Queensland Floods Commission of Inquiry

CROWN LAW–(DERM – Andrew Brier)
Response to Req #1720609 – Moranbah North Coal)
#1722977 File 540093/1
Volume 1 of 2 ORIGINAL

Statement of Andrew Stuart Brier
(Moranbah North Coal Mine)

September 2011 Vol 1

QFCI

Date: 8/11/11 JM

Exhibit Number: 936

QUEENSLAND FLOODS
COMMISSION OF INQUIRY

STATEMENT OF ANDREW STUART BRIER
MORANBAH NORTH COAL MINE

I, **ANDREW STUART BRIER** of c/- 400 George Street Brisbane in the State of Queensland, General Manager Strategic Implementation, Coal & CSG Operations, Regional Service Delivery, Operations and Environmental Regulator, Department of Environment and Resource Management (DERM), solemnly and sincerely affirm and declare:

Requirement from Queensland Floods Commission of Inquiry

1. I have seen a copy of a letter dated 9 September 2011, which is attachment **ASB-01**, from the Commissioner, Queensland Floods Commission of Inquiry to me requiring a written statement under oath or affirmation, and which details the topics my statement should cover.

Role

2. I am currently the General Manager Strategic Implementation, Coal and Coal Seam Gas Operations within the Regional Service Delivery Division in the Department of Environment and Resource Management. I have held this position since 21 February 2011 although I was involved in the management of flood related issues surrounding coal mines from the 10 January 2011 onwards.

3. Between 2010 and 2011 my roles were as follows:
   - 25/12/2009 to 05/08/2010 - Regional Manager GABSI & Major Projects
   - 06/08/2010 to 02/01/2011 - Regional Manager CSG Activities
   - 03/01/2011 to 20/02/2011 - Director LNG Enforcement Unit
   - 21/02/2011 onwards - General Manager Coal & CSG Operations

Item 1: Department of Environment and Resource Management's activities in respect of each mine's flood preparedness in advance of the 2010/2011 wet season, including whether any particular activities were undertaken as a response to the forecast of an above-average rainfall wet season.

4. As a regulator DERM's compliance activities are designed to strategically review the performance of individual regulated entities on the basis of perceived risk.

5. DERM undertook pre wet season compliance programs to evaluate water management preparedness ahead of the 2010/2011 wet season. This primarily involved evaluating past wet season performance and preparedness ahead of the next wet season in terms of having available dam storage capacity to meet the minimum design storage allowance required on the 1 November of any year.

6. Environmental authorities include requirements for companies to prepare Water Management Plans that outline the overall mine water management strategy for their site. The environmental authorities require an annual review of these plans to ensure learnings from past wet season performance are incorporated into forward plans and preparations for future wet seasons.

7. Environmental authorities for mine sites also include dam structural design, construction and operation requirements that are commensurate with flood risks given a mines location, including:
    a. certified hazard assessment required for all dams;
    b. must be designed to prevent floodwaters from entering the dam, wall failure and overtopping up to and including a specified flood event based on AEP;
    c. certified design plans, high risk dams reviewed by DERM technical experts;
    d. having a marked "mandatory reporting level" above which DERM must be notified immediately, and actions put in place to prevent or minimise environmental harm
    e. ensuring that dams are inspected by a suitably qualified and experienced person;
    f. undertaking reviews annually about the effectiveness of the dam during the preceding wet season and modifying the water management system accordingly
    g. monitoring of water quality within the dam prior to the wet season;
    h. maintaining a register of dams and relevant information.

8. Moranbah North Coal mine was included in a list of mines to be inspected prior to the 2010-2011 wet season. This list was developed following an assessment of all coal mines in the region and the risk of a non-compliant discharge from each site on the receiving environment.

9. Officers of DERM carried out a compliance inspection on 6 October 2010. This inspection was prior to the 20 inspections carried out as part of the pre-wet season preparedness plan (**ASB-MN01-01, ASB-MN01-02, ASB-MN01-03 and ASB-MN01-04**). As a result of the 6 October inspection, the Moranbah North Mine was not required to be inspected as part of the pre wet season preparedness inspection program.

10. Prior to the 2010-2011 wet season the site was also issued two Transitional Environmental Programs (TEP) for the construction of a new dam to increase its Design Storage Allowance (DSA) (**ASB-MN01-05 and ASB-MN01-06**) and water management (**ASB-MN01-07**). These TEPs were negotiated in an effort to minimise the risk of non-compliances over the wet season.

Item 2: the water management sections of the environmental authority applicable at the mine during the 2010/2011 wet season, including:

a) **Any concerns held by him or the Department of Environment and Resource Management (DERM) regarding its terms and the ability of the mine operator to comply with it**
b) **Any terms that the mine operator has indicated it is unable to comply with, or breached**
c) **Any terms that had to be amended from the Fitzroy model conditions because the model terms were unsuitable for this mine site**
d) **Any terms that he or DERM consider do not adequately promote environmental protection and dam safety**

a) Any concerns held by him or the Department of Environment and Resource Management (DERM) regarding its terms and the ability of the mine operator to comply with it

11. Following the approval of TEPs prior to the wet season, DERM did not have any specific concerns that the Moranbah North Coal Mine would be unable to comply with the conditions of the TEP.

12. With respect to the environmental authority conditions (**ASB-MN02-01**) DERM was satisfied that those conditions that were not superseded by conditions of the approved TEP, could be complied with.

b) Any terms that the mine operator has indicated it is unable to comply with, or breached

13. DERM was not advised by the mine operator that it would not be able to comply with any terms of the EA or TEPs relevant to the Moranbah North site. The mine was operating under an Environmental Authority and two TEP's prior to the 2010/11 wet-season. Moranbah North Coal contravened the release flow events of TEP MAN10140 between 24 November - 26 November 2010 as detailed in paragraph 52.

14. Moranbah North Coal advised on 1 December 2010 that for a release that commenced on that day it was unable to undertake sampling at the monitoring point required in TEP MAN10140 due to access road conditions. Moranbah North Coal took alternative sampling at approximately 2 kilometres downstream of this location.

15. Moranbah North Coal advised on 12 December 2010 that for a release that commenced on 11 December it was unable to undertake sampling at the monitoring point required in TEP MAN10140 due to access road conditions. Moranbah North Coal took alternative sampling at approximately 1.5 kilometres downstream of this location.

c) Any terms that had to be amended from the Fitzroy model conditions because the model terms were unsuitable for this mine site

16. The Moranbah North Coal Mine Environmental Authority contains the full suite of model water conditions that were developed after the 2008 flooding in Central Queensland. These conditions were applied to the Environmental Authority (EA)

in late 2009.

17. Moranbah North Coal Mine has two approved TEPs with conditions that supersede a number of the Fitzroy Model Conditions.

18. One TEP is in relation to DSA compliance, authorising the construction of a new regulated dam on site and one TEP is in relation to water management, authorising an additional mine affected water release point (**ASB-MN01-05, ASB-MN01-06 and ASB-MN01-07**).

19. There have not been any amendments to model water conditions of the Moranbah North Mine EA.

d) Any terms that he or DERM consider do not adequately promote environmental protection and dam safety

20. To the best of my knowledge the Moranbah North Mine EA/TEPs does not contain terms that do not adequately promote environmental protection and dam safety.

Item 3: any transitional environmental program (TEP) issued or refused or any emergency direction (ED) given or considered regarding either mine during the period 1 October 2010 to 30 July 2011 related to water management, and for each, the following:

a) **Information received from the mine operator**
b) **Any relevant dam safety issues**
c) **Relevant correspondence with the mine operator and other stakeholders**
d) **Whether and, if so, how DERM consulted with stakeholders**
e) **What considerations DERM took into account in making the decision**
f) **Whether, and if so, how DERM balanced environmental considerations and economic consequences of mines being non-operational**
g) **Whether, and if so how, DERM took account of downstream effects, including cumulative effects**
h) **The terms of the TEP issued or ED given**
i) **What actions were taken by DERM to advise emergency management personnel, including local and regional disaster management groups and local residents downstream of the dam about the TEP and any discharges or effects**
j) **Reasons for the decision given to the mine operator**
k) **Any breaches of the TEP or ED by the mine operator and DERM's response**

a) Information received from the mine operator

21. There were a number of dealings related to mine releases authorised by a Transitional Environmental Program (TEP) at Moranbah North mine between the dates specified. Due to the time constraints placed on submission of this statement and the large amount of correspondence received by DERM in relation to TEPs

over the specified period there is a possibility that there are other items of correspondence or information that DERM has received in relation to this mine that have not been attached to this statement. This being said, the information provided is the best available data that could be provided at the time of submission.

22. Moranbah North Coal Mine submitted a request for an ED via email on Sunday 19 December 2010 at 10:05am by [redacted] (**ASB-MN03-01**). A response from Christopher Loveday, Manager, Environmental Services – Mining, Central West Region, DERM on Sunday 19 December 2010 at 11:30am (**ASB-MN03-02**) indicated that an ED was issued to discharge water from Production Dam to the Isaac River via pipeline. The authorisation was valid until 5:00pm Friday 24 December 2010 or until a TEP authorising this release in the medium term could be approved.

23. Another application for an ED was requested 11:12am 20 December 2010 seeking permission to discharge contaminated water from Dam 4. An ED was issued on 20 December 2010 and remained in effect until 25 December 2010 (**ASB-MN03-03 and ASB-MN03-04**).

24. Moranbah North submitted a draft TEP (MAN11420) on 20 December 2010 for release from existing release points at a higher Electrical Conductivity than the existing Environmental Authority (**ASB-MN03-05**).

25. The TEP was assessed by DERM and this assessment is documented in a request for statutory approval (**ASB-MN03-06**) outlining who negotiated with the mine who amended the TEP on 23 December 2010 (**ASB-MN03-06, ASB-MN03-07 through to ASB-MN03-14**). This TEP was forwarded to the delegate for approval on 24 December 2010. The approved TEP, certificate of approval and notice of decision (**ASB-MN03-15**) were forwarded to the mine electronically and in hard copy on the same date.

26. The terms of the approved TEP have been attached (**ASB-MN03-15**).

b) Any relevant dam safety issues

27. The two emergency directions (EDs) were issued due to dam safety potentially being compromised as a result of extreme rainfall on the mine site. In relation to the ED issued on 19 December 2010 for a production dam, in this instance the dam was about to overtop. The ED was issued due to Dam 4 being above MRL and there were safety concerns for dam stability at current water levels and predicted wet weather.

c) Relevant corrcspondence with the mine operator and other stakeholders

28. Notifications and Discharge Reports, provided by the mine were received by DERM during the period of the ED (**ASB-MN03-16, ASB-MN03-17, ASB-MN03-18, ASB-MN03-19 and ASB-MN03-20**).

29. There was a significant level of correspondence with many mines in relation to TEPs assessed as a result of the 10/11 wet season within the dates specified. This correspondence is held in a number of regional offices and in the email accounts of a significant number of DERM staff. It is estimated that there are several thousand correspondence items across all mines within this period of time and, as such, the department was unable to search all the potential sources of correspondence within the timeframe allowed for submission of this statement. I was not comfortable with attaching correspondence items to this statement at this time due to the potential for errors, omissions or inaccuracies due to the high number of documents that would need to be searched in a short period of time. If the Commission wishes copies of particular items of correspondence then I am more than willing to provide these if requested. Additionally, if the Commission wishes copies of all correspondence these can be provided if time is allowed.

d) Whether and, if so, how DERM consulted with stakeholders

30. DERM also consulted with the Fitzroy Water Quality Advisory Group (FWQAG) on three occasions during the dates specified. This consultation formed part of the agenda at meetings of the FWQAG held in Rockhampton on 16 December 2010, 4 February 2011 and 7 April 2011. This consultation was in the context of all mines currently discharging in the Fitzroy Basin and DERMs management of these TEPs and discharges.

31. The FWQAG is made up of a number of stakeholders including the mining industry, community groups, conservation groups, local government and DERM. One of the key roles of the group is to provide advice to State Government agencies relating to water quality management in the Fitzroy River Basin.

32. DERM also consulted with Qld Health regarding mine water discharges. However the Moranbah North Mine releases would not have been individually referred to as the discussions were based around whole of catchment water quality issues. The Moranbah North Mine discharges would only have been discussed if there were specific water quality issues downstream of the mine.

33. The Director Environmental Health from Qld Health was also placed on the distribution list for the weekly Fitzroy Basin water quality report compiled by DERM (**ASB-MN03-39**) in an effort to keep Qld Health informed of the current situation across the Fitzroy Basin.

34. On 28 June 2011, Ed Donohue, Regional Manager, Environmental Services – Mining, Central West Region, DERM presented to the Isaac Regional Council an update on water quality issues associated with mine discharges.

e) What considerations DERM took into account in making the decision

35. Transitional environmental programs (TEPs) are specific programs that, when complied with, achieve compliance with the *Environmental Protection Act 1994* (EP Act) for an activity by reducing environmental harm, detailing the transition of the activity to an environmental standard or detailing the transition of the activity to comply with a condition of a development approval, an environmental

authority or code of environmental compliance. The requirements for TEPs and the process for assessing and approving them is set out in chapter 7, part 3 of the EP Act (**ASB-MN03-35**).

36. Draft TEPs may be submitted voluntarily by a mine operator, or DERM may require an operator to submit a draft TEP if it is satisfied that an activity or proposed activity is or may cause unlawful environmental harm. In either case, the draft TEP is prepared by the operator. DERM's role is to assess the draft TEP against the requirements of the EP Act and either approve the TEP, approve the TEP with conditions, or refuse to approve the TEP.

37. Section 338 of the EP Act (**ASB-MN03-36**) provides the framework for considerations that the administering authority must make in deciding whether to approve or refuse a draft TEP or the conditions (if any) of the approval. In making its decision it:
    - must comply with any relevant regulatory requirement and
    - subject to the above, must also consider the following:
        - the standard criteria
        - additional information given in relation to the draft TEP and
        - the views expressed at a conference held in relation to the draft TEP.

38. DERM has produced guidance material to support regional officers and delegated decision makers in assessing draft TEPs. A two part procedural guide; Part 1- Notice requiring a draft TEP (**ASB-MN03-21**) and Part 2-Considering and making a decision about a draft TEP (**ASB-MN03-22**) is attached. Supplementing the guidelines are two correlating assessment report templates Part 1 Assessment Report (**ASB-MN03-23**) to assist officers to record the information considered by DERM when deciding to issue a notice requiring a TEP and Part 2 – Assessment Report (**ASB-MN03-24**) to assist users to evaluate the content of a draft TEP and make a decision to either approve (with or without conditions) or refuse a draft TEP. Prior to the procedural guides and assessment reports coming into effect, a draft Administrative Practice Note (**ASB-MN03-37**) and a Request for Statutory Approval template (**ASB-MN03-38**) was utilised by regional officers to assist with the TEP assessment process.

39. The reasons for the decisions are contained within the assessment report and request for statutory approval (**ASB-MN03_06, ASB-MN03_25 and ASB-MN03_26**).

40. If an approved TEP authorises the holder of the TEP to do or not do something, the holder may do or not do that thing despite anything in a regulation, an environmental protection policy, an environmental authority held by the holder of the TEP, a development approval, a standard condition of a code of environmental compliance for a chapter 4 activity or an accredited environmental risk management plan.

41. Mine operators typically voluntarily submit TEPs to DERM when they are seeking authorisation to discharge water from the mine site in circumstances

where the discharge is not authorised by the environmental authority. Many TEP applications were received by DERM following the 10/11 wet season.

42. DERM typically require mine operators to submit a draft TEP when DERM becomes aware that there is a non-compliance at the mine site that will require a significant amount of time and/or investment by the operator to rectify.

43. Once a draft TEP is submitted to DERM there is often a discussion between the environmental officer involved in the matter and the mine operator about the contents of the draft TEP. This is an opportunity for DERM to raise any concerns with the draft document and for the operator to take steps to address those concerns before DERM makes a decision about the draft TEP.

44. DERM has produced guidance material to assist environmental officers in assessing draft TEPs (**ASB-MN03-33** and **ASB-MN03-34**).

45. In the case of the Moranbah North Coal Mine, the department considered a number of issues such as:
    - Releases to the major regional watercourse (Isaac River) and the impacts on water quality as a result of releases of mine affected water with EC of up to 10,000uS/cm during large flow events;
    - The background water quality parameters in the streams surrounding the mine;
    - Downstream water quality in the Isaac River and the Isaac River, being mindful of the DRAFT environmental values and water quality objectives for those streams;
    - Water users located downstream of the mine and there requirement for water;
    - The economic impacts of the mine being unable to mine effectively due to inundation; and
    - Impacts of any releases on access to properties.

f) whether, and if so how, DERM balanced environmental considerations and economic consequences of mines being non-operational

46. The EP Act and subordinate legislation governs the responsibilities of DERM in the environmental regulation of mining activities in Queensland. The objective of the EP Act is to protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends. This is referred to as ecologically sustainable development (ESD). Accordingly, DERM is required to balance environmental, economic, social and equity considerations when making decisions.

47. When making any decision under the EP Act, including whether to approve a draft TEP, DERM must consider the "Standard Criteria" (**ASB-MN03-27**) as specified in Schedule 4 of the EP Act. The standard criteria specifically require environmental and economic considerations to be balanced and considered. Part *2- Considering and making a decision about a draft TEP* procedural guide (refer to **ASB-MN03-22***)* provides further guidance on some of the principles on

evaluating ESD. In addition further direction is provided on other considerations of the standard criteria, relevantly the financial implications for an applicant in complying with a TEP (and any conditions that may have been imposed) and the character, resilience and values of the receiving environment.

48. Furthermore, part 2 and 3 of the *Environmental Protection Regulation 2008* (EP Reg) **(ASB-MN03-28)** stipulate requirements for all environmental management decisions and additional regulatory considerations with respect to imposing conditions relating to a wide ambit of environmental and economic considerations including but not limited to monitoring, and releases to waters or land. Decisions must also consider any relevant Environmental Protection Policies (EPP) such as the *Environmental Protection (Water) Policy 2009* which sets out to achieve the objective of the EP Act with respect to Queensland waters. It does this by identifying environmental values and management goals and providing a framework for making consistent, equitable and informed decisions about Queensland waters.

49. In accordance with the provisions of the EP Act, when making an environmental management decision in relation to a TEP DERM must consider the economic or financial implications of the program and any conditions to be imposed on the holder. This part also requires the financial implications of the holder not being granted a TEP. When assessing the Moranbah North Mine TEP and when processing amendments to the approved program DERM did take into consideration the economic and financial implications of the mines inability to extract coal if a release could not be authorised. This was primarily in regard to the decision to grant a TEP however conditioning of the TEP was based on environmental considerations.

g) Whether, and if so how, DERM took account of downstream effects, including cumulative effects

50. When assessing the Moranbah North Mine Water Management TEP submitted on 20 December 2010 **(ASB-MN03-05)** DERM took into consideration the downstream impacts of the proposed releases to Isaac River and other watercourses further downstream by ensuring the conditions of the TEP required adequate dilution to achieve downstream EC targets. These targets included drinking water quality guidelines and aquatic ecosystem guidelines to ensure the protection of waterholes and refugia in the Isaac River.

51. DERM also took into account releases from other mines into the system along with background water quality parameters to ensure cumulative impacts were minimised and downstream water users were adequately protected. DERM also took these other releases into account to ensure other mines were afforded the opportunity to release water where required under similar programs.

52. When assessing and deciding on a draft TEP the assessing officer also seeks advice from other business groups within DERM such as the Aquatic Ecosystem Risk & Decision Support Unit who provide specific scientific advice in relation to proposed TEP conditions and guidance as to the downstream impacts of mine affected water releases to the environment.

53. The Moranbah North TEPs included a condition that required them to cease releases if directed to do so by DERM. This was required to ensure that DERM could direct mines to cease discharging if monitoring demonstrated potential issues with the cumulative effects of multiple mine releases.

h) The terms of the TEP issued or ED given

54. Please refer to (a) in Item 3 above for terms of TEPs issued.

i) What actions were taken by DERM to advise emergency management personnel, including local and regional disaster management groups and local residents downstream of the dam about the TEP and any discharges or effects

55. Due to the limited rate of release, e.g less that a 300 litres per second and the fact that the release was unlikely to cause any significant issues to downstream landholders or the environment. DERM did not consider it was necessary to brief local and regional disaster management groups about the release. The releases of mine affected water from Moranbah North Mine constituted only a very small (typically less than 5%) portion of the flow in the Isaac River. Therefore any risks to person due to flooding were not increased as a result of the releases and had already been accounted for by emergency services personnel.

j) Reasons for the decision given to the mine operator

56. The reasons for the decisions are contained within the request for statutory approval (**ASB-MN03-06**).

k) Any breaches of the TEP or ED by the mine operator and DERM's response

57. The Moranbah North Mine has breached the conditions of its TEP. The notification received by Moranbah North Coal (**ASB-MN03-29**) identified that the mine affected water being released from the Environmental Dam spillway into Service Area Creek was occurring when the natural flow in the Isaac River was less than that required by conditions of the TEP.

58. This release was a contravention of the conditions of the TEP. A warning letter was issued on 3 December 2010 (**ASB-MN03-30**).

59. A second warning letter was also issued to Moranbah North relating to a breach of the ED issued on 20 December 2010 (**ASB-MN03-31 and ASB-MN03-32**). It was identified that Moranbah North Coal was still releasing under the ED, however the Isaac River did not have sufficient flow.

60. Downstream monitoring undertaken on both occasions indicated that water quality parameters were not of a concentration sufficient to cause environmental harm. Warning notices were issued as a result of the contravention of conditions rather than as a result of environmental harm.

Item 4: the effects on the environment, drinking water quality and public health downstream of each of the mine sites (as far as the Great Barrier Reef Marine Park) as a result of discharges of water under a TEP or ED.

61. The potential effects of releases of water from mine sites are assessed prior to the grant of environmental authorities or transitional environmental programs. In applying to receive approval to discharge to a surface water, applicants must prepare information to support the application which identifies the environmental values, water quality objectives and management intent (that is, the goals to be achieved in terms of meeting water quality objectives and protecting environmental values) of the surface water. This framework is provided in the subordinate *Environmental Protection (Water) Policy 2009* (EPP Water) (**ASB-MN04-01**). Applications must be able to demonstrate that the management intent for the receiving water will be met despite the discharge occurring.

62. All applications for environmental authorities and TEPs submitted for the approval of discharge to surface waters must be assessed by DERM against the requirements of the EP Act which includes the EPP Water, including an impact assessment to ensure that environmental values of any surface water will be protected. In conducting these regulatory assessments, DERM has developed a number of decision support tools including the guideline "Protecting Environmental Values from CSG Water Discharged to Surface Waters" (2010, **ASB-MN04-02**) Conditions for Coal Mines in the Fitzroy Basin – Approach to Discharge Licensing (June 2010) and the Operational Policy "Waste water discharge to Queensland Waters" (2007, **ASB-MN04-03**) and associated procedural information (**ASB-MN04-04** and **ASB-MN04-05**). DERM has also prepared an "*Interim Decision Support Matrix Release of water produced in association with Coal Seam Gas activities to surface waterways*" (2010, **ASB-MN04-06**) which informs assessments and resultant authority conditions

63. The approach used by DERM throughout the 2010-2011 wet season aimed to be consistent with state/national water quality guidelines e.g. The Queensland Water Quality Guidelines (2006), ANZECC/ARMCANZ Guidelines for Fresh and Marine Water Quality 2000, the Australian Drinking Water Quality Guidelines and the October 2010 released Draft for Consultation – Establishing Environmental Values, Water Quality Guidelines and Water Quality Objectives for Fitzroy Basin Waters.

64. Controls and limitations are placed on authorities as conditions such as limits upon the volumes discharged, timing of discharge and required dilution and mixing zones for discharges. Conditions also include comprehensive contaminant monitoring programs for discharge quality which is supplemented by detailed receiving environment monitoring programs.

65. Releases of water from a dam at a mine site can be authorised by the conditions of an environmental authority or via specific permission under a transitional environmental program. Regardless of the statutory instrument, for releases of water from a dam at a mine site to be authorised, the assessment procedure described above would apply.

66. The EP Act and the subordinate EPP Water provides for drinking water values for Queensland waters. Accordingly, the protection of these values must be demonstrated prior to any authority being granted authorising a contaminant release to surface waters. Conditions of the environmental authority or TEP will provide quality limits and environmental monitoring to ensure that discharge quality is sufficient to protect drinking water values.

67. During the 10/11 wet season, DERM staff liaised with Queensland Health on a regular basis to ensure that any authorised or un-authorised discharges from mine sites were managed to ensure the protection of drinking water quality.

68. TEPs issued during or as a result of the 10/11 wet season also considered the effects of any mine site release on drinking water and were conditioned to ensure that the discharge was managed in such a way as to ensure the protection of drinking water supplies.

69. DERM has observed that salinity (measured by Electrical Conductivity) in all water courses in the Fitzroy basin has increased following the 2010/2011 wet season. The high rainfall resulted in extensive recharge to the groundwater in the Fitzroy basin which increased contribution of groundwater to base flows in streams high in the catchment. At times, the salinity of this water is quite high (in excess of the EC 2500 micro Siemens per centimetre (uS/cm)). As a consequence, salinity in base flows in the larger streams of the Fitzroy catchment is higher than has been experienced in recent years when there was little or no groundwater contribution to stream flow.

70. DERM does not believe that discharges from mine sites as a result of the 2010/11 wet season have contributed significantly to the currently elevated electrical conductivity of the Fitzroy river system. Discharges from mine sites have been closely monitored in accordance with conditions set on both EAs and TEPs to ensure water quality downstream of mines remains within acceptable limits.

71. This rising salinity is currently causing some minor issues in drinking water supplies in the lower Mackenzie and Fitzroy Rivers. The electrical conductivity (EC) in the Fitzroy Barrage, which supplies drinking water to Rockhampton and the Bedford Weir, which supplies drinking water to Tieri, Middlemount, Blackwater, and Bluff has risen to levels above 600uS/cm. At these levels part of the population are able to detect taste difference to the water normally supplied from these storages.

72. There is no evidence to suggest that any plant or animal species has been adversely impacted by the increased salinity in waterways across the Fitzroy river system.

73. Whilst there have not been major impacts on electricity generation there has been some minor inconvenience and increased costs on electricity generation at the Stanwell power station. An increase in salinity in the raw water supply results in fewer cycles for cooling water. Consequently, to achieve the same levels of electricity generation increased volumes of cooling water sourced from the Fitzroy River are required.

74. DERM has been informed that Stanwell Corporation has been able to handle the increase in salinity in its raw water through a temporary amendment to its Development Approval (DA). The amendment allows Stanwell to use larger volumes of below down water at the same time not exceeding its current water quality discharge limits.

75. There is no evidence that rising EC in stream flow in the Fitzroy river system or mine water discharges across the state as a result of the 2010/11 wet season have had any adverse impact on the environment. DERM has investigated a number of breaches of conditions of both EAs and TEPs and has concluded that no environmental harm has resulted from any non compliant release.

76. Where salinity has risen in drinking water supplies in the lower Mackenzie and Fitzroy Barrage, there is some concern in particular for those people who are on low sodium diets and kidney dialysis in Tieri, Middlemount, Blackwater, Bluff and Rockhampton. Bio medical services of the Central Queensland Health Service District have also reported that adjustments have had to be made to dialysis and other equipment as a result of the associated increase in hardness.

77. Monitoring has shown high EC levels in a number of local catchments upstream of mines not influenced by mine water discharges, therefore DERM believes that the major cause of this increase in salinity and hardness is the increasing contribution of groundwater to stream flows rather than the effects of mine water discharges..

Item 5: details of how the new Fitzroy Model Conditions negotiated during 2011, or any other discussions with DERM, will resolve any issue raised above 1, 2, 3, or 4

78. The new Fitzroy Model conditions may provide more opportunities for the Moranbah North Mine to release mine affected water to the environment. This may have the effect of reducing the volume of mine affected water stored on site, increasing the capacity of the mine to deal with rainfall events without pumping water to active mining pits.

79. It is the opinion of DERM that the Moranbah North mine may benefit from the new Fitzroy Model Conditions as a result of increased flexibility in mine affected water discharge conditions that can be applied to mines close to the boundary of a catchment. Consideration of the potential impacts on the mine due to the modified conditions will require detailed analysis on a site by site basis by the relevant mining company.

80. During a Compliance Inspection at Moranbah North on 16 September 2011, [redacted] Environment Superintendent indicated that they will not be submitting an amendment for the Fitzroy Model Conditions until early next year. In the meantime, [redacted] considers the current TEP (MAN12579) sufficient to deal with the 2011/12 wet season.

Item 6: an explanation as to whether the new Fitzroy Model Conditions negotiated during 2011 are advantageous or disadvantageous to the mine operator in the management of water at the mine, the downstream environment and safety issues.

81. With regard to the Moranbah North Mine, the new Fitzroy Model Conditions may provide the mine operator additional opportunity to discharge mine affected water to the environment through possible amendments to water quality limits and stream flow triggers.

82. Additional discharge of mine affected water may prove advantageous where the Moranbah North Mine is storing amounts of excess water on site either in pits where it is impacting on production or in the current water management system where it is impacting on the ability of the mine to comply with EA conditions.

83. The new Fitzroy Model conditions have been developed in an attempt to provide mine operators with additional flexibility to manage mine affected water on site through discharges, whilst maintaining minimal impacts on the receiving environment. The benefit to individual mines from adoption of the new model conditions needs to be determined by the mine through relevant analysis.

I make this solemn declaration conscientiously believing the same to be true, and by virtue of the provisions of the *Oaths Act 1867*.

Signed . [redacted] .....
Andrew Stuart Brier

Taken and declared before me, at Brisbane this 27th day of September 2011

[redacted]
.....
Solicitor/~~Barrister/Justice of the Peace/Commissioner for Declarations~~

Our ref: Doc 1705864

9 September 2011

[redacted]
Assistant Crown Solicitor
Crown Law - Department of Justice and Attorney-General
GPO Box 5221
BRISBANE QLD 4001

Dear [redacted]

Department of Environment and Resources & Department of Employment, Economic Development and Innovation - Mining Dams

Please find enclosed a Requirement to Provide Statement to the Commission addressed to the following:

1. Mr Andrew Brier, General Manager, Strategic Implementation, Coal & CSG Operations, Regional Service Delivery, Operations and Environmental Regulator, directed to the regulation by the Department of Environment and Resource Management of Ensham Coal Mine and the Moranbah North Coal Mine.

2. Mr Rob Lawrence, Director, Environmental Services (North Region), Regional Service Delivery, Operations and Environmental Regulator, directed to the regulation by the Department of Environment and Resource Management of Mt Oxide Mine.

3. Mr Oskar Kadletz, Abandoned Mine Coordinator in the Department of Employment, Economic Development and Innovation, directed to the State regulations of discharges during floods at Mt Oxide Mine.

Please note that this further requirement for Mr Kadletz is additional to requirement number 1702565 dated 8 September, and that one statement covering topics from both requirements may be provided if convenient. Both requirements are returnable by 5 pm, Friday 16 September 2011.

The material from Mr Brier and Mr Lawrence is returnable to the Commission no later than 5 pm, Monday 26 September 2011.

If you require further information or assistance, please contact [redacted] on telephone [redacted].

400 George Street Brisbane
GPO Box 1738 Brisbane
Queensland 4001 Australia
Telephone **1300 309 634**
Facsimile **+61 7 3405 9750**
www.floodcommission.qld.gov.au
ABN 82 696 762 534

We thank you for your assistance.

Yours sincerely

[redacted]

Jane Moynihan
Executive Director

400 George Street Brisbane
GPO Box 1738 Brisbane
Queensland 4001 Australia
Telephone **1300 309 634**
Facsimile **+61 7 3405 9750**
www.floodcommission.qld.gov.au
ABN 82 696 762 534

Our ref: Doc 1694638

9 September 2011

Mr Andrew Brier
General Manager, Strategic Implementation, Coal & CSG Operations,
Regional Service Delivery, Operations and Environmental Regulator
Department of Environment and Resource Management
Level 13, 400 George Street
BRISBANE QLD 4001

REQUIREMENT TO PROVIDE STATEMENT TO COMMISSION OF INQUIRY

I, Justice Catherine E Holmes, Commissioner of Inquiry, pursuant to section 5(1)(d) of the *Commissions of Inquiry Act 1950* (Qld), require Mr Andrew Brier of the Department of Environment and Resource Management to provide a written statement, under oath or affirmation, to the Queensland Floods Commission of Inquiry, in which the said Mr Brier gives an account of the following topics.

With respect to the Ensham Coal Mine and the Moranbah North Coal Mine:

1. Department of Environment and Resource Management's activities in respect of each mine's flood preparedness in advance of the 2010/2011 wet season, including whether any particular activities were undertaken as a response to the forecast of an above-average rainfall wet season

2. the water management sections of the environmental authority applicable at the mine during the 2010/2011 wet season, including:
   a. any concerns held by him or the Department of Environment and Resource Management (DERM) regarding its terms and the ability of the mine operator to comply with it
   b. any terms that the mine operator has indicated it is unable to comply with, or breached
   c. any terms that had to be amended from the Fitzroy model conditions because the model terms were unsuitable for this mine site
   d. any terms that he or DERM consider do not adequately promote environmental protection and dam safety

3. any transitional environmental program (TEP) issued or refused or any emergency direction (ED) given or considered regarding either mine during the period 1 October 2010 to 30 July 2011 related to water management, and for each, the following:
   a. information received from the mine operator

400 George Street Brisbane
GPO Box 1738 Brisbane
Queensland 4001 Australia
Telephone **1300 309 634**
Facsimile **+61 7 3405 9750**
www.floodcommission.qld.gov.au
ABN 82 696 762 534

b. any relevant dam safety issues
c. relevant correspondence with the mine operator and other stakeholders
d. whether and, if so how, DERM consulted with stakeholders
e. what considerations DERM took into account in making the decision
f. whether, and if so how, DERM balanced environmental considerations and economic consequences of mines being non-operational
g. whether, and if so how, DERM took account of downstream effects, including cumulative effects
h. the terms of the TEP issued or ED given
i. what actions were taken by DERM to advise emergency management personnel, including local and regional disaster management groups and local residents downstream of the dam about the TEP and any discharges or effects
j. reasons for the decision given to the mine operator
k. any breaches of the TEP or ED by the mine operator and DERM's response

4. the effects on the environment, drinking water quality and public health downstream of each of the mine sites (as far as the Great Barrier Reef Marine Park) as a result of discharges of water under a TEP or ED

5. details of how the new Fitzroy Model Conditions negotiated during 2011, or any other discussions with DERM, will resolve any issue raised above in 1, 2, 3, or 4

6. an explanation as to whether the new Fitzroy Model Conditions negotiated during 2011 are advantageous or disadvantageous to the mine operator in the management of water at the mine, the downstream environment and safety issues

With respect to the Ensham Coal Mine only:

7. an account of DERM's activities and decisions to assist Ensham to de-water the mine pits after the 2008 flooding affecting that mine

8. the rationale for prohibiting the discharge of excess water from the 2008 flood which remained in the mine pit through to 2010

9. the positive and negative effects on the environment of the discharge of water from the 2008 flood out of the Ensham mine site in 2010/2011

Mr Brier should attach to his statement:

- the water management sections of the environmental authority in force during the 2010/2011 wet season for the mines
- all relevant TEP or ED documentation, including internal working documents, assessment report, policy documents used, expert reports, notes of any conference, meeting or teleconference, reasons given to mine operators, notice of decision, correspondence with the mine operator and other stakeholders
- any new environmental authority issued in response to the 2011 amendments to the Fitzroy Model Conditions

- any internal reports regarding the Ensham Coal Mine de-watering between 2008 and 2011

In addressing these matters, Mr Brier is to:

- provide all information in his possession and identify the source or sources of that information;
- make commentary and provide opinions he is qualified to give as to the appropriateness of particular actions or decisions and the basis of that commentary or opinion.

Mr Brier may also address other topics relevant to the Terms of Reference of the Commission in the statement, if he wishes.

The statement is to be provided to the Queensland Floods Commission of Inquiry by 5 pm, Monday 26 September 2011.

The statement can be provided by post, email or by arranging delivery to the Commission by emailing info@floodcommission.qld.gov.au.

C. Holmes

Commissioner
Justice C E Holmes

Our ref: Doc 1705885

9 September 2011

Mr Rob Lawrence
Director, Environmental Services (North Region), Regional Service Delivery, Operations and Environmental Regulator
Department of Environment and Resource Management
Level 13, 400 George Street
BRISBANE QLD 4001

REQUIREMENT TO PROVIDE STATEMENT TO COMMISSION OF INQUIRY

I, Justice Catherine E Holmes, Commissioner of Inquiry, pursuant to section 5(1)(d) of the *Commissions of Inquiry Act 1950* (Qld), require Mr Rob Lawrence of the Department of Environment and Resource Management to provide a written statement, under oath or affirmation, to the Queensland Floods Commission of Inquiry, in which the said Mr Lawrence gives an account of the following topics.

With respect to the Mt Oxide Mine (abandoned)

1. Department of Environment and Resource Management (DERM) activities in respect of the mine's flood preparedness in advance of the 2010/2011 wet season, including whether any particular activities were undertaken as a response to the forecast of an above-average rainfall wet season

2. the water management sections of the environmental authority applicable at the mine during the 2010/2011 wet season, including:
   a. any concerns held by him or the Department of Environment and Resource Management (DERM) regarding its terms and the ability of the mine operator to comply with it
   b. any terms that the mine operator has indicated it is unable to comply with, or breached
   c. any terms that had to be amended from the Fitzroy model conditions because the model terms were unsuitable for this mine site
   d. any terms that he or DERM consider do not adequately promote environmental protection and dam safety

3. any transitional environmental program (TEP) issued or refused or any emergency direction (ED) given or considered regarding either mine during the period 1 October 2010 to 30 July 2011 related to water management, and for each, the following:
   a. information received from the mine operator

400 George Street Brisbane
GPO Box 1738 Brisbane
Queensland 4001 Australia
Telephone **1300 309 634**
Facsimile **+61 7 3405 9750**
www.floodcommission.qld.gov.au
ABN 82 696 762 534

b. any relevant dam safety issues
c. relevant correspondence with the mine operator and other stakeholders
d. whether and, if so, how DERM consulted with stakeholders
e. what considerations DERM took into account in making the decision
f. whether, and if so, how DERM balanced environmental considerations and economic consequences of mines being non-operational
g. whether, and if so how, DERM took account of downstream effects, including cumulative effects
h. the terms of the TEP issued or ED given
i. what actions were taken by DERM to advise emergency management personnel, including local and regional disaster management groups and local residents downstream of the dam about the TEP and any discharges or effects
j. reasons for the decision given to the mine operator
k. any breaches of the TEP or ED by the mine operator and DERM's response

4. the effects on the environment, drinking water quality and public health downstream of each of the mine sites (as far as the Great Barrier Reef Marine Park) as a result of discharges of water from the mine during the period 1 October 2010 to 30 July 2011

5. any actions taken by DERM in response to any effect of discharges from the mine falling into 4, above, during the period 1 October 2010 to 30 July 2011

6. reports of visible blue precipitate downstream, including an account of DERM knowledge of the precipitate, the area affected by it, its cause and effects, and response actions taken by DERM

7. any ongoing concerns regarding uncontrolled or controlled discharges from Mt Oxide Mine (abandoned), including the quality of discharges

8. details of any remediation works planned and the intended outcome of those works

9. details of any flood preparedness activities planned to precede the 2011/2012 wet season

10. details of how the new Fitzroy Model Conditions negotiated during 2011, or any other discussions with DERM, will resolve any issue raised above in 1, 2, 3, or 4

11. an explanation as to whether the new Fitzroy Model Conditions negotiated during 2011 are advantageous or disadvantageous to the mine operator in the management of water at the mine, the downstream environment and safety issues

Mr Lawrence should attach to his statement:

- the water management sections of the environmental authority in force during the 2010/2011 wet season for the mines
- all relevant TEP or ED documentation, including internal working documents, assessment report, policy documents used, expert reports, notes of any conference,

meeting or teleconference, reasons given to mine operators, notice of decision, correspondence with the mine operator and other stakeholders
- any new environmental authority issued in response to the 2011 amendments to the Fitzroy Model Conditions
- any internal reports regarding the Ensham Coal Mine de-watering between 2008 and 2011

In addressing these matters, Mr Lawrence is to:
- provide all information in his possession and identify the source or sources of that information;
- make commentary and provide opinions he is qualified to give as to the appropriateness of particular actions or decisions and the basis of that commentary or opinion.

Mr Lawrence may also address other topics relevant to the Terms of Reference of the Commission in the statement, if he wishes.

The statement is to be provided to the Queensland Floods Commission of Inquiry by 5 pm, Monday 26 September 2011.

The statement can be provided by post, email or by arranging delivery to the Commission by emailing info@floodcommission.qld.gov.au.

C. Holmes

Commissioner
Justice C E Holmes

Our ref: Doc 1710243

9 September 2011

Mr Oskar Kadletz
Abandoned Mines Coordinator
Department of Employment, Economic Development and Innovation
PO Box 15168
City East QLD 4002

REQUIREMENT TO PROVIDE STATEMENT TO COMMISSION OF INQUIRY

I, Justice Catherine E Holmes, Commissioner of Inquiry, pursuant to section 5(1)(d) of the *Commissions of Inquiry Act 1950* (Qld), require Mr Oskar Kadletz to provide a written statement, under oath or affirmation, to the Queensland Floods Commission of Inquiry, in which the said Mr Kadletz provides details of:

1. any ongoing concerns regarding uncontrolled or controlled discharges from Mt Oxide Mine (abandoned), including the quality of discharges

2. any remediation works planned and the intended outcome of those works

3. any flood preparedness activities planned to precede the 2011/2012 wet season

The statement is to be provided to the Queensland Floods Commission of Inquiry by 5 pm, Friday 16 September 2011.

The statement can be provided by post, email or by arranging delivery to the Commission by emailing info@floodcommission.qld.gov.au.

C. Holmes

Commissioner
Justice C E Holmes

400 George Street Brisbane
GPO Box 1738 Brisbane
Queensland 4001 Australia
Telephone **1300 309 634**
Facsimile **+61 7 3405 9750**
www.floodcommission.qld.gov.au
ABN 82 696 762 534

File/Ref EMD136 / MIN100557107

17 September 2010

[redacted]
HSE Superintendent
Moranbah North Coal Pty Ltd
PO Box 172
Moranbah Qld 4744

Dear [redacted]

RE: Compliance Inspection to be conducted for MIN100557107 at Moranbah North Coal Mine.

Officers of the Department of Environment and Resource Management are conducting compliance inspections as part of the compliance inspection program. The compliance inspection program is a pro-active system for measuring environmental compliance during the operational stage of an environmentally relevant activity.

Departmental officers will be visiting your site at 9 am, Wednesday **6 October 2010** to conduct a compliance inspection in regards to your Environmental Authority MIN100557107 issued under the *Environmental Protection Act 1994*.

Please arrange to have the appropriate company personnel on site for this inspection, and have all environmental records and documents available for inspection. Departmental officers will enter the premises at a reasonable time and complete the inspection as promptly as possible. Because of the scale of the activity the environmental inspection will take several hours

Should you require any further information regarding this matter, or if you foresee any difficulties meeting the requirements of this notice, please contact [redacted] on [redacted]

[redacted]

A/Manager (Environmental Services - Mining)

Central West Region

Department of Environment and Resource Management
99 Hospital Road
PO Box 19
Emerald Qld 4720
Telephone 07 4980 6200
Facsimile 07 4982 2568
Website www.derm.qld.gov.au
ABN 46 640 294 485

Central West Environmental Services waste water storage risk assessment questionnaire

District Office_____

Facility/Organisation	Description of storage	Details of contaminants & possible outcome	Probability of Release L/M/H	Consequence of Release Minor - Severe	Overall Risk Low - High	DERM Main contact	Details of any existing response plan in place	Comments or observations
EG. Bakers Creek STP Mackay Regional Council	3 ponds (1 with spillway)	Treated effluent	H	Minor	Low	[redacted]	Contingency plan being developed by MRC to be submitted to DERM EPO for monitoring of current discharge	Access prevented when too wet to monitor, observe the dams/discharge point
Blair Athol Coal Mine	Stockpile Dam, (Spillway) Main Release Point	Mine contaminated water	H	Minor	Medium		Monitonng and reporting program in accordance with Environmental Authority MIN100930009 Planned releases for 2010/2011 wet season? Contingency Plans? Monitoring methodology? Monitoring frequency? Sampling methodology for water reuse? Sampling parameters? Sampling frequency? Other release points – intentional or unintentional? Exceedence of EA parameters? Telemetry used? Telemetry maintenance schedule? Contingency plan on failure of telemetry?	
	Environmental Dam, (Spillway)	Mine contaminated water	H	Minor	Low		Same as above for all water holding facilities listed	
	Ramp 1 Transfer Dam, (Pump Station) Not a release point, but can be point of exceedence	Mine contaminated water	H	Minor	Medium			
	Hazardous Waste Storage Not an authorised release point (RP), but could become RP in 1:100 ARI	Highly Contaminated Water	L	High	High			

Clermont Coal Mine	Mine Water Dam, (Outlet Pipe) Main Release Point to Wolfgang Creek	Mine contaminated water	H	Minor	Medium	[redacted]	Monitoring and reporting program in accordance with Environmental Authority MIN100340805 Planned releases for 2010/2011 wet season? Contingency Plans? Monitoring methodology? Monitoring frequency? Sampling methodology for water reuse? Sampling parameters? Sampling frequency? Other release points – intentional or unintentional? Exceedence of EA parameters? Telemetry used? Telemetry maintenance schedule? Contingency plan on failure of telemetry?	
	Northern Mine Water Pit	Mine contaminated water	H	Minor	Low		Same as above for all water holding facilities listed	
	Transfer pipeline, (Pump Station) Not a release point, but can be point of exceedence	Mine contaminated water	H	Minor	Medium			
	Hazardous Waste Storage Not an authorised release point (RP), but could become RP in 1:100 ARI	Highly Contaminated Water	L	High	High			
Kestrel Coal Mine	Environmental Dam-discharge point SW1	Mine contaminated water	H	Minor	Low	[redacted]	Monitoring and reporting program in accordance with Environmental Authority MIN100924009 Planned releases for 2010/2011 wet season? Contingency Plans? Monitoring methodology? Monitoring frequency? Sampling methodology for water reuse? Sampling parameters? Sampling frequency? Other release points – intentional or unintentional? Exceedence of EA parameters? Telemetry used? Telemetry maintenance schedule? Contingency plan on failure of telemetry?	
	Holding Dam-discharge point SW4	Mine contaminated water	H	Minor	Medium		Same as above for all water holding facilities listed	

	Rejects return Water Dam SW5	Mine contaminated water	H	Minor	Medium			
	Hazardous Waste Storage Not an authorised release point (RP), but could become RP in 1:100 ARI	Highly Contaminated Water	L	High	High			
Minerva Coal Mine	Dam, (Spillway) Release Point 1 to Sandhurst Creek	Mine contaminated water	H	Minor	Medium	[redacted]	Monitoring and reporting program in accordance with Environmental Authority MIN100552307 Planned releases for 2010/2011 wet season? Contingency Plans? Monitoring methodology? Monitoring frequency? Sampling methodology for water reuse? Sampling parameters? Sampling frequency? Other release points – intentional or unintentional? Exceedence of EA parameters? Telemetry used? Telemetry maintenance schedule? Contingency plan on failure of telemetry?	
	Dam, (Spillway) Release Point 2 to Sandhurst Creek	Mine contaminated water	H	Minor	Low		Same as above for all water holding facilities listed	
	Dam, (Spillway) Release Point 3 to Sandhurst Creek	Mine contaminated water	H	Minor	Medium			
	Hazardous Waste Storage Not an authorised release point (RP), but could become RP in 1:100 ARI	Highly Contaminated Water	H	High	High			
Oaky Creek Coal Mine	Discharge point RP1 to Oaky Creek G3 – coal handling and preparation area, industrial area and	Mine contaminated water	H	Minor	Low		Monitoring and reporting program in accordance with Environmental Authority MIN100924209 Planned releases for 2010/2011 wet season? Contingency Plans? Monitoring methodology? Monitoring frequency?	

	administration area						Sampling methodology for water reuse? Sampling parameters? Sampling frequency? Other release points – intentional or unintentional? Exceedence of EA parameters? Telemetry used? Telemetry maintenance schedule? Contingency plan on failure of telemetry?	
	RP2 to Oaky Creek OC1 – Oaky No 1	Mine contaminated water	H	Minor	Medium		Same as above for all water holding facilities listed	
	RP3 to Oaky Creek G9 open cut mine to the north of Oaky Ck	Mine contaminated water	H	Minor	Medium			
	RP4 to Sandy Creek	Mine contaminated water	H	Minor	Medium			
	Hazardous Waste Storage Not an authorised release point (RP), but could become RP in 1:100 ARI	Highly Contaminated Water	H	High	High			
Cook Coal Mine	Siltation Pond 3 (Colliery) to Magpie Creek	Mine contaminated water	H	Minor	Medium		Monitoring and reporting program in accordance with Environmental Authority MIN100783108 Planned releases for 2010/2011 wet season? Contingency Plans? Monitoring methodology? Monitoring frequency? Sampling methodology for water reuse? Sampling parameters?	

