction and rehabilitation.</li> </ul>

Table 1: Environmental objectives and assessment criteria (cont...)

Environmental objective	Comment	Means for achieving objectives	Assessment Criteria
<p>6 <i>Minimise soil impacts of construction and routine use</i></p>	<p>Access and pad construction including borrow development can lead to expanding soil erosion or alteration impacts, particularly from water erosion and/or ponding, sand drift and dust generation.</p>	<ul style="list-style-type: none"> <li>• New construction subject to additional route selection, heritage and environmental clearances.</li> <li>• New access north of Walkers Crossing constructed using interdune corridors unconnected to active watercourses and floodplains:</li> <li>• No borrow areas developed for access within the Walk-In zone.</li> <li>• No borrow for access taken from the Controlled Access Zone except at formally notified and approved locations.</li> <li>• Borrow taken from level or near-level areas. Provision on access road for cross-drainage.</li> <li>• Maintenance of oil haulage route to minimise dust generation while EPT in operation.</li> <li>• Minimise scraped and clayed access and pad areas consonant with engineering and safety requirements</li> <li>• Vehicles normally kept to prepared surfaces</li> <li>• Dune crossings clayed to minimise bogging and track braiding.</li> <li>• Topsoil and plant detritus from cleared areas—pads and borrow--stockpiled for later re-spreading</li> </ul>	<ul style="list-style-type: none"> <li>• 0, +1 or +2 GAS criteria are attained for soil impact aspects given in Tables 3-5</li> <li>• Local erosion rates are not obviously accelerated above those of surrounding land.</li> <li>• No unauthorised off-road driving or creation of short cuts.</li> <li>• Surface soil and plant detritus stockpiles evident</li> </ul>

Table 1: Environmental objectives and assessment criteria (cont...)

Environmental objective	Comment	Means for achieving objectives	Assessment Criteria
7 <i>Minimise disturbance to vegetation and habitat</i>	Physical damage to soils, vegetation and habitat generally through access and pad construction or upgrade; fires at facility or in transit resulting in wildfire; spillages and spread of spilled oil	<ul style="list-style-type: none"> <li>• Location and development of facility, new access in dunefield north of Walkers Crossing, and borrow sources subject to environmental inspection and evaluation as part of the route selection process.</li> <li>• Minimised route distances and easement widths for new access.</li> <li>• No clearing of Category 1 trees, minimised removal of tall shrubs or small trees &gt;1.5m both on access and at facility. Flagging of trees/groves for avoidance where appropriate</li> <li>• Stockpiling of surface soil and debris from site levelling and cuts (sumps, pits) for later use in rehabilitation.</li> <li>• Alternate routes and placement considered during planning phase to minimise environmental impacts.</li> <li>• Maintenance of access to minimise dusting, gullyng or collapse of dunes under additional traffic; prohibition of off-easement vehicle movement. Borrow for maintenance taken from pits with low erosion hazard.</li> <li>• Borrow pits, sumps, are designed and constructed as far as practicable to minimise fauna entrapment.</li> <li>• Sumps and mud pits are fenced as appropriate to minimise wildlife access</li> <li>• Assessment records are kept and are available for auditing.</li> <li>• Borrow pits are restored to minimise water holding capacity, where agreements are not in place with stakeholders</li> <li>• Inductions emphasising minimisation of damage to vegetation; controls on movement of vehicles and people off prepared sites; fire procedures in place.</li> <li>• Procedures in place to limit and rehabilitate spill damage (see "Avoid spills" below)</li> </ul>	<ul style="list-style-type: none"> <li>• There is an environmental and heritage assessment perform for new access construction</li> <li>• 0, +1 or +2 GAS criteria are attained for vegetation-related objectives as listed in Tables 2 to 5, during facility and access track site selection, construction and rehabilitation.</li> <li>• 0, +1 or +2 GAS criteria are attained for vegetation-related objectives as listed in Tables 2 to 5, during borrow pit site selection, and restoration.</li> <li>• No unauthorised off-road driving or creation of short cuts.</li> </ul>

Table 1: Environmental objectives and assessment criteria (cont...)

Environmental objective	Comment	Means for achieving objectives	Assessment Criteria
<p>8 <i>Avoid disturbance to rare, endangered, vulnerable species</i></p>	<p>Physical removal of rare, endangered, vulnerable species through construction, oil contamination.</p> <p>Animal species of significance particularly birds will be present intermittently in wet floodout areas. High probability of plant species of significance also being in wetter floodout areas. Cooper Creek itself a significant wildlife corridor, whether wet or dry.</p>	<ul style="list-style-type: none"> <li>• Proposed facility, flowlines, new access and borrow areas assessed for rare, vulnerable and endangered species before construction</li> <li>• New access and EPT facility off-floodplain in more widespread dunefield where possible.</li> <li>• Free-form evaporation area is cleaned water present as a film or shallows: no adverse impact expected. Regular checks for miring of fauna.</li> <li>• nductions emphasising minimisation of damage to vegetation and habitat; controls on movement of vehicles and people off prepared sites; fire procedures in place.</li> </ul>	<ul style="list-style-type: none"> <li>• Sites with rare, vulnerable and endangered flora and fauna present or potentially present have been identified and avoided.</li> </ul>
<p>9 <i>Prevent introduction of pest plants and animals</i></p>	<p>Activity associated with lease and access track construction, particularly movement of vehicles and equipment, is a potential source of weed or disease introduction and spread. The most effective prevention technique is to ensure that vehicles and equipment are cleaned prior to entry.</p> <p>However, given the proximity to Coopers Creek channels, most naturalised aliens of the region can be expected to be present.</p>	<ul style="list-style-type: none"> <li>• Requirement for contractor/other vehicles to be clean prior to entering. but</li> <li>• Control measures implemented for new imports as necessary</li> <li>• Securing of food wastes to avoid encouraging feral animals</li> </ul>	<ul style="list-style-type: none"> <li>• No new weeds or feral animals introduced to operational areas</li> </ul>

Table 1: Environmental objectives and assessment criteria (cont...)

	Environmental objective	Comment	Means for achieving objectives	Assessment Criteria
10	Avoid storage and loading facility spills;	Facility spills from oil flowlines, storage, pumping, loading facilities can arise through physical disruption, overpressure, corrosion. Chemical transport and storage spills present a further risk.	<ul style="list-style-type: none"> <li>EPT facility and all related facilities to be out of Christmas Creek and Cooper Creek floodplain.</li> </ul>	<ul style="list-style-type: none"> <li>No production or process fluid, or fuel or chemical spills or leaks outside areas designed to contain them.</li> </ul>
11	Rapid cleanup and impact minimisation following spills	Spills can arise from vehicle and plant refuelling.	<ul style="list-style-type: none"> <li>Delivery flowlines to follow oil access roads where well is distant from EPT facility. Flowlines laid and supported above ground. Allowance for corrosion and subject to regular maintenance. Regular inspections.</li> <li>Vehicle movement directed away from unprotected pipes. Signs and barriers at EPT to avoid vehicles damaging pipework. Operational procedures for special vehicle use within facility or when need arises to cross flowlines elsewhere.</li> <li>No flowlines in areas regularly accessed by the public.</li> <li>High containment integrity systems complying with AS4041 <i>Pressure Piping</i>. Piping pressure tested to the highest forecast production operating pressures and production conditions. Tanks with bunds sufficiently large to provide for catastrophic tank failure. Pumps and manifold separately banded against local failure.</li> <li>Hard-piped to pump and loading point (threaded or hammer union connections). Loading point with clay pad. Flexible hose with cutoffs for train loading; any minor spillages at loading point to be left to evaporate and bio-remediate. For major contamination, landfarming in place or pit disposal of contaminated soils.</li> <li>Procedures in place for minimising overflow and loading spill risks, and integrity management. Attendance at equipment at all times during road tanker filling. Filling systems, storage tank operation and tanker procedures in accordance with AS1940 <i>The Storage and Handling of Flammable and Combustible Liquids</i></li> <li>Secondary fuel supplies, refuel areas and chemical storage HDPE/clay floored or equivalent and locally banded.</li> </ul>	<ul style="list-style-type: none"> <li>No release of production fluid onto Christmas Creek or Cooper Creek floodplain, floodouts or channels.</li> <li>Levels of hydrocarbon continually decreasing in the case of <i>in situ</i> remediation of spills.</li> <li>Remediation to accepted Soil Health Index levels</li> </ul>

Table 1: Environmental objectives and assessment criteria (cont...)