							Sampling frequency? Other release points – intentional or unintentional? Exceedence of EA parameters? Telemetry used? Telemetry maintenance schedule? Contingency plan on failure of telemetry?	
	V-Notch Weir (Washery) to Taurus Creek	Mine contaminated water	H	Minor	Low		Same as above for all water holding facilities listed	
	Hazardous Waste Storage Not an authorised release point (RP), but could become RP in 1:100 ARI	Highly Contaminated Water	H	High	High			
Peak Downs Coal Mine	12 North Dam (Discharge Point 1) to Cherwell Creek	Mine contaminated water	H	Minor	Medium		Monitoring and reporting program in accordance with Environmental Authority MIN100496107 Planned releases for 2010/2011 wet season? Contingency Plans? Monitoring methodology? Monitoring frequency? Sampling methodology for water reuse? Sampling parameters? Sampling frequency? Other release points – intentional or unintentional? Exceedence of EA parameters? Telemetry used? Telemetry maintenance schedule? Contingency plan on failure of telemetry?	
	7 North Dam (Discharge Point 2) to Harrow Creek	Mine contaminated water	H	Minor	Low		Same as above for all water holding facilities listed	
	1 South Dam (Discharge Point 3) to Ripstone Creek	Mine contaminated water	H	Minor	Low			

	Boomerang Dam (Discharge Point 4) to Boomerang Creek	Mine contaminated water	H	Minor	Low			
	1 North Dam to 1South Dam Release Gates (Discharge Point 5) to Ripstone Creek	Mine contaminated water	H	Minor	Low			
	7N Harrow Creek (Discharge Point 6) to Harrow Creek	Mine contaminated water	H	Minor	Low			
	8/9 South Dam (Discharge Point7) to Boomerang Creek	Mine contaminated water	H	Minor	Low			
	Ripstone RA Dam (Discharge Point 8) to Ripstone Creek							
	Hazardous Waste Storage Not an authorised release point (RP), but could become RP in 1:100 ARI	Highly Contaminated Water	H	High	High			
Rolleston Coal Mine	Bootes Creek Discharge Point 1 RP 1 to Bootes Creek	Mine contaminated water	H	Minor	Medium		Monitoring and reporting program in accordance with Environmental Authority MIM800090802 Planned releases for 2010/2011 wet season? Contingency Plans? Monitoring methodology? Monitoring frequency? Sampling methodology for water reuse? Sampling parameters? Sampling frequency? Other release points – intentional or unintentional? Exceedence of EA parameters? Telemetry used? Telemetry maintenance schedule? Contingency plan on failure of telemetry?	

	Meteor Creek Discharge Point 1 RP 2 to Meteor Creek	Mine contaminated water	H	Minor	Low		Same as above for all water holding facilities listed	
	Environment Dam RP 3 to Bootes Creek	Mine contaminated water	H	Minor	Low			
	Bootes Creek Discharge Point 2 RP 4 to Bootes Creek	Mine contaminated water	H	Minor	Low			
	Meteor Creek Discharge Point 2 RP 5 to Meteor Creek	Mine contaminated water	H	Minor	Low			
	Hazardous Waste Storage Not an authorised release point (RP), but could become RP in 1:100 ARI	Highly Contaminated Water	H	High	High			
Saraji Coal Mine	Lake Lester RP1 to Phillips Creek	Mine contaminated water	H	Minor	Medium		Monitoring and reporting program in accordance with Environmental Authority MIN100845908 Planned releases for 2010/2011 wet season? Contingency Plans? Monitoring methodology? Monitoring frequency? Sampling methodology for water reuse? Sampling parameters? Sampling frequency? Other release points – intentional or unintentional? Exceedence of EA parameters? Telemetry used? Telemetry maintenance schedule? Contingency plan on failure of telemetry?	
	Dudley's Dam RP2 to Hughes Creek	Mine contaminated water	H	Minor	Low		Same as above for all water holding facilities listed	

	Evaporation Ponds RP3 to Hughes Creek	Highly Contaminated Water	H	High	High			
	Farmhouse-Ramp 15 High Wall Dams RP4 to Phillips Creek	Mine contaminated water	H	Minor	Low			
	Campbell's Dam RP5 to One Mile Creek	Mine contaminated water	H	Minor	Low			
	HCD Back Access Road RP6 to Hughes Creek	Mine contaminated water	H	Minor	Low			
	OMCD Back Access Road RP7 to One Mile Creek	Mine contaminated water	H	Minor	Low			
	Ramp Zero Evaporation Dam RP8 to Acacia Pit	Highly Contaminated Water	H	High	High			
	Ramp 2 Fill Dam RP9 to Hughes Creek	Mine contaminated water	H	Minor	Medium			
	Hazardous Waste Storage Not an authorised release point (RP), but could become RP in 1:100 ARI	Highly Contaminated Water	H	High	High			
Carborough Downs Coal Mine: - Mine Waste Water Evaporation Dam (Reg Dam) & (RP1)	Only authorised release point under EA MIN100329305. Spillway is release point.	Contaminant monitoring: Electrical Conductivity, pH Suspended Solids, Sulphate (SO_4^{2-}), Aluminium, Arsenic Cadmium, Chromium, Copper Iron, Lead, Mercury, Nickel, Zinc, Boron, Cobalt, Manganese, Molybdenum, Selenium, Silver, Uranium, Vanadium, Ammonia, Nitrate Petroleum hydrocarbons (C6-C9), Petroleum hydrocarbons (C10-C36), Fluoride (total), Boron. OUTCOMES If authorised release limits are exceeded or the	Medium	Minor	Low	[redacted]	Regulated under EA; including Water Management Plan.	Water from RP1 is being transferred to Broadlea (see below) as a short term management strategy to minimise risk of release.

		receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
Broadlea Coal Mine: (RP1) Quarry Dam - Sediment Dam 2	Only authorised release point under EA MIN100726908.	Contaminant monitoring: Electrical Conductivity, pH Suspended Solids, Sulphate (SO_4^{2-}), Aluminium, Arsenic Cadmium, Chromium, Copper Iron, Lead, Mercury, Nickel, Zinc, Boron, Cobalt, Manganese, Molybdenum, Selenium, Silver, Uranium, Vanadium, Ammonia, Nitrate Petroleum hydrocarbons (C6-C9), Petroleum hydrocarbons (C10-C36), Fluoride (total), Boron. OUTCOMES If authonsed release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.	Medium	Minor	Low	[redacted]	Regulated under EA; including Water Management Plan.	Mine under care & maintenance, no active mining currently being undertaken.
Ensham Coal Mine: RP 1 (Nogoa River) RP2 (Boggy Creek)	(RP1) Ramp 24 Fill Point Dam & Ramp 4 Dam. (RP2) Ramp 8 Pit (Yongala)	Contaminant monitoring: Electrical Conductivity, pH, Turbidity, Suspended Solids, Sulphate (SO_4^{2-}), Aluminium, Arsenic, Cadmium, Chromium,	Medium Medium	Minor Minor	Low Low	[redacted]	Regulated under EA; including Water Management Plan.	Ensham still has large volumes of mine affected water stored on-site, however this water has been consolidated & stored in-pit to negate the potential for release.

		Copper, Iron, Lead, Mercury, Nickel, Zinc, Boron, Cobalt, Manganese, Molybdenum, Selenium, Silver, Uranium, Vanadium, Ammonia, Nitrate, Petroleum hydrocarbons (C6-C9), Petroleum hydrocarbons (C10-C36), Fluoride (total), Boron. OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
Isaac Plains Coal Mine: (RP1) Release Dam 1 (RP2) Release Dam 2	RP1 - release to Smokey Creek RP2 - Release to Billy's Gully	Contaminant monitoring: Electrical Conductivity, pH Suspended Solids, Sulphate (SO_4^{2-}), Aluminium, Arsenic Cadmium, Chromium, Copper Iron, Lead, Mercury, Nickel, Zinc, Boron, Cobalt, Manganese, Molybdenum, Selenium, Silver, Uranium, Vanadium, Ammonia, Nitrate Petroleum hydrocarbons (C6-C9), Petroleum hydrocarbons (C10-C36), Fluoride (total), Boron. OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to	Medium	Minor	Low	[redacted]	Regulated under EA; including Water Management Plan.	TSF only authorised reg. dam is not yet constructed.

		occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
Lake Vermont Coal Project: (RP1) Sediment Dam 1 (RP2) Sediment Dam 2 (RP3) Sediment Dam 3	All RP's report to Garfax Gully before reaching Isaac River.	Contaminant monitoring: Electrical Conductivity, pH Suspended Solids, Sulphate (SO_4^{2-}), Aluminium, Arsenic Cadmium, Chromium, Copper Iron, Lead, Mercury, Nickel, Zinc, Boron, Cobalt, Manganese, Molybdenum, Selenium, Silver, Uranium, Vanadium, Ammonia, Nitrate Petroleum hydrocarbons (C6-C9), Petroleum hydrocarbons (C10-C36), Fluoride (total), Boron. OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.	Medium	Minor	Low	[redacted]	Regulated under EA; including Water Management Plan.	Lake Vermont has a Co-disposal Dam & Environmental Dam as Reg structures - these are not release points.
North	Eastern Sediment	Storm water runoff and	H	Minor (assuming	Low	[redacted]	Water management plan in place	NGCM conducted a release under EA

Goonyella Coal Mine (NGCM)	Dam (authorised release point, releases to Goonyella Ck)	mine process water		water quality is within authorised limits)			Trigger Action Response Plan being developed (as at August 2010) EA conditions	MIN100590107 from the Eastern Sediment Dam in March 2010. The mine was unable to demonstrate compliance with minimum flow requirements of conditions W8 and W9 of the EA. Water quality was within authorised limits.
North Goonyella Coal Mine (NGCM)	Co-disposal dam (regulated dam)	Tailings (coarse and fine rejects), mine affected water	L	Severe	High		Water management plan in place Trigger Action Response Plan being developed (as at August 2010) Operational plan for the dam EA conditions	An expansion of NGCM's co-disposal facilities is currently under construction.
South Walker Creek Coal Mine (SWCM)	Ramp F dam (authorised release point, releases to Walker Ck)	Pit water	H	Minor (assuming water quality is within authorised limits)	High		EA conditions	
South Walker Creek Coal Mine (SWCM)	Ramp C dam (authorised release point, releases to Walker Ck)	Pit water	H	Minor (assuming water quality is within authorised limits)	High		EA conditions	
South Walker Creek Coal Mine (SWCM)	Eastern Sediment Dam (authorised release point, releases to Sandy Ck)	Mine affected water	H	Minor (assuming water quality is within authorised limits)	High		EA conditions	
South Walker Creek Coal Mine (SWCM)	Clean Side Bidgerly's Tailings Dam (authorised release point, releases to Sandy Ck, regulated dam)	Mine affected water	H	Minor (assuming water quality is within authorised limits)	High		EA conditions	
South Walker Creek Coal Mine (SWCM)	Down Dip Dam (authorised release point, releases to Sandy Ck)	Raw water	H	Minor (assuming water quality is within authorised limits)	Low		EA conditions	Sandy Creek rarely flows, and since inclusion of the model water conditions, has not reached minimum flow to allow a compliant release from this release

								point.
South Walker Creek Coal Mine (SWCM)	Bidgerly's Tailings Dam (regulated dam)	Tailings	L	Severe	Medium	[redacted]	EA conditions	Annual Audit conducted in 2009 advised that the dam is in good condition. Raise of Bidgerly's Tailings Dam Cell 1 is currently being actioned, as storage space remaining in Cell 1 will run out in early 2011. Should a flood event cause a release, it may impact on the Hail Creek Railway.
South Walker Creek Coal Mine (SWCM)	Old Tailings Dam (regulated dam)	Tailings - no longer receiving fresh tailings, capped with coarse rejects	L	Severe	Low		EA conditions	The Old Tailings Dam was decommissioned in 2002. Tailings are continuously consolidating and the tailings crust is hard and dry. The tailings have been capped with coarse rejects.
South Walker Creek Coal Mine (SWCM)	Return Water Dam (regulated dam)	Supernatant water from Clean Side Bidgerly's Tailings Dam and runoff from Old Tailings Dam	L	Severe	Low		EA conditions	The SWCM rail loop and main road into the site are downstream of the dam, however they would not be impacted by an uncontrolled discharge from the dam.
Millennium Coal Mine	Sediment Pond 2 (release point)	Mine affected water	H	Minor (assuming water quality is within authorised limits)	Low		EA conditions	
Millennium Coal Mine	Western Dam (release point and regulated dam)	Mine affected water	H	Minor (assuming water quality is within authorised limits)	Low		EA conditions	
Millennium Coal Mine	Windmill Dam (release point)	Mine affected water	H	Minor (assuming water quality is within authorised limits)	Low		EA conditions	
Red Mountain Infrastructure Joint Venture	Process Dam (release point and regulated dam)	Mine affected water	H	Minor (assuming water quality is within authorised limits)	Low		EA conditions	
Red Mountain Infrastructure Joint Venture	Environment Dam (release point and regulated dam)	Mine affected water	H	Minor (assuming water quality is within authorised limits)	Low		EA conditions	
Red Mountain Infrastructure Joint Venture	Tailings Cells (regulated dam)	Tailings	L	Severe	High		EA conditions	

Red Mountain Infrastructure Joint Venture	Emergency Tailings Storage Facility (regulated dam)	Ex-tailings	L	Minor	Low	[redacted]	EA conditions	The emergency tailings storage facility is currently being rehabilitated in line with EA conditions. A recent inspection confirmed that the cells no longer contain tailings, and are being filled in with benign material and levelled.
Poitrel Coal Mine	Sediment Dam 3 (release point)	Mine affected water	H	Minor (assuming water quality is within authorised limits)	Low		EA conditions	
Gregory Crinum	11 Storages (14 release points) Balmoral Dam	Storm waters (With coal dust)	M	Minor	L		Regulated under EA; including Water Management Plan.	Monitored quarterly
	Dam C	Mine affected water	M	Severe	L			
	Dam D	Mine affected water	M	Severe	L			
	F Block spillway	Mine affected water	M	Severe	L			
	Ramp 4	Mine affected water	L	Severe	L			
	Crinum East Trench	Mine affected water	M	Severe	L			
	I Block Spillway	Mine affected water	M	Severe	L			
	TSF Western Cell Spillway	Mine affected water	M	Severe	L			
	J Block South	Mine affected water	M	Severe	L			
	Dam B Spillway	Mine affected water	L	Severe	I			
	Gregory Stormwater Dam Spillway	environmental water	H	Minor	L			
Curragh	Retention Dam RD1	Mine affected water	M	Severe	Low		Regulated under EA; including Water Management Plan.	Monitored quarterly
	Retention Dam CN3	Mine affected water	M	Severe	Low			
	Retention Dam CN5	Mine affected water	M	Severe	Low			
Norwich Park	Horseshoe Dam	Environmental water	M	Minor	Low		Regulated under EA; including Water Management Plan.	Monitored quarterly
	Browns Dam	Mine affected water	M	Minor	Low			
	Leichhardt Pit HW (R20) Dam	Mine affected water	M	Severe	Low			
	Price Pit (R50) Dam	Mine affected water	L	Severe	Low			

	Ramp 6 HW Dam	Mine affected water	M	Severe	Low			
	Ramp 6 Fill Pt Dam	Mine affected water	H	Severe	Low			
	Ramp 8 Dam	Mine affected water	M	Severe	Low			
	Suttles Bend Dam (Old)	Mine affected water	H	Minor	Low			
	Suttles Bend Dam (New)	Mine affected water	Low	Minor	Low			
WA-DS01T Industrial Dam South, Dawson South Mine	Mine affected water storage with release point (**RP-DS01T**)	- Potential contaminants in water storage as per Tables 2 and 3 of the water conditions. - Characterisation studies of potential contaminants at Dawson South Mine with tendency to bioaccumulate have identified selenium and mercury. - Water quality data supplied by Dawson South Mine on 9/11/10 identified **exceedences of contaminant limits for metals and EC** in Tables 2, 3 & 6. EC currently **3790µs/cm.** - Further rainfall may provide the dilution required to meet discharge water quality limits. - In the event of discharge, Industrial Dam South may exceed water quality limits and affect downstream water quality in the Dawson River.	Low	Medium	Medium	[redacted]	**Short term** Actions by Dawson South Mine to minimise the risk of discharge for 2010-2011 wet season include:- - Discontinuation of pit water inflows into Industrial Dam South to maximise residual storage capacity. - Planned construction of contour banks to divert normal catchment flow from adjacent grazing land away from Industrial Dam South. - Monitoring of residual storage capacity via telemetry system. **Long term** Anglo Coal (Dawson Management) Pty Ltd has commenced long term water management planning including:- - Water Management Strategy (10 year water management and associated infrastructure plan) including all Dawson mine sites (Dawson South, Central and North Mines) by Worley Parsons. Draft plan due at end of December 2010. To be finalised March 2011. - Anglo American water management planning for all Anglo mines.	Sections of public roads subject to flash flooding. During these events access to monitoring sites is restricted.
WA-DC02T 14 Dam, Dawson Central and North Mine	Mine affected water storage with release point (**RP-DC02T**)	- Potential contaminants in water storage as per Tables 2 and 3 of the water	High	Medium	Medium	[redacted]	**Short term** Actions by Dawson Central and North Mine to minimise the risk of discharge for 2010-2011 wet season include:-	Water levels depicted on graph at site office appeared inconsistent with water level observed in 14 Dam by approximately 2 metres. Dawson

		conditions. - Characterisation studies of potential contaminants at Dawson Central and North Mine with tendency to bioaccumulate have identified selenium and mercury. - Water quality data supplied by Dawson Central and North Mine on 9/11/10 identified **exceedences of contaminant limits for metals and EC** in Tables 2, 3 & 6. EC currently **3536µs/cm.** - Further rainfall may provide the dilution required to meet discharge water quality limits. - In the event of discharge, 14 Dam may exceed water quality limits and affect downstream water quality in the Dawson R.					- 14 Dam is currently at capacity level. Drains normally directing catchment flow into 14 Dam have been recently blocked to reduce inflows. - Monitoring of residual storage capacity via telemetry system. **Long term** Anglo Coal (Dawson Management) Pty Ltd has commenced long term water management planning including:- - Water Management Strategy (10 year water management and associated infrastructure plan) including all Dawson mine sites (Dawson South, Central and North Mines) by Worley Parsons. Draft plan due at end of December 2010. To be finalised March 2011. - Anglo American water management planning for all Anglo mines.	Central and North Mine to investigate.
WA-DC01T Hillview Dam, Dawson Central and North Mine	Mine affected water storage with release point (**RP-DC01T**)	- Potential contaminants in water storage as per Tables 2 and 3 of the water conditions. - Characterisation studies of potential contaminants at Dawson Central and North Mine with tendency to bioaccumulate have identified selenium and mercury. - Water quality data supplied by Dawson Central and North Mine on 9/11/10 identified **exceedences of contaminant limits for**	High	Medium	Medium	[redacted]	**Short term** Actions by Dawson Central and North Mine to minimise the risk of discharge for 2010-2011 wet season include:- - Two pumps currently transferring water from Hillview Dam to Pit 2C North to increase residual storage capacity. - New pipeline recently installed (not yet operational) dedicated to dewatering of Hillview Dam into Pit 2C North. - Monitoring of residual storage capacity via telemetry system. **Long term** Anglo Coal (Dawson Management) Pty Ltd has commenced long term water management planning including:- - Water Management Strategy (10 year water management and associated infrastructure plan) including all Dawson mine sites (Dawson South, Central and	The shallow nature of Hillview Dam was evident by the current pumping activities. Extensive dam area was exposed compared with relatively small reduction in water level (700mm).

		metals and EC in Tables 3 & 6. EC currently **1396µs/cm.** - Further rainfall may provide the dilution required to meet discharge water quality limits. - In the event of discharge, Hillview Dam may exceed water quality limits and affect downstream water quality in the Dawson River.					North Mines) by Worley Parsons. Draft plan due at end of December 2010. To be finalised March 2011. - Anglo American water management planning for all Anglo mines.	
WA-DN01T Industrial Dam 1 North, Dawson Central and North Mine	Mine affected water storage with release point (**RP-DN01T**)	- Potential contaminants in water storage as per Tables 2 and 3 of the water conditions. - Characterisation studies of potential contaminants at Dawson Central and North Mine with tendency to bioaccumulate have identified selenium and mercury. - Water quality data supplied by Dawson Central and North Mine on 9/11/10 identified **exceedences of contaminant limits for metals and EC** in Tables 2, 3 & 6. EC currently **1990µs/cm.** - Further rainfall may provide the dilution required to meet discharge water quality limits.. - In the event of discharge, Industrial Dam North may exceed water quality limits and affect downstream water quality in the Dawson River.	Low	Medium	Medium	[redacted]	**Short term** Actions by Dawson Central and North Mine to minimise the risk of discharge for 2010-2011 wet season include:- - Monitor residual storage capacity via telemetry system. **Long term** Anglo Coal (Dawson Management) Pty Ltd has commenced long term water management planning including:- - Water Management Strategy (10 year water management and associated infrastructure plan) including all Dawson mine sites (Dawson South, Central and North Mines) by Worley Parsons. Draft plan due at end of December 2010. To be finalised March 2011. - Anglo American water management planning for all Anglo mines.	Nil.

DN-Cell 1, Dawson Central and North Mine	Tailings from coal washing facility.	- Potential contaminants as per Tables 2 and 3 of the water conditions. - Flocculents (chemical content unknown).	No risk of discharge	NA	NA	[redacted]	Tailings from coal washing is deposited into an in pit storage dam. Design of dam includes a section of dam wall constructed of unstabilised spoil to promote seepage of tailings water to report to main section of void maintaining tailings as a thickened paste.	Nil.
Lake Gasteen, Callide Mine	Mine affected water storage with release point.	- Potential contaminants in water storage as per Tables 2 and 3 of the water conditions. - Water quality data supplied by Callide Mine on 10/11/10 identified EC **2400 µs/cm** on 4/08/10 and **1420 µs/cm** on 8/10/10. No additional exceedences were recorded on these dates. - Further rainfall may provide the dilution required to meet discharge water quality limits.. - In the event of discharge Lake Gasteen may exceed water quality limits and affect downstream water quality in the Don River.	Low	Medium	Medium		**Short term** Actions by Callide Mine to minimise the risk of discharge for 2010-2011 wet season include:- - Discontinuation of pit dewatering inflows into Lake Gasteen. - Increased tank capacity at adjacent water fill point to maximise water output to haul road dust suppression operation. - ALS monitoring of residual storage capacity with gauge boards and telemetry system. - 25mm rainfall triggers water discharge site check by ALS. Protocol includes SMS update to Callide Mine. **Long term** - Investigation into alternative in pit water storage. - Anglo American water management planning for all Anglo mines.	Callide Mine is currently actively recruiting additional environmental staff. Callide Mine advised that stream flow gauging station installation completed by 31/10/10.
Goldings Dam, Callide Mine	Mine affected water storage with release point.	- Potential contaminants in water storage as per Tables 2 and 3 of the water conditions. - Water quality data supplied by Callide Mine on 10/11/10 identified EC **1310 µs/cm** on 20/07/10 and **1820 µs/cm** on 8/10/10. No additional	High	Medium	Medium		**Short term** Actions by Callide Mine to minimise the risk of discharge for 2010-2011 wet season include:- - Discontinuation of Trap Gully pit dewatering inflows into Goldings Dam. - Current de-silting program to increase storage capacity. - 25mm rainfall triggers water discharge site check by ALS. Protocol includes SMS update to Callide Mine. **Long term**	At the time of the inspection, Goldings Dam was being desilted. Some water seepage was still being discharged off site. Goldings Dam's capacity was severely reduced by silt levels. Goldings Dam has extremely limited storage capacity. It is considered that that Goldings Dam was not originally constructed as a water storage but as a sediment dam for overflows from Ghost Ryders Dam.

		exceedences were recorded on these dates. - Further rainfall may provide the dilution required to meet discharge water quality limits.. - In the event of discharge Goldings Dam may exceed water quality limits and affect downstream water quality in the Don River.					- Investigation into groundwater bores to intercept groundwater flow into Trap Gully mining area. - Investigation into alternative in pit water storage. - Anglo American water management planning for all Anglo mines.	Callide Mine advised that stream flow gauging station installation completed by 31/10/10.
Oaky Creek Diversion Lake, Callide Mine	Mine affected water storage with release point.	- Potential contaminants in water storage as per Tables 2 and 3 of the water conditions. - Water quality data was unavailable for Oaky Creek Diversion Lake on 10/11/10 - Further rainfall may provide the dilution required to meet discharge water quality limits.. - In the event of discharge Oaky Creek Diversion Lake may exceed water quality limits and affect downstream water quality in the Don River.	Medium	Medium	Medium	[redacted]	**Short term** Actions by Callide Mine to minimise the risk of discharge for 2010-2011 wet season include:- - Discontinuation of pit dewatering inflows into Oaky Creek Diversion Lake. - ALS monitoring of residual storage capacity with gauge boards and telemetry system. - 25mm rainfall triggers water discharge site check by ALS. Protocol includes SMS update to Callide Mine. **Long term** - Investigation into filling in the Oaky Creek Diversion Lake to prevent current seepage from the water storage into adjacent mining pit. - Investigation into alternative in pit water storage. - Anglo American water management planning for all Anglo mines.	Access to monitoring sites restricted during excessive rainfall. Callide Mine advised that stream flow gauging station installation completed by 31/10/10.
Dunn Creek Dam, Callide Mine	Mine affected water storage with release point.	- Potential contaminants in water storage as per Tables 2 and 3 of the water conditions. - Water quality data supplied by Callide Mine on 10/11/10 identified EC **1720 µs/cm** on 8/10/10. No further exceedences	High	Medium	Medium		**Short term** Actions by Callide Mine to minimise the risk of discharge for 2010-2011 wet season include:- - Discontinuation of pit dewatering inflows into Dunn Creek Dam. - Current pumping of Dunn Creek Dam into D West Pit via Magazine Dam to maximise residual storage capacity. - Reduce flows into Dunn Creek Dam from Magazine Dam by pumping from Magazine	Callide Mine advised that stream flow gauging station installation completed by 31/10/10.

		were recorded on this date. - Further rainfall may provide the dilution required to meet discharge water quality limits.. - In the event of discharge Dunn Creek Dam may exceed water quality limits and affect downstream water quality in the Don River.					Dam into D West Pit. - Desilt Magazine Dam to increase storage capacity. - Recently installed pump back system to collect and return from Dunn Creek Dam. - ALS monitoring of residual storage capacity with gauge boards and telemetry system. - 25mm rainfall triggers water discharge site check by ALS. Protocol includes SMS update to Callide Mine. **Long term** - Investigation into alternative in pit water storage. - Anglo American water management planning for all Anglo mines.	
Historical waste dump collection dam ML3228 Cracow Gold Mine	Mine affected water storage with release point SW11	Cyanide, sulphates, molybdenum, cadmium, aluminium, EC.	Low	High	Low	[redacted]	**Short term** Water recycled through ore treatment plant. **Long term** Planned construction of enhanced water storage infrastructure.	Newcrest Operations Limited advised the department in 2010 that nil discharges have occurred from Cracow Gold Mine since operations commenced in 2004 (following exploration period in 1990 - 2004).
Ore treatment plant collection dam Cracow Gold Mine	Mine affected water storage with release point SW12	Cyanide, sulphates, molybdenum, cadmium, aluminium, EC.	Low	Medium	Low		**Short term** Water recycled through ore treatment plant. **Long term** Planned construction of enhanced water storage infrastructure.	As above.
Tailings storage facility Cracow Gold Mine	Cyanide tailings with release point SW13	Cyanide, sulphates, molybdenum, cadmium, aluminium, EC.	Low	High	Low		**Long term** All water from thickened tailings collected and recycled through ore treatment plant.	As above
Decline/workshop/ admin area collection dam Cracow Gold Mine	Mine affected water storage with release point SW14	Cyanide, sulphates, molybdenum, cadmium, aluminium, EC.	Low	Medium	Low		**Short term** Water recycled through ore treatment plant. **Long term** Planned construction of enhanced water storage infrastructure.	As above
TSF seepage collection dam Cracow Gold	Tailings affected water storage with release point SW16	Cyanide, sulphates, molybdenum, cadmium, aluminium, EC.	Low	Medium	Low		**Longterm** Water pumped back to tailings storage facility for recycling through ore treatment plant.	As above

Mine								
Tailings Dam 2 sediment dam Cracow Gold Mine	Tailings affected sediment dam with release point SW20	Cyanide, sulphates, molybdenum, cadmium, aluminium, EC.	Low	Medium	Low	[redacted]	**Long term** Water pumped back to tailings storage facility for recycling through ore treatment plant.	As above
Tailings Dam 4 seepage collection dam Cracow Gold Mine	Tailings affected water storage with release point SW16	Cyanide, sulphates, molybdenum, cadmium, aluminium, EC.	Low	High	Low		**Long term** Water recycled through ore treatment plant.	As above
Tailings Dam 4 Cracow Gold Mine	Cyanide tailings with release point SW33	Cyanide, sulphates, molybdenum, cadmium, aluminium, EC.	Low	High	Low		**Long term** Water recycled through ore treatment plant.	As above
Farm Dam, Baralaba Coal Mine	Mine affected water storage with release point (RP1)	- Potential contaminants in water storage as per Tables 2 and 3 of the water conditions. - In the event of discharge, Farm Dam is not anticipated to exceed water quality limits or affect downstream water quality in the Dawson River.	Low	Minor	Low		Response plan in place to remove water from mine to Farm Dam via pump. Prior to pump, laboratory analysis of water to prevent exceedence of water quality limits.	Mine has not discharged in over 5 years. Mine is a net user of water, recent above average rainfall has not required discharge. Recent maintenance of dam (August 2010) to improve storage.
Boxcut, QER	Boxcut water release location	- Potential contaminants include pH and suspended solids. - Discharge into estuarine environment. - Above average rainfall may require discharge. - Water analysis conducted prior to discharge.	Low	Minor	Low		**Short term** Actions by QER to minimise the risk of discharge for 2010-2011 wet season include:- - minimise stormwater from entering boxcut via stormwater separation - review of release requirements by water services. **Long term** QER to implement release requirements within amended EA - QER to identify water values within Em Plan.	Water release being review as amendment to EA process, QER to implement new water conditions within EA
Clean Water	Mine affected water	- Potential	Medium	Minor	Low		**Short term**	Water storage limited and water storage

Holding Pond, (WP-1) QER	storage with release point (**WP-1**)	contaminants in water storage as per Table 1. - Water analysis conducted prior to discharge. - Excessive rainfall may require uncontrolled discharge.					Actions by QER to minimise the risk of discharge for 2010-2011 wet season include:- - Pump back system and laboratory analysis to ensure discharge meets limits identified on Table 1. **Long term** Department to review conditions with EA amendments to ensure up to date water condition meet current standards	in pit requires treatment prior to discharge.
Mine Water Management System, (WP-2) QER	Mine affected water storage with release point (**WP-2**)	- Potential contaminants in water storage as per Table 1. - Water analysis conducted prior to discharge. - Excessive rainfall may require uncontrolled discharge.	Low	Minor	Low	[redacted]	**Short term** Actions by QER to minimise the risk of discharge for 2010-2011 wet season include:- - Pump back system to Clean Water Holding Pond and laboratory analysis to ensure discharge meets limits identified on Table 1. **Long term** Department to review conditions with EA amendments to ensure up to date water condition meet current standards	Water storage limited and water storage in pit requires treatment prior to discharge.
Emergency Overflow, (WP-3) QER	Mine affected water storage with release point (**WP-3**)	- Potential contaminants in water storage as per Table 1. - Water analysis conducted prior to discharge. - Excessive rainfall may require uncontrolled discharge.	Low	Minor	Low		**Short term** Actions by QER to minimise the risk of discharge for 2010-2011 wet season include:- - Pump back system to Clean Water Holding Pond and laboratory analysis to ensure discharge meets limits identified on Table 1. **Long term** Department to review conditions with EA amendments to ensure up to date water condition meet current standards	Water storage limited and water storage in pit requires treatment prior to discharge.
End of Pipe, (MP) QER - McFarlane	Boxcut with release point (**MP**)	- Potential contaminants in water storage as per Table 2. - Water analysis conducted prior to discharge. - On-going dewatering for proposed backfill.	Low	Minor	Medium		**Short term** Actions by QER to minimise the risk of discharge for 2010-2011 wet season include:- - Dewater as part of backfill activity - Increase available capacity - Laboratory analysis to ensure discharge meets limits identified on Table 2. **Long term** Backfill activity to prevent discharge	Water storage decreasing by backfill activity anticipated completion December 201.

Unused Pit, Omya	Mine affected and stormwater storage with uncontrolled release to drainage.	- Potential contaminants include pH, EC, and suspended solids. - Water quality data recorded during discharge. No exceedences recorded during 2009-2010.	Medium (limited capacity)	Minor	Low	[redacted]	**Short term** Omya current EA allows unrestricted discharge to maintain mining operations. - Omya to improve monitoring to minimise potential receiving water quality impacts.	Recent change to on site environmental personnel (new south wales based) On site water management not to current standards. Amended EA water conditions will be a challenge for Omya to comply with. Water quality does not appear to be an issue, more regarding volume of discharge, receiving waters, and monitoring.
Mine Pit, Omya	Mine affected and stormwater storage with pump release to drainage.	- Potential contaminants include pH, EC, and suspended solids. - Water quality data recorded during discharge. No exceedences recorded during 2009-2010.	Medium (limited capacity within mining pit)	Minor	Low		**Short term** Omya current EA allows unrestricted discharge to maintain mining operations. - Omya to improve monitoring to minimise potential receiving water quality impacts.	Recent change to on site environmental personnel (new south wales based) On site water management not to current standards. Amended EA water conditions will be a challenge for Omya to comply with. Water quality does not appear to be an issue, more regarding volume of discharge, receiving waters, and monitoring.
Unused Pits, QMAG	Mine affected water storage with controlled release to overland flow.	- Potential contaminants include pH, high EC, and suspended solids. - Water quality data recorded during discharge. No exceedences recorded during 2009-2010.	Medium (excess rainfall fills limited capacity)	Minor	Medium		**Short term** QMAG current EA allows unrestricted overland discharge to maintain mining operations. - QMAG current discharge limits includes high EC (6000 us/cm).	On site water management not to current department standards. Water conditions to the current standard will be a challenge for QMAG to comply with. Water services should review current conditions for advice regarding potential approach.
End of Pipe (A), Cement Australia (East End Mine)	Mine affected from pit to sediment ponds discharge to Shultz's lagoon.	- Potential contaminants include pH, EC. - Water quality data recorded during discharge. One exceedence in 2009-2010 wet season investigated and received warning notice.	Medium (poor water management allows excess rainfall into pit)	Minor	Medium		**Short term** Cement Australia current EA allows discharge to maintain mining operations as long as complies with water quality guidelines. - Cement Australia current EA includes discharge volume based on limits includes high EC (4700 us/cm).	On site water management not to current department standards. Water conditions to the current standard will be a challenge for Cement Australia to comply with. EIS for amended EA should be received early 2011. Amended EA to include water conditions to current department standard.

End of Pipe (E), Cement Australia (East End Mine)	Spoil Dump affected water to storage pond to discharge to ephemeral creek, no monitoring of discharge volume.	- Potential contaminants include pH, EC. - Mine reports not meeting monitoring requirements during the last few years.	Medium (poor water management does not monitor as required)	Minor	Medium	[redacted]	**Short term** Cement Australia to improve monitoring of Point E and provided results to department.	On site water management not to current department standards. Water conditions to the current standard will be a challenge for Cement Australia to comply with. EIS for amended EA should be received early 2011. Amended EA to include water conditions to current department standard.
End of Pipe, Affinis	Former mine pit	- Potential contaminants include low pH and metals. - Mine affected water discharge offsite.	Medium (poor water management)	Medium	Medium		**Short term** Affinis pump back system to capture discharge prior to leaving mine site.	On site water management not to current department standards. Water conditions to the current standard will be a challenge for Affinis to comply with. Current owner delays compliance.
Dam 1, Moranbah North Coal Mine	Discharge authorised under EA MIN100557107 – RP3	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow	H	Minor (if compliant)	Low		None – only conditions of EA	

		rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
Dam 2, Moranbah North Coal Mine	Discharge authorised under EA MIN100557107 – RP3	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	

		investigation into the potential for environmental harm.						
Dam 3, Moranbah North Coal Mine	Discharge authorised under EA MIN100557107 – RP1	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	
Dam 4, Moranbah North Coal Mine	Discharge authorised under EA MIN100557107 – RP1 and 2	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-})	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	

		Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
Environmental Dam, Moranbah North Coal Mine	Pond will spill way. Water spills into the Environmental Dam from the Production Dam spillway. Discharge is authorised under TEP MAN10140	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	

		Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
Production Dam, Moranbah North Coal Mine	Water from the Production Dam spills via a spillway to the Environmental Dam. Water is released to the environment, authorised under EA MIN100557107 – RP1	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	

		Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
Oak Park Water Management System, German Creek Mine	Water is released to the environment, authorised under EA MIN100497707 – RP6	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	

		If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
Lake Lindsay Water Management System, German Creek Mine	Water is released to the environment, authorised under EA MIN100497707 – RP6	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	

		values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
Pit W, German Creek Mine	Water is released to the environment, authorised under EA MIN100497707 – RP8	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	
Central Storage, German Creek	Water is released to the environment,	CONTAMINANTS Electrical Conductivity	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	

Mine	authonsed under EA MIN100497707 – RP8	pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
Old Tailings Dam, German Creek Mine	Identified regulated structure under EA MIN100497707. Release from structure not authorised under EA.	CONTAMINANTS Tailings Material Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper	L	Severe	Medium	[redacted]	None – only conditions of EA	

		Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES Potential for environmental harm.						
Bruce's Billabong, German Creek Mine	Identified regulated structure under EA MIN100497707. Release from structure not authorised under EA.	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES	L	Moderate	Low	[redacted]	None – only conditions of EA	

		Potential for environmental harm.						
Lake Lisa, German Creek Mine	Identified regulated structure under EA MIN100497707. Release from structure not authonsed under EA.	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES Potential for environmental harm.	L	Moderate	Low	[redacted]	None – only conditions of EA	
Stacker Dam, German Creek Mine	Identified regulated structure under EA MIN100497707. Release from structure not authorised under EA.	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum	L	Moderate	Low	[redacted]	None – only conditions of EA	

		Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES Potential for environmental harm.						
White's Dam, German Creek Mine	Identified regulated structure under EA MIN100497707. Release from structure not authorised under EA.	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES Potential for environmental harm.	H	Moderate	Medium	[redacted]	None – only conditions of EA	
Pit F, German Creek Mine	Identified regulated structure under EA MIN100497707. Release from structure not authorised under EA.	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium	L	Moderate	Low		None – only conditions of EA	

		Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES Potential for environmental harm.						
Pit B2, German Creek Mine	Identified regulated structure under EA MIN100497707. Release from structure not authorised under EA.	CONTAMINANTS Tailings Material Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9)	L	High	Medium	[redacted]	None – only conditions of EA	

		Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES Potential for environmental harm.						
Pit P North, German Creek Mine	Identified regulated structure under EA MIN100497707. Release from structure not authorised under EA.	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES Potential for environmental harm.	L	Moderate	Low	[redacted]	None – only conditions of EA	
Pit P South, German Creek Mine	Identified regulated structure under EA MIN100497707. Release from structure not authorised under EA.	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel	L	Moderate	Low		None – only conditions of EA	

		Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES Potential for environmental harm.						
Pit Q South, German Creek Mine	Identified regulated structure under EA MIN100497707. Release from structure not authorised under EA.	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES Potential for environmental harm.	L	Moderate	Low	[redacted]	None – only conditions of EA	
Pit U1, German	Identified regulated	CONTAMINANTS	L	Moderate	Low		None – only conditions of EA	

Creek Mine	structure under EA MIN100497707. Release from structure not authorised under EA.	Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES Potential for environmental harm.						
Pit U2, German Creek Mine	Identified regulated structure under EA MIN100497707. Release from structure not authorised under EA.	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium	L	Moderate	Low	[redacted]	None – only conditions of EA	

		Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES Potential for environmental harm.						
Pit T, German Creek Mine	Identified regulated structure under EA MIN100497707. Release from structure not authorised under EA.	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES Potential for environmental harm.	L	Moderate	Low	[redacted]	None – only conditions of EA	
Pit D North, German Creek Mine	Identified regulated structure under EA MIN100497707. Release from structure not authorised under EA.	CONTAMINANTS Tailings Material Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium	L	Severe	Medium		None – only conditions of EA	

		Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES Potential for environmental harm.						
Pit D South, German Creek Mine	Identified regulated structure under EA MIN100497707. Release from structure not authorised under EA.	CONTAMINANTS Tailings Material Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total)	L	Severe	Medium	[redacted]	None – only conditions of EA	

		OUTCOMES Potential for environmental harm.						
Pit C, German Creek Mine	Identified regulated structure under EA MIN100497707. Release from structure not authorised under EA.	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES Potential for environmental harm.	L	Moderate	Low	[redacted]	None – only conditions of EA	
North West Open Cut Pit, Foxleigh Coal Mine	Authorised discharge under EA MIN100734308. Discharge Point RP1	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt	H	Minor (if compliant)	Low		None – only conditions of EA	

		Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
North East Open Cut Pit, Foxleigh Coal Mine	Authorised discharge under EA MIN100734308. Discharge Point RP1	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	

		(C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
WC North Open Cut Pit, Foxleigh Coal Mine	Authorised discharge under EA MIN100734308. Discharge Point RP2	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	

		rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
WC South Open Cut Pit, Foxleigh Coal Mine	Authorised discharge under EA MIN100734308. Discharge Point RP2	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	

		investigation into the potential for environmental harm.						
Far South Pit, Foxleigh Coal Mine	Authorised discharge under EA MIN100734308. Discharge Point RP3	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	
Carlo Creek Open Cut Pit, Foxleigh Coal Mine	Authorised discharge under EA MIN100734308. Discharge Point RP4	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-})	H	Minor (if compliant)	Low		None – only conditions of EA	

		Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
One Tree Open Cut Pit, Foxleigh Coal Mine	Authorised discharge under EA MIN100734308. Discharge Point RP4	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	

		Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
Cockatoo Creek Sediment Dam 1, Foxleigh Coal Mine	Authorised discharge under EA MIN100734308. Discharge Point RP4	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	

		Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
Cockatoo Creek Sediment Dam 2, Foxleigh Coal Mine	Authorised discharge under EA MIN100734308. Discharge Point RP4	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	

		If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
Cockatoo Creek Sediment Dam 3, Foxleigh Coal Mine	Authorised discharge under EA MIN100734308. Discharge Point RP4	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate-(SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	

		values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
Tailings Dam 1, Foxleigh Coal Mine	Identified regulated structure under EA MIN100734308. Release from structure not authorised under EA.	CONTAMINANTS Tailings Material Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES Potential for environmental harm.	L	Severe	Medium	[redacted]	None – only conditions of EA	
Tailings Dam 2, Foxleigh Coal Mine	Identified regulated structure under EA MIN100734308. Release from structure not authorised under EA.	CONTAMINANTS Tailings Material Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury	L	Severe	Medium		None – only conditions of EA	

		Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES Potential for environmental harm.						
Central Storage, Lake Lindsay Coal Mine	Authorised discharge under EA MIN800279904. Discharge Point RP2	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	

		rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
Dam 1A, Middlemount Coal Mine	Authorised discharge under EA MIN100646307. Discharge Point 1A	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	

		investigation into the potential for environmental harm.						
Dam 1B, Middlemount Coal Mine	Authorised discharge under EA MIN100646307. Discharge Point 1B	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	
Dam 1C, Middlemount Coal Mine	Authorised discharge under EA MIN100646307. Discharge Point 1C	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-})	H	Minor (if compliant)	Low		None – only conditions of EA	

		Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
Dam 2, Middlemount Coal Mine	Authorised discharge under EA MIN100646307. Discharge Point 2	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	

		Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
Dam 3, Middlemount Coal Mine	Authorised discharge under EA MIN100646307, Discharge Point 3	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	

		Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
Dam 4, Middlemount Coal Mine	Authorised discharge under EA MIN100646307. Discharge Point 4	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	

		If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
Dam 5, Middlemount Coal Mine	Authorised discharge under EA MIN100646307, Discharge Point 5	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation	H	Minor (if compliant)	Low		None – only conditions of EA	

		values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
Dam 6, Middlemount Coal Mine	Authorised discharge under EA MIN100646307. Discharge Point 6	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	
Dam 7, Middlemount	Authorised discharge under EA	CONTAMINANTS Electrical Conductivity	H	Minor (if compliant)	Low		None – only conditions of EA	

Coal Mine	MIN100646307. Discharge Point 7	pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
Dam 8, Middlemount Coal Mine	Authorised discharge under EA MIN100646307. Discharge Point 8	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	

		Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
Tailings Storage Facility, Middlemount Coal Mine	Identified regulated structure under EA MIN100646307. Release from structure not authorised under EA.	CONTAMINANTS Tailings Material Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum	L	Severe	Medium	[redacted]	None – only conditions of EA	

		Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES Potential for environmental harm.						
Open Pit, Middlemount Coal Mine	Identified regulated structure under EA MIN100646307. Release from structure not authorised under EA.	CONTAMINANTS Tailings Material Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES Potential for environmental harm.	L	Severe	Medium	[redacted]	None – only conditions of EA	
G3 – coal handling and preparation area, industrial area and	Authorised discharge under EA MIN100924209. Discharge Point RP1	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-})	H	Minor (if compliant)	Low		None – only conditions of EA	

administration area, Oaky Creek Coal Mine		Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
OC1 – Oaky No 1, Oaky Creek Coal Mine	Authorised discharge under EA MIN100924209. Discharge Point RP2	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	

		Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
G9 open cut, Oaky Creek Mine	Authorised discharge under EA MIN100924209, Discharge Point RP3	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	

		Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
A4 open cut, Oaky Creek Mine	Authorised discharge under EA MIN100924209. Discharge Point RP4	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	