Environmental objective	Comment	Means for achieving objectives	Assessment Criteria
12 <i>Avoid transportation spills</i>	There is a severe risk of pollution and impact on soils, vegetation and fauna, where spills occur in periods or locations where oil can be easily spread, particularly wet areas and flowing watercourses. The same conditions conducive to high pollution risk are also conducive to road crashes, rollovers, boggings and similar accidents.	<ul style="list-style-type: none"> <li>Procedures in place for safe movement of hydrocarbon/chemical transport</li> </ul>	<ul style="list-style-type: none"> <li>No production or process fluid, or fuel or chemical spills or leaks outside areas designed to contain them.</li> </ul>
13 <i>Minimise the likelihood of spread of a transportation spill</i>		<ul style="list-style-type: none"> <li>Full trains only to move in daylight hours</li> </ul>	<ul style="list-style-type: none"> <li>No release of production fluid onto Christmas Creek or Cooper Creek floodplain, floodouts or channels.</li> </ul>
14 <i>Minimise impacts of fire from any transportation spill</i>	<p>The key risk minimisation is also a practical one: simply not to move during periods of high hazard.</p> <p>Fires from transportation accidents have less pollution issues but potentially major impact if conditions are appropriate for spread of wildfire.</p>	<ul style="list-style-type: none"> <li>No "wet wheel" fording of flowing watercourses other than sealed floodways with depth markers. Fording depth limit as set by regulatory authorities.</li> <li>Reconstruction of Walkers Crossing to safe standard, with vehicle speed limits and procedural "give-way" rules for rig and oil traffic</li> <li>Oil haulage on purpose-constructed haul road north of Walkers Crossing, using interdune corridors as much as possible.</li> <li>Dune crossings designed to minimise risk of collision and of rollovers.</li> <li>contaminated soil on dune, sandplain or floodplain outside Control Zones either landfarmed in place, or in extreme cases removed for pit disposal.</li> <li>contaminated soil on floodplain within Control Zones either be landfarmed in place with local bunding to prevent local runoff/runoff, or in lower floodplain levels removed for pit disposal off the floodplain.</li> <li>contaminated soil from spillage at a watercourse or floodway crossing removed</li> <li>Spill contingency and emergency response plans in place.</li> <li>Conformance with Dangerous Substances Act 1979 and Environment Protection Act 1993</li> <li>Actual transportation fires permitted to burn out. Earthmoving equipment brought in if necessary to contain secondary fires.</li> </ul>	<ul style="list-style-type: none"> <li>Levels of hydrocarbon continually decreasing in the case of <i>in situ</i> remediation of spills.</li> </ul> <p>Remediation to accepted Soil Health Index levels</p> <p>Procedures exist for safe movement of oil haulage and are adhered to.</p>

Table 1: Environmental objectives and assessment criteria (cont...)

Environmental objective	Comment	Means for achieving objectives	Assessment Criteria
15 <i>Avoid contamination of surface waters and groundwater</i>	Pollution of surface or groundwaters can result from spills already discussed and from formation water disposal with hydrocarbons present polluting surface water	<ul style="list-style-type: none"> <li>All preceding spill avoidance measures</li> <li>Produced water with visible oil (&gt;30ppm hydrocarbons) retained in containment areas. Produced water separated from oil and cleaned through                             <ul style="list-style-type: none"> <li>--Initial separation in dewatering tank</li> <li>--clarification in purpose-built lined interceptor pond with takeoff via a breaker siphon or equivalent to a purpose-built guard pond</li> <li>--further residence in guard pond</li> <li>--disposal to freeform infiltration/evaporation in prepared basin at lower level than facility</li> </ul> </li> <li>Fencing of evaporation area dependent on discussion with pastoral management.</li> </ul>	<ul style="list-style-type: none"> <li>No production or processing fluid spills or leaks outside areas designed to contain them</li> <li>No produced water released from containment areas with visible oil present (&gt;30 mg/L)</li> <li>No produced water released in surface watercourses</li> <li>Interceptor pondages are protected from external flooding</li> </ul>
16 <i>Minimise visual impacts</i>	Visual impacts arise through obtrusive access and facility development and/or visible long-term persistence of pad and access. Regular outlines, obtrusive man-made landforms and colour contrasts between borrow and surface soil increase impacts.	<ul style="list-style-type: none"> <li>Junction of dedicated oil haulage road with Walkers Crossing road north of Walkers Crossing will be unavoidably visible but remainder of new access can be hidden</li> </ul> <p>Visibility of EPT facility will depend on siting. At a site such as Jasmine 1 or 500m west of Michelle 1, hidden by dunes, EPT would not be visible from public access. At Michelle 1, facility would be unavoidably obvious.</p>	<ul style="list-style-type: none"> <li>Visual impacts considered in site planning and development</li> </ul>
17 <i>Prevent cross-connection between aquifers, and between aquifers and reservoirs</i>	This objective is to protect water quality and water pressure of aquifers that are potential water supplies, and to maintain pressure in sands that might host petroleum accumulations elsewhere.	<p>At wellsites associated with the EPT:</p> <ul style="list-style-type: none"> <li>Monitoring programs implemented to assess condition of casing and cross-flow behind casing.</li> <li>Risk assessment for remediation if crossflow detected.</li> </ul>	<ul style="list-style-type: none"> <li>No cross-flow behind casing between aquifers, and between aquifers and hydrocarbon reservoirs unless approved by DWLBC.</li> </ul>
18 <i>Minimise air pollution and greenhouse gas emissions</i>	Combustion by-products, particulates, flared or vented hydrocarbon release	<ul style="list-style-type: none"> <li>Production operations in accord with appropriate industry and legislative standards</li> </ul>	<ul style="list-style-type: none"> <li>Compliance with regulatory legislative requirements</li> </ul>