		If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
12 North Dam, Peak Downs Mine	Authorised discharge under EA MIN100496107. Discharge Point 1	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation	H	Minor (if compliant)	Low		None – only conditions of EA	

		values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
7 North Dam, Peak Downs Mine	Authorised discharge under EA MIN100496107, Discharge Point 2	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	
1 South Dam, Peak Downs	Authorised discharge under EA	CONTAMINANTS Electrical Conductivity	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	

Mine	MIN100496107. Discharge Point 3 and 5	pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
1 North Dam, Peak Downs Mine	Authorised discharge under EA MIN100496107. Discharge Point 5	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	

		Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
Boomerange Dam, Peak Downs Mine	Authorised discharge under EA MIN100496107. Discharge Point 4 and 7	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium	H	Minor (if compliant)	Low		None – only conditions of EA	

		Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
7N Harrow Creek, Peak Downs Mine	Authorised discharge under EA MIN100496107. Discharge Point 6	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36)	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	

		Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
8/9 Dam, Peak Downs Mine	Authorised discharge under EA MIN100496107. Discharge Point 7	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	

		occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
Ripstone RA Dam, Peak Downs Mine	Authorised discharge under EA MIN100496107. Discharge Point 12	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	

R6S Tailings Disposal, Peak Downs Mine	Identified regulated structure under EA MIN100496107. Release from structure not authorised under EA.	CONTAMINANTS Tailings Material Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES Potential for environmental harm.	L	Severe	Medium	[redacted]	None – only conditions of EA	
R7S Tailings Disposal, Peak Downs Mine	Identified regulated structure under EA MIN100496107. Release from structure not authorised under EA.	CONTAMINANTS Tailings Material Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum	L	Severe	Medium		None – only conditions of EA	

		Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES Potential for environmental harm.						
2N Tailings Dam, Peak Downs Mine	Identified regulated structure under EA MIN100496107. Release from structure not authorised under EA.	CONTAMINANTS Tailings Material Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES Potential for environmental harm.	L	Severe	Medium	[redacted]	None – only conditions of EA	
Lake Lester, Saraji Coal Mine	Authorised discharge under EA MIN100845908. Discharge Point RP1	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-})	H	Minor (if compliant)	Low		None – only conditions of EA	

		Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
Dudley's Dam, Saraji Coal Mine	Authorised discharge under EA MIN100845908. Discharge Point RP2	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	

		Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
Evaporation Ponds, Saraji Coal Mine	Authorised discharge under EA MIN100845908, Discharge Point RP3	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	

		Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
Farmhouse-Ramp 15 High Wall Dams	Authorised discharge under EA MIN100845908. Discharge Point RP4	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	

		If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
Campbell's Dam, Saraji Coal Mine	Authorised discharge under EA MIN100845908. Discharge Point RP5	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	

		values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
HCD Back Access Road, Saraji Coal Mine	Authorised discharge under EA MIN100845908. Discharge Point RP6	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	
OMCD Back Access Road,	Authorised discharge under EA	CONTAMINANTS Electrical Conductivity	H	Minor (if compliant)	Low		None – only conditions of EA	

Saraji Coal Mine	MIN100845908. Discharge Point RP7	pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
Ramp Zero Evaporation Dam	Authorised discharge under EA MIN100845908. Discharge Point RP8	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	

		Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
Ramp 2 Fill Dam	Authorised discharge under EA MIN100845908. Discharge Point RP9	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium	H	Minor (if compliant)	Low	[redacted]	None – only conditions of EA	

		Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
Evaporation Pond, Saraji Coal Mine	Identified regulated structure under EA, MIN100845908. Release from structure not authorised under EA.	CONTAMINANTS Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36)	L	Medium (if compliant)	Low		None – only conditions of EA	

		Fluoride (total) OUTCOMES If authorised release limits are exceeded or the receiving water flow rate/dilution requirement, there is a potential for environmental harm to occur. If the trigger investigation values are exceeded the client is required to undertake an investigation into the potential for environmental harm.						
Ramp 3 TSF, Saraji Coal Mine	Identified regulated structure under EA MIN100845908. Release from structure not authorised under EA.	CONTAMINANTS Tailings Material Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES Potential for environmental harm.	L	Severe	Medium	[redacted]	None – only conditions of EA	
Ramp 2 TSF, Saraji Coal Mine	Identified regulated structure under EA	CONTAMINANTS Tailings Material	L	Severe	Medium		None – only conditions of EA	

	MIN100845908. Release from structure not authorised under EA.	Electrical Conductivity pH Suspended Solids Sulphate (SO_4^{2-}) Aluminium Arsenic Cadmium Chromium Copper Iron Lead Mercury Nickel Zinc Boron Cobalt Manganese Molybdenum Selenium Silver Uranium Vanadium Ammonia Nitrate Petroleum hydrocarbons (C6-C9) Petroleum hydrocarbons (C10-C36) Fluoride (total) OUTCOMES Potential for environmental harm.						
Coppabella Coal Mine	Raw water dam	Elevated levels of EC	M	Minor	Low			The mine has implemented procedures to pump water back into an unused pit to maintain capacity in the dam for the upcoming wet season
Coppabella Coal Mine	ABI dam	Slightly elevated levels of EC	M	Minor	Low			The mine has constructed diversions to reduce the size of the catchment reporting to the dam. A piping network has been constructed on site to pump water from ABI dam to Creek Pit as an emergency procedure.
Coppabella Coal Mine	Orica dam	Slightly elevated levels of EC	L	Minor	Low			The mine has dredged the dam to increase the capacity of the dam in preparation to the wet season
Coppabella Coal Mine	Creek Pit	Elevated levels of EC and metals	L	Medium	Low			Creek pit currently has an available storage capacity of 20,000 ML. Creek pit has a small catchment area and therefore the water level is unlikely to increase significantly during a heavy rainfall event. Creek pit does not have a release point.
Moorvale Mine	Sediment dam 1	Slightly elevated levels of EC and turbidity	L- M	Minor	Low			The mine is planning to increase the height of the dam wall to increase capacity of the dam in preparation to the wet season.
Moorvale Mine	Raw water dam	Elevated levels of EC	L - M	Minor	Low			The mine has implemented procedures to pump

								water back into the current pit to maintain capacity in the dam for the upcoming wet season
Hail Creek	Polishing Pond	Water impounded in the Hail Creek mine water storage system. Including water used in processing, dewatering from pits and rainfall entering catchment	L- M	Medium	Low - Medium	[redacted]		Undertaking inspection on 16 Nov
Burton	Plumtree Northern Dam, Wallanbah Eastern Dam, Wallanbah Eastern, Dirty Water Dam, Wallanbah ROM Dam, Broadmeadow North, Western Dam, Western Lease Dam, Dam B2N, Dam B4N,	Mine affected water						Undertaking inspection on 18 Nov
Newlands	West Drain Sediment Basin, Wollombi Farm Evaporation Dam, Banrock C, Dirty Water Dam, Banrock Evaporation Dam, Lenny's Lagoon, Mclaren Evaporation Dam, Ramp 17, East Drain Sediment Dam	Mine affected water	Unknown - Need to check file/ PoO					
Sonoma	Decant water dam 1 (for Co-disposal Stage 1 – dam 1)	Mine impacted water	L	L	Low			No discharge point – very low risk for discharge
Sonoma	Decant water dam 2 (for Co-disposal Stage 2 - dams 2 to 6)	Mine impacted water	L	M	Low			No discharge point – very low risk for discharge
Sonoma	Sediment Dam 3, Sediment Dam 4	Runoff from overburden stockpile	L		L			
Sonoma	Sediment Dam 5,	Runoff from ROM, wash plant and product stockpile						
Collinsville Coal	Kerale Dam • Colinta Dam • Strathmore Seepage • Farm Dam • CHPP Primary Antipollution Pond • CHPP Secondary Antipollution Pond • Workshop Antipollution Pond • Workshop	Mine impacted water – acid mine drainage	L – M Not sure of discharges in previous years – would need to check file	Medium – High – The area has	Medium			Collinsville has a very old EA – Does not have model water conditions Acid mine drainage issues

	Evaporation Pond • Workshop Evaporation Pond #3 • Garrick East Pit • Tailings / reject disposal area • Hookies Highway Dam • Ramp 11 Pit		L	L	L	[redacted]		Not operational
Olive Downs, New Lenton								

Queensland Government

Create Customer Transaction

* denotes mandatory field

Request	◉ Invoice	○ Adjustment Note	○ Recurring Invoice	Document Number	

Basic Data

Company Code *	1002				
Customer Account No *	[redacted]	**Customer Details** *(For determination/validation of existing customer number)*			
		Account Name	ATTENTION: [redacted]		
		House Number	Senior Tenancy Manager, Government Employee Housing		
		Street	GPO Box 2457		
		City/Suburb	BRISBANE QLD 4001		
Invoice Date *	11.10.2011	Reference Document No		Posting Date	
Amount *	50,336.00	Line Item Text *	Fees - GEHB Agency Work 01.07.11 to 31.12.11		

Payment

Base Line Date		Payment Terms		Payment Block	

Details

Header Text	Tenancy Management Work	Dunning Block	

* denotes mandatory field

Line Items

Line No	GL Account *	DR/ CR *	Amount *	Tax Code *	Cost Centre	Internal Order	Profit Centre	WBS Element
02	415006	CR	1,084.16	SG	2000252			
	Line Item Text *	GEHB Fees 01.07.11 to 31.12.11 - Atherton						
	Long Text	Fees - GEHB agency work 01.07.11 to 31.12.11 per GEHB Tenancy Management Agreement						
Line No	GL Account *	DR/ CR *	Amount *	Tax Code *	Cost Centre	Internal Order	Profit Centre	WBS Element
03	415006	CR	1,084.16	SG	2000310			
	Line Item Text *	GEHB Fees 01.07.11 to 31.12.11 - Ayr						
	Long Text	Fees - GEHB agency work 01.07.11 to 31.12.11 per GEHB Tenancy Management Agreement						
Line No	GL Account *	DR/ CR *	Amount *	Tax Code *	Cost Centre	Internal Order	Profit Centre	WBS Element
04	415006	CR	464.64	SG	2000257			
	Line Item Text *	GEHB Fees 01.07.11 to 31.12.11 - Bamaga						
	Long Text	Fees - GEHB agency work 01.07.11 to 31.12.11 per GEHB Tenancy Management Agreement						

* denotes mandatory field

Line Items

Line No	GL Account *	DR/ CR *	Amount *	Tax Code *	Cost Centre	Internal Order	Profit Centre	WBS Element
05	415006	CR	154.88	SG	2000291			
	Line Item Text *	GEHB Fees 01.07.11 to 31.12.11 - Blackwater						
	Long Text	Fees - GEHB agency work 01.07.11 to 31.12.11 per GEHB Tenancy Management Agreement						
Line No	GL Account *	DR/ CR *	Amount *	Tax Code *	Cost Centre	Internal Order	Profit Centre	WBS Element
06	415006	CR	2,323.20	SG	2000272			
	Line Item Text *	GEHB Fees 01.07.11 to 31.12.11 - Bowen						
	Long Text	Fees - GEHB agency work 01.07.11 to 31.12.11 per GEHB Tenancy Management Agreement						
Line No	GL Account *	DR/ CR *	Amount *	Tax Code *	Cost Centre	Internal Order	Profit Centre	WBS Element
07	415006	CR	4,491.52	SG	2000298			
	Line Item Text *	GEHB Fees 01.07.11 to 31.12.11 - Charleville						
	Long Text	Fees - GEHB agency work 01.07.11 to 31.12.11 per GEHB Tenancy Management Agreement						

* denotes mandatory field

Line Items

Line No	GL Account *	DR/ CR *	Amount *	Tax Code *	Cost Centre	Internal Order	Profit Centre	WBS Element
08	415006	CR	1,548.80	SG	2000311			
	Line Item Text *	GEHB Fees 01.07.11 to 31.12.11- Charters Towers						
	Long Text	Fees - GEHB agency work 01.07.11 to 31.12.11 per GEHB Tenancy Management Agreement						
Line No	GL Account *	DR/ CR *	Amount *	Tax Code *	Cost Centre	Internal Order	Profit Centre	WBS Element
09	415006	CR	774.40	SG	2000299			
	Line Item Text *	GEHB Fees 01.07.11 to 31.12.11 - Chinchilla						
	Long Text	Fees - GEHB agency work 01.07.11 to 31.12.11 per GEHB Tenancy Management Agreement						
Line No	GL Account *	DR/ CR *	Amount *	Tax Code *	Cost Centre	Internal Order	Profit Centre	WBS Element
10	415006	CR	2,787.84	SG	2000287			
	Line Item Text *	GEHB Fees 01.07.11 to 31.12.11 - Cloncurry						
	Long Text	Fees - GEHB agency work 01.07.11 to 31.12.11 per GEHB Tenancy Management Agreement						

* denotes mandatory field

Line Items

Line No	GL Account *	DR/ CR *	Amount *	Tax Code *	Cost Centre	Internal Order	Profit Centre	WBS Element
11	415006	CR	1,703.68	SG	2000301			
	Line Item Text *	GEHB Fees 01.07.11 to 31.12.11 - Dalby						
	Long Text	Fees - GEHB agency work 01.07.11 to 31.12.11 per GEHB Tenancy Management Agreement						
Line No	GL Account *	DR/ CR *	Amount *	Tax Code *	Cost Centre	Internal Order	Profit Centre	WBS Element
12	415006	CR	0.00	SG	2000293			
	Line Item Text *	GEHB Fees 01.07.11 to 31.12.11 - Gladstone						
	Long Text	Fees - GEHB agency work 01.07.11 to 31.12.11 per GEHB Tenancy Management Agreement						
Line No	GL Account *	DR/ CR *	Amount *	Tax Code *	Cost Centre	Internal Order	Profit Centre	WBS Element
13	415006	CR	2,168.32	SG	2000302			
	Line Item Text *	GEHB Fees 01.07.11 to 31.12.11 - Goondiwindi						
	Long Text	Fees - GEHB agency work 01.07.11 to 31.12.11 per GEHB Tenancy Management Agreement						

* denotes mandatory field

Line Items

Line No	GL Account *	DR/ CR *	Amount *	Tax Code *	Cost Centre	Internal Order	Profit Centre	WBS Element
14	415006	CR	154.88	SG	2000310			
	Line Item Text *	GEHB Fees 01.07.11 to 31.12.11 - Home Hill						
	Long Text	Fees - GEHB agency work 01.07.11 to 31.12.11 per GEHB Tenancy Management Agreement						
Line No	GL Account *	DR/ CR *	Amount *	Tax Code *	Cost Centre	Internal Order	Profit Centre	WBS Element
15	415006	CR	309.76	SG	2000257			
	Line Item Text *	GEHB Fees 01.07.11 to 31.12.11- Horn Island						
	Long Text	Fees - GEHB agency work 01.07.11 to 31.12.11 per GEHB Tenancy Management Agreement						
Line No	GL Account *	DR/ CR *	Amount *	Tax Code *	Cost Centre	Internal Order	Profit Centre	WBS Element
16	415006	CR	1,858.56	SG	2000312			
	Line Item Text *	GEHB Fees 01.07.11 to 31.12.11 - Ingham						
	Long Text	Fees - GEHB agency work 01.07.11 to 31.12.11 per GEHB Tenancy Management Agreement						

* denotes mandatory field

Line Items

Line No	GL Account *	DR/ CR *	Amount *	Tax Code *	Cost Centre	Internal Order	Profit Centre	WBS Element
17	415006	CR	2,168.32	SG	2000254			
	Line Item Text *	GEHB Fees 01.07.11 to 31.12.11 - Innisfail						
	Long Text	Fees - GEHB agency work 01.07.11 to 31.12.11 per GEHB Tenancy Management Agreement						
Line No	GL Account *	DR/ CR *	Amount *	Tax Code *	Cost Centre	Internal Order	Profit Centre	WBS Element
18	415006	CR	1,393.92	SG	2000265			
	Line Item Text *	GEHB Fees 01.07.11 to 31.12.11 - Kingaroy						
	Long Text	Fees - GEHB agency work 01.07.11 to 31.12.11 per GEHB Tenancy Management Agreement						
Line No	GL Account *	DR/ CR *	Amount *	Tax Code *	Cost Centre	Internal Order	Profit Centre	WBS Element
19	415006	CR	9,292.80	SG	2000288			
	Line Item Text *	GEHB Fees 01.07.11 to 31.12.11 - Longreach						
	Long Text	Fees - GEHB agency work 01.07.11 to 31.12.11 per GEHB Tenancy Management Agreement						

* denotes mandatory field

Line Items

Line No	GL Account *	DR/ CR *	Amount *	Tax Code *	Cost Centre	Internal Order	Profit Centre	WBS Element
20	415006	CR	2,013.44	SG	2000255			
	Line Item Text *	GEHB Fees 01.07.11 to 31.12.11 - Mareeba						
	Long Text	Fees - GEHB agency work 01.07.11 to 31.12.11 per GEHB Tenancy Management Agreement						
Line No	GL Account *	DR/ CR *	Amount *	Tax Code *	Cost Centre	Internal Order	Profit Centre	WBS Element
21	415006	CR	0.00	SG	2000305			
	Line Item Text *	GEHB Fees 01.07.11 to 31.12.11 - Millmerran						
	Long Text	Fees - GEHB agency work 01.07.11 to 31.12.11 per GEHB Tenancy Management Agreement						
Line No	GL Account *	DR/ CR *	Amount *	Tax Code *	Cost Centre	Internal Order	Profit Centre	WBS Element
22	415006	CR	464.64	SG	2000274			
	Line Item Text *	GEHB Fees 01.07.11 to 31.12.11 - Proserpine						
	Long Text	Fees - GEHB agency work 01.07.11 to 31.12.11 per GEHB Tenancy Management Agreement						

* denotes mandatory field

Line Items

Line No	GL Account *	DR/ CR *	Amount *	Tax Code *	Cost Centre	Internal Order	Profit Centre	WBS Element
23	415006	CR	7,589.12	SG	2000306			
	Line Item Text *	GEHB Fees 01.07.11 to 31.12.11 - Roma						
	Long Text	Fees - GEHB agency work 01.07.11 to 31.12.11 per GEHB Tenancy Management Agreement						
Line No	GL Account *	DR/ CR *	Amount *	Tax Code *	Cost Centre	Internal Order	Profit Centre	WBS Element
24	415006	CR	5,420.80	SG	2000257			
	Line Item Text *	GEHB Fees 01.07.11 to 31.12.11 - Thursday Is						
	Long Text	Fees - GEHB agency work 01.07.11 to 31.12.11 per GEHB Tenancy Management Agreement						
Line No	GL Account *	DR/ CR *	Amount *	Tax Code *	Cost Centre	Internal Order	Profit Centre	WBS Element
25	415006	CR	1,084.16	SG	2000269			
	Line Item Text *	GEHB Fees 01.07.11 to 31.12.11 - Warwick						
	Long Text	Fees - GEHB agency work 01.07.11 to 31.12.11 per GEHB Tenancy Management Agreement						
		Total:	-50,336.00					

Queensland Government

Create Customer Transaction

* denotes mandatory field

Requestor Information		
Name	[redacted]	
Signature *For printed forms only*		☒ Notify *When processed*
Email		
Agency	JAG	Date 11.10.2011

Approver Information		
Name	[redacted]	☒ Approved ☐ Rejected
Signature *For printed forms only*		☐ Notify *When processed*
Position Title	[redacted]anager, Finance and Assets Unit, RSS	
Agency	JAG	Date 11/10/11.

Processor Information		
Name		☐ Actioned ☐ Rejected
Signature *For printed forms only*		
Agency		Date
Requestor Notified by		Date Time

* denotes mandatory field

Comments *(if the printed version does not display all the comments attach a separate sheet)*

GEHB Housing Inspections

Period: 1 July 2011 to 31 December 2011
Based on Data September 2011

Cost Per Rental GST Exclusive	GST Exclusive Total	Cost per Rental GST Inclusive	GST Inclusive Total
$140.80	$45,760.00	$154.88	$50,336.00

	Data						
Town	Sum of Unit	Sum of House	Total Units and Houses	Total (GST Excl) $	GST	Total (GST Inc) $	Cost Centre
Atherton		7	7	$985.60	$98.56	$1,084.16	2000252
Ayr		7	7	$985.60	$98.56	$1,084.16	2000310
Bamaga	2	1	3	$422.40	$42.24	$464.64	2000257
Blackwater		1	1	$140.80	$14.08	$154.88	2000291
Bowen	2	13	15	$2,112.00	$211.20	$2,323.20	2000272
Charleville	6	23	29	$4,083.20	$408.32	$4,491.52	2000298
Charters Towers		10	10	$1,408.00	$140.80	$1,548.80	2000311
Chinchilla		5	5	$704.00	$70.40	$774.40	2000299
Cloncurry	4	14	18	$2,534.40	$253.44	$2,787.84	2000287
Dalby		11	11	$1,548.80	$154.88	$1,703.68	2000301
Goondiwindi	4	10	14	$1,971.20	$197.12	$2,168.32	2000302
Home Hill		1	1	$140.80	$14.08	$154.88	2000310
Horn Island	2		2	$281.60	$28.16	$309.76	2000257
Ingham		12	12	$1,689.60	$168.96	$1,858.56	2000312
Innisfail		14	14	$1,971.20	$197.12	$2,168.32	2000254
Kingaroy		9	9	$1,267.20	$126.72	$1,393.92	2000265
Longreach	14	46	60	$8,448.00	$844.80	$9,292.80	2000288
Mareeba		13	13	$1,830.40	$183.04	$2,013.44	2000255
Proserpine		3	3	$422.40	$42.24	$464.64	2000274
Roma	4	45	49	$6,899.20	$689.92	$7,589.12	2000306
Thursday Island	22	13	35	$4,928.00	$492.80	$5,420.80	2000257
Warwick		7	7	$985.60	$98.56	$1,084.16	2000269
Grand Total	**60**	**265**	**325**	**$45,760.00**	**$4,576.00**	**$50,336.00**	

Department of Environment and Resource Management

Form

Compliance

Compliance program - audit report

This report is to be completed for every compliance inspection/audit undertaken (including site inspection and desktop review). The information in this report is to be used to update the relevant record/s in Ecotrack, and to obtain approval for compliance/enforcement action.

INSPECTING OFFICER SIGN OFF

Officer Name: [redacted]	*Signature:*	*Date:* 6 October 2010

Administration

Ecotrack Case No.	CA21594	CARMS File No.	EMD137
ACP project name (where relevant)	Moranbah North Coal Mine		
Supervisor	Recommendations Approved: Yes Comment:		

GENERAL INFORMATION

Person and location details

Person/ organisation/ development name (where relevant)	Moranbah North Coal Mine
Location (incl. street address, lot/plan, tenure, estate, LGA where relevant)	Moranbah Central West
Inspection focus/ agency interest	Water management

Description of activity and permit

Type of activity (eg. ERA, park visitor activity)	Non-code compliant level1 Mining Project
Permitting body	DERM
Permit No.	EA MIN100557107
Permit effective date	11 December 2009
Permit Act/type (e.g. EP Act / registration certificate)	EP Act

Department of Environment and Resource Management
www.derm.qld.gov.au ABN 46 640 294 485

Queensland Government

Client (Permit holder, if DERM is permitting body)

Permit holder name (if any)	Moranbah North Coal Pty Ltd (principal holder)
Position title	
Phone/Fax No.	Phone: [redacted]
Registered business address	Anglo Coal (Moranbah North Management) Pty Ltd PO Box 172 Moranbah Qld 4744
Responsibility	

Client (On-site Representative)

Name	[redacted]
Position title	Health, Safety and Environment Superintendent
Phone/Fax No.	Phone: [redacted]
Other contact details	Anglo Coal (Moranbah North Management) Pty Ltd PO Box 172 Moranbah Qld 4744
Responsibility	Health, Safety and Environment

PRE-INSPECTION INFORMATION (N.B. refer to audit plan where relevant)

Environmental risk	1/Very Low
Last inspection date	March 2010
General description of location and surrounding environment	Low open woodland
History of the activity	Coal mining
Description of activity (e.g. major industrial processes)	Underground coal mining
Outstanding issues and/or non-compliances (e.g. EPO's)	None
Current enforcement measures	TEPs

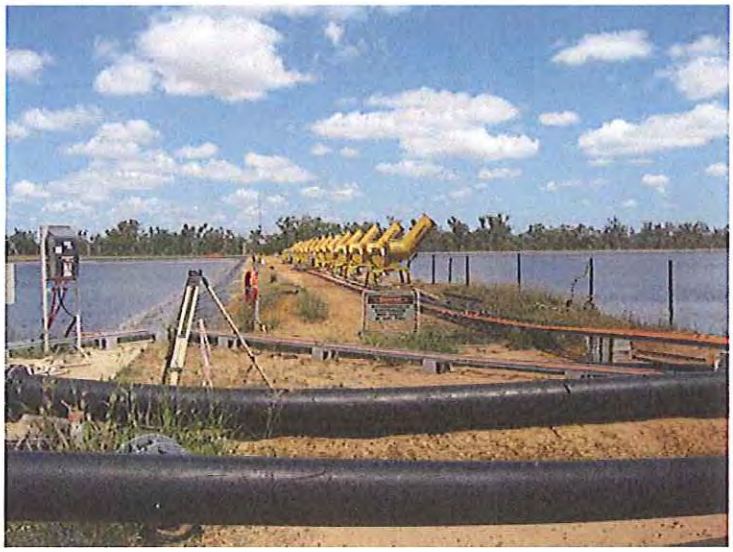
INSPECTION RESULTS SUMMARY (NB: refer to audit/inspection checklist where relevant)

Inspection Overview

Date of inspection	
Inspection days	
Inspection trigger	Proactive
Inspection type	B
Inspection level (refer to appendix for definitions)	B/Condition Inspection
Inspection focus	Water Issues

Inspection Attendees

DERM officer/s (who undertook site inspection or desktop review)	[redacted]
Client representative/s	[redacted]



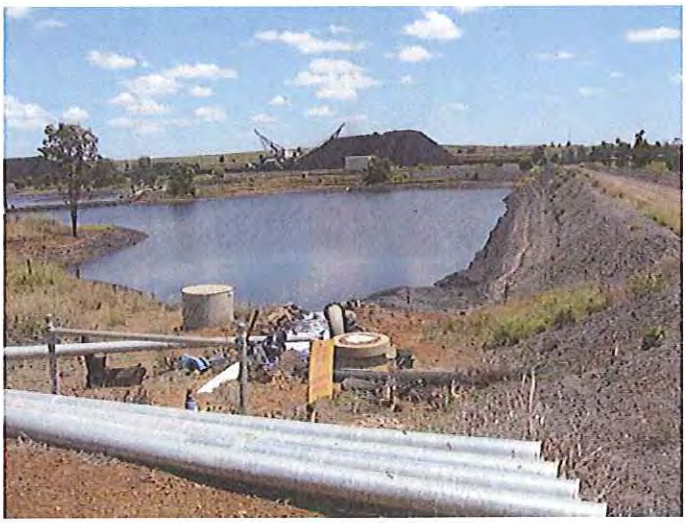
Moranbah North Coal Mine Misters on the Dam wall between two of their dams (1 & 2). Units were not working at time of visit due to unfavourable weather conditions.

Moranbah North Coal Mine Dam 2 Liner in good condition.

Moranbah North Coal mine's Reverse Osmosis Plant beside Dam 2 (unit was working at time of visit).

Moranbah North Dam 4 showing marked DSA and MRL level markings.

Moranbah North Coal mine panel subsidence at Isaac River Crossing.



Moranbah North Coal mine Production Dam. Level is quite low. Water is being pumped into it from other dams.

Moranbah North Coal Mine Environmental Dam. Level is low.

Moranbah North Coal Mine Automatic Monitoring Station on the Isaac River.

Moranbah North Coal Mine Raw water Dam.

Overall Findings

General observation/s	Moranbah North Coal Mine has a number of water management issues they are working on at the moment. They have two TEP on water management issues and working towards compliance with their EA. Dam 5 is in the preliminary (concept) stage. There was evidence on-site of survey work and soil testing related to dam 5. The Reverse Osmosis plant was working on the day of the inspection. The misters were not working on the day of the inspection, due to unfavourable weather conditions. Monitoring point (spillway) on Dam 4 is very far away from vehicle access. Not a good location, especially during wet weather. All mine-affected water storages appeared to be in good condition and below DSAs and MRLs, except for the production dam, which had no DSA or MRL marked and looked like it contained a large sediment load. Questions were asked about the production dam and the client responded that this dam's water level was highly variable due to: (a) the regular draw down of the water for washing coal, (b) the pumping of water back into it to increase the water level, and (c) its small volume. The raw water dam was very full (at the level of the spillway). The client is about to employ a contractor to remove sediment from all dams. This will affect all DSAs and MRLs, and they will need to be recalculated. Client appears to have a good handle on water levels in storages, at the office. Remote sensing equipment that monitored dam water levels would be an advantage to the client, especially at the production dam with its volatile level nature. Panel subsidence was not having an obvious impact on the environment. No significant areas of significant erosion or salt related soil problems. Rehabilitation appears to be in a trial stage at the moment.
Compliance level	Compliant
Environmental risk	2/Low
Compliance behaviour	Compliant

Client Action/s Required

Condition No. /Legislation reference	Continue to develop both TEPs
Agency interest	This will provide better water management on-site, resulting (hopefully) in less unauthorised discharges in the future.
Observations	NA
Compliant	Yes
Requirement	NA

Due date	Refer to TEPs
Client agreement	Yes

DERM Actions Taken/Recommended (N.B. refer to PCAR/guidelines where relevant)

Enforcement measure/s taken during inspection	**Date issued:** NA	**Type:** NA	**Next due date:** NA
Further enforcement measures recommended (NB: refer to relevant client action items listed above)	NA		
Other recommendations (e.g. permit amendments)	NA		
Next inspection date	1 Year		

Appendix 1

INSTRUCTIONS FOR COMPLETING COMPLIANCE INSPECTION REPORT

Inspection Days
This estimate (to the nearest 0.1 day) includes the cumulative effort of all participating inspectors; any effort for laboratory analyses, testing, and remote sensing; and the billed payroll time for travel and pre and post inspection preparation.

Inspection Trigger
- Reactive – e.g. complaint, incident
- Routine – e.g. ERA, Mining, Coastal, Contaminated Land
- ACP Project – e.g. Activity
- Data – e.g. Annual Return, Waste Tracking, NPI
- Permit Dealing – e.g. surrender

Inspection Type
- Preliminary
- Compliance Assessment (e.g. compliance with conditions of approval)
- Potential Enforcement Measurement
- Compliance Progress Check (e.g. follow up inspection or compliance with issued enforcement measure)

Inspection Focus/Agency Interest

Biodiversity	rare and threatened species and ecosystems, vegetation clearing, marine systems, sustainable use of wildlife, riparian buffer zones, wild river area
National & International	world heritage, Ramsar listed wetlands, migratory species, national estate, commonwealth marine areas, radioactive materials
Resource Allocation	mining, dredging, occupancy of marine lands (marinas etc), activities on protected areas and marine parks, allocation of public resources (eg. physical and natural resources environmental capacity), national competition policy
Tenure Issues	protected areas, native title interests, offshore jurisdiction, commonwealth jurisdiction, inter-state jurisdiction
Water Issues	quality, discharges, stream flows (effects on ecology), waterway management, hydrology, impact on freshwater and marine systems, groundwater
Air Issues	air shed management, pollution, health, nuisance, ecological impacts
Noise Issues	community noise, transportation noise, industrial noise, ground vibration, air blast overpressure
Waste Issues	solid waste, liquid waste, gaseous waste, dredge spoil disposal, energy, best practice environmental management
Land Issues	contaminated land, acid sulphate soils, erosion/stability, landscapes, effects on hydrology, sustainable use, clearing, land use history, compliance with planning schemes, rehabilitation and subsequent use
Heritage Issues	Aboriginal and Torres Strait Islander cultural sites, historic buildings and locations, designated landscape areas
Coastal Issues	erosion, structures, reclamation, state/regional/strategic planning
Impacts on Surrounds Issues	transportation, visual impacts, compatibility with surrounding uses and activities, neighbours opinions
Social Issues	amenity, displacement of use, community views, public safety, politics/policy

Compliance Level
- Fully compliant and evidence of best practice
- Compliant
- Evidence of environmental nuisance or minor non-compliance
- Evidence of actual or significant risk of material environmental harm or repeated minor non-compliance
- Evidence of actual or significant risk of serious environmental harm

Compliance Behaviour

Intentional non-compliance *Knowingly breaking the law*	Economic motivations Low risk of detection Frustration – complexity/delays Anger and resistance Lack of acceptance of science
Opportunistic non-compliance *People will break the law if they think they can*	Small number of investigations Others getting away with non-compliance Penalties not advertised Belief that investigations do not occur Belief that law breaking is not penalised
Accidental non-compliance *People who would normally comply, but who make mistakes or don't understand their obligations*	Lack of understanding of obligations/procedures Lack of access to information/advice Lack of access to tools/technology

Inspection Level

DESCRIPTOR	TYPES OF COMPLIANCE ASSESSMENT INSPECTIONS		
	Level A	Level B	Level C
Label	**Basic Inspection**	**Condition Review**	**Compliance Audit**
Brief Outline	*A basic inspection requiring minimal planning. Focussing on a specific issue typically as a result of a public report or service request, industry self-reporting, follow-up of a previous inspection, or to assess more generally the risk posed by a site and need/extent for further compliance inspections.*	*The most common level of inspection undertaken; this is an assessment of compliance with regulations, licences and standards. Formulation of an opinion about compliance is based primarily on professional judgement, or an expression of negative assurance. The effectiveness of our regulatory systems may also be assessed during the inspection.*	*An audit of high risk licensed premises requiring detailed planning. It is a systematic examination involving analysis, tests and confirmation of procedures and practices, to verify compliance with legal requirements and the presence/absence of impacts; and may consider additional factors such as management practices and the ability to meet future standards.*
Site Type	• non-licensed, pre-licensed or licensed • low, medium or high risk • degree of compliance often unknown	• non-licensed or licensed • medium or high risk • unknown or fair degree of compliance usually exhibited	• licensed • medium or high risk • poor degree of compliance has been exhibited in past
Trigger/Scope	• initial response to a public report or service request, or industry self-reporting. (eg. determining source of impacts beyond boundary or if ERA being conducted, emergency incident response excluding cleanup, validating aspects of annual returns or permit applications) • to physically verify that corrective actions have been carried out (eg. in response to a simple enforcement tool)	• usually associated with proactive monitoring programs and related follow-up (eg. industrial estate, water catchment, or industry sector inspection programs) ▪ review focuses only on the specific processes or discharges that relate to the monitoring program • to physically verify that corrective actions have been carried out (eg. in response to a complex enforcement tool)	• usually associated with proactive maintenance inspections of high risk sites or after a catastrophic event • audit focuses on either: ▪ all activities, processes and discharges when generally chronic issues exist ('comprehensive audit'); or ▪ specific processes or discharges when generally acute problems exist ('focussed audit')
Objective	• to assess risk and determine need/extent for further compliance inspections	1. compliance with regulations, licences and standards ▪ review history of legislative compliance including prior enforcement action and public complaints ▪ review statutory licences – held, correct and current – are conditions valid, achievable, relevant and being complied with, including required monitoring programs ▪ review other regulatory requirements – eg. waste tracking, NPI reporting, contaminated land SMPs, GED 2. could also assess regulatory system effectiveness across an industry – including consistency, validity, relevance, achievability, enforceability, degree of protection.	In addition to the Level B objectives, a Level C inspection may: 3. review ability to meet future standards 4. review management and operating practices ▪ staff training and responsibilities and public relation policies ▪ minimisation of risks (eg. emergency response procedures, handling/storage and transfer of hazardous materials, encroaching residential areas or conflicting industries, maintenance procedures) ▪ sustainable practices (eg. source of raw materials, minimise/ reuse/recycle materials, disposal of wastes) 5. review adequacy of financial assurance
Methodology	• low-level planning and record keeping required • cursory/visual examination, possibly just a drive-by • pre-inspection – desktop analysis • inspection – undertaken within a few hours, easily undertaken by 1 or 2 officers, simple enforcement	• medium-level planning and record keeping required • professional judgement used to assess compliance (review consists primarily of observations, inquiry, and analytical procedures and discussion related to information supplied by the operator with the limited objective of assessing if the information is plausible) • pre-inspection – desktop analysis, inspection checklists • inspection – can take up to a day, usually undertaken by multiple officers, simple enforcement action could be taken	• high-level planning and record keeping required • objective evidence used to verify compliance (in relation to monitoring for example – verification and assurance that the monitoring is being carried out, that the results are within acceptable limits (or recognise where they exceed), and that monitoring will continue within the parameters set by the permits) • pre-inspection - desktop analysis, audit plan (particularly for comprehensive audits), inspection checklists • inspection – opening/closing meetings and interviews, collection

	action could be taken onsite • post-inspection – Ecotrack updated with degree of compliance found, client thankyou/non-conformance letter sent	onsite in addition to further followup action • post-inspection – Ecotrack updated with degree of compliance found, written compliance report, client thankyou/non-conformance letter sent	of data; can take more than a day, undertaken by multiple officers; can include desktop/site assessment by other disciplines • post-inspection – Ecotrack updated with degree of compliance and risks found, further desktop analysis often required, written compliance report, client thankyou/non-conformance letter sent

Transitional Environmental Program for DSA Compliance

March, 2010

Anglo Coal (Moranbah North Management) Pty Ltd

Parsons Brinckerhoff Australia Pty Limited
ABN 80 078 004 798

Level 4, Northbank Plaza
69 Ann Street
BRISBANE QLD 4000
GPO Box 2907
BRISBANE QLD 4001
Australia
Telephone +61 7 3854 6200
Facsimile +61 7 3854 6500
Email brisbane@pb.com.au

Certified to ISO 9001, ISO 14001, AS/NZS 4801

Revision	Details	Date	Amended By
00	Original	29/01/2010	-
A	Final Issue	29/03/2010	[redacted]
B	Final Issue	30/03/2010	
C	Final Issue	31/03/10	

Author: [redacted] Senior Water Engineer

Signed:

Reviewer: [redacted] - Water Resources

Signed:

Approved by: [redacted] Team Manager Water Resources

Signed:

Date: 31 March 2010

Distribution: Anglo Coal – MNM, PB Library

Contents

List of figures

List of Tables

Appendices

Glossary

AEP	Annual Exceedance Probability
ARI	Annual Rainfall Intensity
BMA	BHP Billiton Mitsubishi Alliance
BOM	Bureau of Meteorology
DERM	Department for Environment and Resource Management
DSA	Design Storage Allowance
EA	Environmental Authority
EPA	Environmental Protection Agency
MNM	Anglo Coal (Moranbah North Management) Pty Ltd
PB	Parsons Brinckerhoff (Australia) Pty Ltd
TEP	Transitional Environmental Program

Executive summary

Anglo Coal (Moranbah North Management) Pty Ltd (MNM) has engaged Parsons Brinckerhoff (PB) to redesign the catchment that drains to the existing Production and Environmental dams to ensure compliance with the current Environmental Authority (EA) permit number MIN100557107, condition G1-G18.

The first step in this process has been to prepare this Transitional Environmental Program (TEP) for submission to the Department of Environment and Resource Management (DERM). The TEP sets out MNM's approach to updating the hazardous water management infrastructure in this catchment, to achieve compliance with the EA. This TEP deals only with the catchment that drains to the existing Production and Environmental dams, it does not deal with any other hazardous dams on the site, or any other area of the site.

The existing storages in the area of interest are non compliant in terms of their design storage allowance (DSA) and spillway capacity. The current areas draining to the storages of interest include the mine industrial area, the CHPP and the co-disposal area. Staged expansion of the co-disposal area to support mining activities has contributed to the inadequacy of the existing system.

Expansion of the storage capacity in the area where the existing dams are located is limited due to existing topography and site infrastructure constraints. Whilst some additional storage volumes can be achieved, major expansion would impact on the downstream Isaac River flood plain and existing mining infrastructure. In addition, bed rock in the downstream creek and the existing BHP Billiton Mitsubishi Alliance (BMA) pipeline make this option impractical to implement. Therefore, increasing the size of the existing Production Dam and Environmental Dam is not currently planned. The spillways for these dams will however be upgraded to comply with the EA.

It is proposed to expand the existing storage by constructing a new Dam, which will be called Dam 5, located south of the existing Co-disposal area (Refer Figure 3-1). This new dam will, together with the existing Production and Environmental Dams, provide sufficient DSA for the site as well as the site's operational water requirements (150 ML). Adequate pumping facilities will be provided to manage the worked water on site and maintain adequate freeboard in the Production and Environmental dams in accordance with the EA.

A schedule of the TEP proposed works is included in Appendix A. The schedule includes the full TEP processes, ranging from this initial submission of the proposed actions to DERM for their consideration and approval, through design and construction to commissioning and ultimate signoff by DERM that the site is in compliance with the EA. The schedule includes liaison, reviews and approvals by MNM and DERM. In addition a strengths, weaknesses, opportunities and threats (SWOT) analysis of the schedule was carried out to determine the validity of the proposed schedule (refer Section 4.2).

Key elements of the proposed infrastructure works include:

- new Dam 5 (preliminary volume estimate – 1301 ML) complete with spillway and piped inlet and outlet
- upgrade of spillways on the existing Production Dam and Environmental Dam
- new pumped systems to ensure adequate diversion and management of worked water on site.

1. Introduction

1.1 General

This Draft Transitional Environmental Program (TEP) for the Moranbah North Coal Mine is in response to a request from DERM to make the site compliant with the current Environmental Authority (EA) permit number MIN100557107, condition G1-G18. The EA was released on 1 March 2009 and was subsequently amended and approved by Department of Environment and Resource Management (DERM) on 11 December 2009.

Anglo Coal (Moranbah North Management) Pty Ltd (MNM) has engaged Parsons Brinckerhoff (PB) to redesign the dams in the catchment that drains to the existing Production and Environmental dams to ensure compliance with the current EA. PB will work closely with both MNM and DERM to ensure compliance is met in the agreed time frame.

The first step in this process is to prepare the TEP with close consultation between MNM and PB. The TEP has been developed in accordance with *Environmental Protection Act 1994*, Chapter 7 Environmental Management Part 3 Transitional Environmental Program. It provides a detailed program demonstrating how the mine site will update its water management strategies and infrastructure to ensure compliance with the current EA.

PB and MNM undertook a joint site inspection of the site on 17 November 2009, to assess the issues relating to the current water management and determine potential measures to make the site compliant with the EA.

The reference documents referred to in this TEP are listed in Section 1.5 below.

1.2 Objectives

The objective of this TEP is to gain compliance of the sites worked water dams in accordance with he EA.

In particular this requires the following:

- appropriate design storage allowance (DSA) for the worked water catchment
- appropriate spillway capacities for the Production Dam, Environmental Dam and Dam 5
- established reporting levels
- appropriate on site water management systems and protocols
- achieving compliance with the EA within the shortest reasonable timeframe.

For further details of these objectives refer to Section 1.3 and 1.4 below.

1.3 Compliance requirements

A draft TEP was previously developed by MNM and submitted to DERM in November 2009. That TEP was not accepted by DERM, and PB was subsequently engaged in the same month to develop this proposed TEP, as well as undertake the design and construction of the identified works.

This TEP identifies the water management infrastructure that will be required to ensure compliance with the current approved EA (refer Section 1.3 (e)). Section G6, Table 21: Specification of regulated dams; identifies the Production Dam and Environmental Dam as having a hazard category of 'Significant'. Condition G7, Table 22: Hydraulic performance of regulated dams; stipulates that the DSA for both of these dams is to be the 0.1 AEP 3 month wet season. This figure has not however been adopted for the reason contained in the following paragraphs.

Condition G2 of the EA stipulates that 'The holder of this EA must arrange for a hazard assessment of all dams by a suitably qualified and experienced person not less frequently than on an annual basis'. A Dam Hazard Category Assessment was consequently carried out for the site and was completed in December 2009 (Henderson 2009b). A copy of this report has been included in Appendix B. Chapter 7 and 8 of this document identify both the Production Dam and the Environmental Dam as having a 'low' hazard category. The report has identified the DSA criterion as the 0.05 AEP 3 month wet season based on the Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland (Department of Mines and Energy, 1995).

The TEP has adopted the result of the Dam Hazard Category Assessment, as this was a condition of the current EA, and provides a more stringent condition. As such, the DSA adopted in the TEP is the 0.05 AEP 3 month wet season.

The key design standards relating to the hydraulic performance of the existing dams, as identified in the current Dam Hazard Category Assessment, include:

Production Dam	
Purpose:	Main storage for CHPP operational water
Spillway flow capacity	0.001 AEP peak discharge
Mandatory Reporting Level (MRL)	0.05 AEP 72hour storm event.
Design Storage Allowance (DSA)	0.05 AEP 3 month wet season + net inputs

Figure 1-1: Production Dam wall and spillway configuration

Environmental Dam	
Purpose:	Capture overflow from Production Dam
Spillway flow capacity	0.001 AEP peak discharge
Mandatory Reporting Level (MRL)	0.05 AEP 72hour storm event.
Design Storage Allowance (DSA)	0.05 AEP 3 month wet season + net inputs

Figure 1-2: Environmental Dam wall

Any new dams within these catchments will be subject to the above conditions with regard to DSA, Mandatory Reporting Level (MRL) and spillway capacity.

1.4 KPIs confirming compliance

Compliance is deemed to be achieved if the following Key Performance Indicators are met:

a. the required DSA for the catchment is provided

b. appropriate water management infrastructure is in place to adequately convey water to Dam 5 and maintain water levels in the Production and Environmental dams

c. pumped systems are fully automated and start/operate/stop without human intervention

d. releases through the gravity pipeline from Dam 5 to the Production Dam are controlled by automated valves that open/close based on set water levels at the Production Dam

e. a fully automated standby diesel generator is installed and operational to provide power to the pumps in the event of a grid power failure

f. a comprehensive operations and maintenance manual/regime is in place to ensure continued operation of the system

g. operation of the site's worked water system is in compliance with the EA and adopted water management protocols.

1.5 References

The following documents have been consulted as part of this TEP.

a. Anglo Coal (Moranbah North Management) Pty Ltd, *Draft Transitional Environmental program under Section 333 of the Environmental protection Act 1994*, November 2009.

b. Department of Mineral and Energy, *Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland*, January 1995.

c. Draft Transitional Environmental Program under Section 333 of the Environmental Protection Act 1994, Moranbah North Pty Ltd, 12 November 2009.

d. Environmental Authority (Mining Activities) Non Code Compliant Level 1 – Mining Project – Permit Number MIN100557107 – Moranbah North Coal Mine, Environmental Protection Agency, 6 March 2009.

e. Environmental Authority (Mining Activities) Non Code Compliant Level 1 Mining Project – Permit Number MIN100557107 – Moranbah North Coal Mine, Environmental Protection Agency, 11 December 2009.

f. Henderson Geotech the MINSERVE Group Pty Ltd, 2009a. Annual Inspections of Regulated Dams, Anglo Coal (Moranbah North Management) Pty Ltd, October 2009.

g. Henderson Geotech the MINSERVE Group Pty Ltd, 2009b. Dam Hazard Category Assessment, Anglo Coal (Moranbah North Management) Pty Ltd, December 2009.

h. Water Solutions Pty Ltd, 2007. Mine Water Management Update – May 2007, Anglo Coal (Moranbah North) Pty Ltd, May 2007.

2. Background

2.1 Moranbah North Mine

The Moranbah North Coal Mine is located approximately 17 km north of Moranbah Township. The mine is an underground coal mine producing around 4.0 Mtpa (Water Solutions 2007). The location of the mine site is shown in Figure 2-1.

Figure 2-1: Moranbah North Coal Mine – see red circle tab

2.2 Mining infrastructure

The mine's spoil and tailings management is focussed around a system of co-disposal. The Co-disposal system combines the disposal of course rejects and tailings, by pumping them into an impoundment. Typically this method of rejects handling occupies about 20% less volume than separate disposal methods and provides a more stable material, better suited for re-contouring and rehabilitation. The higher density of the co-disposal also results in fewer voids, thus reducing permeability, infiltration and seepage of contaminants.