Table 1: Environmental objectives and assessment criteria (cont...)

	<b>Environmental objective</b>	<b>Comment</b>	<b>Means for achieving objectives</b>	<b>Assessment Criteria</b>
19	<i>Minimise adverse impact on Regional Reserve operations</i>	Interference with reserve management; interference with visitors associated with operations and vehicle movements. Some impact on visitor use inevitable due to increased vehicular movement on major Park access	<ul style="list-style-type: none"> <li>Liaison with Park management maintained.</li> <li>Proposals to reduce public risk also minimise impact on visitors (see Public Risk, 1 above).</li> </ul>	<ul style="list-style-type: none"> <li>No unresolved reasonable complaints</li> </ul>
20 21	<i>Minimise adverse impact on livestock</i> <i>Avoid contamination of stockwaters with hydrocarbons</i>	Problems can arise from interference with normal pastoral operation, direct interference to stock, pollution of stock water by spills or formation water or brines disposal with hydrocarbons present polluting stock water	<ul style="list-style-type: none"> <li>Stock proof fencing around facility and water disposal</li> <li>Timber fenceposts and flowline support sleepers may be creosoted but not CCA-treated.</li> <li>No oil released outside containment areas</li> <li>Production water cleaned to no visible hydrocarbons (&lt;30ppm) before disposal to infiltration/evaporation. Disposal not on floodplain or channels, or near stockwaters</li> </ul>	<ul style="list-style-type: none"> <li>Facility and water disposal are fenced</li> <li>No production or processing fluid spills or leaks outside areas designed to contain them</li> <li>No produced water released from containment areas with visible oil present (&gt;30 mg/L)</li> <li>No CCA-treated fencing or flowline supports.</li> </ul>
22	<i>Minimise waste handling and disposal impact</i>	Creation of wastes: sewerage, litter, overflow and spillage	<ul style="list-style-type: none"> <li>Generally, domestic wastes disposed in accordance with EPA licensing.</li> <li>EPT camp sewerage disposed via permanent septic tank system.</li> <li>Wastes on site confined by bins/skips. Disposal eventually to EPA-licensed waste disposal facility at Moomba. C</li> <li>chemicals and fuel oils purchased in bulk; adequate storage and tankage provided at EPT.</li> <li>Sewage using self-contained temporary tankage and disposed at Moomba.</li> <li>Wastes on site confined by bins/skips. Disposal eventually to EPA-licensed waste disposal facility at Moomba:</li> <li>Minor non-toxic wastes, muds disposed in drill sump.</li> <li>Litter cleanup during and post-drilling.</li> </ul>	<ul style="list-style-type: none"> <li>No Environment Protection Act infringements</li> <li>No spills or leaks from sewage disposal system</li> <li>Bo litter remaining on or around sites</li> <li>Attainment of GAS criteria for "Site left in clean, tidy and safe condition after final clean-up" objective during well site restoration (Table 3).</li> <li>Attainment of GAS criteria for "Site left in clean, tidy and safe condition" objective during borrow pit restoration (Table 5).</li> </ul>

Table 1: Environmental objectives and assessment criteria (cont...)