The surface runoff from the Co-disposal area and production water, currently gravity feed back to the Production Dam via sedimentation dams before being reused in the coal wash process.

Due to the staged expansion of the mine, and associated runoff areas, as well as changes to the required DSA, the capacity of the storages on site no longer provide for the operational water volumes, as well as the required DSA. Therefore, the system of dams requires upgrading to ensure that sufficient capacity is provided to adequately store the specified rainfall volumes and production water requirements, and discharge any flows exceeding these volumes out of the system to the Isaac River.

The current layout for the mine site is presented in Figure 2-2. The overall site water management is shown in schematic form in Figure 2-3.

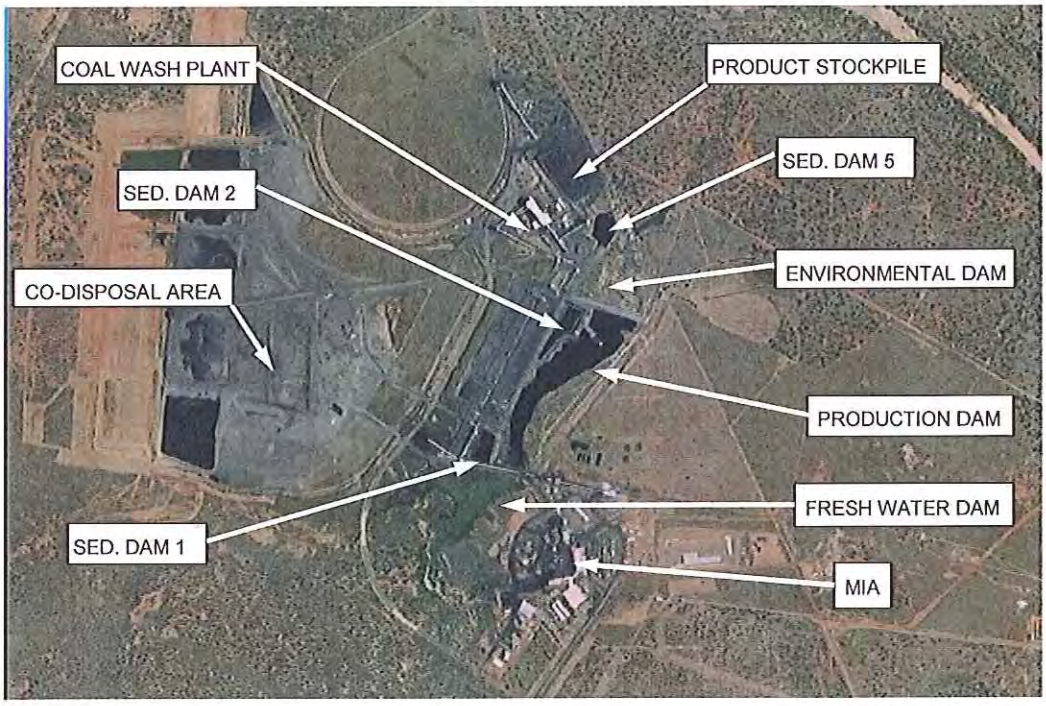


Figure 2-2: Current key water management features

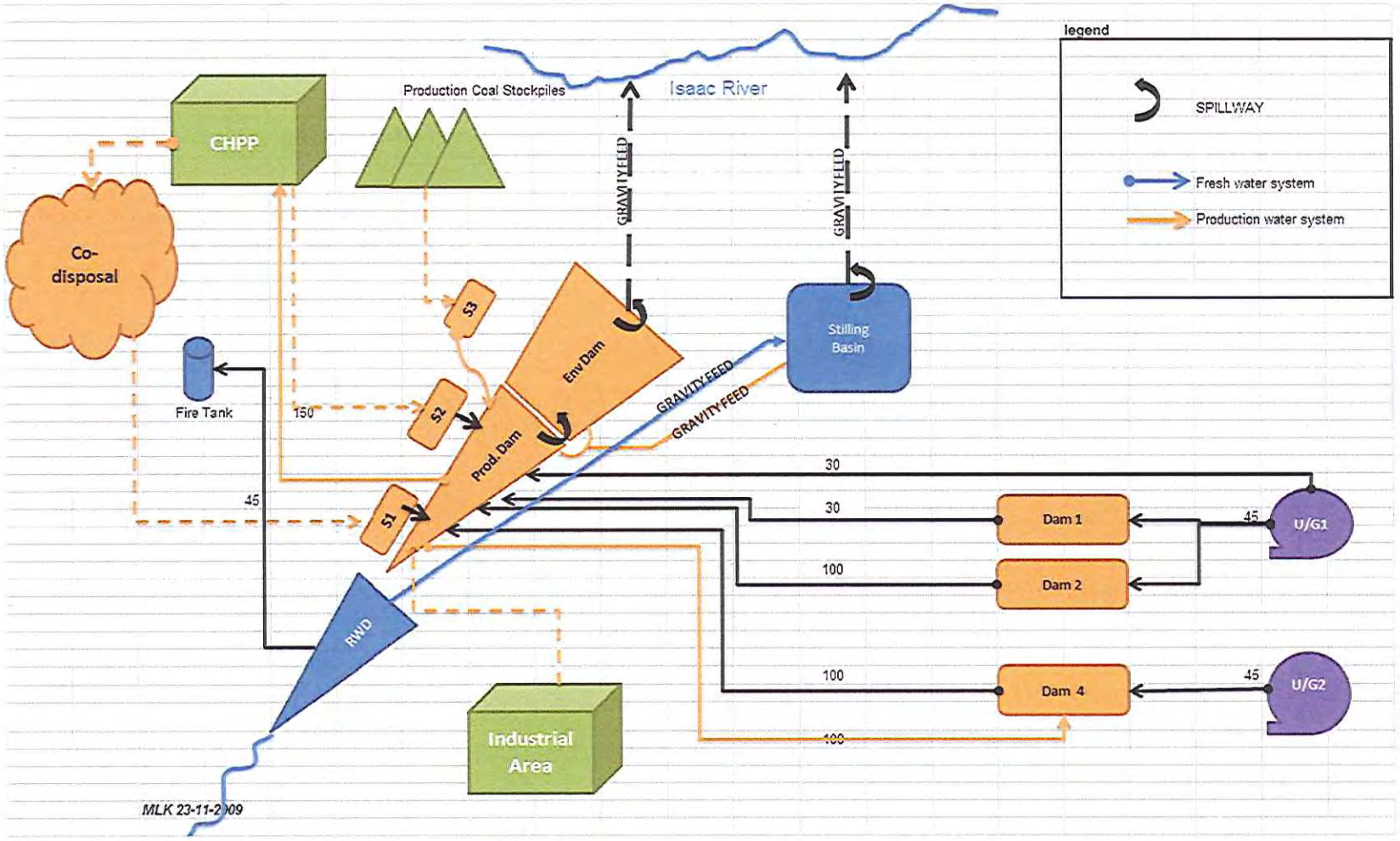


Figure 2-3: Water management schematic (Existing)

2.3 Key areas of non-compliance

Section G12 of the EA requires an annual inspection of all regulated dams on the site. The current inspection report for the sites dams 'Annual Inspections of Regulated Dams' (Henderson Geotech, 2009a) has been included in Appendix C, and reports the areas of non compliance of the existing storages. The areas of non compliance for the storages of interest to this TEP have been summarised below.

Production Dam:

- the capacity of the existing spillway is 2.5 m^3/s and the required capacity will be the 0.001 AEP peak discharge
- the capacity of the existing storage is 200 ML and the required capacity would need to allow for production water requirements plus 900 ML of freeboard for DSA.

Figure 1-1 shows the existing dam wall and spillway for the Production Dam.

Environmental Dam:

- the capacity of the existing spillway is 2.4 m^3/s and the required capacity will be the 0.001 AEP peak discharge
- the capacity of the existing storage is 66 ML and the required capacity would need to allow for 132 ML of freeboard for DSA.

Figure 1-2 shows the existing dam wall for the Environmental Dam. The existing spillway for the Environmental Dam is similar to the Production Dam spillway.

It should be noted that the above numbers represent the existing catchment conditions for the area of interest. The actions from the TEP will redesign the area of interest, which will result in different values for DSA and spillway capacities for both of these dams. A full updated analysis of the DSA and spillway capacities for each of these storages will be carried out as part of the design process and submitted to DERM for approval.

3. Proposed works

For the area of interest to become compliant with the existing EA, the site DSA volume needs to be increased and the existing spillways need to be upgraded. It would be physically impractical, and very expensive, for the existing dams to be increased in size sufficiently to provide the additional volumes required. This is primarily due to the existing topography and existing on site infrastructure. In addition the site presents extensive bed rock, which would severely hamper the expansion of the existing dams. As such, an additional dam is proposed to provide sufficient storage capacity for the site to become compliant.

The proposed Dam 5 is located in an existing gully, immediately downstream of the co-disposal area. It is ideally situated to capture most of the runoff of the existing co-disposal area, which previously reported to the Production Dam. The three storages will effectively provide sufficient storage capacity to manage the water from the area of interest. Figure 3-1 shows the layout of the proposed storage configuration and associated catchments.

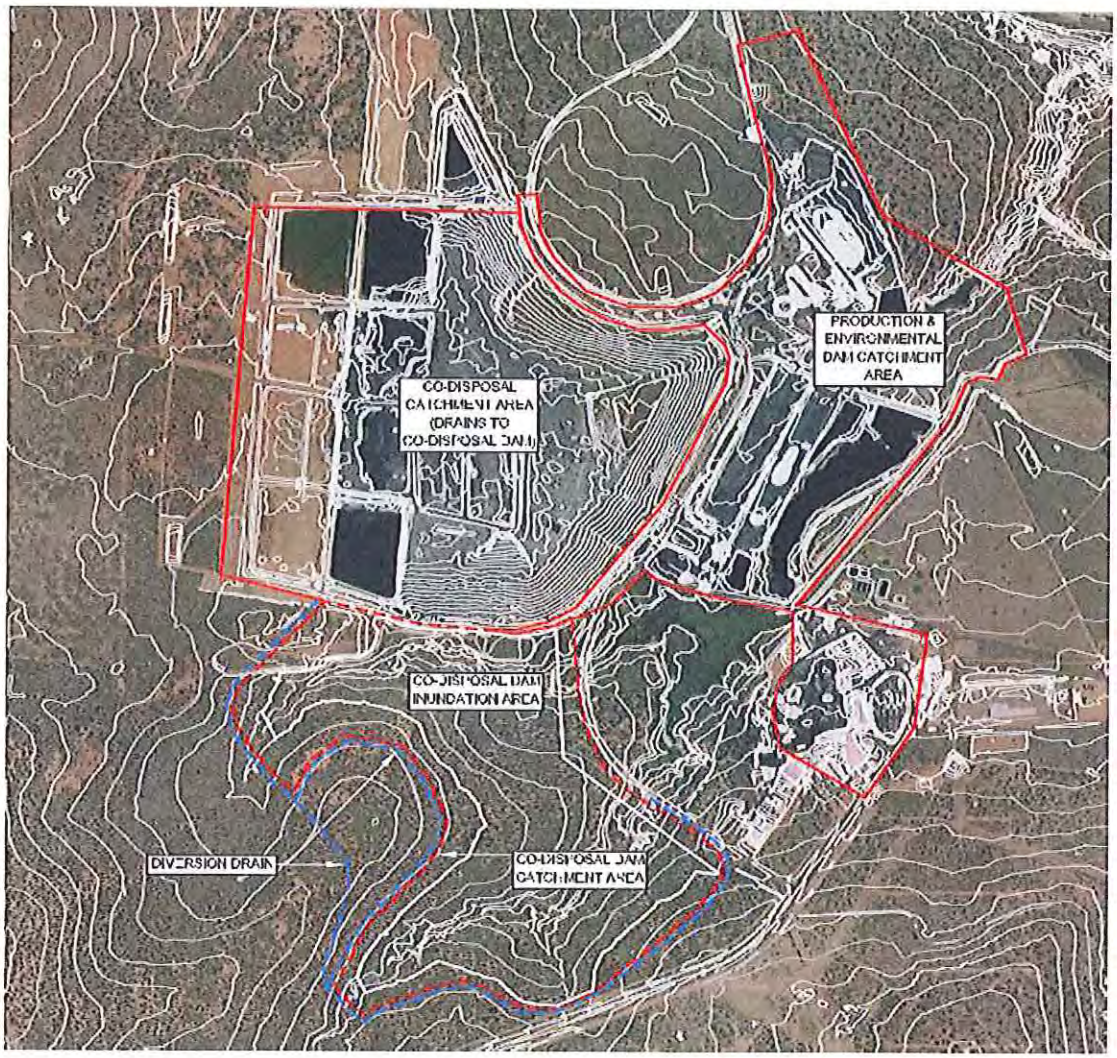


Figure 3-1: Configuration of proposed storages and associated catchments

3.1 Preliminary volume calculations

A preliminary estimate of the storage volumes required was made and the results are summarised below.

3.1.1 Rainfall

The following methodology was used for the sourcing and analysis of the rainfall:

- monthly rainfall was sourced for the SILO database provided by the Bureau of Meteorology (BOM)
- the conservative 'method of deciles' was used to determine the 0.05 AEP 3 month wet season rainfall (517 mm).

3.1.2 Volumes

The following assumptions were made in assessing the required volumes:

- no allowance has been made for catchment losses (in accordance with guidelines). This is considered conservative
- surface water runoff from the catchments draining towards Dam 5 are planned to be diverted around Dam 5 through diversion drains and discharged downstream of Dam 5 into the Raw Water dam
- where the existing topography of the natural ground levels does not provide sufficient storage capacity, additional DSA volume will be acquired by excavation of the storage, either in depth or in area
- DSA volumes will focus on compliance for the current areas draining to the hazardous dams.

Based on these assumptions, preliminary analysis indicates that about 274 ha will drain to the proposed storages. This will result in a requirement for 1,567 ML of storage within the catchment, inclusive of the 150 ML required for production. The existing storage of the system is 266 ML creating a shortfall of 1301 ML. This shortfall will be provided through the construction of the proposed Dam 5.

As part of the design of these structures, a 'full hydrological analysis' will be carried out for the site to optimise the sizing of these structures. A water balance model will be used to optimise the management of the storages over the three month wet season. As a result of the hydrological analysis the runoff volumes and required DSA may change from the figures provided in this report.

Geotechnical studies will be undertaken as part of the process outlined in this TEP. Results from these investigations will provide additional information that will feed into the design process for Dam 5, Production Dam and Environmental Dam. Key issues that require further investigation include the suitability of soils within the storage areas for dam construction, the adequacy of existing embankments, and the potential requirement for further engineering options (including lining).

3.1.3 Dam 5

Dam 5 will provide additional storage for the management of worked water runoff from the site. The majority of the runoff to this dam will come from the operation of the Co-disposal area. The majority of the coarse and fine rejects will fall out of suspension on the area of the Co-disposal. There is, however, expected to be some fine sediment remaining in the runoff from this procedure. Drains will be constructed to capture this runoff from the Co-disposal area. The runoff will then be conveyed to Dam 5. Additional sediment and erosion control measures will be integrated into these drains to minimise sediment entering Dam 5.

3.1.4 Spillways

Spillways will be provided to the required standards for each dam. Spillways will discharge into stilling basins where necessary, and safely discharged to the environment without causing erosion. Where necessary, discharge channels will be provided to discharge spillway flows without causing adverse effects to the environment or mining infrastructure.

The spillway for the Production Dam will continue to discharge to the Environmental Dam and then into the Isaac River. Dam 5 will spill into the mine site's Raw Water Dam which in turn discharges into a fresh water channel to the Stilling Basin, from where it flows to the Isaac River.

3.1.5 Diversion drains

All surface water from upstream of the catchments draining to the hazardous dams, will be diverted around to prevent contamination of this fresh water, and will be discharged to natural drainage paths and/or the site's existing raw water dam. It is assumed that all diversion drains will operate under gravity.

3.2 Operating philosophy

The system of dams to contain the worked water on site will comprise the Production Dam (200 ML storage), the Environmental Dam (66 ML storage) and Dam 5 (1301 ML storage). The total storage capacity on site is therefore 1,567 ML, which incorporates 150 ML of production water and 1,417 ML of DSA.

The following operating philosophy will be verified during the detailed design process, and assessed for its practicality and performance to meet the EA requirements.

In order to manage the onsite DSA, a combined pump station will be installed at the Production Dam with two pumps dedicated to the Production Dam and one pump dedicated to the Environmental Dam. The appropriate number of pumps and respective pump rates are subject to outcome of the hydrological study. Each these pumps will have a dedicated pipeline to convey water to Dam 5. Although there will be three pumps and pipelines installed, the design pump rate will assume that only two of these pumps are working at any one time, with the third being available as standby, for ease of operation or for emergency buffer (e.g. following failure of plant / equipment). The system will ensure that the water levels in the Production and Environmental dams will only exceed spillway crest levels when Dam 5 is full to capacity (i.e. when the total DSA for the catchment is exceeded).

On 1 November of each year, the Production Dam volume will be drawn down to contain 50 ML of production water (subject to practicality of operating at this reduced level). The remaining production water provision of 100 ML will be stored in Dam 5. The water in the Production Dam is replenished by a gravity pipeline between Dam 5 and the Production Dam. An automated self actuated valve will control the flow through this gravity pipeline to ensure that the designated water levels are not exceeded.

During the designated "wet season" the Production Dam volume will be maintained as close as is practical to 50 ML (or such as is practical) and the Environmental Dam will be kept empty to ensure adequate storage buffer in the event of a storm event.

A design philosophy has been adopted that will ensure any two pumps will have the combined pump capacity to drain the volume of flow from a 100 year 72 hour storm event over the Production and Environmental Dam catchment within 3 days of the event finishing. As an extra level of safety it has also been assumed that pumping will not commence until day two of the event. This is considered conservative given the general philosophy will be to maintain the dam at 50 ML at all times during the wet season.

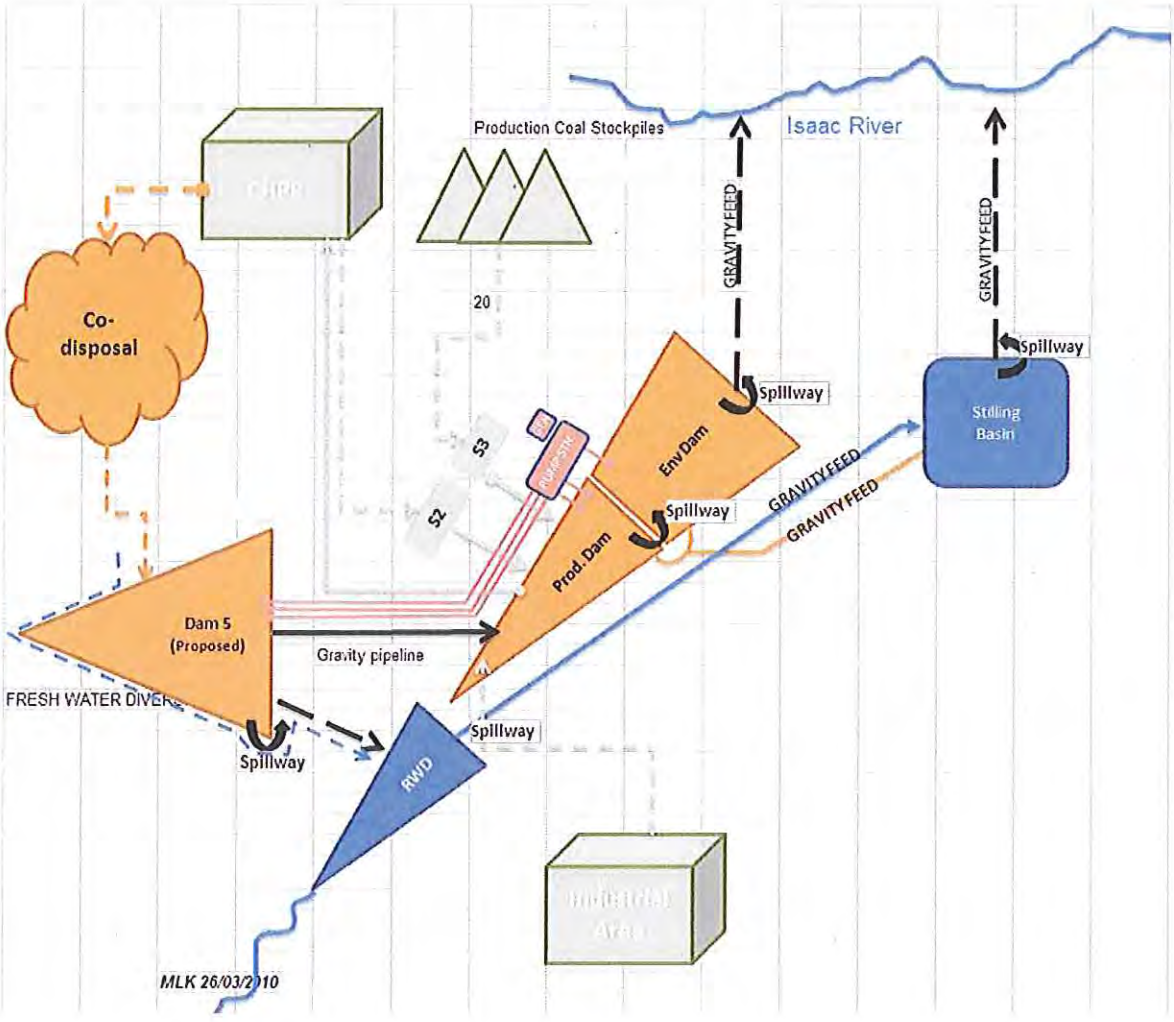


Figure 3-2: Proposed operating philosophy

In the event that the total DSA is exceeded, the Production Dam will overflow into the Environmental Dam. Dam 5, immediately followed by the Environmental Dam, will commence spilling through their respective spillways. The Environmental Dam will spill into the downstream creek leading to the Isaac River, and Dam 5 will spill into the mine site's Raw Water Dam which in turn discharges into a fresh water channel to the Stilling Basin, from where it flows to the Isaac River. The proposed configuration is illustrated in Figure 3-2.

3.3 Pump system

Based on the philosophy described above the required pump capacity of each of the three pumps will be approximately 280 L/s and each of these pumps will have a dedicated pipeline which will need to be at least 450 mm in diameter. Pump and pipeline design will be optimised during detailed design.

Each of the pumps will be electric motor driven, with normal power supply from the grid, as for the overall site. However, in recognition that power failures happen during storm events, the pumps will be fitted with a dedicated fully automated standby generator set and dedicated diesel tanks. This will exclude any human intervention for the start-up and shut-down processes. On site water management protocols will set out a monitoring and maintenance program to ensure the systems integrity throughout the wet season.

The pump stations will be automatically activated by water level sensors to ensure that the storages are maintained at the levels identified in the design philosophy.

4. Project timeline

4.1 Schedule

A schedule of the TEP works is included in Appendix A. The following summarised the key milestones as identified in this schedule:

Milestone	Duration	Completion
Submission TEP to DERM	0	01 April 2010
Design of the TEP works	8 weeks	Mid June 2010
Review and approval by DERM	4 weeks	Mid July 2010
Tender process	8 weeks	Late September 2010
Mobilisation and Construction (includes provision for unworkable weather and holidays)	40 weeks	Mid June 2011
Develop O&M manuals, compliance procedures	6 weeks	Late July 2011

This timeline has made allowance for the following risks:

- approval of the TEP
- geotechnical properties of the site
- options and opportunities for water management of the DSA volumes
- weather conditions (unworkable weather).

4.2 SWOT Analysis

As part of this TEP application, a strengths, weaknesses, opportunities and threats (SWOT) analysis of the TEP schedule has been undertaken to validate the current timelines.

This analysis detailed in Table 4-1, shows the following key points:

- Strengths: That the schedule is realistic and achievable
- Weaknesses: Some of the construction assumptions may suggest that the schedule is optimistic.
- Opportunities: There are limited opportunities with a low probability of occurrence.
- Threats: The identified design and construction risks, in general, have a moderate probability of occurrence. In general their impacts are moderate to high.

Table 4-1: TEP for DSA Compliance – SWOT analysis of Schedule

STRENGTHS	WEAKNESSES
▪ **Achievable timeframes** (Design estimated 2 months; DERM review of design 1 month; tender process 2 months. Consequently award construction contract in October). ▪ **Realistic Dam 5 construction timeframe and wet weather allowance**: Dam 5 construction scheduled to take 4 months plus a provision of 6 weeks for inclement weather. With commencing in October, will be constructed during wet season and completed between February and April 2011 depending on severity of wet weather. ▪ **Realistic lead times**: Potentially 3 months lead time for pump plant ordered by the construction contractor, allows earliest commissioning of the pump station by February 2011 (4 months). ▪ **Achievable spillway construction**: Production and Environmental dam spillways construction (approximately 1 month each) can be achieved during wet season without compromising storage volumes or risks to site (provided dam levels are maintained at a low level).	▪ **Wet season works**: Construction of Dam 5 and works on Production and Environmental dam spillways occur during wet season. ▪ **Freeboard assumptions**: Schedule assumes that sufficient freeboard is available in the Production and Environmental Dams to undertake spillway works. ▪ **DSA compliance and early completion**: Earlier than scheduled completion of Construction does not mean that site is certified compliant (Documentation and certification to be provided to DERM).
OPPORTUNITIES	**THREATS**
▪ **Accelerated tender**: Early and quicker tender process through short listing ▪ **Constructing DSA volume**: By early progressing of Dam 5 construction additional DSA volume will become available for use on site. However temporary pumps would need to be provided to transfer water from the Production dam to Dam 5. This could impact on the efficiency of construction. ▪ **Mild wet season**: Wet season is mild, hence Contractor can fast track construction ▪ **Split contracts**: Order pump plant independently of construction contract to gain additional time.	**Design Risks** ▪ Delayed commencement of design phase due to delayed appointment of designer – slippage of program. ▪ Delayed receipt of topographical survey results. ▪ Delayed receipt of geotechnical investigation / lab results. ▪ Delayed tender phase due to awaiting DERM approval of design. Current schedule assumes that the tender phase commences prior to DERM approval of the TEP design. ▪ Dam 5 is not fully passive in function – may not be approved by the Statutory Authority. **Construction Risks** ▪ Unworkable weather: greater severity and/or longer duration. ▪ Loss of works partially completed due to wet weather ▪ Poor soil conditions ▪ Contractor issues ▪ Limited availability of contractor resources in competitive market

At the design stage, a risk and opportunity management workshop will be held with stakeholders:

- to identify all project risks and opportunities (including those related to the schedule), to assess the probability of the occurrence of each risk and its related impact
- to develop a plan to manage each of the risks and opportunities identified where applicable.

4.3 Reporting

Reports will be provided to DERM on a monthly basis, reporting on progress to date and advising of any unforeseen circumstances as they arrive. These reports will be in a memorandum format and will be provided at the end of each calendar month, commencing from the approval of this TEP.

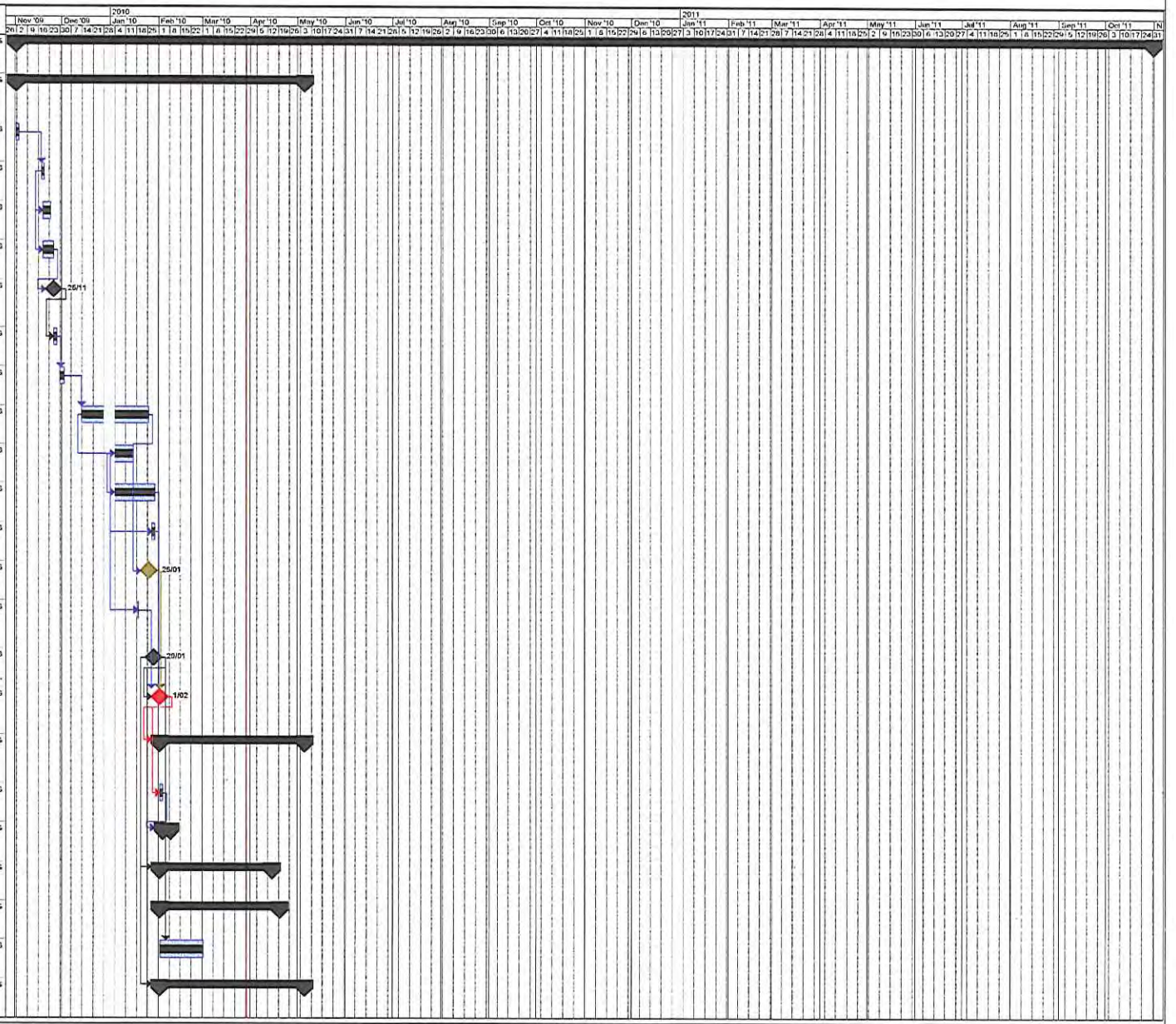
A final report will be provided at the completion of the works, advising of the certified completion of the works, compliance with the appropriate guidelines as per the KPIs (refer Section 1.5) and any operational matters of relevance.

Appendix A

TEP Schedule

Anglo Coal (Moranbah North Management) Pty Ltd
Transitional Environmental Program

ID	Task Name	% Complete	Duration
1	**Award Contract**	14%	509 days
2	**Transitional Environmental Program (TEP) Application**	72%	127 days
3	Review of the Environmental Assessment	100%	2 days
4	Site visit	100%	2 days
5	Review existing water management plan	100%	3 days
6	Assess hazardous dams and prepare scoping report	100%	5 days
7	Submit Moranbah North Production Dam Compliance report	100%	0 days
8	Catchment analysis	100%	2 days
9	Prepare preliminary hydrology analysis for TEP	100%	3 days
10	Preperation of draft TEP	100%	5 wks
11	Preperation of schedule	100%	2 wks
12	Preperation of outline plan and CAPEX dovlopment	100%	20 days
13	Risk and opportunities	100%	2 days
14	Issue Draft TEP to MNM	100%	0 days
15	Presentation by PB to MNM at Moranbah to discuss TEP	100%	4 hrs
16	Issue of letter by MNM to DERM re timeframes	100%	0 days
17	MNM Approval PB Commission for TEP review tasks	100%	0 days
18	**PB TEP review of existing infrastructure data & scope & cost confirmation**	60%	67 days
19	Library searches	100%	2 days
20	**Data Collection & review**	100%	3 days
29	**Topographical Survey**	55%	52 days
31	**12D storage assessment**	50%	55 days
34	**Cultural Heritage**	100%	20 days
35	**Geotechnical Survey**	55%	67 days

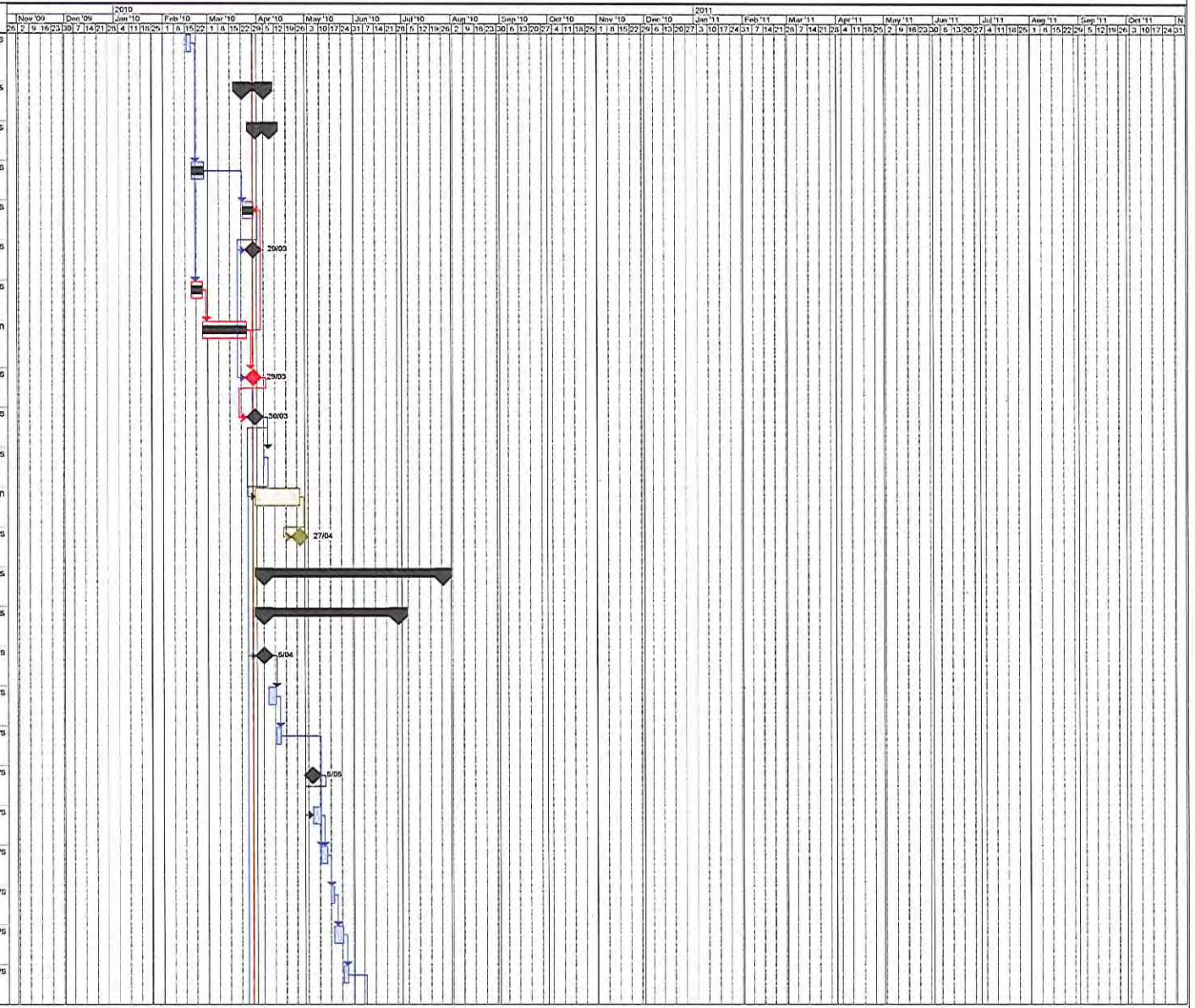


Project: 2148801A
Date: Mon 29/03/10

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External MileTask | Split

Anglo Coal (Moranbah North Management) Pty Ltd
Transitional Environmental Program

ID	Task Name	% Complete	Duration
40	**Proposed operational Philosophy to meet EA (DRAFT- Rev.1)**	0%	3 days
41	**Hydrologic design**	39%	9.5 days
47	**Water Balance Modelling (OPSIM)**	0%	6.5 days
52	Finalise TEP scope and cost estimate	100%	6 days
53	Final Revisions to TEP	100%	5 days
54	Issue of revised scope & cost to MNM	100%	0 days
55	MNM Technical review	100%	5 days
56	**MNM REVIEW and APPROVAL of scope & financial commitment**	100%	1 mon
57	**MNM APPROVAL TO PROCEED**	0%	0 days
58	Submission TEP to DERM	0%	0 wks
59	Presentation meeting to DERM	0%	4 hrs
60	DERM review of TEP submission	0%	1 mon
61	Approval DERM re TEP	0%	0 days
62	**DETAILED DESIGN PHASE**	0%	80.5 days
63	**Co-disposal dam design**	0%	60.5 days
64	Identify additional topographical data required	0%	0 days
65	12D modelling existing topography	0%	3 days
66	12D modelling design to dam required capacity	0%	3 days
67	Identify additional geotechnical data required	0%	0 days
68	Geotechnical assessement and design advice	0%	3 days
69	Embankment design	0%	4 days
70	Design of dam volume excavations	0%	2 days
71	Spillway design	0%	4 days
72	Outlet design	0%	3 days

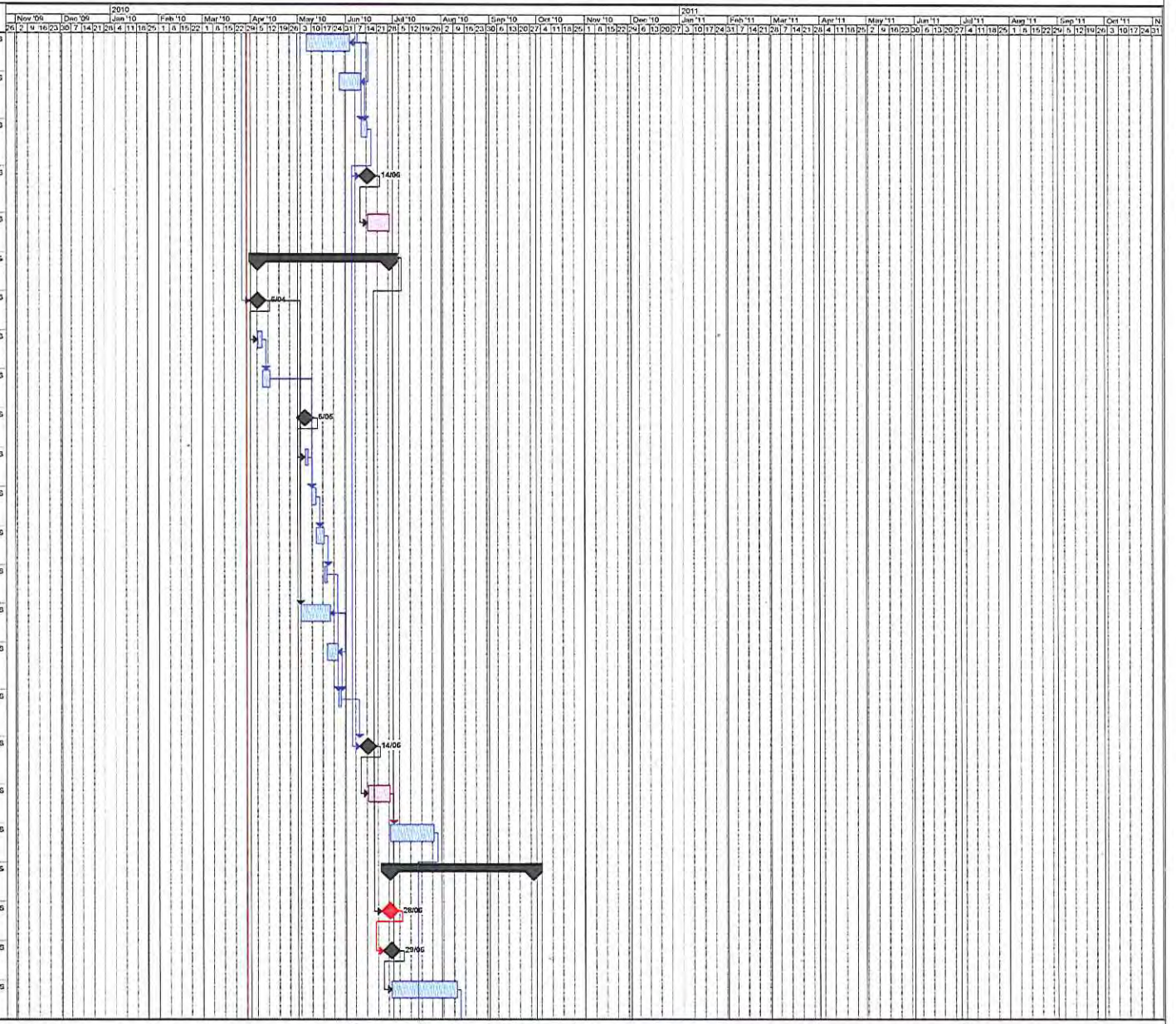


Project: 2148801A
Date: Mon 29/03/10

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Split

Anglo Coal (Moranbah North Management) Pty Ltd
Transitional Environmental Program

ID	Task Name	% Complete	Duration
73	Drafting (20 Drawings, refer attached) 2 drafters	0%	20 days
74	Technical Specifications (based on Anglo's standard specification)	0%	10 days
75	Certification of design by a registered RPEQ and Dams Safety Engineer.	0%	2 days
76	Issue final Tender Documentation TO MNMPL for review / Approval	0%	0 days
77	MNMPL Review of tender documentation	0%	2 wks
78	**Upgrade production dam and environmental dam**	0%	60.5 days
79	Identify additional topographical data required	0%	0 days
80	12D modelling existing topography	0%	3 days
81	12D modelling design to dam required capacity	0%	3 days
82	Identify additional geotechnical data required	0%	0 days
83	Geotechnical assessement and design advice	0%	2 days
84	Embankment design	0%	3 days
85	Spillway design	0%	3 days
86	Outlet design	0%	2 days
87	Drafting (20 Drawings, refer attached) 2 drafters	0%	15 days
88	Technical Specifications (based on Anglo's standard specification)	0%	5 days
89	Certification of design by a registered RPEQ and Dams Safety Engineer.	0%	2 days
90	Issue final Tender Documentation TO MNMPL for review / Approval	0%	0 days
91	MNMPL Review of tender documentation	0%	2 wks
92	Review and approval by DERM of design report	0%	4 wks
93	**Tender for Construction**	0%	66 days
94	ACMNMPL Approval Issue tender	0%	0 days
95	Issue Tender Documentation to tenderers	0%	0 days
96	Tender period	0%	6 wks

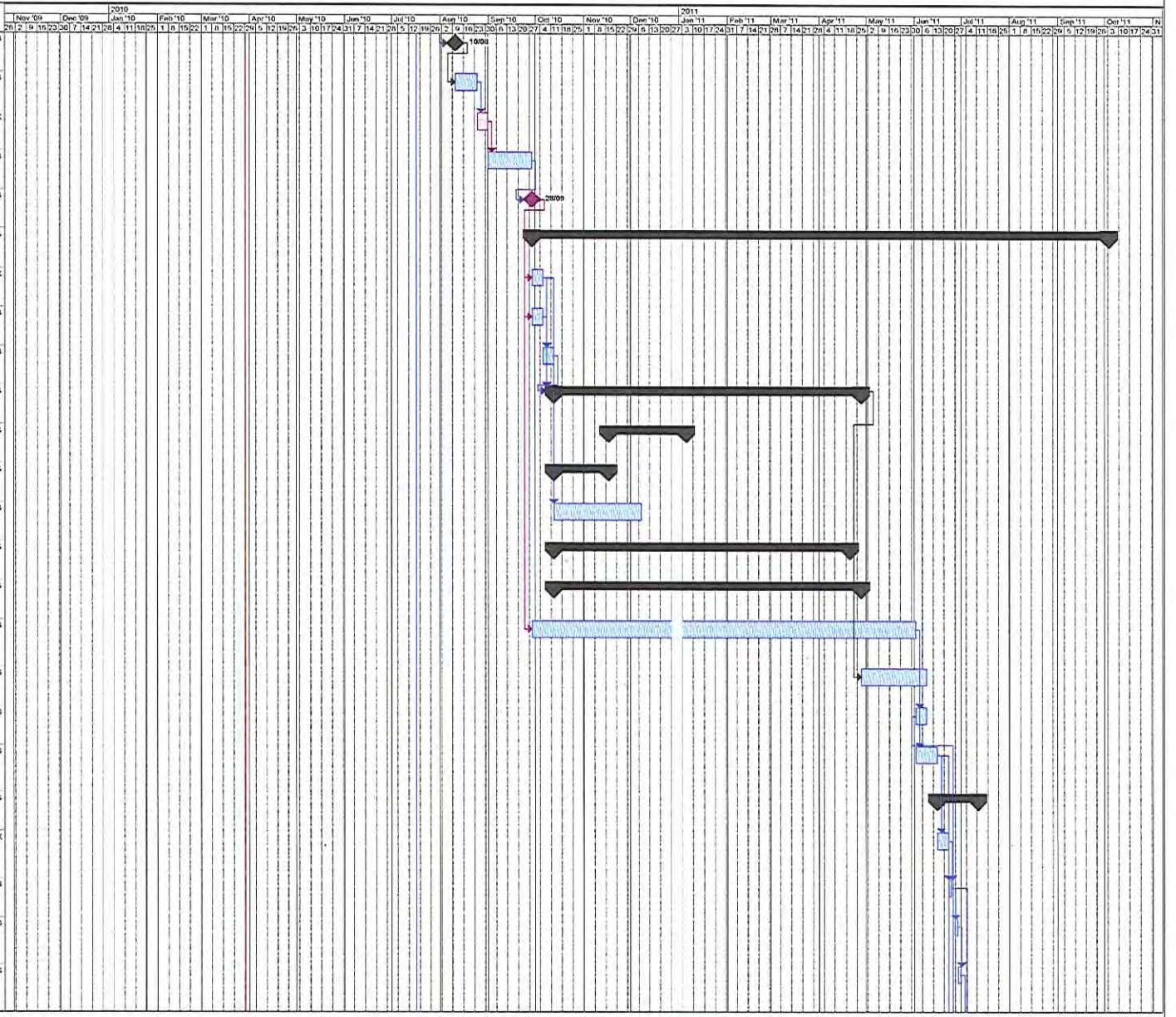


Project: 2148801A
Date: Mon 29/03/10

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External MileTask | Split

Anglo Coal (Moranbah North Management) Pty Ltd
Transitional Environmental Program

ID	Task Name	% Complete	Duration
97	Close of tender Period	0%	0 days
98	Tender review	0%	2 wks
99	Negotiation	0%	1 wk
100	Anglo Approvals	0%	20 days
101	Award of Contract	0%	0 days
102	**Construction**	**0%**	**258 days**
103	Mobilisation	0%	1 wk
104	Planning of construction with Contractor	0%	5 days
105	Contractor Site Inductions + Equip Certification	0%	5 days
106	**Construction Contract Period**	**0%**	**135 days**
107	**Upgrade of production dam (PRELIMINARY)**	**0%**	**30 days**
112	**Upgrade of Environmental dam (PRELIMINARY)**	**0%**	**25 days**
117	**Fresh Water Diversion & Quality Management**	**0%**	**8 wks**
118	**Co-disposal Dam (1) (PRELIMINARY)**	**0%**	**130 days**
128	**Pipes and pumps**	**0%**	**135 days**
134	Supervise construction to ensure full compliance with technical specification and Environmental Authority	0%	34 wks
135	Unworkable weather and holiday provision	0%	6 wks
136	**Provide certification of construction**	**0%**	**5 days**
137	Prepare as constructed drawings, supporting data, test results and certification (Refer EA Clause G9)	0%	2 wks
138	**Operation and maintenance**	**0%**	**18 days**
139	Develop an operations manual for each regulated dam to ensure compliance with EA (Clause G10)	0%	1 wk
140	Verify the operations manual to as constructed data	0%	2 days
141	Develop a maintenance program to ensure compliance with EA (clause G10)	0%	2 days
142	Verify Mainteance programme against as constructed data	0%	2 days

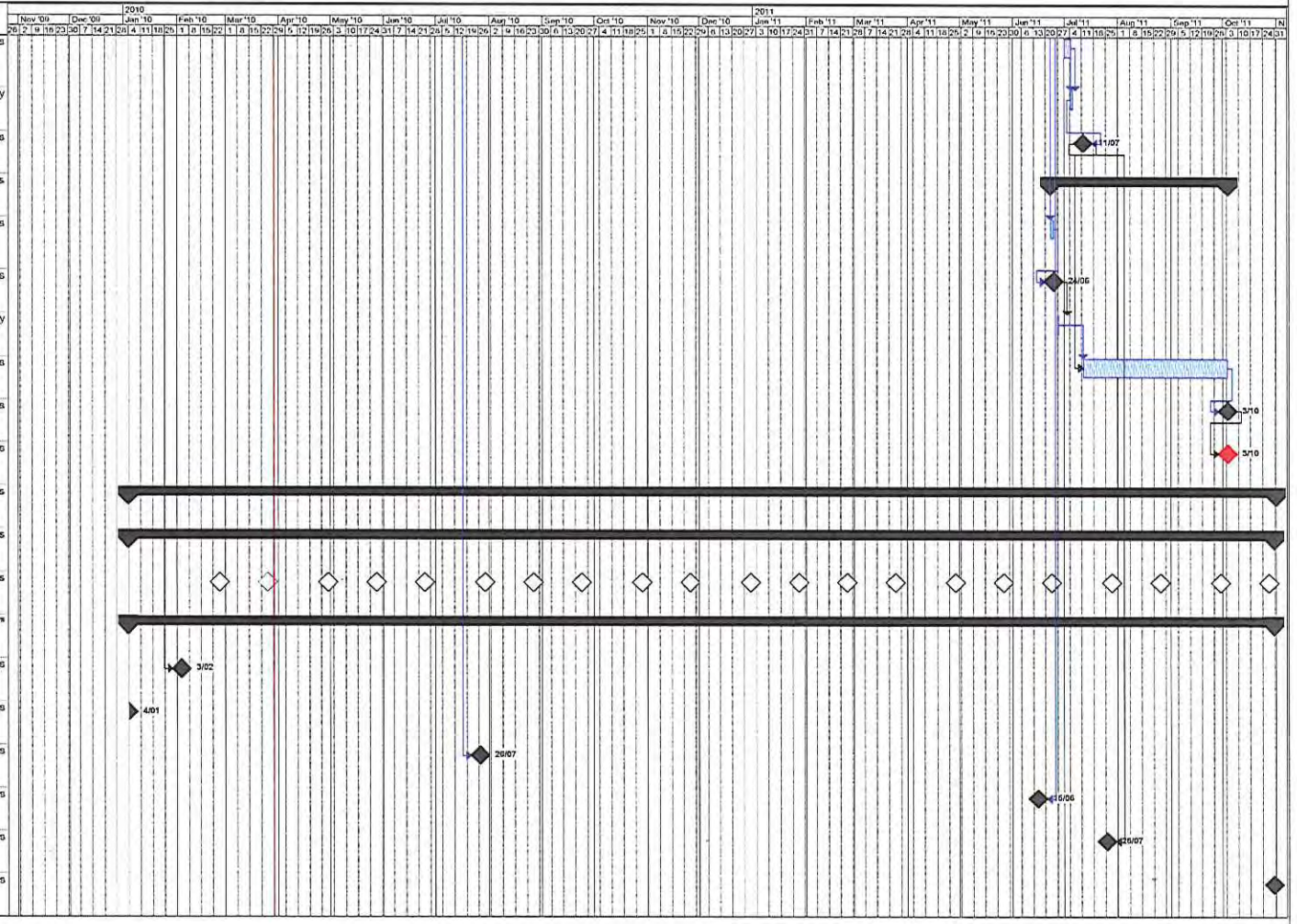


Project: 2145801A
Date: Mon 29/03/10

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Split

Anglo Coal (Moranbah North Management) Pty Ltd
Transitional Environmental Program

ID	Task Name	% Complete	Duration
143	Develop an operations and maintenance KPI chart to ensure compliance with EA (clause G10)	0%	2 days
144	Verify O&M KPI chart against as constructed data	0%	1 day
145	Draft O&M report	0%	0 days
146	**Compliance to Hazardous Dam Category**	**0%**	**73 days**
147	Provide details of the dam(s) to satisfy compliance with the EA	0%	2 days
148	Meet the hydraulic performance requirements	0%	0 days
149	Issue of EA required data to DERM	0%	1 day
150	DERM review and approval tep submissions	0%	3 mons
151	End of TEP period	0%	0 days
152	**Site Compliant**	0%	0 days
153	**Review Processes**	**0%**	**470 days**
170	**Reporting**	**0%**	**469 days**
171	**Monthly Progress Reporting to DERM**	**0%**	**429 days**
193	**MNM Reporting**	**0%**	**469 days**
194	TEP Proposal	0%	0 days
195	Draft design Philosophy report	0%	0 days
196	Design report	0%	0 days
197	Construction certification	0%	0 days
198	O&M Report	0%	0 days
199	***Final Report***	0%	0 days



Project: 2148601A
Date: Mon 29/03/10

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External MileTask | Split

Appendix B

Dam Hazard Category Assessment Report

Anglo Coal (Moranbah North Management) Pty Ltd

Dam Hazard Category Assessments

December 2009

henderson geotech
The *MINSERVE* Group Pty Limited

23 McDonald St
HAWTHORNE 4171
ph: 07 3399 5020
fax: 07 3399 5019

CONTENTS

1. SUMMARY AND CERTIFICATION

The following assessments have been made, in accordance with the Department of Mines and Energy's *Site Water Management Technical Guideline for Environmental Management of Exploration and Mining in Queensland 1995*. Details of each assessment follow.