Environmental objective	Comment	Means for achieving objectives	Assessment Criteria
23 <i>Remediate and rehabilitate surface facilities and access</i>	Risk arises if EPT demonstrates that the resource is unsuitable for commercial development, and the facility is abandoned	<ul style="list-style-type: none"> <li>• Wellsite cleanups as for unsuccessful drilling outcomes.</li> <li>• Removal of flowlines.</li> <li>• Removal of EPT camp and facilities, including sewerage system for disposal at EPA facility.</li> <li>• Rehabilitation of dedicated access if no further petroleum exploration likely.</li> </ul>	<ul style="list-style-type: none"> <li>• 0, +1 or +2 GAS criteria are attained for all objectives listed in Tables 2 to 5, during facility and access track site selection, construction and rehabilitation.</li> <li>• 0, +1 or +2 GAS criteria are attained for all objectives as listed in Tables 2 to 5, during borrow pit site selection, and restoration.</li> </ul>
24 <i>Undertake long-term planning for rehabilitation for potential producing wellsite</i>	In the event of a successful extended production test, rehabilitation will not be undertaken, as development toward commercial production would be needed.	<ul style="list-style-type: none"> <li>• Development of rehabilitation plans included in production management.</li> </ul>	<ul style="list-style-type: none"> <li>• Planning completed and rehabilitation objectives developed prior to facility abandonment.</li> </ul>
25 <i>Maintain partnerships in community</i>	Liaison with local Cooper Basin community and information to other stakeholders		<ul style="list-style-type: none"> <li>• Affected parties notified and consulted on proposed activities.</li> <li>• Public scrutiny, consultation and participation in EIR and SEO process</li> <li>• No unresolved reasonable complaints</li> </ul>

**Table 2: GAS criteria for assessing facility location and construction**

	<b>Reduce disturbance to drainage patterns</b>	<b>Minimise impacts on soil</b>	<b>Minimise impact on vegetation</b>
	<i>No obstruction of water flows</i>	<i>Access</i>	<i>Minimise perennial vegetation clearance</i>
<b>-2</b>	Water flows obstructed as a result of earthworks (other than containment bunding to prevent polluted runoff).	New road construction in Walk-in Zone. Borrow materials taken from Walk-In Zone.	Trees of priority 1 removed in area where could have been avoided.
<b>-1</b>	Minor channels only obstructed during well lease and access track construction (other than containment bunding to prevent polluted runoff).	New road construction in Controlled Access Zone outside approved areas. Borrow materials taken from Controlled Access Zone outside approved areas	Vegetation of priority 2 or 3 removed in area where could have been avoided.
<b>0</b>	No obstruction of water flows, or flows diverted around the well lease if required (other than containment bunding to prevent polluted runoff).	Access and pad borrow	Trees and vegetation removed in area where unavoidable
<b>1</b>	No obstruction of water flows, or flows diverted around the facility lease if required, containment bunding		No trees removed, only vegetation of priority 4 cleared.
<b>2</b>	No obstruction of channels of any dimension.		No trees or vegetation removed.

**Table 3: GAS criteria for assessing well and other facility site restoration**

	Minimise residual impacts on drainage	Minimise visual impact of abandoned well and facility sites and access tracks		
		<i>Interdune and floodplain sites</i>	<i>Sites on dunes</i>	<i>Access tracks assessed from the main track</i>
-2	Site or access permanently blocks drainage	The site remains as a prominent consolidated surface with a distinct edge.	Extensive gully erosion down the face of the dune and/or a steep site edge is prominent.	The track is prominent because of a scraped surface, windrows along its edges or gully erosion.
-1	Site or access permanently impedes and/or diverts drainage	The site surface and edge have been contoured into the surrounding landscape, but the colour of foreign material contrasts with the surroundings.	The edge of the site has been restored into the natural contour of the dune, but the colour of foreign material contrasts with the surroundings.	The track surface has been contoured into the surrounding landscape, but the colour of foreign material contrasts with the surroundings.
0	Site or access has minor drainage influence or redirection	The site contours and colour blend with the surroundings; but earthwork disturbance (eg ripping or respreading of original material) is still prominent.	The edge and colour of the site blend with the surroundings. The site contours are visible only when viewed from the top of the dune. They cannot be seen from the base. Erosion gullies are present down the face of the dune but they are not extensive or prominent.	The track contours and colour blend with the surroundings, but the earthwork disturbance (eg. ripping, rolling or respreading of original material) is still prominent.
+1	Site or access has no apparent influence on drainage	The earthwork disturbance is beginning to blend into the surroundings.	The edge and colour of the site blend with the surroundings. The site contours are visible only when viewed from the top of the dune. They cannot be seen from the base. There are no erosion gullies down the face of the dune.	The track contours and colour blend with the surroundings and the earthwork disturbance is beginning to blend also.
+2	[Site or access cannot affect drainage regardless of construction—may apply for dunefield areas]	The site contours and colour blend with the surroundings and the earthwork disturbance is indistinguishable from the surroundings.	The edge and colour of the site blend with the surroundings. The site contours are indistinguishable, whether viewed from the top or base of the dune.	The track contours and colour blend with the surroundings and the earthwork disturbance is indistinguishable.