Dam	Hazard Category	
	Failure to contain	**Dam break**
Dam 1	Significant	High
Dam 2	Low	Significant
Dam 3	Low	n/a
Dam 4	Low	Significant
Raw Water Dam	n/a	Low
Production Dam	Low	Significant
Environmental Dam	Low	Significant
Stilling Basin	Low	Significant
Heather's Dam	Low	Low

Hazard categories for all dams except Stilling Basin are unchanged from the previous assessment. Stilling Basin has now been assessed as Significant Hazard Category with regard to dam break, based on its use to receive water from Environmental Dam to avoid unauthorised or non-compliant off-site release. Consequently, the following actions are required for each dam:

- Advise EPA of the current location and details - EA condition G3 a);
- Ensure the dam meets hydraulic performance requirements within 12 months - EA condition G3 b);
- Within 12 months submit to the EPA 'as constructed drawings' and certification that the dam is fit for purpose, in accordance with accepted engineering standards and compliant in all respects with the Environmental Authority - EA Condition G9;
- Ensure there is a current operational plan for the dam - EA condition G10.

Note that the same actions were required for the dams that were assessed as Significant or High Hazard Category under the previous assessment.

These hazard category assessments were made by the undersigned based on documentation provided by Anglo Coal (Moranbah North Management) Pty Ltd and in the public domain, as noted in the following tables. Note that many of the hydraulic performance criteria have changed since the previous assessment, to reflect the classifications in Table 3 of the DME Technical Guideline.

[redacted]

2. DAM 1

Purpose: Contain brine from RO plant
Would spill to: Isaac River
Scheduled decommissioning: 15 years
Current Hazard Category: Significant
Refer: Figure 1 Orthophoto & Figure 2 Region Ecosystem Map

Dam 1 Details

Feature	Value	Source of Information
Embankment height	3.9m	Drawing 3A Evaporation Pond No 1 Bund Maintenance Works
Capacity to spillway	136ML	Advised by mine personnel, from OpSim water balance model, reduced for recently constructed spillway
Surface area when full	7.6ha	Measured from Drawing 3A
Catchment	8ha	Advised by mine personnel, from OpSim water balance model, reduced for recently constructed spillway
Est'd spillway discharge	8ML	100mm runoff over catchment
Discharge impact reach	1.0km	Based on Natural Resources & Mines' *Guidelines for Failure Impact Assessment of Water Dams, Table 2*
Est'd dam-break discharge	163ML	Aboveground volume + 20%
Dam-break impact reach	4.1km	Based on Natural Resources & Mines' *Guidelines for Failure Impact Assessment of Water Dams, Table 2*
Water quality:	*10% Exceedence Probability*	
Arsenic	mg/L	No information provided
Boron	mg/L	No information provided
Cadmium	mg/L	No information provided
Cobalt	mg/L	No information provided
Copper	mg/L	No information provided
Lead	mg/L	No information provided
Mercury	µg/L	No information provided
Nickel	mg/L	No information provided
Selenium	µg/L	No information provided
Zinc	mg/L	No information provided
Cyanide	mg/L	No information provided
Fluoride	mg/L	No information provided
pH		No information provided
Chloride	mg/L	No information provided
Sulphate	mg/L	No information provided
Conductivity	130,000µS/cm	OpSim modelled 66,000ppm for brine
DME 1995 Classification	toxic	

Dam 1 Receiving Environment within reaches of interest

Aspect	Description	Source of Information
Human use	No water is extracted for human consumption and the river is not used for recreation There are no residences or commercial places within the floodplain.	Mine personnel and 2007 aerial photography
Stock use	Both landholders have previously advised that no water is extracted for stock use. 2007 aerial photography shows no stock dams. Stock are able to access the river.	Mine personnel and 2007 aerial photography
Aquatic ecosystem	Isaac River in the reach of interest for daybreak has a simple but robust structure with limited aquatic ecosystems due to the lack of dry season refugia.	Mine personnel, based on studies in 2002, 2004, and 2007
Flora	Remnant of concern regional ecosystem (poplar box woodland and terrace redgum woodland) is dominant on the floodplain within the reach of interest for daybreak	Copy of the certified regional ecosystem map for the Vegetation Management Act 1999. Online RE Maps, EPA, Brisbane. Accessed 5/11/08.
Fauna	Native fauna are able to access the reaches of interest	Mine personnel
Economic use	There are no public roads or utilities crossing the reaches of interest	Mine personnel and 2007 aerial photography
Groundwater	No information provided	

Hazard Category Assessment:

Dam 1 Impacts

Failure to contain	Impact	Category
Loss or harm to humans	No contamination of a drinking water supply is expected	Low
Loss of stock	No contamination of a stock water supply is expected	Low
Environmental damage	Spillway discharge would flow into remnant regional ecosystem within the mine lease; considering the salinity the resultant die-off would be unauthorised environmental harm.	Significant
Dam break	**Impact**	**Category**
Loss or harm to humans	No loss of life is expected	Low
Environmental damage	Destruction of of-concern regional ecosystem off-lease is expected	High
Direct economic loss	Minor direct economic loss is possible.	Low
Indirect economic loss	Repairs to the dam would be practicable, but temporary redirection of brine to another water storage would adversely affect water quality throughout the mine water system	Significant

Hazard Category as regards containment:	**SIGNIFICANT**
Design Storage Allowance criterion:	0.005 AEP 3 month wet season
Mandatory Reporting Level criterion:	0.005 AEP 72 hour storm
Hazard Category as regards dam break:	**HIGH**
Spillway design criterion:	0.00005 AEP peak discharge

3. DAM 2

Purpose: Contain mine water
Would spill to: Isaac River
Scheduled decommissioning: 15 years
Current Hazard Category: Significant
Refer: Figure 1 Orthophoto & Figure 2 Region Ecosystem Map

Dam 2 Details

Feature	Value	Source of information
Embankment height	3.8m	Drawing 2A Evaporation Pond No 2 Earthworks & Sections
Capacity to spillway	221ML	Estimated from Drawing 2A
Surface area when full	6.2ha	Measured from Drawing 2A
Catchment	6ha	Advised by mine personnel, from OpSim water balance model, reduced for recently constructed spillway
Est'd spillway discharge	6ML	100mm runoff over catchment
Discharge impact reach	1.0km	Based on Natural Resources & Mines' *Guidelines for Failure Impact Assessment of Water Dams, Table 2*
Est'd dam-break discharge	265ML	Aboveground volume + 20%
Dam-break impact reach	5.5km	Based on Natural Resources & Mines' *Guidelines for Failure Impact Assessment of Water Dams, Table 2*
Water quality:	*10% Exceedence Probability*	
Arsenic	mg/L	No information collated
Boron	mg/L	No information collated
Cadmium	mg/L	No information collated
Cobalt	mg/L	No information collated
Copper	mg/L	No information collated
Lead	mg/L	No information collated
Mercury	µg/L	No information collated
Nickel	mg/L	No information collated
Selenium	µg/L	No information collated
Zinc	mg/L	No information collated
Cyanide	mg/L	No information collated
Fluoride	mg/L	No information collated
pH	8.1 - 8.6	Water quality monitoring Apr-05 to Aug-09
Chloride	4,535mg/L	Water quality monitoring Apr-05 to Aug-09
Sulphate	238mg/L	Water quality monitoring Apr-05 to Aug-09
Conductivity	12,835µS/cm	Water quality monitoring Apr-05 to Aug-09
DME 1995 Classification	sub-lethal	

Dam 2 Receiving Environment within reaches of interest

Aspect	Description	Source of Information
Human use	No water is extracted for human consumption and the river is not used for recreation There are no residences or commercial places within the floodplain.	Mine personnel and 2007 aerial photography
Stock use	Both landholders have previously advised that no water is extracted for stock use. 2007 aerial photography shows no stock dams. Stock are able to access the river.	Mine personnel and 2007 aerial photography
Aquatic ecosystem	Isaac River in the reach of interest for daybreak has a simple but robust structure with limited aquatic ecosystems due to the lack of dry season refugia.	Mine personnel, based on studies in 2002, 2004, and 2007
Flora	Remnant of concern regional ecosystem (poplar box woodland and terrace redgum woodland) is dominant on the floodplain within the reach of interest for daybreak	Copy of the certified regional ecosystem map for the Vegetation Management Act 1999. Online RE Maps, EPA, Brisbane. Accessed 5/11/08.
Fauna	Native fauna are able to access the reaches of interest	Mine personnel
Economic use	There are no public roads or utilities crossing the reaches of interest	Mine personnel and 2007 aerial photography
Groundwater	No information provided	

Hazard Category Assessment:

Dam 2 Impacts

Failure to contain	Impact	Category
Loss or harm to humans	No contamination of a drinking water supply is expected	Low
Loss of stock	No contamination of a stock water supply is expected	Low
Environmental damage	Spillway discharge would flow into remnant regional ecosystem within the mine lease.	Low
Dam break	**Impact**	**Category**
Loss or harm to humans	No loss of life is expected	Low
Environmental damage	Damage to of-concern regional ecosystem off-lease is expected	Significant
Direct economic loss	Minimal direct economic loss is possible.	Low
Indirect economic loss	Repairs to the dam would be practicable. Alternative water storages are available but loss of the dam would stress the mine's water management system	Significant

Hazard Category as regards containment:	**LOW**
Design Storage Allowance criterion:	0.05 AEP 3 month wet season
Mandatory Reporting Level criterion:	0.05 AEP 72 hour storm
Hazard Category as regards dam break:	**SIGNIFICANT**
Spillway design criterion:	0.001 AEP peak discharge

4. DAM 3

Purpose: Contain mine water

Would spill to: Isaac River

Scheduled decommissioning: 0 years; dam is breached but still contains salts and sediment

Current Hazard Category: Low

Refer: Figure 1 Orthophoto & Figure 2 Region Ecosystem Map

Dam 3 Details

Feature	Value	Source of information
Embankment height	3.0m	Estimated from field observation
Capacity to spillway	0ML	Dam has been breached
Surface area when full	2.8ha	Measured from Drawing 2A
Catchment	3ha	Advised by mine personnel, from OpSim water balance model
Est'd spillway discharge	3ML	100mm runoff over catchment
Discharge impact reach	1.0km	Based on Natural Resources & Mines' *Guidelines for Failure Impact Assessment of Water Dams, Table 2*
Est'd dam-break discharge	0ML	Dam has been breached
Dam-break impact reach	n/a	
Water quality:	*10% Exceedence Probability*	
Arsenic	mg/L	No information collated
Boron	mg/L	No information collated
Cadmium	mg/L	No information collated
Cobalt	mg/L	No information collated
Copper	mg/L	No information collated
Lead	mg/L	No information collated
Mercury	µg/L	No information collated
Nickel	mg/L	No information collated
Selenium	µg/L	No information collated
Zinc	mg/L	No information collated
Cyanide	mg/L	No information collated
Fluoride	mg/L	No information collated
pH	7.7 - 8.3	Water quality monitoring Jan-06 to Dec-08
Chloride	2,819mg/L	Water quality monitoring Jan-06 to Dec-08
Sulphate	187mg/L	Water quality monitoring Jan-06 to Dec-08
Conductivity	10,511µS/cm	Water quality monitoring Jan-06 to Dec-08
DME 1995 Classification	sub-lethal	

Dam 3 Receiving Environment within reach of interest

Aspect	Description	Source of Information
Human use	No water is extracted for human consumption and the river is not used for recreation There are no residences or commercial places within the floodplain.	Mine personnel and 2007 aerial photography
Stock use	Both landholders have previously advised that no water is extracted for stock use. 2007 aerial photography shows no stock dams. Stock are able to access the river.	Mine personnel and 2007 aerial photography
Aquatic ecosystem	Isaac River in the reach of interest has a simple but robust structure with limited aquatic ecosystems due to the lack of dry season refugia.	Mine personnel, based on studies in 2002, 2004, and 2007
Flora	The reach of interest is wholly within the mine lease. No remnant endangered or of concern regional ecosystem is present.	Copy of the certified regional ecosystem map for the Vegetation Management Act 1999. Online RE Maps, EPA, Brisbane. Accessed 5/11/08.
Fauna	Native fauna are able to access the river	Mine personnel
Economic use	There are no public roads or utilities crossing the reach of interest	Mine personnel and 2007 aerial photography
Groundwater	No information provided	

Hazard Category Assessment:

Dam 3 Impacts

Failure to contain	**Impact**	**Category**
Loss or harm to humans	No contamination of a drinking water supply is expected	Low
Loss of stock	No contamination of a stock water supply is expected	Low
Environmental damage	No remnant endangered or of concern regional ecosystems are in the area that would be impacted	Low
Dam break	**Impact**	**Category**
Loss or harm to humans	n/a	n/a
Environmental damage		
Direct economic loss		
Indirect economic loss		

Hazard Category as regards containment:	**LOW**
Design Storage Allowance criterion:	0.05 AEP 3 month wet season
Mandatory Reporting Level criterion:	0.05 AEP 72 hour storm
Hazard Category as regards dam break:	**Not applicable, dam is breached**
Spillway design criterion:	n/a

5. DAM 4

Purpose: Contain mine water
Would spill to: Isaac River
Scheduled decommissioning: 15 years
Current Hazard Category: Significant
Refer: Figure 1 Orthophoto & Figure 2 Region Ecosystem Map

Dam 4 Details

Feature	Value	Source of information
Embankment height	5.2m	Infrastructure Engineering Dwg No. 06012-3F Dam No. 4 Dimensioned Plan
Capacity to spillway	472ML	Infrastructure Engineering Dwg No. 06012-2A Dam No. 4 Dimensioned Plan
Surface area when full	5.7ha	Computed from Infrastructure Engineering Dwg No. 06012-3F Dam No. 4 Dimensioned Plan
Catchment	6ha	Computed from Infrastructure Engineering Dwg No. 06012-3F Dam No. 4 Dimensioned Plan
Est'd spillway discharge	6ML	100mm runoff over catchment
Discharge impact reach	1.0km	Based on Natural Resources & Mines' *Guidelines for Failure Impact Assessment of Water Dams, Table 2*
Est'd dam-break discharge	290ML	Aboveground volume + 20%
Dam-break impact reach	5.8km	Based on Natural Resources & Mines' *Guidelines for Failure Impact Assessment of Water Dams, Table 2*
Water quality:	*10% Exceedence Probability*	
Arsenic	mg/L	No information collated
Boron	mg/L	No information collated
Cadmium	mg/L	No information collated
Cobalt	mg/L	No information collated
Copper	mg/L	No information collated
Lead	mg/L	No information collated
Mercury	µg/L	No information collated
Nickel	mg/L	No information collated
Selenium	µg/L	No information collated
Zinc	mg/L	No information collated
Cyanide	mg/L	No information collated
Fluoride	mg/L	No information collated
pH	8.2 - 8.5	Water quality monitoring Jan-09 to Aug-09
Chloride	2,930mg/L	Water quality monitoring Jan-09 to Aug-09
Sulphate	83mg/L	Water quality monitoring Jan-09 to Aug-09
Conductivity	8,900µS/cm	Water quality monitoring Jan-09 to Aug-09
DME 1995 Classification	sub-lethal	

Dam 4 Receiving Environment within reaches of interest

Aspect	Description	Source of Information
Human use	No water is extracted for human consumption and the river is not used for recreation There are no residences or commercial places within the floodplain.	Mine personnel and 2007 aerial photography
Stock use	Both landholders have previously advised that no water is extracted for stock use. 2007 aerial photography shows no stock dams. Stock are able to access the river.	Mine personnel, based on studies in 2002, 2004, and 2007
Aquatic ecosystem	Isaac River in these reaches has a simple but robust structure with limited aquatic ecosystems due to the lack of dry season refugia.	Copy of the certified regional ecosystem map for the Vegetation Management Act 1999. Online RE Maps, EPA, Brisbane. Accessed 5/11/08.
Flora	The reach of interest for spillway discharge is wholly within the mine lease and is no-of-concern remnant growth. The reach of interest for daybreak includes dominant of-concern regional ecosystem.	Mine personnel
Fauna	Native fauna are able to access the river	Mine personnel and 2007 aerial photography
Economic use	Within the reach of interest for daybreak, there are two Moranbah Seam Gas methane pipelines crossing the river, anchored in alluvial sand about 2m below bed level. The mine has one bed level road crossing.	Mine personnel, based on studies in 2002, 2004, and 2007
Groundwater	No information provided.	

Hazard Category Assessment:

Dam 4 Impacts

Failure to contain	Impact	Category
Loss or harm to humans	No contamination of a drinking water supply is expected	Low
Loss of stock	No contamination of a stock water supply is expected	Low
Environmental damage	No remnant endangered or of concern regional ecosystems are in the area that would be impacted	Low
Dam break	**Impact**	**Category**
Loss or harm to humans	No loss of life is expected	Low
Environmental damage	Damage to of-concern regional ecosystem off-lease is expected	Significant
Direct economic loss	Minimal direct economic loss is expected.	Low
Indirect economic loss	Repairs to the dam would be practicable. Alternative water storages are available but loss of the dam would stress the mine's water management system	Significant

Hazard Category as regards containment:	**LOW**
Design Storage Allowance criterion:	0.05 AEP 3 month wet season
Mandatory Reporting Level criterion:	0.05 AEP 72 hour storm
Hazard Category as regards dam break:	**SIGNIFICANT**
Spillway design criterion:	0.001 AEP peak discharge

6. RAW WATER DAM

Purpose: Contain raw water
Would spill to: Isaac River
Scheduled decommissioning: 15 years
Current Hazard Category: Low
Refer: Figure 1 Orthophoto & Figure 2 Region Ecosystem Map

Raw Water Dam Details

Feature	Value	Source of information
Embankment height	no information	
Capacity to spillway	106ML	Advised by mine personnel, from OpSim water balance model
Surface area when full	5.1ha	Advised by mine personnel, from OpSim water balance model
Catchment		No information
Est'd spillway discharge	n/a	Water from Eungella Pipeline
Discharge impact reach	n/a	Water from Eungella Pipeline
Est'd dam-break discharge	127ML	Aboveground volume + 20%
Dam-break impact reach	3.2km	Based on Natural Resources & Mines' *Guidelines for Failure Impact Assessment of Water Dams, Table 2*
Water quality:	*10% Exceedence Probability*	
Arsenic	mg/L	No information collated
Boron	mg/L	No information collated
Cadmium	mg/L	No information collated
Cobalt	mg/L	No information collated
Copper	mg/L	No information collated
Lead	mg/L	No information collated
Mercury	µg/L	No information collated
Nickel	mg/L	No information collated
Selenium	µg/L	No information collated
Zinc	mg/L	No information collated
Cyanide	mg/L	No information collated
Fluoride	mg/L	No information collated
pH	7.6 - 8.6	Water quality monitoring Apr-05 to Aug-09
Chloride	82mg/L	Water quality monitoring Apr-05 to Aug-09
Sulphate	12mg/L	Water quality monitoring Apr-05 to Aug-09
Conductivity	560µS/cm	Water quality monitoring Apr-05 to Aug-09
DME 1995 Classification	low-toxicity - exceeds pH limit for drinking water	

Raw Water Dam Receiving Environment within reach of interest

Aspect	Description	Source of Information
Human use	No water is extracted for human consumption and the river is not used for recreation There are no residences or commercial places within the floodplain.	Mine personnel and 2007 aerial photography
Stock use	Both landholders have previously advised that no water is extracted for stock use. 2007 aerial photography shows no stock dams. Stock are able to access the river.	Mine personnel and 2007 aerial photography
Aquatic ecosystem	Isaac River in this reach has a simple but robust structure with limited aquatic ecosystems due to the lack of dry season refugia.	Mine personnel, based on studies in 2002, 2004, and 2007
Flora	The reach of interest for daybreak is wholly within the mine lease. No remnant endangered or of-concern regional ecosystem is present.	Copy of the certified regional ecosystem map for the Vegetation Management Act 1999. Online RE Maps, EPA, Brisbane. Accessed 5/11/08.
Fauna	Native fauna are able to access the river	Mine personnel
Economic use	There are no public roads or utilities crossing the reach of interest	Mine personnel and 2007 aerial photography
Groundwater	No information provided	

Hazard Category Assessment:

Raw Water Dam Impacts

Failure to contain	**Impact**	**Category**
Loss or harm to humans	No contamination of a drinking water supply is possible	n/a
Loss of stock	No contamination of a stock water supply is possible	n/a
Environmental damage	No contamination of remnant ecosystems downstream is possible	n/a
Dam break	**Impact**	**Category**
Loss or harm to humans	No loss of life is expected	Low
Environmental damage	No remnant endangered or of concern regional ecosystems are in the area that would be impacted	Low
Direct economic loss	Appreciable direct economic loss is not expected.	Low
Indirect economic loss	Repairs to the dam would be practicable. Stilling Basin could be used as an alternative water storage, or water could be brought in on demand until repairs were made.	Low

Hazard Category as regards containment: **Not applicable**

Design Storage Allowance criterion:

Mandatory Reporting Level criterion:

Hazard Category as regards dam break: **LOW**

Spillway design criterion: 0.01 AEP peak discharge

7. PRODUCTION DAM

Purpose: Contain mine water
Would spill to: Isaac River
Scheduled decommissioning: 15 years
Current Hazard Category: Significant
Refer: Figure 1 Orthophoto & Figure 2 Region Ecosystem Map

Production Dam Details

Feature	Value	Source of information
Embankment height	5.0m	Estimated from spillway survey and pre-mine contours
Capacity to spillway	200ML	Advised by mine personnel, from OpSim water balance model
Surface area when full	5.7ha	Advised by mine personnel, from OpSim water balance model
Catchment	164ha	Advised by mine personnel, from OpSim water balance model
Est'd spillway discharge	164ML	100mm runoff over catchment
Discharge impact reach	4.1km	Based on Natural Resources & Mines' *Guidelines for Failure Impact Assessment of Water Dams, Table 2*
Est'd dam-break discharge	164ML	Aboveground volume + 20%
Dam-break impact reach	5.3km	Based on Natural Resources & Mines' *Guidelines for Failure Impact Assessment of Water Dams, Table 2*
Water quality:	*10% Exceedence Probability*	
Arsenic	mg/L	No information collated
Boron	mg/L	No information collated
Cadmium	mg/L	No information collated
Cobalt	mg/L	No information collated
Copper	mg/L	No information collated
Lead	mg/L	No information collated
Mercury	µg/L	No information collated
Nickel	mg/L	No information collated
Selenium	µg/L	No information collated
Zinc	mg/L	No information collated
Cyanide	mg/L	No information collated
Fluoride	mg/L	No information collated
pH	8.0 - 8.6	Water quality monitoring Apr-05 to Aug-09
Chloride	3,416mg/L	Water quality monitoring Apr-05 to Aug-09
Sulphate	441mg/L	Water quality monitoring Apr-05 to Aug-09
Conductivity	11,089µS/cm	Water quality monitoring Apr-05 to Aug-09
DME 1995 Classification	sub-lethal	

Production Dam Receiving Environment within reaches of interest

Aspect	Description	Source of Information
Human use	No water is extracted for human consumption and the river is not used for recreation There are no residences or commercial places within the floodplain.	Mine personnel and 2007 aerial photography
Stock use	Both landholders have previously advised that no water is extracted for stock use. 2007 aerial photography shows no stock dams. Stock are able to access the river.	Mine personnel and 2007 aerial photography
Aquatic ecosystem	Isaac River in this reach has a simple but robust structure with limited aquatic ecosystems due to the lack of dry season refugia.	Mine personnel, based on studies in 2002, 2004, and 2007
Flora	The reaches of interest are wholly within the mine lease. No remnant endangered or of concern regional ecosystem is present.	Copy of the certified regional ecosystem map for the Vegetation Management Act 1999. Online RE Maps, EPA, Brisbane. Accessed 5/11/08.
Fauna	Native fauna are able to access the river	Mine personnel
Economic use	Within the reach of interest for daybreak, the BMA Braeside raw water pipeline crosses the river on the clay bed at the base of the alluvial sand. There is one Moranbah Seam Gas methane pipeline crossing the river, anchored in alluvial sand about 2m below bed level. The mine has one bridge and two bed level road crossings.	Mine personnel and 2007 aerial photography
Groundwater	No information provided	

Hazard Category Assessment:

Production Dam Impacts

Failure to contain	**Impact**	**Category**
Loss or harm to humans	No contamination of a drinking water supply is expected	Low
Loss of stock	No contamination of a stock water supply is expected	Low
Environmental damage	No remnant endangered or of concern regional ecosystems are in the area that would be impacted	Low
Dam break	**Impact**	**Category**
Loss or harm to humans	No loss of life is expected	Low
Environmental damage	No remnant endangered or of concern regional ecosystems are in the area that would be impacted.	Low
Direct economic loss	Appreciable direct economic loss is not expected.	Low
Indirect economic loss	Repairs to the dam may not be practicable. Loss of the dam would impact on CHPP production and jeopardise compliance with EA discharge conditions.	Significant

Hazard Category as regards containment:	**LOW**
Design Storage Allowance criterion:	0.05 AEP 3 month wet season
Mandatory Reporting Level criterion:	0.05 AEP 72 hour storm
Hazard Category as regards dam break:	**SIGNIFICANT**
Spillway design criterion:	0.001 AEP peak discharge

8. ENVIRONMENTAL DAM

Purpose: Contain mine water
Would spill to: Isaac River
Scheduled decommissioning: 15 years
Current Hazard Category: Significant
Refer: Figure 1 Orthophoto & Figure 2 Region Ecosystem Map

Environmental Dam Details

Feature	Value	Source of information
Embankment height	4.5m	Estimated from spillway survey and pre-mine contours
Capacity to spillway	66ML	Advised by mine personnel, from OpSim water balance model
Surface area when full	2.2ha	Advised by mine personnel, from OpSim water balance model
Catchment	24ha	Advised by mine personnel, from OpSim water balance model
Est'd spillway discharge	24ML	100mm runoff over catchment
Discharge impact reach	1.0km	Based on Natural Resources & Mines' *Guidelines for Failure Impact Assessment of Water Dams, Table 2*
Est'd dam-break discharge	79ML	Aboveground volume + 20%
Dam-break impact reach	2.0km	Based on Natural Resources & Mines' *Guidelines for Failure Impact Assessment of Water Dams, Table 2*
Water quality:	*10% Exceedence Probability*	
Arsenic	mg/L	No information collated
Boron	mg/L	No information collated
Cadmium	mg/L	No information collated
Cobalt	mg/L	No information collated
Copper	mg/L	No information collated
Lead	mg/L	No information collated
Mercury	µg/L	No information collated
Nickel	mg/L	No information collated
Selenium	µg/L	No information collated
Zinc	mg/L	No information collated
Cyanide	mg/L	No information collated
Fluoride	mg/L	No information collated
pH	8.0 - 9.0	Water quality monitoring Apr-05 to Aug-09
Chloride	3,861mg/L	Water quality monitoring Apr-05 to Aug-09
Sulphate	535mg/L	Water quality monitoring Apr-05 to Aug-09
Conductivity	12,895µS/cm	Water quality monitoring Apr-05 to Aug-09
DME 1995 Classification	sub-lethal	

Environmental Dam Receiving Environment within reaches of interest

Aspect	Description	Source of Information
Human use	No water is extracted for human consumption and the river is not used for recreation There are no residences or commercial places within the floodplain.	Mine personnel and 2007 aerial photography
Stock use	Both landholders have previously advised that no water is extracted for stock use. 2007 aerial photography shows no stock dams. Stock are able to access the river.	Mine personnel and 2007 aerial photography
Aquatic ecosystem	Isaac River in this reach has a simple but robust structure with limited aquatic ecosystems due to the lack of dry season refugia.	Mine personnel, based on studies in 2002, 2004, and 2007
Flora	The reaches of interest are wholly within the mine lease. No remnant endangered or of concern regional ecosystem is present.	Copy of the certified regional ecosystem map for the Vegetation Management Act 1999. Online RE Maps, EPA, Brisbane. Accessed 5/11/08.
Fauna	Native fauna are able to access the river	Mine personnel
Economic use	There are no public roads or utilities crossing the reach of interest	Mine personnel and 2007 aerial photography
Groundwater	No information provided	

Hazard Category Assessment:

Environmental Dam Impacts

Failure to contain	Impact	Category
Loss or harm to humans	No contamination of a drinking water supply is expected	Low
Loss of stock	No contamination of a stock water supply is expected	Low
Environmental damage	No remnant endangered or of concern regional ecosystems are in the area that would be impacted	Low
Dam break	**Impact**	**Category**
Loss or harm to humans	No loss of life is expected	Low
Environmental damage	No remnant endangered or of concern regional ecosystems are in the area that would be impacted.	Low
Direct economic loss	Appreciable direct economic loss is not expected.	Low
Indirect economic loss	Repairs to the dam would be practicable. As the dam is the most downstream capture for process water before Isaac River, loss of the dam would jeopardise compliance with EA discharge conditions	Significant

Hazard Category as regards containment:	**LOW**
Design Storage Allowance criterion:	0.05 AEP 3 month wet season
Mandatory Reporting Level criterion:	0.05 AEP 72 hour storm
Hazard Category as regards dam break:	**SIGNIFICANT**
Spillway design criterion:	0.001 AEP peak discharge

9. STILLING BASIN

Purpose: Contain mine water
Would spill to: Isaac River
Scheduled decommissioning: 15 years
Current Hazard Category: Low
Refer: Figure 1 Orthophoto & Figure 2 Region Ecosystem Map

Stilling Basin Details

Feature	Value	Source of information
Embankment height	1.5m	Estimated from spillway survey and pre-mine contours
Capacity to spillway	40ML	Advised by mine personnel, from OpSim water balance model
Surface area when full	8.4ha	Advised by mine personnel, from OpSim water balance model
Catchment	50ha	Advised by mine personnel, from OpSim water balance model
Est'd spillway discharge	50ML	100mm runoff over catchment
Discharge impact reach	1.3km	Based on Natural Resources & Mines' *Guidelines for Failure Impact Assessment of Water Dams, Table 2*
Est'd dam-break discharge	48ML	Aboveground volume + 20%
Dam-break impact reach	1.2km	Based on Natural Resources & Mines' *Guidelines for Failure Impact Assessment of Water Dams, Table 2*
Water quality:	*10% Exceedence Probability*	
Arsenic	mg/L	No information collated
Boron	mg/L	No information collated
Cadmium	mg/L	No information collated
Cobalt	mg/L	No information collated
Copper	mg/L	No information collated
Lead	mg/L	No information collated
Mercury	µg/L	No information collated
Nickel	mg/L	No information collated
Selenium	µg/L	No information collated
Zinc	mg/L	No information collated
Cyanide	mg/L	No information collated
Fluoride	mg/L	No information collated
pH	7.7 - 9.1	Water quality monitoring Apr-05 to Aug-09
Chloride	3,570mg/L	Water quality monitoring Apr-05 to Aug-09
Sulphate	371mg/L	Water quality monitoring Apr-05 to Aug-09
Conductivity	12,120µS/cm	Water quality monitoring Apr-05 to Aug-09
DME 1995 Classification	sub-lethal	

Stilling Basin Receiving Environment within reaches of interest

Aspect	Description	Source of Information
Human use	No water is extracted for human consumption and the river is not used for recreation There are no residences or commercial places within the floodplain.	Mine personnel and 2007 aerial photography
Stock use	Both landholders have previously advised that no water is extracted for stock use. 2007 aerial photography shows no stock dams. Stock are able to access the river.	Mine personnel and 2007 aerial photography
Aquatic ecosystem	Isaac River in this reach has a simple but robust structure with limited aquatic ecosystems due to the lack of dry season refugia.	Mine personnel, based on studies in 2002, 2004, and 2007
Flora	The reaches of interest are wholly within the mine lease. No remnant endangered or of concern regional ecosystem is present.	Copy of the certified regional ecosystem map for the Vegetation Management Act 1999. Online RE Maps, EPA, Brisbane. Accessed 5/11/08.
Fauna	Native fauna are able to access the river	Mine personnel
Economic use	There are no public roads or utilities crossing the reach of interest	Mine personnel and 2007 aerial photography
Groundwater	No information provided	

Hazard Category Assessment:

Stilling Basin Impacts

Failure to contain	**Impact**	**Category**
Loss or harm to humans	No contamination of a drinking water supply is expected	Low
Loss of stock	No contamination of a stock water supply is expected	Low
Environmental damage	No remnant endangered or of concern regional ecosystems are in the area that would be impacted.	Low
Dam break	**Impact**	**Category**
Loss or harm to humans	No loss of life is expected	Low
Environmental damage	No remnant endangered or of concern regional ecosystems are in the area that would be impacted.	Low
Direct economic loss	Appreciable direct economic loss is not expected.	Low
Indirect economic loss	Repairs to the dam would be practicable. If the dam was not available to receive excess water from Environmental Dam, compliance with EA discharge conditions would be jeopardised.	Significant

Hazard Category as regards containment:	**LOW**
Design Storage Allowance criterion:	0.05 AEP 3 month wet season
Mandatory Reporting Level criterion:	0.05 AEP 72 hour storm
Hazard Category as regards dam break:	**SIGNIFICANT**
Spillway design criterion:	0.001 AEP peak discharge

10. HEATHER'S DAM

Purpose: Contain CSG water
Would spill to: Isaac River
Scheduled decommissioning: 15 years
Current Hazard Category: Low
Refer: Figure 1 Orthophoto & Figure 2 Region Ecosystem Map

Heather's Dam Details

Feature	Value	Source of information
Embankment height	0.5m	Advised by Moranbah North Seamgas Manager
Capacity to spillway	48ML	Advised by Moranbah North Seamgas Manager
Surface area when full	0.8ha	Advised by Moranbah North Seamgas Manager
Catchment	1ha	Advised by Moranbah North Seamgas Manager
Est'd spillway discharge	1ML	100mm runoff over catchment
Discharge impact reach	1.0km	Based on Natural Resources & Mines' *Guidelines for Failure Impact Assessment of Water Dams, Table 2*
Est'd dam-break discharge	58ML	Aboveground volume + 20%
Dam-break impact reach	1.4km	Based on Natural Resources & Mines' *Guidelines for Failure Impact Assessment of Water Dams, Table 2*
Water quality:	*10% Exceedence Probability*	
Arsenic	mg/L	No information collated
Boron	mg/L	No information collated
Cadmium	mg/L	No information collated
Cobalt	mg/L	No information collated
Copper	mg/L	No information collated
Lead	mg/L	No information collated
Mercury	µg/L	No information collated
Nickel	mg/L	No information collated
Selenium	µg/L	No information collated
Zinc	mg/L	No information collated
Cyanide	mg/L	No information collated
Fluoride	mg/L	No information collated
pH	8.0 - 8.6	Water quality monitoring for Dams 1-4 Apr-05 to Aug-09
Chloride	4,478mg/L	Water quality monitoring for Dams 1-4 Apr-05 to Aug-09
Sulphate	222mg/L	Water quality monitoring for Dams 1-4 Apr-05 to Aug-09
Conductivity	14,079µS/cm	Water quality monitoring for Dams 1-4 Apr-05 to Aug-09
DME 1995 Classification	sub-lethal	

Heather's Dam Receiving Environment within reaches of interest

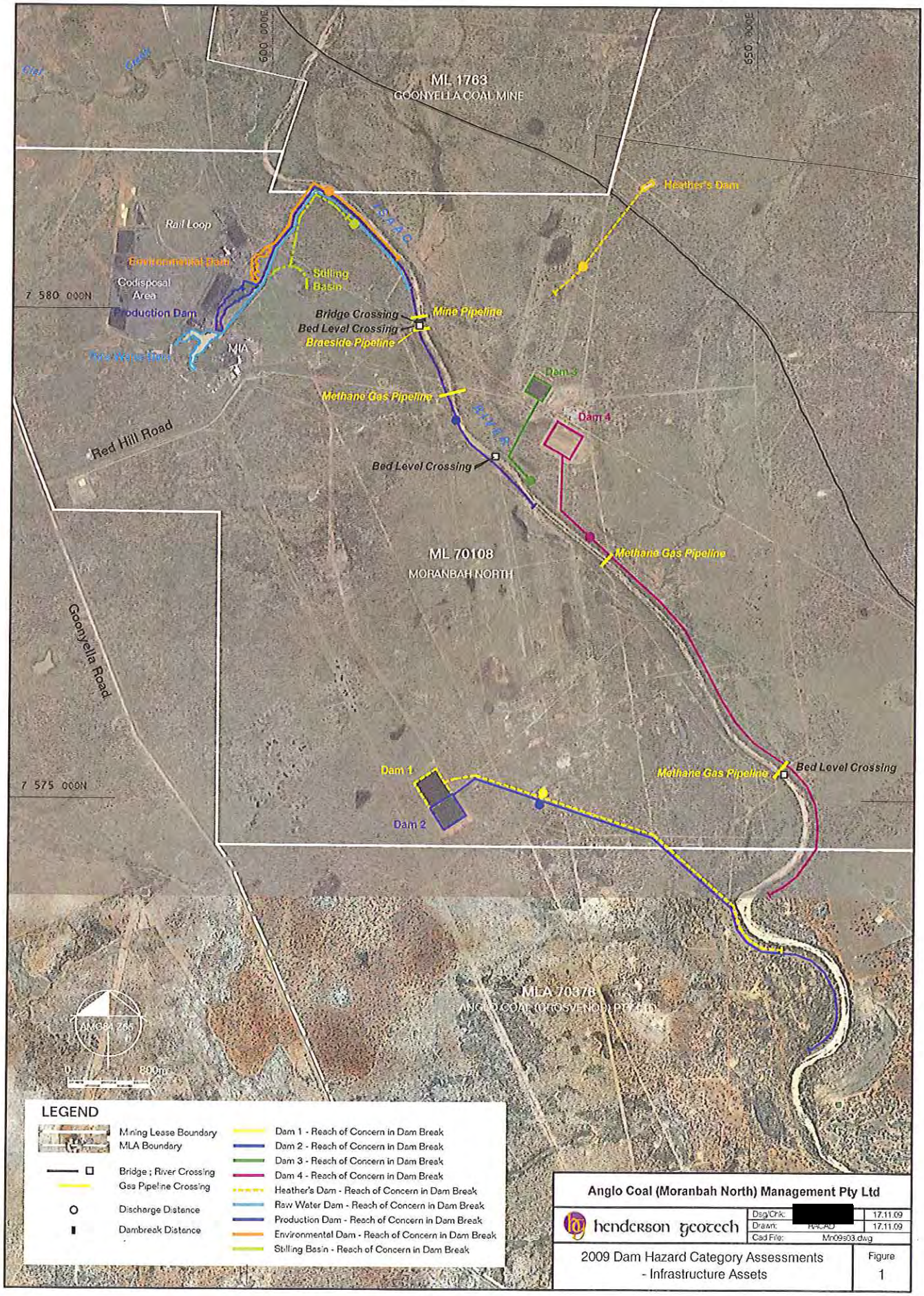
Aspect	Description	Source of Information
Human use	No water is extracted for human consumption and the river is not used for recreation There are no residences or commercial places within the floodplain.	Mine personnel and 2007 aerial photography
Stock use	The reaches of interest to not extend to Isaac River	Mine personnel and 2007 aerial photography
Aquatic ecosystem	n/a - discharge would be overland flow within the reaches of interest.	2007 aerial photography
Flora	The reach of interest is wholly within the mine lease. No remnant endangered or of concern regional ecosystem is present.	Copy of the certified regional ecosystem map for the Vegetation Management Act 1999. Online RE Maps, EPA, Brisbane. Accessed 5/11/08.
Fauna	Native fauna are able to access the reaches of interest.	Mine personnel
Economic use	There are no public roads or utilities crossing the reach of interest	Mine personnel and 2007 aerial photography
Groundwater	No information provided	

Hazard Category Assessment:

Heather's Dam Impacts

Failure to contain	Impact	Category
Loss or harm to humans	No contamination of a drinking water supply is expected	Low
Loss of stock	No contamination of a stock water supply is expected	Low
Environmental damage	No remnant endangered or of concern regional ecosystems are in the area that would be impacted.	Low
Dam break	**Impact**	**Category**
Loss or harm to humans	No loss of life is expected	Low
Environmental damage	No remnant endangered or of concern regional ecosystems are in the area that would be impacted.	Low
Direct economic loss	Appreciable direct economic loss is not expected.	Low
Indirect economic loss	Repairs to the dam would be practicable. Alternative water storages are available.	Low

Hazard Category as regards containment:	**LOW**
Design Storage Allowance criterion:	0.05 AEP 3 month wet season
Mandatory Reporting Level criterion:	0.05 AEP 72 hour storm
Hazard Category as regards dam break:	**LOW**
Spillway design criterion:	0.01 AEP peak discharge



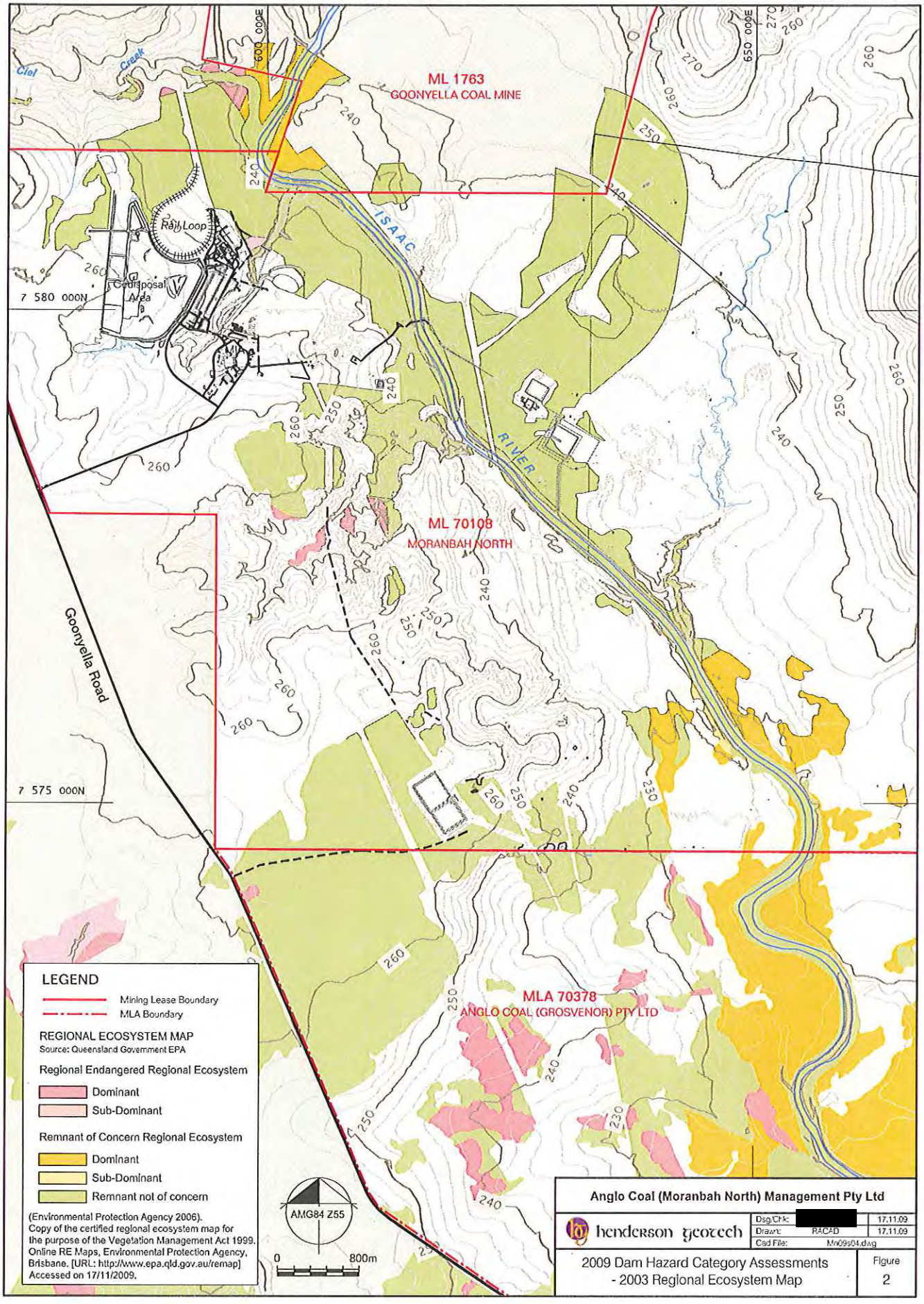
Anglo Coal (Moranbah North) Management Pty Ltd

henderson geotech

Dsg/Chk:	[redacted]	17.11.09
Drawn:	RA/AD	17.11.09
Cad File:	Mn09s03.dwg	

2009 Dam Hazard Category Assessments - Infrastructure Assets

Figure 1


ML 1763
GOONYELLA COAL MINE
ML 70108
MORANBAH NORTH
MLA 70378
ANGLO COAL (GROSVENOR) PTY LTD
Goonyella Road
ISAAC RIVER
Rail Loop
Coal Disposal Area
7 580 000N
7 575 000N
600 000E
650 000E
LEGEND
Mining Lease Boundary
MLA Boundary
REGIONAL ECOSYSTEM MAP
Source: Queensland Government EPA
Regional Endangered Regional Ecosystem
Dominant
Sub-Dominant
Remnant of Concern Regional Ecosystem
Dominant
Sub-Dominant
Remnant not of concern
(Environmental Protection Agency 2006). Copy of the certified regional ecosystem map for the purpose of the Vegetation Management Act 1999. Online RE Maps, Environmental Protection Agency, Brisbane. [URL: http://www.epa.qld.gov.au/remap] Accessed on 17/11/2009.
AMG84 Z55
0
800m
Anglo Coal (Moranbah North) Management Pty Ltd
henderson geotech
Dsg/Chk: [redacted] 17.11.09
Drawn: RACAD 17.11.09
Cad File: Mn09s04.dwg
2009 Dam Hazard Category Assessments - 2003 Regional Ecosystem Map
Figure 2

Appendix C

Annual Inspections of Regulated Dams Report

Anglo Coal (Moranbah North Management) Pty Ltd

Annual Inspections of Regulated Dams

October 2009

henderson geotech
The ***MINSERVE*** Group Pty Limited

23 McDonald St
HAWTHORNE 4171
ph: 07 3399 5020
fax: 07 3399 5019

CERTIFICATION

[redacted]
23 McDonald Street
Hawthorne Qld 4171

Statement of Relevant Experience

I am a geotechnical engineer, with the following qualifications:

BE (Civil) 1st Class Honours, QIT 1983

ME (Civil), QUT 1989

PhD (Civil Engineering), University of Adelaide 1993

RPEQ No. 4952 since 1996

MIE Aust, No. 33326+, NPER since 1996

Over more than twenty six years of professional practice I have:

- contributed to and managed geotechnical site investigations for roads, commercial and residential developments and earthfill dams;
- participated in research projects on decommissioning tailings dams, rehabilitation techniques for waste rock and coal mine spoil; rehabilitation of mining voids & spoil-void hydrology, and stakeholder engagement in assessment of mine rehabilitation;
- carried out annual dam inspections and audits of CHPP waste storage facilities at several coal mines in Queensland;
- undertaken designs and provided peer review of designs for dams and tailings storage facilities on minesites;
- undertaken and advised on water balance modelling for mines and mine closure.

As a result of the experience summarised above, I state that I have at least:

a) five years of experience and demonstrated expertise in the geomechanics of dams with particular emphasis on stability, geology and geochemistry, and

b) five years of experience and demonstrated expertise in investigation and design of dams; operation and maintenance of dams; and hydrology with particular reference to water management and estimation of extreme events;

and that I therefore meet the definition of 'suitably qualified and experienced person' as defined in Environmental Authority MIN100557107 for Moranbah North Coal Mine.

Statement of Certification

The material relied upon included:

- Visual observation of the dams by myself on 22/10/2009;
- Previous annual inspection reports;
- Catchment and storage capacity data included in the 2007 mine water balance model and interpreted from dam design drawings.

Results of the annual inspections were:

Production Dam: The embankment and spillway have adequate structural and geomechanical performance. The spillway does not have discharge capacity to meet the design criterion specified in the Environmental Authority. The dam does not have sufficient capacity to comply with Design Storage Allowance and Mandatory Reporting Level criteria specified in the Environmental Authority.

Environmental Dam: The embankment and spillway have adequate structural and geomechanical performance. The storage level on 1st November was below the Mandatory Reporting Level. The spillway does not have discharge capacity to meet the design criterion specified in the Environmental Authority. The dam does not have sufficient storage capacity to comply with the Design Storage Allowance criterion specified in the Environmental Authority.

Dam 1: The embankments and spillway works have adequate structural and geomechanical performance. The dam complied with hydraulic performance criteria specified in then Environmental Authority, namely spillway capacity and DSA and MRL freeboards.

Dam 2: The embankments are in adequate structural condition, except that the south-eastern corner needs to be raised 0.1m. The spillway works are in adequate structural condition and comply with the hydraulic performance criterion specified in the Environmental Authority. The dam also complied with DSA and MRL criteria specified in the Environmental Authority

Dam 4: The embankments and spillway works have adequate structural and geomechanical performance. The dam complied with hydraulic performance criteria specified in the Environmental Authority, namely spillway capacity and DSA and MRL freeboards.

I, [redacted] of 23 McDonald Street Hawthorne Queensland, being aware that it is an offence under Section 480 of the Environment Protection Act 1994 to provide false or misleading information, declare that the preceding information is true and correct to the best of my knowledge and I make this declaration believing the same to be true.

Signed **Date**

16-11-09

[redacted]

CONTENTS

1. PRODUCTION DAM

Inspected by: [redacted] Date: 22/10/2009

Description: Earth embankment across a natural drainage line, apparently comprising clayey soil core with coarse rejects batters.

Purpose: Main storage for CHPP water.

Actions Recommended from Previous Inspection:

- Repair the spillway channel and the adjacent embankment.
- Increase the spillway capacity if necessary to accommodate 0.001AEP peak flow.
- Provide additional mine water storage to enable Production Dam to meet the hydraulic performance appropriate to its assessed hazard category.

1.1 Observations

1.1.1 Embankment:

The dam embankment was in essentially the same condition as at previous annual inspections: the crest, which is also a road, was clear and level (Photo 1-1); the upstream batter was covered with coarse rejects but had only minor erosion and no structural movement (Photo 1-2); and the downstream batter showed the shallow slip that occurred a few years ago when spillway discharge scoured the toe but the failure had not progressed and no other movement was apparent (Photo 1-3).

1.1.2 Storage

The natural gully slopes forming the rear of the containment showed no signs of instability or significant erosion. The storage level was more than a metre below the spillway invert and a gauge post had been installed in front of the spillway. There had been obvious sediment build up in the storage over the past year, due to water that had been pumped directly from the underground workings (Photo 1-4).

Inflow from the underground started up during the inspection, and there was also overflow in from Sediment Traps 1 and 3. The offtake pump to the CHPP was operating.

1.1.3 Spillway

The single box culvert spillway was clear and functional (Photo 1-5). The channel leading downstream from the spillway, that was damaged during the January 2008 rain, had been repaired (Photo 1-6) and would now discharge flow up to its original capacity away from the embankment's downstream toe.

1.2 Assessment

The embankment was geomechanically stable and the spillway and spillway channel were in adequate structural condition.

The hazard category for the dam was assessed in 2008 as "Significant", based on the Department of Mines and Energy's *Site Water Management Technical Guideline for Environmental Management of Exploration and Mining in Queensland 1995.* The following hydraulic design criteria are nominated in Moranbah North Mine's Environmental Authority:

Spillway flow capacity:	0.001 AEP peak discharge
Mandatory Reporting Level	0.1 AEP 72hour storm runoff
Design Storage Allowance	0.1 AEP 3 month wet season + net inputs

The dam catchment remained 164ha, including the Co-Disposal Area and Sediment Traps 1 and 3. The design peak discharge was estimated as $32m^3/s$; however, the culvert spillway has a capacity of only $2.5m^3/s$, and in view of the damage caused by discharge in January 2008, the capacity of the downstream channel is probably less than that. With catchment losses ignored, the required freeboards are 900ML for DSA (550mm rainfall, using the conservative 'method of deciles') and 317ML for MRL (193mm rainfall). The 2007 mine water balance model recorded the capacity for Production Dam as 200ML. It could not be ascertained how much capacity has been lost to siltation in the past year.

Mine personnel advised the storage level on 2nd November as RL 243.5m, 1.23m below the spillway invert of RL 244.73m. However, in light of the preceding paragraph, the dam does not meet the hydraulic performance criteria specified in the EA.

1.2.1 Recommended Actions

1. Investigate and implement options for reducing the dam's catchment, increasing it's capacity and providing extra storage capacity elsewhere, in order to comply with the DSA and MRL performance standards specified with the EA

2. Provide additional passive discharge capacity to comply with the spillway performance standard specified in the EA.

1.3 Photographs

Photo 1-1: Production Dam, crest

Photo 1-2: Production Dam, upstream batter

Photo 1-3: Production Dam, downstream batter

Photo 1-4: Production Dam, storage

Photo 1-5: Production Dam, spillway

Photo 1-6: Production Dam, spillway channel

2. ENVIRONMENTAL DAM

Inspected by: [redacted] Date: 22/10/2009

Description: Earth embankment across a natural drainage line, apparently comprising clayey soil core with coarse rejects batters.

Purpose: Capture overflow from Production Dam and Sediment Trap 5.

Actions Recommended from Previous Inspection:

- Increase the spillway capacity if necessary to accommodate 0.001AEP peak flow.
- Provide additional mine water storage to enable Environmental Dam to meet the hydraulic performance appropriate to its assessed hazard category.

2.1 Observations

2.1.1 Embankment

The embankment had not changed noticeably since the previous annual inspection: the clay crest had wheel ruts to about 0.3m deep but no cracking or subsidence (Photo 2-1); the upstream face was covered with coarse rejects from a crest safety rill with the actual earthfill embankment batter only exposed at the toe (Photo 2-2); and the downstream batter, which was also covered with coarse rejects, likewise showed no structural movement or deep erosion (Photo 2-3).

2.1.2 Storage

The storage is bounded at the rear by Production dam and at the sides by moderate natural gully slopes. As in previous years, there was minor erosion where there was no vegetative cover but no slumping or slip failures.

The storage level was low at the time of inspection (Photo 2-2). Since the previous inspection, survey pegs had been installed to monitor water level relative to the spillway invert. The overflow from Sediment Trap 5 into Environmental Dam was not running. A diesel pump was present to transfer water to Stilling Basin but was not operating.

2.1.3 Spillway

The box culvert spillway at the southern end of the embankment remained in good condition and clear of obstruction (Photo 2-4). The geo-fabric and rock lining on the downstream channel, which had been damaged in the January 2008 rains, had been repaired during the past year (Photo 2-5). There was some soil amongst the rock but it was accepted that this was simply captured when the stockpiled rack was moved, as a continuous rock cover was obvious under the soil.

2.2 Assessment

The embankment was in adequate condition to contain mine water. The spillway culvert and the downstream channel were functional.

The hazard category for the dam was assessed in 2008 as "Significant", based on the Department of Mines and Energy's *Site Water Management Technical Guideline for Environmental Management of Exploration and Mining in Queensland 1995.* The following hydraulic design criteria are nominated in Moranbah North Mine's Environmental Authority:

Spillway flow capacity:	0.001 AEP peak discharge
Mandatory Reporting Level	0.1 AEP 72hour storm runoff
Design Storage Allowance	0.1 AEP 3 month wet season + net inputs

The dam catchment was unchanged at 24ha, including Sediment Traps 5. The design peak discharge was estimated as 11m^3/s; however, the culvert spillway has a capacity of only 2.4m^3/s. With catchment losses ignored, the required freeboards are 132ML for DSA (550mm rainfall, using the conservative 'method of deciles') and 46ML for MRL (193mm rainfall). The 2007 mine water balance model recorded the capacity for Production Dam as 66ML, that is, less than the DSA. The MRL would be RL 239.6m.

Mine personnel reported the storage level on 2nd November as RL 239.0m, 1.87m below the spillway invert of RL 240.87m and below the MRL. However, the dam cannot meet the DSA performance criterion specified in the Environmental Authority.

2.2.1 Recommended Actions

1. Investigate and implement options for reducing the dam's catchment, increasing it's capacity and providing extra storage capacity elsewhere, in order to comply with the DSA criterion specified with the EA

2. Provide additional passive discharge capacity to comply with the spillway performance standard specified in the EA.

2.3 Photographs

Photo 2-1: Environmental Dam, embankment crest

Photo 2-2: Environmental Dam, upstream batter

Photo 2-3: Environmental Dam, downstream batter

Photo 2-4: Environmental Dam, spillway

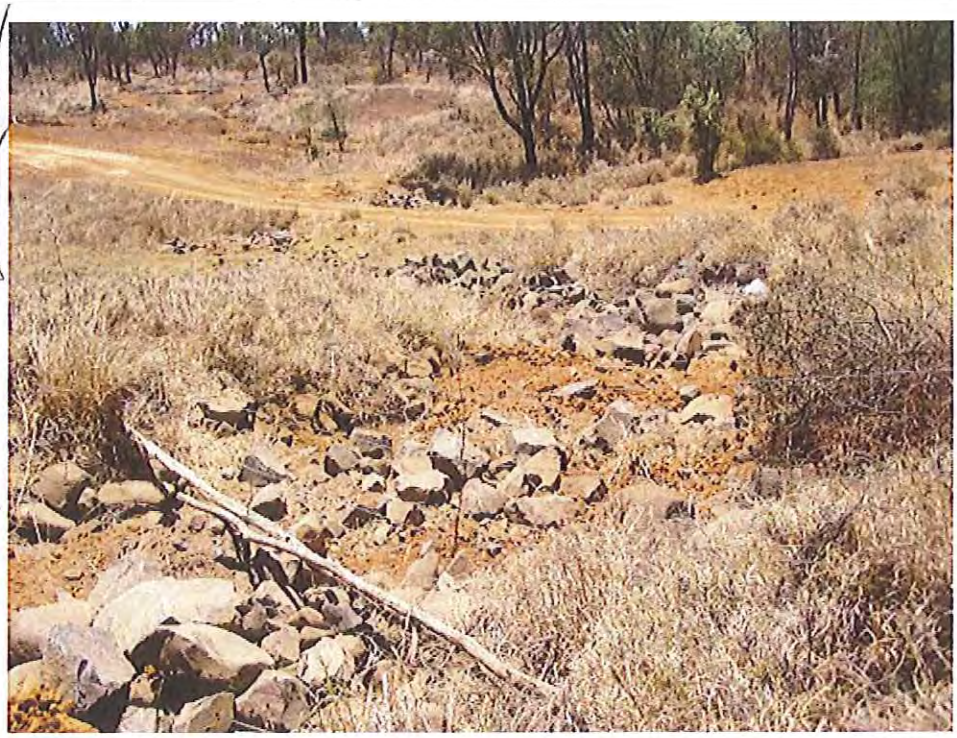


Photo 2-5: Environmental Dam, channel from spillway

3. DAM1

Inspected by: [redacted] Date: 22/10/2009

Description: Earthfill turkey's nest dams with geo-membrane lining over the base and inner batters

Purpose: Store and evaporate mine water.

Actions Recommended from Previous Inspection:

- Trim the geo-membrane at the spillway invert so that it sits flat against the embankment;
- Carry out earthworks to direct any spillway discharge away from the embankment toe;
- Mark the MRL on the liner near the pump installation;
- Continue to remove saplings from the embankment batters;
- Continue to restrict vehicle access along all embankments.

3.1 Observations

3.1.1 Embankment

Grass on the embankment crests had died back from the upstream edge, exposing more bare earth behind the geomembrane liner (Photo 3-1). There was frequent cracking 1-2mm wide along the outside of the liner anchor trench that was either due to shrinkage or to the pull of the liner earlier in the year when the dam was empty. The liner was not abnormally sagged and there was no suggestion of movement in the underlying batter. One tear in the liner was observed near the top on the northern embankment (Photo 3-2), apparently caused by an animal. Dams 1 and 2 were ringed by a barbed wire fence but one kangaroo or wallaby was inside the fence at the time of inspection and was not able to get out.

The eastern and western downstream batter was generally well grassed and had only a few small saplings (Photo 3-3) – mine personnel advised that saplings had been removed about three months ago. As at previous inspections, the outside of the northern embankment had more bare patches and some gully erosion but the crest remained intact.

The southern embankment is common with Dam 2. The crest had patchy grass cover away from wheel tracks (Photo 3-4). Low safety rills at each side obviously trapped runoff at times but there was no indication of this having damaged the embankment structure.

3.1.2 Storage

Mine personnel advised that during the year, water had been pumped to the dam directly from the underground workings. This water had a large suspended solids load that was deposited in the storage, to the extent that inlet and outlet pipes were buried (Photo 3-5) and therefore inoperable. It was also advised that a valve needed repair.

In the previous year an RO desalination plant was constructed near the eastern batter. It was not commissioned at the time of this inspection but was planned to take in underground de-water and to discharge the resultant brine into Dam 1.

A knotted rope had been laid down the upstream batter near the inlet/offtake infrastructure to allow monitoring of storage level relative to MRL. The level at the time of inspection was about RL 263.5m and below the MRL.

3.1.3 Spillway

As recommended at the previous inspection, the geo-membrane at the spillway had been trimmed to lie flatter against the embankment (Photo 3-6). A small cavity was noted at one end of the concrete invert – there was no evidence of surrounding erosion, so the cause was presumed to be in adequate backfilling when the spillway was constructed two years ago.

A bund of soil had been placed at one side of the spilling basin (Photo 3-7). This would have the desired effect of directing any spillway discharge away from the embankment, but the bund is likely to require ongoing maintenance to repair erosion damage.

3.2 Assessment

The embankments were in adequate condition to contain mine water. The spillway was functional and now substantially in accordance with the design. Inlet and outlet works were not operational.

The hazard category for the dam was assessed in 2008 as "Significant", based on the Department of Mines and Energy's *Site Water Management Technical Guideline for Environmental Management of Exploration and Mining in Queensland 1995.* The following hydraulic design criteria are nominated in Moranbah North Mine's Environmental Authority:

Spillway flow capacity:	0.001 AEP peak discharge
Mandatory Reporting Level	0.1 AEP 72hour storm runoff
Design Storage Allowance	0.1 AEP 3 month wet season + net inputs

The spillway was designed for the nominated discharge capacity and so is now considered compliant. For the turkey's nest catchment of 8ha the MRL volume is 15ML and the DSA volume is 44ML, which correspond to RL 265.04m and RL 264.66m respectively. (Sedimentation during the past year will have reduced storage capacity but only below these levels.) The storage level in Dam 1 was reported as RL 263.75m on 2nd November, and so was compliant with conditions specified in the Environmental Authority.

3.2.1 Recommended Actions

1. Repair the hole in the liner at the northern embankment and any other damage;
2. Fill the hole under the southern end of the spillway invert by tamping in gravel;
3. Extract the pipe ends from the sediment and repair the valve so that inlet and outlet lines can operate;
4. Continue to remove saplings from the embankment batters and backfill any subsequent holes with fill compacted by tamping;
5. Continue to restrict vehicle access along all embankments.
6. When the RO plant starts to operate, revise the dam's hazard category to take account of the change in water quality, the impact of embankment failure on the RO plant, and the change in net process inputs during the wet season.

3.3 Photographs

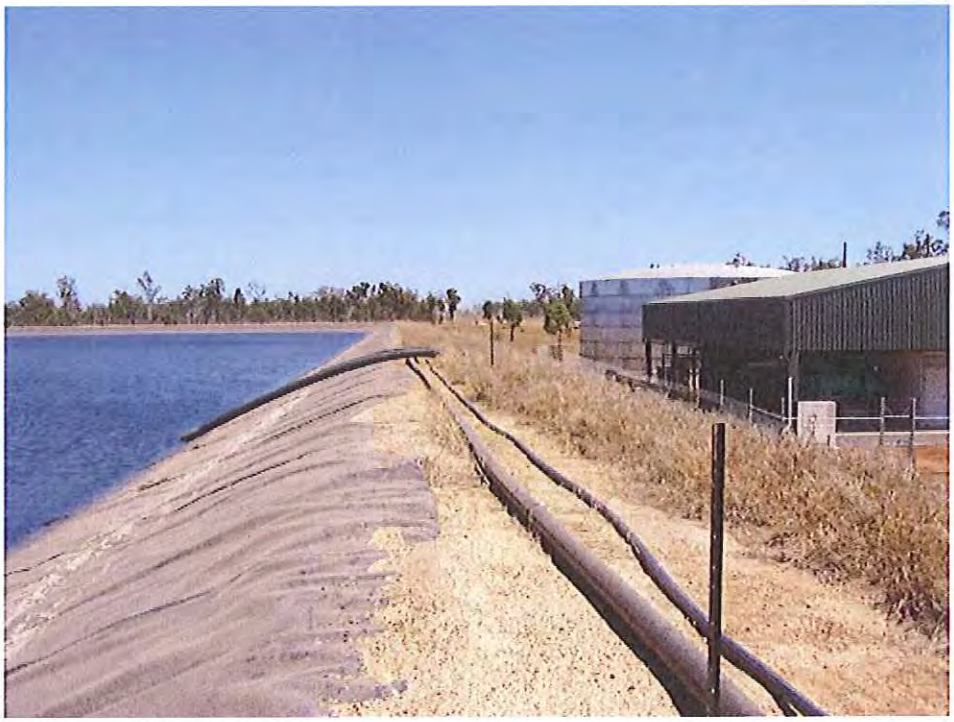


Photo 3-1: Dam 1, eastern embankment

Photo 3-2: Dam1, tear in liner at northern crest

Photo 3-3: Dam 1, eastern downstream batter

Photo 3-4: Dam 1 and Dam 2, shared embankment

Photo 3-5: Dam 1, storage

Photo 3-6: Dam 1, spillway

Photo 3-7: Dam 1, spillway stilling basin

4. DAM 2

Inspected by: [redacted] Date: 22/10/2009

Description: Earthfill turkey's nest dam with geo-membrane lining over the base and inner batters. The dam shares its northern embankment with Dam 1.

Purpose: Store and evaporate mine water.

Actions Recommended from Previous Inspection:

- Trim the geo-membrane and geo-textile around the spillway to sit flat against the embankment;
- Carry out earthworks to direct any spillway discharge away from the embankment toe;
- Restore the crest at the south-eastern corner to the same level as the rest of the embankment;
- Mark the MRL on the liner near the pump installation;
- Continue to remove saplings from the embankment batters;
- Continue to restrict vehicle access along all embankments.

4.1 Observations

4.1.1 Embankment

Like Dam 1, there was narrow cracking in the liner anchor trench, but no sign of structural movement under the liner or along the crest (Photo 4-1). The downstream batter of the eastern embankment had been topsoiled during the previous year and showed improved grass cover. The more severe erosion on the southern downstream batter had not been repaired (Photo 4-2) but had not increased noticeably either.

A new inflow pipe for underground dewatering had been run over the crest at the south-eastern corner. The shallow gully across the crest had been filled and erosion resistant matting had been laid under the pipe but the gully along the crest had not been repaired (Photo 4-1) and there was no evidence that the fill had been keyed in or compacted. At the previous inspection, this location was noted as requiring a slight raise to bring it to consistent level with the rest of the embankments.

4.1.2 Storage

Elevations were painted on the liner near the main pipe installation and showed the storage level at inspection as about RL 264m. Like Dam 1, pipe ends had become buried in sediment and so were inoperable except for one pipe delivering a trickle of flow from gas drainage operations.

4.1.3 Spillway

Geo-membrane and geo-textile at the spillway had been trimmed as recommended at the previous inspection and were essentially flat with the concrete invert (Photo 4-3). An earthfill bund had been constructed at one side of the stilling basin to prevent discharge flowing against the embankment toe (Photo 4-4). Reference to a contour plan confirmed that the bund was on the low side of a slight gradient and would be effective.

4.2 Assessment

The embankments were in adequate condition to contain mine water except that the structural crest at the south-eastern corner was about 0.1m below the rest of the dam. The spillway was constructed to design. Inlet and outlet pipes to other mine storages were not operational because the ends were blocked.

The hazard category for the dam was assessed in 2008 as "Significant", based on the Department of Mines and Energy's *Site Water Management Technical Guideline for Environmental Management of Exploration and Mining in Queensland 1995.* The following hydraulic design criteria are nominated in Moranbah North Mine's Environmental Authority:

Spillway flow capacity:	0.001 AEP peak discharge
Mandatory Reporting Level	0.1 AEP 72hour storm runoff
Design Storage Allowance	0.1 AEP 3 month wet season + net inputs

The spillway was designed for the nominated discharge capacity and so is now considered compliant. For the turkey's nest catchment of 6.4ha the MRL volume is 12ML and the DSA volume is 36ML, which correspond to RL 265.06m and RL 264.80m respectively. The storage level in Dam 2 was reported as RL 263.9m on 2nd November, and so was compliant with conditions specified in the Environmental Authority.

4.2.1 Recommended Actions

1. Strip the crest at the south-east corner and compact fill to restore the crest to the same level as the rest of the embankment;
2. Extract the pipe ends from the sediment and repair the valve so that inlet and outlet lines can operate;
3. Continue to remove saplings from the embankment batters and backfill any subsequent holes with fill compacted by tamping;
4. Continue to restrict vehicle access along all embankments.

4.3 Photographs

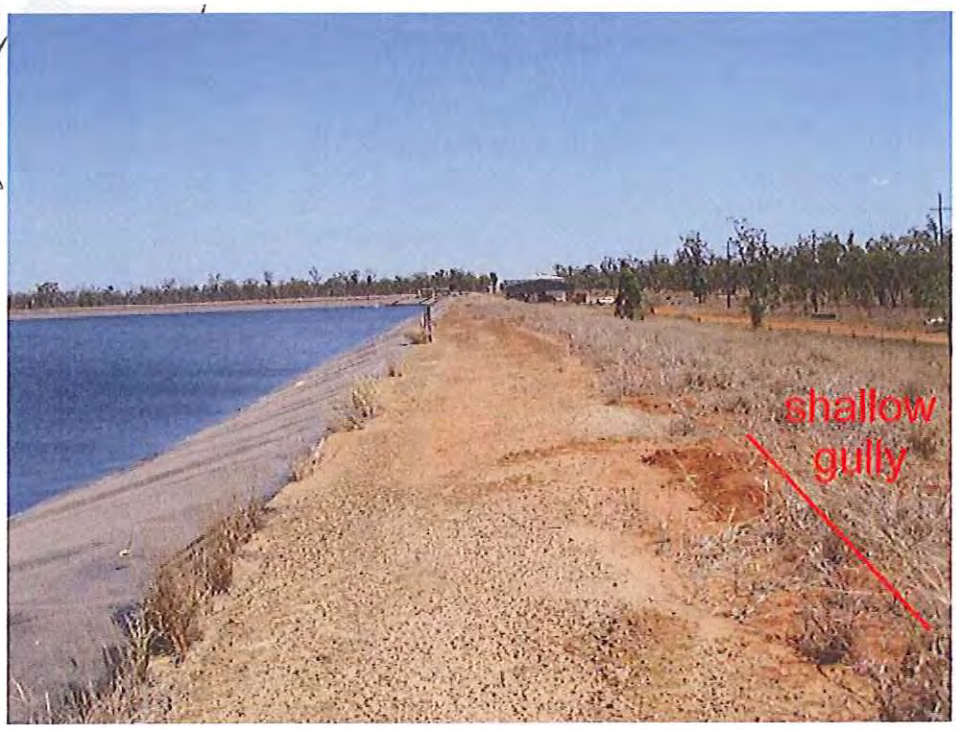


Photo 4-1: Dam 2, eastern embankment

Photo 4-2: Dam 2, southern embankment downstream batter

Photo 4-3: Dam 2, spillway

Photo 4-4: Dam 2, stilling basin

5. DAM 4

Inspected by: [redacted] Date: 22/10/2009

Description: Poly-lined storage formed by excavation to 12m below ground level and construction of homogenous earthfill embankments to 5m above ground level. A central embankment juts about half-way into the storage.

Purpose: Store and evaporate mine water, in particular water extracted during mine dewatering.

Actions Recommended from Previous Inspection:

- Trim and lay 150mm of compacted gravel on the crest to reduce infiltration;
- Install and commission the pump and pipes to allow water to be removed to other mine storages;
- Add a bend or diffuser to the end of the discharge pipe so that concentrated flow is not directed onto the side of the stilling basin.

5.1 Observations

5.1.1 Embankment

Since the previous inspection, the crests of all embankments had been covered with a gravel layer, as recommended (Photo 5-1). Downstream batters had also had gravel spread and were in the process of being hydro-mulched. Through these works, the erosion damage noted in the previous annual inspection had been repaired.

The liner that covered the upstream batters appeared to be in good condition with no obvious holes. There was water ponded beyond the toe of the north-eastern embankment but this was due to constrained surface drainage and therefore did not indicate seepage from the dam.

5.1.2 Storage

The storage level at the time of inspection was about RL237m, that is, 0.9m below the spillway invert. During the year water had been piped in from underground workings (Photo 5-2) but that had stopped because the off-take pump was not yet working and the dam had filled to normal maximum operating level. During the inspection only a small volume was flowing in from the blowers.

Water in the storage clearly carried a high load of coal and other fines, which would be reducing storage capacity by an uncertain amount.

A Mandatory Reporting Level and Design Storage Allowance level were painted onto the liner near where the return pump will be located when it is operable.

5.1.3 Spillway

The spillway was in good condition and had clearly not experienced discharge (Photo 5-3).

The pipe running around the dam from the north-eastern side, was still present but during the inspection a mine representative moved it so as not to discharge into the stilling basin (Photo 5-4). Water currently in the storage was not of acceptable quality for discharge (even if the outlet pump was working) so the pipe is unlikely to be used. The drain downstream of the stilling basin was unlined and is likely to be prone to erosion.

5.2 Assessment

The dam embankment was in adequate structural and geomechanical condition to contain mine water. The spillway was also in sound structural condition. There were no operable controlled outlet works at the time of this inspection.

The hazard category for the dam was assessed in the Design Plan as "Significant". The following hydraulic design criteria are nominated in Moranbah North Mine's Environmental Authority:

Spillway flow capacity:	0.001 AEP peak discharge
Mandatory Reporting Level	0.01 AEP 72hour storm runoff
Design Storage Allowance	0.1 AEP 3 month wet season + net inputs

The spillway was constructed to a design based on the nominated discharge capacity and so is considered compliant. As Dam 4 is a turkey's nest the freeboard depth below spillway level is approximately equal to the design rainfall. On this basis, the DSA level is RL 237.35m and the MRL is RL 237.57m, compared with RL 237.25m and RL 237.7m respectively as marked on the dam liner. Despite these small discrepancies, the storage level was reported as RL 237.0m on 2nd November and hence the dam was compliant with conditions specified in the Environmental Authority.

5.2.1 Recommended Actions

1. Install and commission the pump and pipes to allow water to be removed to other mine storages.
2. Change the MRL marked on the liner to RL 237.57m;
3. Close the end of the pipe that would discharge into the spillway channel to prevent inadvertent unauthorised discharge'
4. Unless sediment removal is implemented at the underground workings, re-survey the storage capacity - such as by bathymetry or emptying the dam – at least every two years.

5.3 Photographs

Photo 5-1: Daw 4, embankment

Photo 5-2: Dam 4, inlet pipes

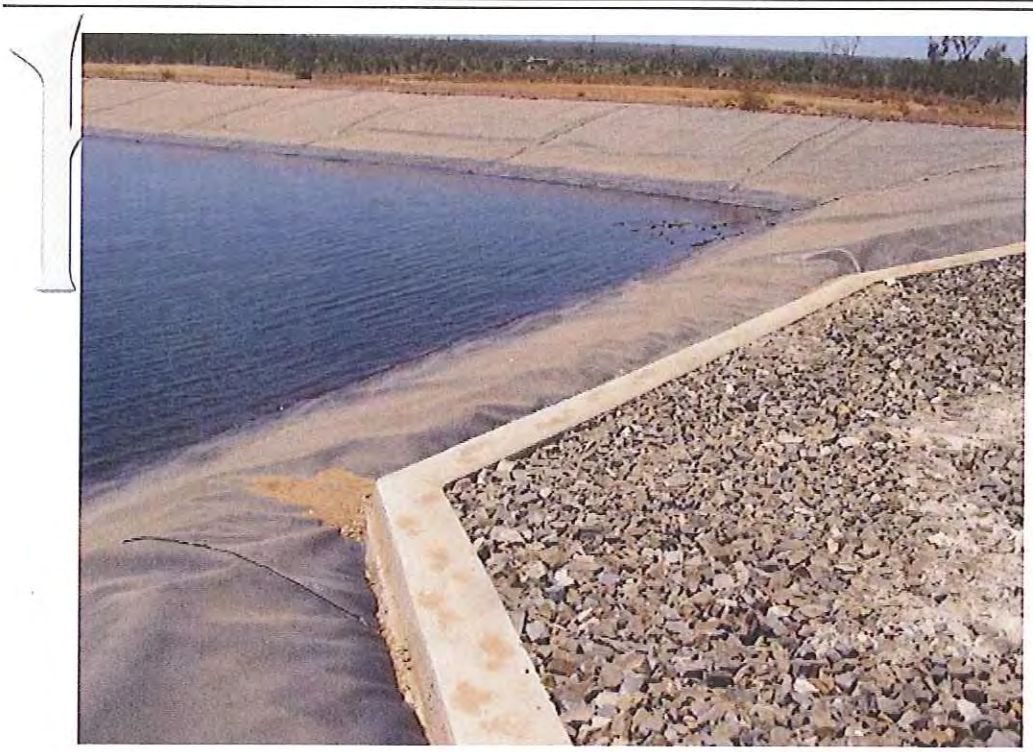


Photo 5-3: Dam 4, spillway

Photo 5-4: Dam 4, downstream from stilling basin

Moranbah North Coal

ANGLO COAL

28th of May 2010

[redacted]

Senior Environmental Officer
Environmental Protection Agency
PO Box 906
EMERALD QLD 4720

Anglo Coal (Moranbah North Management) Pty Ltd.

[redacted]

General Manager
Moranbah North Mine
Direct Line [redacted]

e-mail; [redacted]

Dear [redacted]

Please find attached the revised Transitional Environmental Program (TEP) for Design Storage Allowance Compliance at Moranbah North Mine, Mining Lease 70108.

This TEP is submitted as requested in your letter dated 27th of May 2010 (File/ Ref: EMD136).

A bound copy of both the TEP has been sent by mail today for your records.

If you require any additional information please do not hesitate to contact me.

Yours sincerely

[redacted]

General Manager
Anglo American Metallurgical Coal
Moranbah North Mine

TRANSITIONAL ENVIRONMENTAL PROGRAM

AMENDMENT (MAN10140)

MORANBAH NORTH COAL PTY LTD

MIN100557107

WORKED WATER MANAGEMENT

SUBMISSION 22 FEBRUARY 2011

COMPLETION 24 FEBRUARY 2012

Index

EXECUTIVE SUMMARY

Moranbah North Mine is located approximately 18km north of Moranbah in Central Queensland. Mining is via conventional longwall operation with drift underground access. Surface infrastructure consists of a coal preparation plant and associated coal handling facilities including rail load out, co-disposal area, raw and product stockpiles and water management structures.

Longwall operations commenced in 1999 and the mine has a current production of around 4.1Mtpa. Current operations are associated with longwall panels LW108 and LW202. Co-disposal of coarse and fine rejects is undertaken with deposition into a prepared area located to the immediate west of the Industrial Area.

Central to the ongoing viability of the Moranbah North Mine is:

- Access to Raw Water;
- Effective management of Worked Water (mine affected Raw Water);
- Continued safe operation;
- Reliability of production assets.

Changes to the MNM Environmental Authority (EA) in 2009, restrict the mines ability to discharge Worked Water to the Isaac River during natural flow events. These changes, and other influences discussed in Section 2.4, have seen the total Worked Water stored onsite increase to levels approaching Mandatory Reporting Level (MRL). This information has been communicated to DERM as required under Section A8 of the EA and a Program Notice was subsequently submitted. In response DERM requested submission of a TEP detailing the considerations and recommended actions required to bring the water balance at Moranbah North into compliance with the current EA requirements.

Where actions potentially require dispensation from current EA conditions these are clearly identified in Section 5 - Proposed actions.

Should the proposed actions fail to reduce the need to store Worked Water then MNM may need to:

- Continue to store Worked Water above MRL whilst alternative solutions are developed that will reverse the trend;
- Discharge.

It should be noted that any discharge would occur in accordance with standard practice prior to December 2008, with environmental monitoring failing to identify significant environmental harm in receiving waters during previous release events.

1 INTRODUCTION

1.1 Background

Anglo Coal (Moranbah North Management) Pty Ltd (MNM) engaged Water Solutions Pty Ltd (WSPL) to assist with the development of the Transitional Environmental Program (TEP) covering Worked Water Management at MNM.

The Transitional Environmental Program (TEP) outlined actions that Moranbah North Mine (MNM) proposed to (and have already completed) undertake over a period of 14 months to deliver compliance with the site Environmental Authority (EA) MIN 10055717.

The TEP was prepared in response to a request from DERM dated 23rd March 2010 (Ref MIN100557107) following their review of the MNM Program Notice submitted 9th of March 2010. Lodgement of the TEP was required by the 18 May 2010. Approval of the Worked Water TEP was received on the 8th of August 2010.

Implementation of the current TEP for Worked Water has identified that opportunities to discharge worked water can be improved. Issues exist where the current discharge location identified within the TEP (from the Environmental Dam spillway) and the existing flow requirement for the Isaac River exposes the mine to non-compliance. This is as a result of the river flow rate dropping to below the required flow rate for discharge, while the discharge continues as a result of the flow associated with the co-disposal catchment area taking longer to cease.

This document incorporates the existing Worked Water Management TEP and outlines proposed amendment to reducing the flow required in the Isaac River for discharge to occur from the Environmental Dam discharge point. Mitigation of any potential environmental harm is addressed by dilution of the discharge with non-contaminated water from the stilling basin which can be released at the Environmental Dam spillway discharge point.

1.2 Objective

The objective of this TEP is to identify actions required to deliver compliance with the site EA within the nominated TEP period while mitigating and eliminating potential environmental harm through best practice activities in discharge management.

1.3 Compliance Requirements

Previous Worked Water discharges from site to the Isaac River during 2010 were not compliant with the site EA conditions (refer W3 and W2), as evidenced by fines imposed by DERM in March 2010 (DERM reference: EMD 137) and a warning notice in December 2010.

In response to these non-compliances, an Incident Management Team (IMT) was established at MNM to investigate and recommend actions to achieve compliance with the site EA.

The actions in this TEP have been identified following consideration of the following:

- Legislative compliance:

  Compliance to the Environmental Protection Act 1994, Environmental Protection Regulation 2008 and the Environmental Authority (Permit Number: MIN100557107 – Moranbah North Coal Mine). Consideration has been focused on how the Environmental Management System (EMS) can be better designed and implemented to ensure compliance. Stakeholders include MNM Site Leadership Team, AAMC and DERM.

- Community expectations and social engagement:

  MNM's Social Licence to Operate. This area of consideration revolves around the socially responsible use of raw water, the ability to recycle Worked Water and optimising site evaporation capabilities. Stakeholders include the properties associated in the near and downstream areas adjacent to the mine, Fitzroy Water Quality Advisory Group and the Isaac Regional Council.

- Sustainable operation:

  The area for consideration has been around the financial impacts of delivering/ using Worked Water (high in salt 8,000 – 10,000 uS/cm) into the production process underground. The key areas of focus have been:

  Increased health and safety risks:

  Underground Longwall Mining utilises high pressure hydraulic systems in face operations. The health and safety risks associated with operating these systems in close proximity to Mine Workers requires a thorough and effective maintenance system. These maintenance systems require MNM to identify the safety critical equipment (e.g. hydraulic hoses and valves) and to understand the mean time to failure for this equipment. Replacement of these items is then scheduled and effected before the mean time to failure.

  Introduction of Worked Water into these hydraulic systems is expected to dramatically reduce the mean time to failure. At the time of writing this TEP it is unclear exactly what the reduction in mean time to failure will be for specific equipment.

  Whilst MNM will endeavour to manage these risks, to as low as reasonably achievable, there needs to be recognition that the properties of the Worked Water are outside Original Equipment Manufacturer (OEM) specifications.

  Note: The risk of a serious injury or fatality to Mine Workers, as a result of an unexpected premature failure of safety critical equipment, is a significant area of concern for MNM and needs to be a key point of consideration when assessing this TEP.

  Ongoing viability of the operation:

  The current mining equipment runs on raw water (<400µS/cm) supplied from Eungella Dam. Introduction of Worked Water, above the OEM specification of 800µS/cm, is likely to reduce the production availability of the Longwall Mining Equipment (currently 33%) and profitability of the Moranbah North Mine.

  This reduced profitability could impact the ongoing viability of the mine thereby directly jeopardising 550 primary jobs at MNM and remove an annual spend of $371 million, including $61 million in royalties.

  Note: Environmental Monitoring during previous discharge events have failed to identify significant environmental harm to the receiving waters. This is a fact that is supported by conducted during discharges. This and the ongoing viability of the operation needs to be a key point for consideration when assessing this TEP.

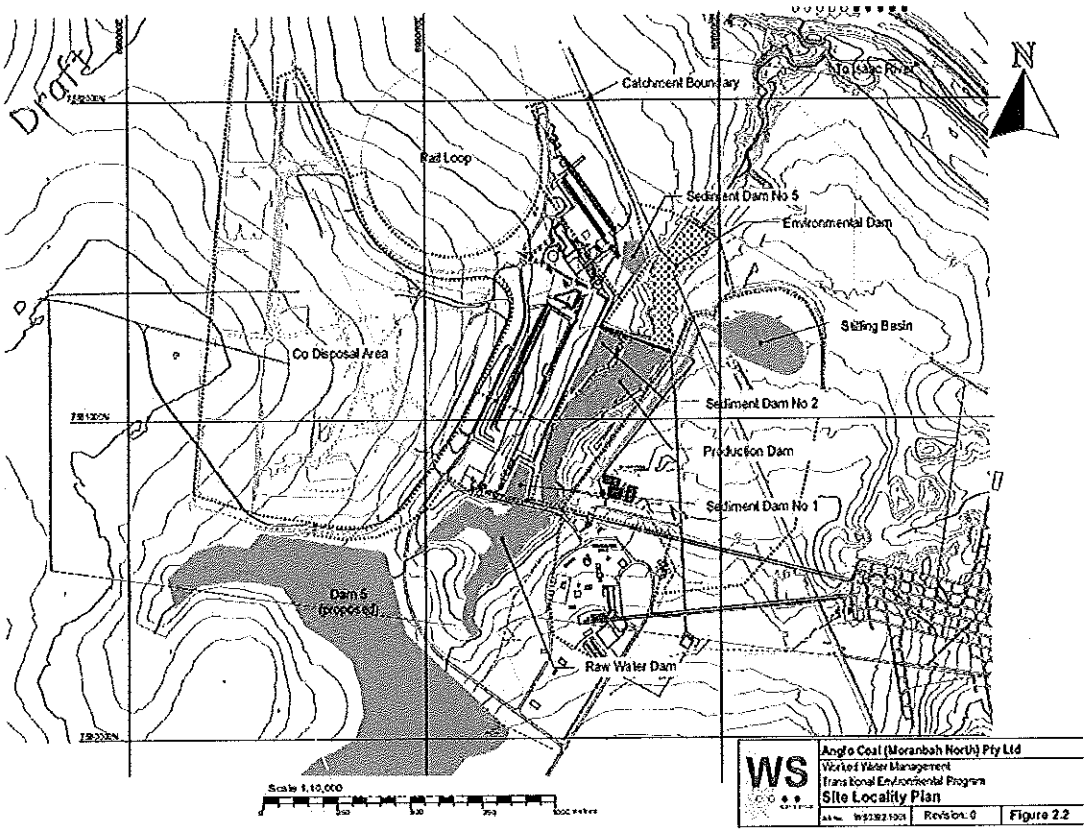


Figure 2.2 detailed layout plan of the Industrial Area showing the major water management infrastructure including proposed Dam 5

2 CURRENT STATUS

2.1 Worked Water Management System - Overview

MNM have identified a Worked Water management system to achieving compliance with both Anglo American Metallurgical Coal (AAMC) and regulatory requirements. A key component of this system is the MNM Operational Simulation (OPSIM) model which simulates the operation of the Worked Water management system on a daily time step basis whilst keeping account of all site water and representative water quality. Background details of the MNM OPSIM model are contained in the WSPL Report WS090544.

The Worked Water inventory status as at 13th December 2010 is summarised in Table 2.1.