**Table 3: GAS criteria for assessing well and facility site restoration (Cont...)**

	Re-establish natural vegetation on abandoned well and facility sites and access tracks		Site to be left in a clean and safe condition	
	Less than 5 years since restoration	More than 5 years since restoration	Backfilling and marking	Rubbish removed
<b>-2</b>	The site remains as a consolidated surface.	No revegetation evident.	Incomplete filling of sumps, cellars, ramps	Large items of litter present across site, eg. drums, pieces of casing and cables etc.
<b>-1</b>	The colour of foreign material contrasts with the surroundings.	The revegetation mostly consists of annuals and biennials. In contrast to the surroundings, there are few perennials.	Cellar backfilled but no marker erected.	Small items of litter spread over more than 50% of the site, eg. tin cans, nuts and bolts, rags, small pieces of cable and wood etc.
<b>0</b>	The site surface has been appropriately restored to facilitate revegetation (eg. ripping or respreading of original material).	The revegetation consists of annuals, biennials and perennials, but there are some bare patches which are inconsistent with the surroundings.	Cellar backfilled and marker erected.	No evidence of litter on site.
<b>+1</b>	The revegetation is extensive and consists of annuals and biennials. In contrast to the surroundings, there are no perennials.	The revegetation, mostly perennials, is consistent with the surroundings, but there is contrast in maturity between them.		
<b>+2</b>	The revegetation is extensive and mostly consists of annuals and biennials. Perennials which are consistent with the surroundings are beginning to establish.	The revegetation type, density and maturity is indistinguishable from the surroundings.		

**Table 4: GAS criteria for assessing borrow pit siting and construction**

	Minimise impacts on vegetation	Protect unknown sites of natural, scientific, or heritage significance	Minimise visual impacts
	<i>Perennial vegetation clearance minimised</i>	<i>Avoid sites</i>	<i>Site pit appropriately</i>
-2	Trees of priority 1 in Field Guide <sup>1</sup> removed in area where could have been avoided.	Sites disturbed.	Borrow pit less than 20m from road.
-1	Trees of priority 2 or 3 in Field Guide <sup>1</sup> removed in area where could have been avoided.		Borrow pit less than 50m from road.
0	Trees and vegetation removed in area where could not have been avoided.	Sites identified, flagged and avoided.	Borrow pit more than 50m from road. Visible from road due to lack of screening vegetation.
+1	No trees removed, only vegetation of priority 4 in Field Guide <sup>1</sup> cleared.		Borrow pit shielded from road by utilising screening vegetation or landform.
+2	No trees or vegetation removed.	Sites identified, flagged and avoided by 100m.	Borrow pit not visible from road.

<sup>1</sup> Field Guide refers to the *Field Guide to the Common Plants of the Cooper Basin – South Australia and Queensland* (SEA Pty Ltd 1997)

**Table 5: GAS criteria for assessing borrow pit restoration**

	<b>Minimise impact on vegetation</b>	<b>Minimise impact on soil</b>	<b>Minimise visual impacts</b>	<b>Site to be left in a clean and tidy condition</b>
	<i>Acceptable revegetation after rainfall</i>	<i>Minimise erosion</i>	<i>Borrow pit effectively recontoured and ripped</i>	<i>Rubbish removed</i>
-2	No revegetation evident.	Severe erosion evident.	No recontouring of pit has occurred – pit sides are very steep. Topsoil and vegetation not respread.	Litter present on site.
-1	Revegetation localised on the base of the pit but none or very little on the sides of the pit.	Moderate erosion.	Pit sides battered but not ripped.	
0	Perennial grasses and shrubs revegetated and type consistent with surroundings. Some bare patches still present. Vegetation cover is uniform over base and sides of pit.	Minor erosion along the sides of the pit.	Pit sides battered and ripped along the contour, but are still highly visible. Topsoil and vegetation respread over disturbed area.	No litter present on site.
+1			Pit contours blend well into surrounding landscape, although still evident.	
+2	Vegetation type and density indistinguishable from surrounding landscape.	No erosion anywhere on the pit.	Pit contours indistinguishable from surrounding landscape. Access ripped.	