Table 2.1. Worked Water Storages – Inventory Status

Storage Name	Inventory (13 Dec 2010) (ML)	Full Supply Volume (ML)	Mandatory Reporting Level (ML)
Production Dam	200	200	180[2]
Environmental Dam	60	66	20[1]
Dam 1	77	160	145[1]
Dam 2	173	267	255[1]
Dam 4	403	476	457[1]

Note: 1/ Reference from *Annual Inspection of Regulated Dams October 2009 (Henderson Geotech).*

2/ For the purposes of the TEP period, MNM have adopted 200ML as the effective MRL for the Production Dam, pending approval of the Hazardous Dam TEP (submitted 1 April 2010 to DERM) and construction of proposed Dam 5.

2.2 Circumstances Leading to Current Site Position

A review of site operations over the last 3 years has identified that the following issues have contributed to the current situation at MNM.

Increasing Underground Raw Water Consumption

The inability for site to reduce Worked Water inventory via active discharge has been compounded by increases in raw water consumption by underground mining operations.

In 2005, underground raw water consumption was 113L/tonne of coal mined and by early 2010 this had increased to 175 L/tonne– this equates to a 64% increase raw water consumption with no corresponding increase in site containment capacity.

The impacts of this change are the principal reason for the current site Worked Water imbalance.

Changes to EA Discharge Requirements

The MNM EA was amended in December 2008 with reductions in the "end of pipe" discharge limits from <10,000µs/cm to <1,500µs/cm during flow events in the Isaac River. Given the salinity of MNM Worked Water (typically 8,000-10,000us/cm) this change effectively removed the ability for MNM to discharge during Isaac River flow events.

Previous site practice was to discharge 200-300ML from Dams 1, 2 & 4 during natural flow events, thereby creating additional storage capacity within the MNM Worked Water system. Changes to the EA mean Worked Water which would previously have been released during large flow events has accumulated in the Worked Water circuit.

Change Management was not applied to identify and manage the risks associated with the site EA changes.

EMS – Water Balance

The current Water Balance Procedure (3.3 Water Balance), contained within the MNM Environmental Management System (EMS), does not incorporate Trigger Action Response Plans (TARP's) to provide advanced warning and escalate actions to control the site Water Balance in

accordance with the current EA As a consequence, the water imbalance was not identified early enough to enable MNM to address the relevant issues prior to reaching site MRL.

3 FUTURE REQUIREMENTS

In understanding the future requirements for MNM, the following were considered:

- Legislative Compliance
  - At the completion of the TEP site must be compliant with EA conditions.
- Community Expectations
  - The actions recommended in the TEP must be consistent with community expectations as they relate too responsible use of raw water and impacts on receiving waterways.
- Social Engagement
  - The TEP must consider avenues for the engagement of and consideration of stakeholders concerns.
- Sustainable operation
  - Corporate Compliance
    At the completion of the TEP, site must be compliant with both AAPIc values and the *Anglo Environment Way.*
  - Effective EMS
    During the TEP process the site EMS must be reviewed and updated so that the system defines sustainable outcomes.
  - Rehabilitation
    The TEP must consider potential harm to the environment. Harm should be avoided where possible, with remedial strategies defined where necessary.
  - Ongoing Viability of the Business
    Proposed TEP actions must deliver solutions that do not compromise the ongoing viability of the mine. Specifically consideration must be given to the financial, health and safety impacts of introducing Worked Water into the underground production raw water circuit.

4 IDENTIFIED IMPROVEMENT OPTIONS

The following areas of opportunity were identified as potential actions for this TEP.

4.1 Behavioural

Education and awareness of responsible water management on site

Deliver training to improve workforce understanding of the Raw and Worked Water management systems function and the responsible use of these systems (ie. align business values).

Assignment of site role related KPI's

Include a KPI into relevant Performance Reviews which represents a 50% reduction in the use of Raw Water for 2010/11 Year.

No. of Lt's of Water/ Tonne of coal mined. (Equivalent to 500Ml use for 2010/11 water year)

4.2 Eliminate Raw Water Use Onsite

Surface

Quantify current surface use of Raw Water and develop strategies to reduce consumption.

Note: The TEP must consider potential environmental harm from alternative uses of saline water. Harm should be avoided where possible, with remedial strategies defined where necessary.

Underground

Quantify current underground use of Raw Water and develop strategies to reduce consumption. Investigations to-date have identified the ability to reduce raw water use by:

- maintaining con-flow valves on conveyor sprays ,
- Reinstalling heat exchangers on the LW and conveyors thereby preventing release of cooling water underground.
- Utilizing Automatic Raw Water shut off when the longwall's are not operating, and
- Repair leaking hoses/ pipes.

Nominal these reductions could be expected to achieve up to 500kL/day in raw water use savings.

4.3 Substitute Raw Water for Worked Water

Water replacement / Substitution

Identify opportunities from the above and replace Raw Water use with Worked Water where risks are deemed acceptable having consideration for the Future Requirements detailed in Section 3.

Desalination Plant

Commission the Desalination Plant and introduce permeate to the raw water system to reduce reliability on raw water import. At present commissioning of the desalination plant is not authorised under the current EA and this issue must be addressed through this TEP.

4.4 Engineering Controls

Additional evaporative surface area

Optimise the evaporative capacity of Dam 5 to ensure sustainable outcomes post-TEP operation.

- Construction and commissioning of Dam 5 (nominal capacity 1,310ML). A TEP was lodged with DERM on the 1st of April containing this action.

- Storing Worked Water in Dams 1, 2 and 4 above Mandatory Reporting Level without discharging. This would give MNM an additional 35Ml storage.

Underground

Consider utilisation of the bored and pilar area for Worked Water storage as a short term strategy until Dam 5 is available. Investigation has found that underground storage in decommissioned bord and pillar areas is not a viable option as these areas are full from groundwater ingress.

Additional storage could potentially be achieved in the 100 series goafs by increasing the RL of the Pleuger Pump at LW105. Investigations have found that this is not a viable option as the current seals on the LW107 panel holding this water in place are not designed/ rated to retain significant amounts of Worked Water.

4.5 Discharge Management

Off-lease beneficial use

Neighbouring mines and farmers have been asked if they could utilise MNC Worked Water. Given the salinity of Worked Water, all have declined at this stage.

Diluted with imported Raw Water

MNC has a current ability to dilute Worked Water with Raw Water and discharge either to pasture or the Isaac River. Given the quantity of Worked Water required to be discharged (nominally around 300ML) and the associated flow dilution ratio (20%, which equates to 1,200ML Raw Water) this would result in 1,500ML of diluted water discharged annually to receiving waters. While the current MNM raw water pipeline does not have the capability to deliver this quantity of water this option is considered environmentally and socially unacceptable.

Diluted with flood harvested Raw Water

MNM does not have a license or the ability to harvest flood water from the Isaac River for the purposing of diluting Worked Water.

Diluted with site catchment harvested Raw Water

MNM does not have the infrastructure to catchment harvest raw water. The yield from this arrangement would be insufficient to make any significant impact on the current Worked Water site inventory. Return on investment (ROI) is not acceptable from a business perspective.

Diluted with permeate

MNM has the capability to produced 2ML/day of permeate (at around 800µs/cm). This could potentially be used to dilute Worked Water at a nominal 40/60 dilution ratio to enable discharge of 3.8ML/day at around 5,000µs/cm.

Note: The preference for the permeate stream is for substitution of imported raw water further reducing site containment requirements, not discharge.

Discharge to pasture (irrigation)

MNM has capability to discharge 2ML/day of permeate to pasture or to the Isaac River during a flow event. Again, preference for the permeate stream is for substitution of imported raw water further reducing site containment requirements.

Undiluted (direct to river)

This action is not authorised under the current MNM EA. Previous application via TEP seeking

reinstatement of previous discharge criteria with DERM were unsuccessful. This is considered a viable option given current community expectations.

The key component modified within this TEP relates to the flow rate requirement for discharge from the Environmental Dam discharge point, decreasing required flow from $5m^3$/sec to $2.5m^3$/sec. This is designed to eliminate non-compliance for flow in the Isaac River. As identified in the notification reports supplied to DERM during recent releases, the volume discharged from this point is significantly less than the permitted 20%.

To mitigate the potential of causing environmental harm MNM proposes to accelerate the flow by installation of a diesel pump. The pump is stated as able to deliver 75-80l/sec and has been site inducted. When sufficient flow in the Isaac River is reached the pump will be turned on. If the flow in river decreases to $<5m^3$/sec and discharge continues the stilling basin water valve will be turned on to dilute discharge from the environment dam.

4.6 Administrative Controls

- Develop and implement Trigger Action Response Plans (TARPs) for Worked Water management into EMS.
- Develop and implement an Environmental Management Assurance Program – Corporate initiative currently being developed for AAMC. Need to consider requirements to expedite this program to better align site performance with A/A Plc expectations.
- Review the site Water Management Standard to include yearly refresher awareness for the workforce in responsible water use.

5 PROPOSED ACTIONS

The following actions drawn from above are proposed for this TEP. A detailed project plan containing responsible persons and due dates for action completion is attached in Appendix A.

Summary details are provided in Table 5.1.

Table 5.1 – MNC Worked Water TEP – Proposed Actions Summary Details

Proposed Actions		Completion Date
Behavioural		
❑ Education and awareness of responsible water management on site		Completed
❑ Assignment of site role related KPI's Community Expectations		01/07/10
Stakeholder Engagement		
MNM will extend and open invitation to DERM, the Fitzroy Water Quality Advisory Group and the Isaac Regional Council to attend site for the purposes of discussing this TEP or any other environmental topic.		
Eliminate Raw Water Use Onsite		
❑ Reduction of Raw Water Usage (Surface)	➢ Cease Raw Water use in the Clarified Water Tank – CHPP	Completed
❑ Reduction of Raw Water Usage (Underground)	➢ Maintain con-flow values	Completed
	➢ Reinstall heat exchangers on the LW and conveyors – cooling water not discharged to ground.	Completed
	➢ When longwalls are not operating, close the raw water valve.	Completed
Substitute Raw Water for Worked Water		
❑ Recycling of Worked Water	➢ Commission the Desalination Plant and introduce permeate to the raw water circuit. (Replaces 2Ml/dy of Raw Water use)	Completed
	➢ Reroute underground water network to establish 2 independent circuits. Permeate to face units and treated worked water to outbye uses (e.g. conveyor sprays)	Completed and trialling
	➢ Introduce treated Worked Water into the Worked Water circuit underground. (Replaces deficit between permeate and total underground daily use)	Completed and trialling
Engineering Controls to Improve Evaporation Effectiveness		
❑ Increasing site Worked Water storage capacity	➢ Optimise natural evaporative design capability of Dam 5 to assist with sustainable outcomes post TEP.	Completed

	➢ Construction and commissioning of Dam 5 (nominal capacity - 1,310ML).	October 2011
❑ Discharge management	➢ **Environmental Dam Spillway** Electrical Conductivity readings have historically been about 5,000µS/cm during discharges. Discharge would only be authorised when the Isaac River is flowing at or greater than $5m^3$/sec as the river rises, but continue to $2.5m^3$/sec as the river flow decreases (if needed). Discharge monitoring would be conducted at the Environmental Dam Spillway and 500m downstream of the Service Creek flow into the Isaac River. Both passive and active discharge would occur during appropriate flow conditions through installation of a diesel pump. The release of contaminants from the Environment Dam will occur in accordance with this Transitional Environmental Program. The release of contaminants under this approval will cease on **10 January 2012.**	10 January 2012
Administrative Controls		
❑ Develop and implement Trigger Action Response Plans (TARPs) for Worked Water management into EMS.		Completed & reviewing
❑ Develop and implement an Environmental Management Assurance.		2011

Discharge Management
In carrying out this Transitional Environmental Program, Moranbah North Coal Pty Ltd will undertake all activities in accordance with the following conditions.

Undertaking the release of mine affected water

1 Contaminants that will, or have the potential to cause environmental harm must not be released directly or indirectly to any waters except as permitted under this Transitional Environmental Approval – Certificate of Approval, unless otherwise authorised to under the *Environmental Protection Act 1994*.

2 The release of contaminants to waters must only occur from the release points specified in Table 2 and depicted in Appendix D attached to this Transitional Environmental Program.

3 The release of contaminants to waters must not exceed the release limits stated in Table 4 at the monitoring points specified in Table 2 and Table 3 of this Transitional Environmental Program.

4 The release of contaminants to waters from the release points must be monitored at the locations specified in Table 2 and Table 3 for each quality characteristic and at the frequency specified in Table 4 and Table 5 of this Transitional Environmental Program.

5 If quality characteristics of the release exceed any of the trigger levels specified in Table 5 during a release event, the Transitional Environmental Program holder must compare the downstream results in the receiving waters identified in Table 7 to the trigger values specified in Table 5 and:
a) where the trigger values are not exceeded then no action is to be taken

b) where the downstream results exceed the trigger values specified Table 5 for any quality characteristic, compare the results of the downstream site to the data from background monitoring sites and
   i) if the result is less than the background monitoring site data, then no action is to be taken or
   ii) if the result is greater than the background monitoring site data, complete an investigation in accordance with the ANZECC & ARMCANZ 2000 methodology, into the potential for environmental harm and provide a written report to the administering authority in the next annual return, outlining
      1) details of the investigations carried out
      2) actions taken to prevent environmental harm.

6 If an exceedance in accordance with condition 5(a)(ii)(2) is identified, the holder of the Transitional Environmental Program must notify the administering authority within 24 hours of receiving the result. The notification must include written verification of the exceedance forwarded to the administering authority either via facsimile [redacted] or email to [redacted]

Receiving environment monitoring and contaminant trigger levels

7 The quality of the receiving waters must be monitored at the locations specified in Table 7 for each quality characteristic and at the monitoring frequencies stated in Table 8.

8 If quality characteristics of the receiving water at the downstream monitoring points exceed any of the trigger levels specified in Table 8 during a release event the holder of this Transitional Environmental Program must compare the downstream results to the upstream results in the receiving environment and:
   a. where the downstream result is the same or a lower value than the upstream value for the quality characteristic then no action is to be taken;
   b. where the downstream results exceed the upstream results complete an investigation in accordance with the ANZECC & ARMCANZ 2000 methodology, into the potential for environmental harm and provide a written report to the administering authority within 28 days, outlining:
      i. details of the investigations carried out;
      ii. actions taken to prevent environmental harm.

9 If an exceedance in accordance with condition 5(a)(ii)(2) is identified, the holder of the Transitional Environmental Program must notify the administering authority within 24 hours of receiving the result. The notification must include written verification of the exceedance forwarded to the administering authority either via facsimile [redacted] or email to [redacted]

Contaminant Release Events

10 The Transitional Environmental Program holder must install, operate and maintain a stream flow gauging station to determine and record stream flows at the locations upstream of each release point specified in Table 2 for any receiving waters into which a release occurs.

11 Notwithstanding any other condition of this Transitional Environmental Program, the release of contaminants to waters must only take place during periods of natural flow events specified as minimum flow in Table 6 for the contaminant release point(s) specified in Table 2.

12 Contaminant release flow rate must not exceed 20% of receiving water flow rate.

13 The daily quantity of contaminants released from each release point must be measured and recorded at the monitoring points in Table 2.

Erosions and Sediment Control

14 Releases to waters must be undertaken so as not to cause erosion of the bed and banks of the receiving waters, or cause a material build up of sediment in such waters.

15 Erosion protection must be designed, installed and maintained at each release point authorised by this Transitional Environmental Program and must:
   a) designed and constructed by a suitably qualified and experienced person, and
   b) be inspected by a suitably qualified and experienced person
      1. prior to the commencement of dewatering operations; and
      2. following the cessation of release in accordance with the conditions of this Transitional Environmental Program – Certificate of Approval.

16 The holder of this Transitional Environmental Program must provide a report to the administering authority within 10 business days following the cessation of release of mine affected water authorised under authority of this Transitional Environmental Program. The report must detail the performance of erosion protection measures, including:
   a) identification of erosion, slumping and scour impacts to vegetation,
   b) rehabilitation, including earthworks, scour protection and flow velocity controls undertaken to minimise environmental harm, and
   c) detailed engineering assessment of erosion protection works completed to date and any proposed works to be undertaken.

Notification of Release Events

14 The Transitional Environmental Program holder must notify the administering authority within eight hours of having commenced releasing mine affected water to the receiving environment. Notification must include the submission of written verification to the administering authority (either via facsimile [redacted] or email to [redacted] of the following information:
   a) release commencement date/time
   b) expected release cessation date/time
   c) release point/s
   d) release volume (estimated)
   e) receiving water/s including the natural flow rate
   f) any details (including available data) regarding likely impacts on the receiving water(s).

15 The Transitional Environmental Program holder must provide the administering authority daily during the release of mine affected water, in writing (either via facsimile [redacted] or email to [redacted] of the following information:
   a) all in situ monitoring data for that day
   b) the receiving water flow rate
   c) the release flow rate.

16 The Transitional Environmental Program holder must notify the administering authority as soon as practicable, (no later than within 24 hours after cessation of a release) of the cessation of a release notified under condition 14 and within 28 days provide the following information in writing:
   a) release cessation date/time
   b) natural flow volume in receiving water
   c) volume of water released
   d) details regarding the compliance of the release with the conditions of this Transitional Environmental Program (i.e. contamination limits, natural flow, discharge volume)
   e) all in-situ water quality monitoring results
   f) any other matters pertinent to the water release event.

Notification of release event exceedence

17 If the release limits defined in Table 3 are exceeded, the holder of the Transitional Environmental Program must notify the administering authority within 24 hours of receiving the results.

18 The Transitional Environmental Program holder must, within 28 days of a release that exceeds the conditions of this Transitional Environmental Program, provide a report to the administering authority detailing:
   a) the reason for the release
   b) the location of the release

c) all water quality monitoring results
d) any general observations
e) all calculations
f) any other matters pertinent to the water release event.

Requirements to cease the release of mine affected water

19 The release of mine affected waters must cease immediately if any water quality limit as specified in Table 4 is exceeded.

20 The release of mine affected waters must cease immediately if identified that the release of mine affected waters is causing erosion of the bed and banks of the receiving waters, or is causing a material build up of sediment in such waters.

21 The release of mine affected waters must cease immediately if the holder of this Transitional Environmental Program is directed to do so by the administering authority.

22 The release of mine affected waters authorised under this Transitional Environmental Program must cease by **10 January 2012.**

23 The release of mine affected waters authorised under this Transitional Environmental Program must cease when the flow of water within the Isaac River, when measured at the stream flow gauging station identified as Isaac River @ Goonyella, Site ID: 130414A, is less than 2.5m^3/second.

24 Subject to condition 23 the release of mine affected waters authorised under this Transitional Environmental Program must cease within 24 hours when the flow of water within the Isaac River, when measured at the stream flow gauging station identified as Isaac River @ Goonyella, Site ID: 130414A, declines to less than 5m^3/second.

Monitoring Requirements

25 Where monitoring is a requirement of this Transitional Environmental Program, ensure that a competent person(s) conducts all monitoring.

26 All monitoring undertaken as a requirement of this Transitional Environmental Program must be undertaken in accordance with the administering authority's Water Sampling Manual.

Notification of emergencies, incidents and exceptions

27 As soon as practicable after becoming aware of any emergency or incident which results in the release of contaminants not in accordance, or reasonably expected to be not in accordance with the conditions of this Transitional Environmental Program, the administering authority must be notified of the release by telephone, facsimile or email.

28 The notification of emergencies or incidents must include but not be limited to the following:
a) the holder of the Transitional Environmental Program
b) the location of the emergency or incident
c) the number of the Transitional Environmental Program
d) the name and telephone number of the designated contact person
e) the time of the release
f) the time the holder of the Transitional Environmental Program became aware of the release
g) the suspected cause of the release
h) the environmental harm caused, threatened, or suspected to be caused by the release, and
i) actions taken to prevent any further release and mitigate any environmental harm caused by the release.

29 Not more than fourteen days following the initial notification of an emergency or incident, written advice must be provided of the information supplied to the administering authority in relation to:
a) proposed actions to prevent a recurrence of the emergency or incident, and
b) outcomes of actions taken at the time to prevent or minimise environmental harm.

5.1 Reporting

Moranbah North Coal Pty Ltd will notify the administering authority, in writing, within six hours of commencing a release of contaminants under this Transitional Environmental Program, detailing:

g) release commencement date/time
h) expected release cessation date/time
i) release point/s
j) release volume (estimated)
k) receiving water/s including the natural flow rate
l) any details (including available data) regarding likely impacts on the receiving water(s).

Moranbah North Coal Pty Ltd will submit a report to the administering authority daily during the release of contaminants under this Transitional Environmental Program, detailing:

a) all in situ monitoring data for that day
b) the receiving water flow rate
c) the release flow rate.

Moranbah North Coal Pty Ltd will notify the administering authority, in writing, within twenty-four hours of ceasing a release of contaminants uner this Transitional Environmental Program, detailing:

g) release cessation date/time
h) natural flow volume in receiving water
i) volume of water released
j) details regarding the compliance of the release with the conditions of this Transitional Environmental Program (i.e. contamination limits, natural flow, discharge volume)
k) all in-situ water quality monitoring results
l) any other matters pertinent to the water release event.

Moranbah North Coal Pty Ltd will submit a report to the administering authority on the final business day of each month detailing:

a) all activities undertaken under the Transitional Environmental Program,
b) b) how the Transitional Environmental Program holder has met the objectives of the Transitional Environmental Program, taking into account:
    i. the best practice environmental management for the activity, and
    ii. the risks of environmental harm being caused by the activity, and
c) how the Transitional Environmental Program holder has complied with all conditions contained within the Transitional Environmental Program.

Moranbah North Coal Pty Ltd will submit a report to the administering authority by **24 January 2012** including:

a) details of the completion of the Transitional Environmental Program,
b) details on all activities undertaken under the Transitional Environmental Program,
c) identification of how the Transitional Environmental Program holder has met the objectives of the Transitional Environmental Program, taking into account:
    i. the best practice environmental management for the activity, and
    ii. the risks of environmental harm being caused by the activity,
d) identification of how the Transitional Environmental Program holder has complied with all conditions contained within the Transitional Environmental Program, and
e) confirmation that at closure of the Transitional Environmental Program, the holder will be able to comply with the conditions of the current Environmental Authority issued for the Moranbah North Coal Mine, located at Mining Lease 70108 and the *Environmental Protection Act 1994*.

6 CONCLUSIONS

Actions proposed in this TEP are designed to reduce the current worked water inventory in a manner that does not result in significant environmental harm. The actions recommended are considered to be executable and we have a high level of confidence in the margin for success.

7 REFERENCES

- Water Solutions Pty Ltd, 2007. *Report to Moranbah North Coal on OPSIM Water Management Update – May 2007.* WS070260, Rev 1. 29/10/2007.
- Water Solutions Pty Ltd, 2005. *Report to Moranbah North Coal on OPSIM Water Management Update – June 2005.* WS050294, Rev 2. 25/07/2005.
- Water Solutions Pty Ltd, 2003. OPSIM II Reference Manual. A General Purpose Operational Simulation Modelling System for the Management, Design and Assessment of Water Resource Systems. December 2003. Revision 1.
- Water Solutions Pty Ltd, 2002. *Report to Moranbah North Coal (Management) Pty Ltd on Water Management Infrastructure Assessment. Evaluation of Water Management Options.* WS020164, Rev 2. 16/10/2002.
- Water Solutions Pty Ltd, 2001. *Report to Moranbah North Coal Pty Ltd on Water Management Infrastructure Assessment. Phase 1 – Options Investigations. Phase 1 & 2 Investigations.* WS010181, Rev 0 {Draft}. 08/05/2001.
- Bureau of Meteorology, 2001. Climatic Atlas of Australia – Evapotranspiration.
- Water Solutions Pty Ltd, 2000. *Report to Moranbah North Coal on OPSIM Water Management. Phase 1 & 2 Investigations.* WS000377, Rev 1. 03/11/2000.
- Boughton, W.C., 1993. *A Hydrograph-Based Model for Estimating the Water Yield of Ungauged Catchments.* IEAust Hydrology & Water Resources Symposium, 1993.
- *Anglo Coal (Moranbah North Management) Pty Ltd, Draft Transitional Environmental program under Section 333 of the Environmental protection Act 1994, November 2009.*
- *Department of Mineral and Energy, Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland, January 1995.*
- *Draft Transitional Environmental Program under Section 333 of the Environmental Protection Act 1994, Moranbah North Pty Ltd, 12 November 2009.*
- *Environmental Authority (Mining Activities) Non Code Compliant Level 1 – Mining Project – Permit Number MIN100557107 – Moranbah North Coal Mine, Environmental Protection Agency, 6 March 2009.*
- *Environmental Authority (Mining Activities) Non Code Compliant Level 1 Mining Project – Permit Number MIN100557107 – Moranbah North Coal Mine, Environmental Protection Agency, 11 December 2009.*
- *Henderson Geotech the MINSERVE Group Pty Ltd, 2009a. Annual Inspections of Regulated Dams, Anglo Coal (Moranbah North Management) Pty Ltd, October 2009.*
- *Henderson Geotech the MINSERVE Group Pty Ltd, 2009b. Dam Hazard Category Assessment, Anglo Coal (Moranbah North Management) Pty Ltd, December 2009.*
- *Water Solutions Pty Ltd, 2007. Mine Water Management Update – May 2007, Anglo Coal (Moranbah North) Pty Ltd, May 2007.*

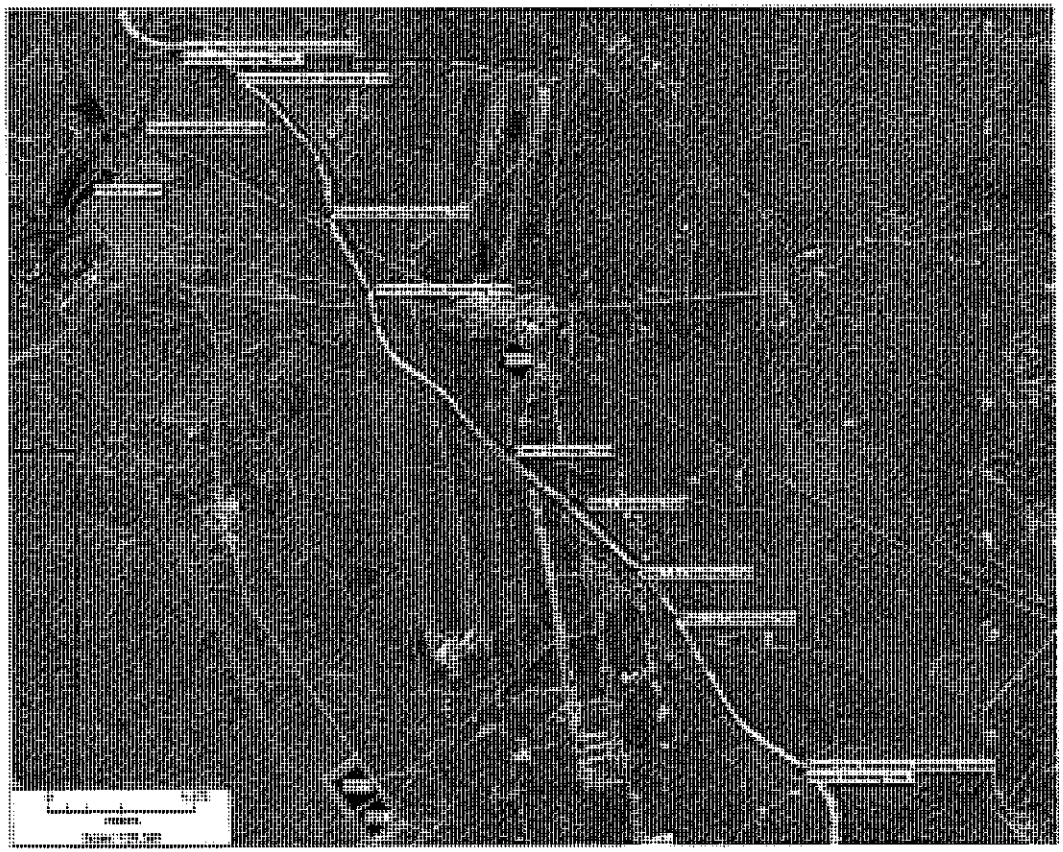
APPENDIX A

Project Plan

Submitted with original TEP

APPENDIX B

Overview of Site Discharge Locations & Associated Monitoring Points



APPENDIX C

TEP Tables – from DERM TEP Template

Table 2 - Contaminant release points, sources and receiving waters

Release point (TEP RP)	Easting GDA94	Northing GDA94	Contaminant source and location	Monitoring point	Receiving waters
TEP RP 1	599,980	7,580,615	Environmental Dam	TEP MP 1 TEP MP 9 TEP MP 8	Service Area Creek & Isaac River

Table 3 - Contaminant release monitoring points

Monitoring point	Easting GDA94	Northing GDA94	Contaminant source and location	Monitoring point location	Receiving waters
TEP MP 1	601,532	7,579,884	Environmental Dam	1900m downstream of junction of Service Area Creek & Isaac River	Service Area Creek & Isaac River
TEP MP 9	599,980	7,580,615	Environmental Dam	Spillway of Environmental Dam	Isaac River
TEP MP 8	605,310	7,575,260	Environmental Dam	2200m downstream of RP 4	Isaac River

Table 4 - Contaminant release limits

Quality characteristic	Release Limit	Monitoring Frequency	Sample Type	Monitoring Point
Compliance release levels for releases occurring at 5m^3/second or greater flow in the Isaac River				
Electrical Conductivity (uS/cm)	800 *or* upstream background electrical conductivity[3] + 10% *whichever is the higher level*	Daily during release (the first sample must be taken within 8 hours of commencement of release)	*In situ*[1]	TEP MP 1
			Samples require laboratory analysis[2]	TEP MP 1
	500 *or* upstream background electrical conductivity[3] + 10% *whichever is the higher level*	Daily during release (the first sample must be taken within 8 hours of commencement of release)	*In situ*[1]	TEP MP 8
			Samples require laboratory analysis[2]	TEP MP 8
	N/A	Daily during release (the first	*In situ*[1]	TEP MP 9

		sample must be taken within 8 hours of commencement of release)	Samples require laboratory analysis[2]	TEP MP 9
pH (pH Unit)	6.5 (minimum) 9.0 (maximum)	Daily during release (the first sample must be taken within 8 hours of commencement of release)	*In situ*[1]	TEP MP 9
			Samples require laboratory analysis[2]	TEP MP 9
TSS	Limit = 80th percentile of upstream background sites[3]	Daily during release (the first sample must be taken within 8 hours of commencement of release)	Samples require laboratory analysis[2]	TEP MP 9
Sulphate (SO_4^{2-}) (mg/L)	250	Daily during release (the first sample must be taken within 8 hours of commencement of release)	Samples require laboratory analysis[2]	TEP MP 9
Compliance release levels for releases occurring between 2.5m^3/second and 5m^3/second flow in the Isaac River				
Electrical Conductivity (uS/cm)	800 *or* upstream background electrical	Daily during release (the first sample must be taken within 2 hours of commencement of release)	*In situ*[1]	TEP MP 1
			Samples require laboratory analysis[2]	TEP MP 1

	conductivity[3] + 10% *whichever is the higher level*			
	500 *or* upstream background electrical conductivity[3] + 10% *whichever is the higher level*	Daily during release (the first sample must be taken within 8 hours of commencement of release)	*In situ*[1]	TEP MP 8
			Samples require laboratory analysis[2]	TEP MP 8
	1500	Daily during release (the first sample must be taken within 8 hours of commencement of release)	*In situ*[1]	TEP MP 9
			Samples require laboratory analysis[2]	TEP MP 9
pH (pH Unit)	6.5 (minimum) 9.0 (maximum)	Daily during release (the first sample must be taken within 8 hours of commencement of release)	*In situ*[1]	TEP MP 9
			Samples require laboratory analysis[2]	TEP MP 9

TSS	Limit = 80th percentile of upstream background sites[3]	Daily during release (the first sample must be taken within 8 hours of commencement of release)	Samples require laboratory analysis[2]	TEP MP 9
Sulphate (SO_4^{2-}) (mg/L)	250	Daily during release (the first sample must be taken within 8 hours of commencement of release)	Samples require laboratory analysis[2]	TEP MP 9

[1] In situ samples can be taken using electronic sampling equipment.

[2] Samples are required to be analysed at a NATA accredited facility in accordance with this Transitional Environmental Program.

[3] Upstream background sites are defined in Table 7. For release point 'TEP RP 1' monitoring for Electrical Conductivity and TSS, the associated upstream background site is TEP Reference Monitoring Point 1.

Table 5 - Release contaminant trigger investigation levels

Quality characteristic	Trigger levels (µg/L)	Monitoring frequency	Monitoring Point
Aluminium	55	Commencement of release and thereafter weekly during release	TEP MP 9
Arsenic	13		
Cadmium	0.2		
Chromium	1.0		
Copper	2.0		
Iron	300		
Lead	10		
Mercury	0.2		
Nickel	11		
Zinc	8.0		
Boron	370		
Cobalt	90		
Manganese	1900		
Molybdenum	34		
Selenium	10		
Silver	1.0		
Uranium	1.0		
Vanadium	10		

Ammonia	900		
Nitrate	1100		
Petroleum hydrocarbons (C6-C9)	20		
Petroleum hydrocarbons (C10-C36)	100		
Fluoride (total)	2000		

Table 6 - Contaminant release during flow events

Receiving waters	Release point (TEP RP)	Gauging station description	Longitude (GDA94)	Latitude (GDA94)	Receiving water flow rate	Flow recording frequency	Activity Authorised
Isaac River	TEP RP 1	Isaac River @ Goonyella Site ID:130414A	147 58 21	-21 51 20	= > 5m^3/sec	Continuous (minimum daily)	Commence releasing contaminants from TEP RP 1
Isaac River	TEP RP 1	Isaac River @ Goonyella Site ID:130414A	147 58 21	-21 51 20	= > 2.5m^3/sec	Continuous (minimum daily)	Continue releasing contaminants from TEP RP 1 for a maximum of 24 hours. Commencement of the release of contaminants from TEP RP 1 is not permitted.

Table 7 - Reference monitoring points

Monitoring points (TEP MP)	Receiving waters location description	Longitude (GDA94)	Latitude (GDA94)
Upstream background monitoring point			
TEP Reference Monitoring Point 1	Upstream Isaac River – Automated Water Station. TEP Reference Monitoring Point 1 is the reference site for TEP Impact Monitoring Point 1.	147 58 12	-21 52 40
Downstream background monitoring point			
TEP Impact Monitoring Point 1	TEP Impact Monitoring Point 1 is located south of the downstream Automatic Water Station on the Isaac River.	148 00 58	-21 55 18

Table 8 – Receiving waters contaminant trigger levels

Quality characteristic	Trigger level	Monitoring frequency	Sample type
Electrical Conductivity (uS/cm)	400 *or* upstream background electrical conductivity[3] + 10% *whichever is the higher level*	Daily during release (the first sample must be taken within 2 hours of commencement of release)	*In situ*[1]
			Samples require laboratory analysis[2]
pH	6.5-8.0	Daily during release (the first sample must be taken within	*In situ*[1]

		2 hours of commencement of release)	Samples require laboratory analysis[2]
Suspended Solids (mg/L)	Limit = 80th percentile of upstream background sites[3]	Daily during release (the first sample must be taken within 2 hours of commencement of release)	Samples require laboratory analysis[2]
Sulphate (SO_4^{2-}) (mg/L)	250	Daily during release (the first sample must be taken within 2 hours of commencement of release)	Samples require laboratory analysis[2]

[1] In situ samples can be taken using electronic sampling equipment.

[2] Samples are required to be analysed at a NATA accredited facility in accordance with this Transitional Environmental Program.

[3] Upstream background sites are defined in Table 7. For release point 'TEP Impact Monitoring Point 1' monitoring for Electrical Conductivity and Suspended Solids, the associated upstream background site is TEP Reference Monitoring Point 1.

Department Interest: Water

Authorised releases

W1 Contaminants that will, or have the potential to cause environmental harm must not be released directly or indirectly to any waters except as permitted under the conditions of this environmental authority.

W2 The release of contaminants to waters must only occur from the release points specified in *Table 1: Discharge Locations* and depicted in *Attachment A: Figure 1* attached to this environmental authority.

Table 1: Discharge Locations

Release Point	Latitude (GDA94)	Longitude (GDA94)	Contaminant source and Location	Monitoring Point	Receiving Waters description
RP 1	147 58 2	21 52 49	Dam 3, Dam 4 and Production Dam via pipeline	Sampling tap in pipeline to Isaac River	Isaac River
RP 2	147 59 49	21 53 41	Dam 4 spillway via pipeline	End of pipe	Isaac River
RP 3	148 0 27	21 54 26	Dam 1, Dam 2 and Dam via pipeline	Sampling tap in pipeline to Isaac River	Isaac River

W3 The release of contaminants to waters must not exceed the release limits in *Table 2: Contaminant Release Limits* when measured at the monitoring points specified in *Table 1: Discharge Locations* for each quality characteristic.

Table 2: Contaminant Release Limits

Quality characteristic	Interim Release Limit (for all mines) (limits apply from the date of issue)	Future Release Limits from 31 December 2011	Monitoring Frequency	Comments
Electrical Conductivity (µS/cm)	1600 µS/cm (Maximum)	1,000 µS/cm (Maximum) in the receiving waters (Must have natural flow i.e. the 20th percentile *flow* trigger and achieve a 1:4 dilution)	Daily during release (the first sample must be taken within 2 hours of commencement of release)	
pH (pH Units)	6.5 (minimum) 9.0 (maximum)	6.5 (minimum) 9.0 (maximum)	Daily during release (the first sample must be taken within 2 hours of commencement of release)	
Turbidity (NTU)	80th percentile[1] of reference[2]	[3]	Daily during release (the first sample must be taken within 2 hours of commencement of release)	Turbidity is required to assess ecosystems impacts and provide instantaneous results.
Suspended Solids	NA[3]	[3]		
Sulphate (SO_4^{2-}) (mg/L)	250	250		

[1] 80th percentiles are calculated using ANZECC (2000) methodology (section 7.1.4.1)
[2] Reference sites are defined in *Table 6: Receiving Water Upstream Background Sites and Downstream Monitoring Points*. For 'end of pipe' monitoring for Release Points RP1, RP2, RP3 the associated reference point is Reference Monitoring Point 1.
[3] Limit to be determined based on receiving water reference data and achievable best practice sedimentation control and treatment. These Future Release Limits are to be submitted to the administering authority in accordance with condition W41.

W4 The release of contaminants to waters from the release points must be monitored at the locations specified in *Table 1: Discharge Locations* for each quality characteristics and at the frequency specified in *Table 2: Contaminant Release Limits* and *Table 3: Release Contaminant Trigger Investigation Levels*.

Table 3: Release Contaminant Trigger Investigation Levels

Quality characteristic	Trigger Levels (mg/l)	Comment on Trigger Level	Monitoring Frequency
Aluminium	100	For aquatic ecosystem protection, based on LOR for ICPMS.	Commencement of release and thereafter weekly during release.
Arsenic	13	For aquatic ecosystem protection, based on SMD guideline.	
Cadmium	0.2	For aquatic ecosystem protection, based on SMD guideline.	
Chromium	1	For aquatic ecosystem protection, based on SMD guideline.	
Copper	2	For aquatic ecosystem protection, based on LOR for ICPMS.	
Iron	300	For aquatic ecosystem protection, based on low reliability guideline.	
Lead	10	For aquatic ecosystem protection, based on LOR for ICPMS.	
Mercury	0.2	For aquatic ecosystem protection, based on LOR for CV FIMS.	
Nickel	11	For aquatic ecosystem protection, based on SMD guideline.	
Zinc	8	For aquatic ecosystem protection, based on SMD guideline.	
Boron	370	*For aquatic ecosystem protection, based on SMD guideline*	
Cobalt	90	*For aquatic ecosystem protection, based on low reliability guideline*	
Manganese	1900	*For aquatic ecosystem protection, based on SMD guideline*	
Molybdenum	34	*For aquatic ecosystem protection, based on low reliability guideline*	
Selenium	10	*For aquatic ecosystem protection, based on LOR for ICPMS*	
Silver	1	*For aquatic ecosystem protection, based on LOR for ICPMS*	
Uranium	1	*For aquatic ecosystem protection, based on LOR for ICPMS*	
Vanadium	10	*For aquatic ecosystem protection, based on LOR for ICPMS*	
Ammonia	900	*For aquatic ecosystem protection, based on SMD guideline*	
Nitrate	1100	*For aquatic ecosystem protection, based on ambient Qld WQ Guidelines (2006) for TN*	
Petroleum hydrocarbons (C6-C9)	20		
Petroleum hydrocarbons (C10-C36)	100		
Fluoride (total)	2000	*Protection of livestock and short term irrigation guideline*	

1. All metals and metalloids must be measured as total (unfiltered) and dissolved (filtered). Trigger levels for metal/metalloids apply if dissolved results exceed trigger.
2. The list of quality characteristics required to be monitored as per *Table 3: Release Contaminant Investigation Trigger Levels* will be reviewed once the results of the monitoring data is gathered for the interim period until 31 December 2011 or an earlier date if the data is, or becomes, available and it is determined that there is no need to monitor for certain individual quality characteristics these can be removed from *Table 3: Release Contaminant Investigation Trigger Levels*.
3. SMD – slightly moderately disturbed level of protection, guideline refers ANZECC & ARMCANZ (2000).
4. LOR – typical reporting for method stated. ICPMS/CV FIMS – analytical method required to achieve LOR.

W5 If quality characteristics of the release exceed any of the trigger levels specified in *Table 3: Release Contaminant Trigger Investigation Levels* during a release event, the environmental authority holder must compare the downstream results in the receiving waters to the trigger values specified in *Table 3: Release Contaminant Trigger Investigation Levels* and:

1. where the trigger values are not exceeded then no action is to be taken; or
2. where the downstream results exceed the trigger values specified *Table 3: Release Contaminant Trigger Investigation Levels* for any quality characteristic, compare the results of the downstream site to the data from background monitoring sites and;
   a) if the result is less than the background monitoring site data, then no action is to be taken; or
   b) if the result is greater than the background monitoring site data, complete an investigation in accordance with the ANZECC & ARMCANZ 2000 methodology, into the potential for environmental harm and provide a written report to the administering authority in the next annual return, outlining:
      i. details of the investigations carried out; and
      ii. actions taken to prevent environmental harm.

NOTE: Where an exceedence of a trigger level has occurred and is being investigated, in accordance with W5 2. b) ii. of this condition, no further reporting is required for subsequent trigger events for that quality characteristic.

W6 If an exceedence in accordance with condition W5 2. b) ii. is identified, the holder of the authority must notify the administering authority within fourteen (14) days of receiving the result.

Contaminant release events

W7 The holder must install, operate and maintain a stream flow gauging station to determine and record stream flows at the locations upstream of each Release Point as specified in *Table 4: Contaminant Release Events* for any receiving water into which a release occurs.

W8 Notwithstanding any other condition of this environmental authority, the release of contaminants to waters must only take place during periods of natural flow events specified as minimum flow in *Table 4: Contaminant Release Events* for the contaminant release point(s) specified in *Table 1: Discharge Locations*.

Table 4: Contaminant Release Events

Receiving water description	Release Point	Gauging station description	Latitude (GDA94)	Longitude (GDA94)	Minimum Flow in Receiving Water Required for a Release Event	Flow recording Frequency
Isaac River	RP1 RP2 RP3 RP4	Upstream Automated Water Station	147 58 12	21 52 4	> or = 5 m^3/sec	Continuous (minimum daily)

W9 Contaminant release flow rate must not exceed twenty (20) percent (%) of receiving water flow rate.

W10 The daily quantity of contaminants released from each release point must be measured and recorded at the monitoring points in *Table 1: Discharge Locations*.

W11 Releases to waters must be undertaken so as not to cause erosion of the bed and banks of the receiving waters, or cause a material build up of sediment in such waters.

Notification of release event

W12 The authority holder must notify the administering authority as soon as practicable (no later than six (6) hours of having commenced releasing mine affected water to the receiving environment). Notification must include the submission of written verification to the administering authority of the following information:

a) release commencement date/time;
b) expected release cessation date/time;
c) release points;
d) release volume (estimated);
e) receiving waters including the natural flow rate; and
f) any details (including available data) regarding likely impacts on the receiving water(s).

NOTE: Notification to the administering authority must be addressed to the Manager and Project Manager of the local administering authority via email or facsimile.

W13 The authority holder must notify the administering authority as soon as practicable, (nominally within twenty-four (24) hours after cessation of a release) of the cessation of a release notified under condition **W12** and within twenty-eight (28) days provide the following information in writing:

a) release cessation date/time;
b) natural flow volume in receiving water;
c) volume of water released;
d) details regarding the compliance of the release with the conditions of Department Interest: Water of this environmental authority (i.e. contamination limits, natural flow, discharge volume);
e) all in-situ water quality monitoring results; and
f) any other matters pertinent to the water release event.

Notification of release event exceedence

W14 If the release limits defined in *Table 2: Contaminant Release Limits* are exceeded, the holder of the environmental authority must notify the administering authority within twenty-four (24) hours of receiving the results.

W15 The authority holder must, within twenty-eight (28) days of a release that exceeds the conditions of this authority, provide a report to the administering authority detailing:

a) the reason for the release;
b) the location of the release;
c) all water quality monitoring results;
d) any general observations;
e) all calculations; and
f) any other matters pertinent to the water release event.

Monitoring of water storage quality

W16 Water storages stated in *Table 5: Water Storage Monitoring* which are associated with the release points must be monitored for the water quality characteristics specified in *Table 6: Onsite Water Storage Contaminant Limits* at the monitoring locations and at the monitoring frequency specified in *Table 6: Water Storage Monitoring*.

Table 5: Water Storage Monitoring

Water Storage Description	Latitude (GDA94)	Longitude (GDA94)	Monitoring Location	Frequency of Monitoring
Dam 4			Adjacent to spillway	Quarterly
Environmental Dam			Western end of dam wall	Quarterly
Production Dam			From pump pontoon	Quarterly
Dam 1			South western corner	Quarterly
Dam 2			North western corner	Quarterly

W17. In the event that waters storages defined in *Table 5: Water Storage Monitoring* exceed the contaminant limits defined in *Table 6: Onsite Water Storage Contaminant Limits*, the holder of the environmental authority must implement measures to prevent access to waters by all livestock.

Table 6: Onsite Water Storage Contaminant Limits

Quality Characteristic	Test Value	Contaminant Limit
pH (pH Unit)	Range	Greater than 4, less than 9[2]
EC (uS/cm)	Maximum	5970[1]
Sulphate (mg/L)	Maximum	1000[1]
Fluoride (mg/L)	Maximum	2[1]
Aluminium (mg/L)	Maximum	5[1]
Arsenic (mg/L)	Maximum	0.5[1]
Cadmium (mg/L)	Maximum	0.01[1]
Cobalt (mg/L)	Maximum	1[1]
Copper (mg/L)	Maximum	1[1]
Lead (mg/L)	Maximum	0.1[1]
Nickel (mg/L)	Maximum	1[1]
Zinc (mg/L)	Maximum	20[1]

[1] Contaminant limit based on ANZECC & ARMCANZ (2000) stock water quality guidelines.
[2] Page 4.2-15 of ANZECC & ARMCANZ (2000) "Soil and animal health will not generally be affected by water with pH in the range of 4–9".
NOTE: Total measurements (unfiltered) must be taken and analysed

Receiving environment monitoring and contaminant trigger levels

W18 The quality of the receiving waters must be monitored at the locations specified in *Table 8: Receiving Water Upstream Background Sites and Downstream Monitoring Points* for each quality characteristic and at the monitoring frequency stated in *Table 7: Receiving Waters Contaminant Trigger Levels*.

CH

Table 7: Receiving Waters Contaminant Trigger Levels

Quality Characteristic	Trigger Level	Monitoring Frequency	Comments
pH	6.5 – 8.0	Daily during the release	See Table 2 comments
Electrical Conductivity (µS/cm)	1000		
Suspended solids (mg/L)	80[th] percentile[1] of reference[2]		
Sulphate (SO_4^{2-}) (mg/L)	250		

[1] 80[th] percentiles are calculated using ANZECC (2000) methodology (section 7.4.4.1).

[2] Reference sites are defined in *Table 8: Receiving Water Upstream Background Sites and Downstream Monitoring Points* as 'Upstream Background Monitoring Points'. For Impact Monitoring Point 1 the associated reference point is Reference Monitoring Point 1.

Table 8: Receiving Water Upstream Background Sites and Downstream Monitoring Points

Monitoring Points	Receiving Waters Location Description	Latitude (GDA94)	Longitude (GDA94)
Upstream Background Monitoring Points			
Reference Monitoring Point 1	Upstream Isaac River – Automated Water Station. Reference Monitoring Point 1 is the reference site for Impact Monitoring Point 1	147 58 12	-21 52 4
Downstream Monitoring Points			
Impact Monitoring Point 1	Impact Monitoring Point 1 is located on downstream Isaac River – Automated Water Station.	148 0 58	-21 55 10

NOTE: The data from background monitoring points must not be used where they are affected by releases from other mines.

W19. If quality characteristics of the receiving water at the downstream monitoring points exceed any of the trigger levels specified in *Table 7: Receiving Waters Contaminant Trigger Levels* during a release event the environmental authority holder must compare the downstream results to the upstream results in the receiving waters and:

a) where the downstream result is the same or a lower value than the upstream value for the quality characteristic then no action is to be taken; or

b) where the downstream results exceed the upstream results, complete an investigation in accordance with the ANZECC & ARMCANZ 2000 methodology, into the potential for environmental harm and provide a written report to the administering authority in the next annual return, outlining:

i. details of the investigations carried out; and

ii. actions taken to prevent environmental harm.

Note: Where an exceedence of a trigger level has occurred and is being investigated, in accordance with W19 b) ii. of this condition, no further reporting is required for subsequent trigger events for that quality characteristic.

Receiving environment monitoring program (REMP)

W20. A REMP must be developed and implemented by 11 March 2010 to monitor and record the effects of the release of contaminants on the receiving environment periodically and whilst contaminants are being discharged from the site, with the aims of identifying and describing the extent of any adverse impacts to local environmental values, and monitoring any changes in the receiving water. A copy of the REMP must be provided to the administering authority prior to its implementation and due consideration given to any comments made on the REMP by the administering authority.

For the purposes of the REMP, the receiving environment is the Isaac River and connected waterways within 10km downstream of the release.

W21 The REMP must address (but not necessarily be limited to) the following:

a) Description of potentially affected receiving waters including key communities and background water quality characteristics based on accurate and reliable monitoring data that takes into consideration any temporal variation (e.g. seasonality);
b) Description of applicable environmental values and water quality objectives to be achieved (i.e. as scheduled pursuant to the *Environmental Protection (Water) Policy 1997*);
c) Any relevant reports prepared by other governmental or professional research organisations that relate to the receiving environment within which the REMP is proposed;
d) Water quality targets within the receiving environment to be achieved; and clarification of contaminant concentrations or levels indicating adverse environmental impacts during the REMP;
e) Monitoring for any potential adverse environmental impacts caused by the release;
f) Monitoring of stream flow and hydrology;
g) Monitoring of toxicants should consider the indicators specified in *Table 3: Release Contaminant Trigger Investigation Levels* to assess the extent of the compliance of concentrations with water quality objectives and/or the ANZECC & ARMCANZ 2000 guidelines for slightly to moderately disturbed ecosystems;
h) Monitoring of physical chemical parameters as a minimum those specified in *Table 2: Contaminant Release Limits* (in addition to dissolved oxygen saturation and temperature);
i) Monitoring biological indicators (for macroinvertebrates in accordance with the AusRivas methodology) and metals/metalloids in sediments (in accordance with ANZECC & ARMCANZ 2000, BATLEY and/or the most recent version of AS5667.1 *Guidance on Sampling of Bottom Sediments*) for permanent, semi-permanent water holes and water storages;
j) The locations of monitoring points (including the locations specified in *Table 6: Receiving Water Upstream Background Sites and Downstream Monitoring Points* which are background and downstream impacted sites for each release point);
k) The frequency or scheduling of sampling and analysis sufficient to determine water quality objectives and to derive site specific reference values within 2 years (depending on wet season flows) in accordance with the *Queensland Water Quality Guidelines* 2006. For ephemeral streams, this should include periods of flow irrespective of mine or other discharges;
l) Specify sampling and analysis methods and quality assurance and control;
m) Any historical datasets to be relied upon;
n) Description of the statistical basis on which conclusions are drawn; and
o) Any spatial and temporal controls to exclude potential confounding factors.

CM

W22 A report outlining the findings of the REMP, including all monitoring results and interpretations in accordance with condition W20 must be prepared and submitted in writing to the administering authority by 1 October 2011. This should include an assessment of background water quality, any assimilative capacity of those contaminants monitored and the suitability of current discharge limits to protect downstream environment values.

Water reuse

W23 Water contaminated by mining activity may be piped or trucked or transferred by some other means that does not contravene the conditions of this authority during periods of dry weather for the purpose of supplying stock water to properties directly adjoining properties owned by the environmental authority holder or a third party and subject to compliance with the quality release limits specified in *Table 9: Stock Water Release Limits*.

Table 9: Stock Water Release Limits

Quality characteristic	Units	Minimum	Maximum
pH	pH units	6.5	8.5
Electrical Conductivity	µS/cm	N/A	5000

W24 Water contaminated by mining activity may be piped or trucked or transferred by some other means that does not contravene the conditions of this authority during periods of dry weather for the purpose of supplying irrigation water to properties directly adjoining properties owned by the environmental authority holder or a third party and subject to compliance with quality release limits in *Table 10: Irrigation Water Release Limits*.

Table 10: Irrigation Water Release Limits

Quality characteristic	Units	Minimum	Maximum
pH	pH units	6.6	8.5
Electrical Conductivity	µS/cm	N/A	Site specific value to be determined in accordance with ANZECC & ARMCANZ (2000) Irrigation Guidelines and provided through an amendment process.

W25 Water contaminated by mining activity may be piped or trucked off the mining lease for the purpose of supplying water to a third party for purpose of construction and/or road maintenance in accordance with the conditions of this environmental authority.

W26 If the responsibility of water contaminated by mining activities (the water) is given or transferred to another person in accordance with conditions W23, W24 or W25:

a) the responsibility of the water must only be given or transferred in accordance with a written agreement (the third party agreement); and

b) include in the third party agreement a commitment from the person utilising the water to use water in such a way as to prevent environmental harm or public health incidences and specifically make the persons aware of the General Environmental Duty (GED) under section 319 of the *Environmental Protection Act 1994*, environmental sustainability of the water disposal and protection of environmental values of waters.

Water general

W27 All determinations of water quality must be:

a) performed by a person or body possessing appropriate experience and qualifications to perform the required measurements;

b) made in accordance with methods prescribed in the latest edition of the administering authority's Water Quality Sampling Manual;

c) collected from the monitoring locations identified within this environmental authority, within five (5) hours of each other where possible;

d) carried out on representative samples; and

e) laboratory testing must be undertaken using a laboratory accredited (e.g. NATA) for the method of analysis being used;

NOTE: Condition W27 requires the Water Quality Manual to be followed and where it is not followed because of exceptional circumstances this should be explained and reported with the results.

W28 The release of contaminants directly or indirectly to waters:

a) must not produce any visible discolouration of receiving waters; and

b) must not produce any slick or other visible or odorous evidence of oil, grease or petrochemicals nor contain visible floating oil, grease, scum, litter or other objectionable matter.

CA

Annual water monitoring reporting

W29 The following information must be recorded in relation to all water monitoring required under the conditions of this environmental authority and submitted to the administering authority in the specified format with each annual return:

a) the date on which the sample was taken;
b) the time at which the sample was taken;
c) the monitoring point at which the sample was taken;
d) the measured or estimated daily quantity of the contaminants released from all release points;
e) the release flow rate at the time of sampling for each release point;
f) the results of all monitoring and details of any exceedences with the conditions of this environmental authority; and
g) water quality monitoring data must be provided to the administering authority in the specified electronic format upon request.

Temporary interference with waterways

W30 Temporarily destroying native vegetation, excavating, or placing fill in a watercourse, lake or spring necessary for and associated with mining operations must be undertaken in accordance with Department of Natural Resources and Water *Guideline - Activities in a Watercourse, Lake or Spring associated with Mining Activities*.

Water management plan

W31 A Water Management Plan must be developed and implemented by 11 March 2010 that provides for the proper and effective management of the actual and potential environmental impacts resulting from the mining activity and to ensure compliance with the conditions of this environmental authority.

W32 The Water Management Plan must be developed in accordance with Department of Environment and Resource Management *Guideline for Preparation of water management plans for mining activities* or any updates that become available from time to time and must include at least the following components:

a) Contaminant Source Study;
b) Site Water Balance and Model;
c) Water Management System;
d) Saline Drainage Prevention and Management Measures;
e) Acid Rock Drainage Prevention and Management Measures (if applicable);
f) Emergency and Contingency Planning; and
g) Monitoring and Review.

W33 Each year the holder of the environmental authority must undertake a review of the Water Management Plan prior to the wet season (i.e. by 1 November) and a further review following the wet season (i.e. by 1 May the following year) to ensure that proper and effective measures, practices or procedures are in place so that the mine is operated in accordance with the conditions of this environmental authority and that environmental harm is prevented or minimised.

W34 A copy of the Water Management Plan and/or a review of the Water Management Plan must be provided to the administering authority on request.

Saline drainage

W35 The holder of this environmental authority must ensure proper and effective measures are taken to avoid or otherwise minimise the generation and/or release of saline drainage.

Acid rock drainage

W36 The holder of this environmental authority must ensure proper and effective measures are taken to avoid or otherwise minimise the generation and/or release of acid rock drainage.

Stormwater and water sediment controls

W37 An Erosion and Sediment Control Plan must be developed by a suitably qualified person and implemented for all stages of the mining activities on the site to minimise erosion and the release of sediment to waters and contamination of stormwater.

W38 The maintenance and cleaning of any vehicles, plant or equipment must not be carried out in areas from which contaminants can be released into any waters.

W39 Any spillage of wastes, contaminants or other materials must be cleaned up as quickly as practicable to minimise the release of wastes, contaminants or materials to any stormwater drainage system or waters.

Fitzroy river basin study

W40 The administering authority and the holder of this environmental authority both acknowledge that the conditions for release of contaminants to the Isaac River in this environmental authority have been calculated without the benefit of the findings of projects proposed to be undertaken as per recommendations 2 and 3 of the *Study of cumulative impacts on water quality of mining activities in the Fitzroy River Basin* (April 2009). The administering authority may, based on the information provided in the study report when it becomes available, all relevant information available at the time and the regulatory framework applicable at that time, consult with the holder of this environmental authority about the conditions in the environmental authority concerning the treatment and disposal of waste water.

The aim of the consultation shall be the meaningful review of the contaminant release limits imposed in this authority having regard to:

a) the study results;
b) near field monitoring results;
c) Queensland Water Quality Guidelines; and
d) best practice environmental management.

If this review leads to a change in the requirements on this environmental authority holder, this shall be advanced by way of an authority amendment or a Transitional Environmental Program and as is necessary or desirable.

Additional water release requirements

W41 In addition to the quality characteristic limits specified in *Table 2: Contaminant Release Limits*, process water and stormwater contaminated by mining activities and released in accordance with conditions **W2** and **W3**, must not have any properties nor contain any organisms in concentrations that are capable of causing environmental harm.

Groundwater

W42 Groundwater affected by the mining activities must be monitored at the locations and frequencies defined in *Table 11: Groundwater monitoring locations and frequency*.

Table 11: Groundwater monitoring locations and frequencies

Monitoring Points	Easting (GDA94)	Northing (GDA94)	Frequency
Tertiary Basalt			
PZ-003			Quarterly
PZ-004			Quarterly
RDH513			Quarterly
RDH124			Quarterly
RDH21C			Quarterly
Tertiary Gravel/Alluvial Sands			
PZ-001			Quarterly
PZ-002			Quarterly
SML1			Quarterly
SML2			Quarterly
GM Coal Seam			
DDH004			Quarterly
DDH080			Quarterly
DDH072			Quarterly
RDH287			Quarterly
RDH121			Quarterly

W43 If the groundwater investigation trigger levels defined in *Table 12: Groundwater investigation trigger levels* are exceeded then the environmental authority holder must complete an investigation into the potential for environmental harm and notify the administering authority within twenty-eight (28) days of receiving the analysis results.

Table 12: Groundwater investigation trigger levels

Parameter	Unit	Trigger Levels			Limit type
		Tertiary Basalt[1]	Tertiary Gravel/Alluvial Sands[2]	GM Coal Seam[3]	
pH	pH Units	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5	Minimum - Maximum
Electrical Conductivity	µS/cm	15790	19230	17480	Maximum
Total Dissolved Solids	mg/L	10274	13976	12652	Maximum
Calcium	mg/L	246	400	335	Maximum
Magnesium	mg/L	330	918	420	Maximum
Sodium	mg/L	3050	4050	3150	Maximum
Potassium	mg/L	38	102	47	Maximum
Chloride	mg/L	4872	6070	5509	Maximum
Sulphate	mg/L	1061	946	402	Maximum
Carbon Trioxide (CO_3)	To be provided as per condition W48.	To be provided as per condition W48.	To be provided as per condition W48.	To be provided as per condition W48.	Maximum
Bicarbonate (HCO_3)	To be provided as per condition W48.	To be provided as per condition W48.	To be provided as per condition W48.	To be provided as per condition W48.	Maximum
Iron	mg/L	2.16	16	12	Maximum
Aluminium	mg/L	0.73	0.84	2.7	Maximum
Arsenic	mg/L	0.006	0.007	0.006	Maximum
Mercury	To be provided as per condition W48.	To be provided as per condition W48.	To be provided as per condition W48.	To be provided as per condition W48.	Maximum
Antimony	To be provided as per condition W48.	To be provided as per condition W48.	To be provided as per condition W48.	To be provided as per condition W48.	Maximum
Molybdenum	To be provided as per condition W48.	To be provided as per condition W48.	To be provided as per condition W48.	To be provided as per condition W48.	Maximum
Selenium	mg/L	0.01	0.01	0.008	Maximum
Total Petroleum Hydrocarbons (C6-C9)	µg/L	20	20	20	Maximum
Total Petroleum Hydrocarbons (C10-C36)	µg/L	100	100	100	Maximum

[1] Tertiary Basalt groundwater monitoring points are identified in *Table 11: Groundwater monitoring locations and frequencies* as PZ-003, PZ-004, RDH21C, RDH513 and RDH124.
[2] Tertiary Gravel/Alluvial Sands groundwater monitoring points are identified in *Table 11: Groundwater monitoring locations and frequencies* as PZ-001, PZ-002, SML1 and SML2.
[3] GM Coal Seam groundwater monitoring points are identified in *Table 11: Groundwater monitoring locations and frequencies* as DDH004, DDH072, DDH080, RDH121 and RDH287.

W44 Groundwater levels, affected by the mining activities must be monitored at the locations and frequencies defined in *Table 13: Groundwater levels*.

Table 13: Groundwater levels

Monitoring Points	Easting (GDA94)	Northing (GDA94)	Surface RL (m)	Frequency
PZ-003				Monthly
PZ-004				Monthly
RDH513				Monthly
RDH124				Monthly
RDH21C				Monthly
PZ-001				Monthly
PZ-002				Monthly
SML1				Monthly
SML2				Monthly
DDH004				Monthly
DDH080				Monthly
DDH072				Monthly
RDH287				Monthly
RDH121				Monthly

W45 Groundwater levels and groundwater drawdown fluctuations in excess of 2m per year, not resulting from the pumping of licensed bores, must be notified within seven (7) days to the administering authority following completion of monitoring.

Groundwater monitoring program

W46 The groundwater monitoring data must be reviewed on an annual basis. The review must include the assessment of groundwater levels and quality data, and the suitability of the monitoring network. The assessment must be submitted to the administering authority within twenty eight (28) days of receiving the report.

W47 A background groundwater monitoring program must be undertaken at the locations defined in *Table 10: Groundwater monitoring locations and frequencies* to provide the following:

a) at least twelve (12) sampling events (monthly sampling) to determine background groundwater quality for Carbonate Trioxide (CO_3), Bicarbonate (HCO_3), Mercury, Antimony and Molybdenum; and

b) the final groundwater contaminant parameters and trigger levels required at each location for Carbonate Trioxide (CO_3), Bicarbonate (HCO_3), Mercury, Antimony and Molybdenum must be provided for condition **W42**.

W48 Groundwater contaminant trigger levels for Carbonate Trioxide (CO_3), Bicarbonate (HCO_3), Mercury, Antimony and Molybdenum as per *Table 11: Groundwater investigation trigger levels* must be finalised based on a background groundwater monitoring program defined in condition **W47** and submitted to the administering authority by **1 March 2010**.

Groundwater monitoring

W49 The following information must be recorded in relation to all groundwater water sampling:

a) the date on which the sample was taken;

b) the time at which the sample was taken;

c) the monitoring point at which the sample was taken; and

d) the results of all monitoring.

W50 The method of water sampling required by this environmental authority must comply with that set out in the latest edition of the administering authority's *Water Quality Sampling Manual*.

Sewage treatment

W51 The daily operation of the sewage treatment plant and pollution control equipment must be carried out by a person(s) with appropriate experience and/or qualifications to ensure the effective operation of that treatment system and control equipment.

W52 The only contaminants permitted to be released to land are treated effluent to the areas shown in *Table 16: Treated effluent discharge locations*, in compliance with the limits levels stated in *Table 14: Contaminant release limits to land* and the conditions of this authority.

Table 14: Contaminant release limits to land

Quality characteristic	Release Limit		
	Minimum	Median	Maximum
5 Day BOD			50 mg/L
Faecal Coliform (FC)		1000 cfu/100mL[2]	
Suspended Solids			30 mg/L
Electrical Conductivity		1600 µS/cm	
pH	6.5		8.5
Total Nitrogen			40 mg/L
Total Phosphorus as P			8 mg/L
Residual Cl2			1 mg/l
Oil and Grease			10 mg/l

W53 Monitoring must be undertaken and records kept of a monitoring program of contaminant releases to the irrigation area at the monitoring points, frequency, and for the parameters specified in *Table 15: Monitoring program.*

Table 15: Monitoring program

Monitoring point	Quality characteristic	Units	Frequency
Effluent Monitoring Point 1 (effluent irrigation line)	5 Day BOD	mg/L	Monthly
	Faecal Coliform	cfu/100mL[2]	Monthly
	Suspended Solids	mg/L	Monthly
	Electrical Conductivity	µS/cm	Monthly
	pH	pH Units	Weekly
	Total Nitrogen	mg/L	Monthly
	Total Phosphorus	mg/L	Monthly
	Residual Cl2	mg/L	Monthly
	Oil and Grease	mg/L	Monthly

W54 Treated effluent from the sewage treatment plant must only be discharged from the authorised discharge points, as specified in *Table 16: Treated effluent discharge locations.*

Table 16: Treated Effluent Discharge locations

Authorised Discharge Point	Location	Latitude (GDA94) (Bounds)	Longitude (GDA94) (Bounds)
Effluent Discharge Point	Effluent irrigation area	X1: 147.57.69 X1: 147.58.4	Y1: -21.52.65 Y2: -21.52.53

W55 Notwithstanding the quality characteristic release limits specified in *Table 14: Contaminant release limits to land*, releases of effluent must not have any properties nor contain any organisms or other contaminants in concentrations that are capable of causing environmental harm.

W56 Treated effluent must not be released from the site to any waters or the bed and banks of any waters.

W57 Water or stormwater contaminated by sewage treatment activities must not be released to any waters or the bed and banks of any waters.

W58 The irrigation of effluent must be carried out in a manner such that:

a) vegetation is not damaged;
b) soil erosion and soil structure damage is avoided;
c) there is no surface ponding of effluent;
d) percolation of effluent beyond the plant root zone is minimised;
e) the capacity of the land to assimilate nitrogen, phosphorus, salts, organic matter as measured by oxygen demand and water is note exceeded; and
f) the quality of groundwater is not adversely effected.

W59 Notices must be prominently displayed on areas undergoing effluent irrigation, warning the public that the area is irrigated with effluent and not to use or drink the effluent. These notices must be maintained in a visible and legible condition.

W60 The daily volume of contaminants released to land must be determined or estimated by an appropriate method, for example a flow meter, and records kept of such determinations and estimates.

W61 When conditions prevent the irrigation of treated effluent to land (such as during or following rain events), the contaminants must be directed to a wet weather storage or alternative measures must be taken to store/lawfully dispose of effluent (such as wet weather storage or tanking off site to another treatment plant or sewer). A record must be kept of any removal or discharge off site, including destination, transporter, dates and volumes.

W62 Pipelines and fittings associated with the effluent irrigation system must be clearly identified. Lockable valves or removable handles must be fitted to all release pipelines situated in public access areas.

W63 Conduct and keep records of any monitoring programs of contaminant releases from the treatment plant at the monitoring points, frequency, and for the parameters specified in *Table 14: Contaminant release limits to land*, *Table 15: Monitoring program* and *Table 16: Treated effluent discharge locations*.

W64 The following information must be recorded in relation to all sampling:
a) the date on which the sample was taken;
b) the time at which the sample was taken;
c) the monitoring point at which the sample was taken;
d) the measured or estimated daily flow of effluent at the time of sampling; and
e) the results of all monitoring.

W65 All ponds used for the storage or treatment of contaminants, sewage or wastes at or on the authorised place must be constructed, installed and maintained:
a) so as to minimise the likelihood of any release of effluent through the bed or banks of the pond to any waters (including groundwater);
b) so that a freeboard of not less than 0.5 metres is maintained at all times, except in emergencies; and
c) so as to ensure the stability of the pond construction.

W66 Suitable banks and/or diversion drains must be installed and maintained to exclude stormwater runoff from entering any ponds or other structures used for the storage or treatment of contaminants or wastes.

W67 Biosolids produced by the activity for re-use must be:
a) sampled, analysed, graded and classified according to the procedures specified in the administering authority's systems and standards; and
b) re-used under an Environmental Management Program or other environmentally relevant activity with the administering authority's approval.

W68 If the responsibility of the treated effluent is given or transferred to another person:

a) the responsibility of such effluent must only be given or transferred in accordance with a written agreement (the third party agreement);

b) include in the third party agreement a commitment from the person utilising the effluent to use effluent in such a way as to prevent environmental harm or public health incidences and specifically make the persons aware of the General Environmental Duty (GED) under section 319 of the *Environmental Protection Act 1994*, environmental sustainability of any effluent disposal and protection of environmental values of waters; and

c) upon being notified or otherwise becoming aware that the person's use of effluent is causing or threatens to cause environmental harm or is posing a human health risk, and if the person does not rectify the situation upon written request, the giving and transferring responsibility for such effluent must cease.

Department Interest: Noise and vibration

Noise nuisance

D1 Noise from activities must not cause an environmental nuisance at any noise sensitive or commercial place.

D2 All noise from activities must not exceed the levels specified in *Table 17: Noise limits* at any noise affected place.

Noise monitoring

D3 When requested by the administering authority, noise monitoring must be undertaken to investigate any complaint of noise nuisance, and the results notified within fourteen (14) days to the administering authority. Monitoring must include:

a) $L_{A\,10,\,adj,\,10\,mins}$

b) $L_{A\,1,\,adj,\,10\,mins}$

c) the level and frequency of occurrence of impulsive or tonal noise;

d) atmospheric conditions including wind speed and direction;

e) effects due to extraneous factors such as traffic noise; and

f) location date and time of recording.

D4 Noise is not considered to be a nuisance under condition **D1** if monitoring shows that noise does not exceed the following levels in the time periods specified in *Table 17: Noise limits*.

Table 17: Noise limits

Noise level dB(A)	Monday to Saturday			Sundays and public holidays		
	7am - 6pm	6pm - 10pm	10pm - 7am	9am - 6pm	6pm - 10pm	10pm - 9am
	Noise measured at a 'Noise sensitive place'					
$L_{A10,adj\ 10\ min}$	B/g + 5	B/g + 5	B/g + 0	B/g + 5	B/g + 5	B/g + 0
$L_{A1,adj\ 10\ min}$	B/g + 10	B/g + 10	B/g + 5	B/g + 10	B/g + 10	B/g + 5
	Noise measured at a 'Commercial place'					
$L_{A10,adj\ 10\ min}$	B/g + 10	B/g + 10	B/g + 5	B/g + 10	B/g + 10	B/g + 5
$L_{A1,adj\ 10\ min}$	B/g + 15	B/g + 15	B/g + 10	B/g + 15	B/g + 15	B/g + 10

D5 The method of measurement and reporting of noise monitoring must comply with the current edition of the administering authority's *Noise Measurement Manual*.

D6 If monitoring indicates exceedence of the relevant limits in Condition D4, then the environmental authority holder must:

a) address the complaint including the use of appropriate dispute resolution if required; and

b) immediately implement noise abatement measures so that emissions of noise from the activity do not result in further environmental nuisance.

Vibration nuisance

D7 Vibration from the licensed activities must not cause an environmental nuisance, at any sensitive or commercial place.

D8 When requested by the administering authority, vibration monitoring must be undertaken within a reasonable and practicable timeframe nominated by the administering authority to investigate any complaint (which is neither frivolous nor vexatious nor based on mistaken belief in the opinion of the authorised officer) of environmental nuisance at any sensitive or commercial place, and the results must be notified within fourteen (14) days to the administering authority following completion of monitoring.

From: [redacted]
Sent: Monday, 20 December 2010 9:06 AM
To: [redacted]
Subject: FW: Emailing: PC180004.JPG, PC180001.JPG, PC180002.JPG, PC180003.JPG

Hello [redacted]

FYI. Am writing letter now and will provide shortly.

[redacted]

-----Original Message-----
From: Loveday Chris [redacted]
Sent: Sunday, 19 December 2010 11:30 AM
To: [redacted]
Subject: RE: Emailing: PC180004.JPG, PC180001.JPG, PC180002.JPG, PC180003.JPG

[redacted]

As discussed, Moranbah North are authorised to discharge water from Production Dam to the Isaac River via pipeline. I am aware of the significant rainfall in the area and should it become necessary to release water from another point on site to ensure safety of infrastructure or persons on site I am prepared to authorise further releases.

This authorisation is valid until 5pm Friday 24 December, or until a TEP authorising this release in the medium term can be approved.

Due to significant flows in the Isaac River I am satisified that adequate dilution of water will occur at this stage.

Regards

Christopher Loveday

Manager - Environmental Services, Mining
Telephone: [redacted] Facsimile: [redacted]
Mobile: [redacted]
www.derm.qld.gov.au

Department of Environment and Resource Management
136 Goondoon Street, Gladstone Q 4680
PO Box 5065, Gladstone Q 4680

-----Original Message-----
From: [redacted]
Sent: Sunday, 19 December 2010 10:20 AM
To: Loveday Chris
Subject: FW: Emailing: PC180004.JPG, PC180001.JPG, PC180002.JPG, PC180003.JPG

[redacted]

-----Original Message-----
From: [redacted]
Sent: Sunday, 19 December 2010 10:05 AM
To: [redacted]

Subject: Emailing: PC180004.JPG, PC180001.JPG, PC180002.JPG, PC180003.JPG

[redacted]

Photo 1: [redacted] checked and water level 10 minutes ago would have been very close to the height of the dam wall (without the piles either side of the road)
Photo 2: Env Dam, again close to overtopping Photo 3 and
4: Persprectives of discharge and height in dam

[redacted]

The message is ready to be sent with the following file or link attachments:

PC180004.JPG
PC180001.JPG
PC180002.JPG
PC180003.JPG

Note: To protect against computer viruses, e-mail programs may prevent sending or receiving certain types of file attachments. Check your e-mail security settings to determine how attachments are handled.

From: [redacted]
Sent: Sunday, 19 December 2010 4:35 PM
To: Loveday Chris; [redacted]
Cc: [redacted]
Subject: RE: Emailing: PC180004.JPG, PC180001.JPG, PC180002.JPG, PC180003.JPG

Follow Up Flag: Follow up
Flag Status: Yellow

Hello [redacted]

I set up and began discharge to the point on the river from production dam at ~3:45pm. Thank you for the approval and sorry to interrupt on a Sunday for us. I will provide [redacted] a further update tomorrow morning. We took a sample at the river crossing when configuring the valves at ~3:00pm which came out as; EC 120 Ph 8.15 Temp 25.8 Flow in river: 804m3/sec Discharge 1m3/sec from EnvDam
.1m3/sec from Production discharge point

Regards
[redacted]

-----Original Message-----
From: Loveday Chris [redacted]
Sent: Sunday, 19 December 2010 11:30 AM
To: [redacted]
Subject: RE: Emailing: PC180004.JPG, PC180001.JPG, PC180002.JPG, PC180003.JPG

[redacted]

As discussed, Moranbah North are authorised to discharge water from Production Dam to the Isaac River via pipeline. I am aware of the significant rainfall in the area and should it become necessary to release water from another point on site to ensure safety of infrastructure or persons on site I am prepared to authorise further releases.

This authorisation is valid until 5pm Friday 24 December, or until a TEP authorising this release in the medium term can be approved.

Due to significant flows in the Isaac River I am satisified that adequate dilution of water will occur at this stage.

Regards

Christopher Loveday

Manager - Environmental Services, Mining
Telephone: [redacted] Facsimile: [redacted]
Mobile: [redacted]
www.derm.qld.gov.au

Department of Environment and Resource Management
136 Goondoon Street, Gladstone Q 4680
PO Box 5065, Gladstone Q 4680

-----Original Message-----
From: [redacted]

Sent: Sunday, 19 December 2010 10:20 AM
To: Loveday Chris
Subject: FW: Emailing: PC180004.JPG, PC180001.JPG, PC180002.JPG, PC180003.JPG

[redacted]

-----Original Message-----
From: [redacted]
Sent: Sunday, 19 December 2010 10:05 AM
To: [redacted]
Subject: Emailing: PC180004.JPG, PC180001.JPG, PC180002.JPG, PC180003.JPG

[redacted]

Photo 1: [redacted] checked and water level 10 minutes ago would have been very close to the height of the dam wall (without the piles either side of the road)
Photo 2: Env Dam, again close to overtopping Photo 3 and
4: Persprectives of discharge and height in dam

[redacted]

The message is ready to be sent with the following file or link attachments:

PC180004.JPG
PC180001.JPG
PC180002.JPG
PC180003.JPG

Note: To protect against computer viruses, e-mail programs may prevent sending or receiving certain types of file attachments. Check your e-mail security settings to determine how attachments are handled.

Queensland Government

Department of
Environment and Resource Management

File/Ref EMD136

20 December 2010

Health, Safety and Environment Superintendent
Moranbah North Coal Mine
Moranbah North Coal Pty Ltd
Moranbah Qld 4744

Attention: Environmental Superintendent)

Dear

Emergency Direction for release of water from Moranbah North Coal Mine

The Department of Environment and Resource Management (the department) refers to correspondence received 11:12am, 20 December 2010, requesting permission to discharge contaminated water from located at the Moranbah North Coal Mine. The administering authority is issuing an emergency direction to Moranbah North Coal Pty Ltd to discharge contaminated water from Dam 4 located on Mining Lease 70108. The department considers the request to issue an emergency direction to discharge the contaminated water is:

- necessary and reasonable because it is an emergency; and
- there are no practical alternatives to the release.

Accordingly the following is authorised under s468 of the *Environmental Protection Act 1994*:

- water contaminated by mining activities may be released to the Isaac River from the Discharge Point 2, as nominated within Environmental Authority MIN100557107 and not in accordance with contaminant release limits specified in condition W3 of Environmental Authority MIN100557107.

Under s468(b) of the *Environmental Protection Act 1994*, the administering authority has imposed conditions on this direction that Moranbah North Coal Pty Ltd must comply with (attached).

Department of Environment and Resource Management
99 Hospital Road
PO Box 19
Emerald Qld 4720
Telephone 07 4980 6200
Facsimile 07 4982 2568
Website www.derm.qld.gov.au
ABN 46 640 294 485

You are reminded that section 319 of the Environmental Protection Act 1994, which sets out the general environmental duty, requires anyone who carries out an activity that causes or is likely to cause environmental harm to take all reasonable and practicable measures to prevent or minimise the harm. In that regard, you are encouraged to actively identify all of the environmental risks associated with the activities conducted on the site on an ongoing bases, and to implement strategies to effectively address them.

This Emergency direction remains in effect until **25 December 2010**.

Should you have any further enquiries, please do not hesitate to contact [redacted] Principal Environmental Officer of the department on telephone [redacted]

Yours sincerely,

Christopher Loveday
Manager (Environmental Services – Mining)
Central West Region

Conditions imposed under section 468 of the *Environmental Protection Act 1994* on Emergency Direction, issued to Moranbah North Coal Pty Ltd on 20 December 2010 for the release of mine affected water from [redacted] on Mining Lease 70108.

In carrying out this Emergency Direction, Moranbah North Coal Pty Ltd must comply with the following conditions.

Release of contaminants

1 Contaminants that will, or have the potential to cause environmental harm must not be released directly or indirectly to any waters except as permitted under this Emergency Direction, unless otherwise authorised to under the *Environmental Protection Act 1994*.

2 The release of contaminants to waters must only occur from the release points specified in Table 1 of this Emergency Direction.

3 The release of contaminants to waters must not exceed the release limits stated in Table 3 at the monitoring points specified in Table 2 of this Emergency Direction.

4 The release of contaminants to waters from the release points must be monitored at the locations specified in Table 2 for each quality characteristic and at the frequency specified in Table 3 of this Emergency Direction.

Contaminant Release Events

5 Moranbah North Coal Pty Ltd must monitor the departments stream flow gauging station, site identification number 130414A to determine and record stream flows at the locations upstream of each release point specified in Table 1 for any receiving waters into which a release occurs.

6 The release of contaminants to waters must only take place during periods of natural flow events specified as minimum flow in Table 4 for the contaminant release point(s) specified in Table 2.

7 Contaminant release flow rate must not exceed a release ratio of 1 (release of mine effected water from Dam 4) to 39 (receiving flow in the Isaac River).

8 The daily quantity of contaminants released from each release point must be measured and recorded at the monitoring points in Table 2.

Erosions and Sediment Control

9 Releases to waters must be undertaken so as not to cause erosion of the bed and banks of the receiving waters, or cause a material build up of sediment in such waters.

Notification of Release Events

10 Moranbah North Coal Pty Ltd must notify the administering authority within 6 hours of having commenced releasing mine affected water to the receiving environment. Notification must include the submission of written verification to the administering authority (either via facsimile [redacted] or email to [redacted] of the following information:

a) release commencement date/time
b) expected release cessation date/time
c) release point/s
d) release volume (estimated)
e) receiving water/s including the natural flow rate
f) any details (including available data) regarding likely impacts on the receiving water(s).

11 Moranbah North Coal Pty Ltd must provide the administering authority daily during the release of mine affected water, in writing (either via facsimile [redacted] or email to [redacted] of the following information:
a) all in situ monitoring data for that day
b) the receiving water flow rate
c) the release flow rate.

12 Moranbah North Coal Pty Ltd must notify the administering authority as soon as practicable, (no later than within 6 hours after cessation of a release) of the cessation of a release notified under condition 10 and within 28 days provide the following information in writing:
a) release cessation date/time
b) natural flow volume in receiving water
c) volume of water released
d) details regarding the compliance of the release with the conditions of this Emergency Direction (i.e. contamination limits, natural flow, discharge volume)
e) all in-situ water quality monitoring results
f) any other matters pertinent to the water release event.

Notification of release event exceedence

13 If the release limits defined in Table 3 are exceeded, Moranbah North Coal Pty Ltd must notify the administering authority within 24 hours of receiving the results.

14 Moranbah North Coal Pty Ltd must, within 28 days of a release that exceeds the conditions of this Moranbah North Coal Pty Ltd, provide a report to the administering authority detailing:
a) the reason for the release
a) the location of the release
b) all water quality monitoring results
c) any general observations
d) all calculations
e) any other matters pertinent to the water release event.

Requirements to cease the release of mine affected water

15 The release of mine affected waters must cease immediately if any water quality limit as specified in Table 2 is exceeded.

16 The release of mine affected waters must cease immediately if identified that the release of mine affected waters is causing erosion of the bed and banks of the receiving waters, or is causing a material build up of sediment in such waters.

17 The release of mine affected waters must cease immediately if Moranbah North Coal Pty Ltd is directed to do so by the administering authority.

18 The release of mine affected waters authorised under this Emergency Direction must cease by **24 December 2010**.

Monitoring Requirements

23 Where monitoring is a requirement of this Emergency Direction, Moranbah North Coal Pty Ltd must ensure that a competent person(s) conducts all monitoring.

24 All monitoring undertaken as a requirement of this Emergency Direction must be undertaken in accordance with the administering authority's Water Sampling Manual.

Table 1 - Contaminant release points, sources and receiving waters

Release point (ED RP)	Longitude (GDA94)	Latitude (GDA94)	Contaminant source and location	Monitoring point	Receiving waters
ED RP 1			spillway via pipeline	ED MP 1	Isaac River

Quality characteristic	Trigger levels (µg/L)	Monitoring frequency	Monitoring Point
Aluminium	55	Commencement of release and thereafter weekly during release	TEP MP 5 TEP MP 6 TEP MP 7
Arsenic	13		
Cadmium	0.2		
Chromium	1.0		
Copper	2.0		
Iron	300		
Lead	10		
Mercury	0.2		
Nickel	11		
Zinc	8.0		
Boron	370		
Cobalt	90		
Manganese	1900		
Molybdenum	34		
Selenium	10		
Silver	1.0		
Uranium	1.0		
Vanadium	10		
Ammonia	900		
Nitrate	1100		
Petroleum hydrocarbons (C6-C9)	20		
Petroleum hydrocarbons (C10-C36)	100		
Fluoride (total)	2000		

Table 6 - Contaminant release during flow events

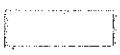
Receiving waters	Release point (TEP RP)	Gauging station description	Longitude (GDA94)	Latitude (GDA94)	Minimum flow in receiving water required for a release event	Flow recording frequency
Isaac River	TEP RP 2	Isaac River @ Goonyella Site ID:130414A			=> 20m^3/sec	Continuous (minimum daily)
Isaac River	TEP RP 3	Isaac River @ Goonyella Site ID:130414A			=> 20m^3/sec	Continuous (minimum daily)
Isaac River	TEP RP 4	Isaac River @ Goonyella Site ID:130414A			=> 50m^3/sec	Continuous (minimum daily)

Table 2 - Contaminant release monitoring points

Monitoring point (ED MP)	Longitude (GDA94)	Latitude (GDA94)	Contaminant source and location	Monitoring point location	Receiving waters
ED MP 1	[redacted]	[redacted]	Dam 4 spillway via pipeline	End of Pipe	Isaac River

Table 3 - Contaminant release limits

Quality characteristic	Release Limit	Monitoring Frequency	Sample Type	Monitoring Point
Electrical conductivity (uS/cm)	10,000	Daily during release (the first sample must be taken within 2 hours of commencement of release)	*In situ*[1]	ED MP 1
			Samples require laboratory analysis[2]	ED MP 1
pH (pH Unit)	6.5 (minimum) 9.0 (maximum)	Daily during release (the first sample must be taken within 2 hours of commencement of release)	*In situ*[1]	ED MP 1
			Samples require laboratory analysis[2]	ED MP 1
Sulphate (SO_4^{2-}) (mg/L)	250	Daily during release (the first sample must be taken within 2 hours of commencement of release)	Samples require laboratory analysis[2]	ED MP 1

[1] In situ samples can be taken using electronic sampling equipment.
[2] Samples are required to be analysed at a NATA accredited facility in accordance with this Emergency Direction.

Table 4 - Contaminant release during flow events

Receiving waters	Release point (ED RP)	Gauging station description	Longitude (GDA94)	Latitude (GDA94)	Minimum flow in receiving water required for a release event	Flow recording frequency
Isaac River	ED RP1	Isaac River @ Goonyella Site ID:130414A			= > 39m^3/sec	Continuous (minimum daily)

DRAFT TRANSITIONAL ENVIRONMENTAL PROGRAM UNDER SECTION 333 OF THE *ENVIRONMENTAL PROTECTION ACT 1994*

Principal Holder: [redacted] l Pty Ltd
[redacted] d
Moranbah QLD 4744

EA Number: MIN1005577107

Title: Worked Water TEP - Additional Discharge Locations

Date: 20th December 2010

Finish Date: 30th June 2011

BACKGROUND

Changes to the MNM Environmental Authority (EA) in 2009, restricted the mines ability to discharge Worked Water to the Isaac River during natural flow events. These changes, and other influences, have seen the total Worked Water stored onsite increase to levels approaching Mandatory Reporting Level (MRL). This information has been communicated to DERM as required under Section A8 of the EA and a Program Notice was subsequently submitted. In response DERM requested submission of a TEP detailing the considerations and recommended actions required to bring the water balance at Moranbah North into Compliance with the current EA requirements.

Moranbah North has worked towards reducing the site worked water inventory through the actions identified within the approved TEP for Worked Water and the associated Certificate of Approval MAN10140. However, due to significant rainfall seen to date this wet season, the dam's onsite are again filling to MRL. Given the height of the Isaac River and the consistent rainfall currently being experienced, discharges from site water storages (in addition to the Environmental Dam Spillway already identified within the approved TEP MAN 10140) would experience significant dilution and therefore reduce the potential for environmental harm to occur.

The additional locations proposed are:

- Production Dam via pipeline (RP1 within current EA).
  Discharge rates from this location would be approximately 100l/s
  Water quality was 5300µS/cm at 15 December

- [redacted] via pipeline (RP2 within current EA)
  Discharge rates from this location would be approximately 70l/s
  Water quality is approximately 7700µS/cm at 15 December

- [redacted] via pipeline (RP3 within current EA)
  Discharge rates from this location would be approximately 100l/s
  Dam 2 is approximately 11,300µS/cm at 15 December

Please see the tables within the Monitoring section of the TEP which outline reporting, monitoring and compliance limits to be achieved. Assessment of the pumping capabilities, minimum flow requirements and distances from release have identified targeted quality levels of 500µS/cm can be achieved.

Given the significant dilution of the worked water within the Isaac River, stakeholders who would potentially be impacted by discharge activities have not raised any concerns. MNM will extend an open invitation to DERM, the Fitzroy Water Quality Advisory Group and the Isaac Regional Council to attend site for the purposes of discussing this TEP or any other environmental topic.

OBJECTIVES

The objective of this TEP is to identify actions required to deliver compliance with the site EA within the nominated TEP period while providing mitigation of potential environmental harm and damage to mine infrastructure.

HOW OBJECTIVES ARE TO BE ACHIEVED

The TEP will achieve its objectives by discharging water harvested by the mine with a view to best proactive environmental management by mitigating harm in controlled active discharge while maximum dilution is available.

Table 1 – achieving TEP objectives

OBJECTIVE	ACTION	RESPONSIBILITY	TIME FRAME	PERFORMANCE INDICATOR
Manage worked water captured on site	Actively discharge contaminants from nominated points via existing pumping infrastructure	Environmental Superintendent	The release of contaminants under this approval will cease on **13 May 2011**	No discharges not in compliance with the TEP occur

MONITORING

Table 2 - Contaminant release points, sources and receiving waters

Release point (TEP RP)	Easting GDA94	Northing GDA94	Contaminant source and location	Monitoring point	Receiving waters
TEP RP 2			Production Dam	TEP MP 2 TEP MP 5 TEP MP 8	Isaac River
TEP RP 3			Dam 4	TEP MP 3 TEP MP 6 TEP MP 8	Isaac River
TEP RP 4			Dam 2	TEP MP 4 TEP MP 7 TEP MP 8	Isaac River

Table 3 - Contaminant release monitoring points

Monitoring point	Easting GDA94	Northing GDA94	Contaminant source and location	Monitoring point location	Receiving waters
TEP MP 2			Production Dam	750m downstream of junction of Production Dam pipeline & Isaac River	Isaac River
TEP MP 3			Dam 4	650m downstream of junction of Dam 4 overflow flume and Isaac River	Isaac River
TEP MP 4			Dam 2	500m downstream of junction of Dams 1 & 2 pipeline & Isaac River	Isaac River
TEP MP 5			Production Dam	TEP RP 2, End of Pipe	Isaac River
TEP MP 6			Dam 4	TEP RP 3, End of Pipe	Isaac River
TEP MP 7			Dam 2	TEP RP 4, End of Pipe	Isaac River
TEP MP 8			Production Dam Dam 4 Dam 2	2200m downstream of RP 4	Isaac River

Table 4 - Contaminant release limits

Quality characteristic	Compliance Limit	Monitoring Frequency	Sample Type	Monitoring Point
Electrical Conductivity (uS/cm)	5,500	Daily during release (the first sample must be taken within 8 hours of commencement of release)	*In situ*[1]	TEP MP 5
			Samples require laboratory analysis[2]	TEP MP 5
	8,000	Daily during release (the first sample must be taken within 8 hours of commencement of release)	*In situ*[1]	TEP MP 6
			Samples require laboratory analysis[2]	TEP MP 6
	11,500	Daily during release (the first sample	*In situ*[1]	TEP MP 7

		must be taken within 8 hours of commencement of release)	Samples require laboratory analysis[2]	TEP MP 7
	400	Daily during release (the first sample must be taken within 8 hours of commencement of release)	*In situ*[1]	TEP MP 2 TEP MP 3 TEP MP 4 TEP MP 8
			Samples require laboratory analysis[2]	TEP MP 2 TEP MP 3 TEP MP 4 TEP MP 8
pH (pH Unit)	6.5 (minimum) 9.0 (maximum)	Daily during release (the first sample must be taken within 8 hours of commencement of release)	*In situ*[1]	TEP MP 2 TEP MP 3 TEP MP 4 TEP MP 5 TEP MP 6 TEP MP 7 TEP MP 8
			Samples require laboratory analysis[2]	TEP MP 2 TEP MP 3 TEP MP 4 TEP MP 5 TEP MP 6 TEP MP 7 TEP MP 8
TSS	Limit = 80th percentile of upstream background[3] sites	Daily during release (the first sample must be taken within 8 hours of commencement of release)	Samples require laboratory analysis[2]	TEP MP 5 TEP MP 6 TEP MP 7
Sulphate (SO_4^{2-}) (mg/L)	250	Daily during release (the first sample must be taken within 8 hours of commencement of release)	Samples require laboratory analysis[2]	TEP MP 5 TEP MP 6 TEP MP 7

[1] In situ samples can be taken using electronic sampling equipment.
[2] Samples are required to be analysed at a NATA accredited facility in accordance with this Transitional Environmental Program.
[3] Upstream background sites are defined in Table 7. For release points 'TEP RP 2', 'TEP RP 3' and 'TEP RP 3' monitoring for Total Suspended Solids, the associated upstream background site is TEP Reference Monitoring Point

Table 5 - Release contaminant trigger investigation levels

Table 7 - Receiving water downstream monitoring points

Monitoring points (TEP MP)	Receiving waters location description	Easting (GDA94)	Northing (GDA94)
TEP Impact Monitoring Point 1	TEP Impact Monitoring Point 1 is located south of the downstream Automatic Water Station on the Isaac River.	[redacted]	[redacted]

REPORTING

Moranbah North Coal Pty Ltd will notify the administering authority, in writing, within eight hours of commencing a release of contaminants under this Transitional Environmental Program, detailing:

a) release commencement date/time
b) expected release cessation date/time
c) release point/s
d) release volume (estimated)
e) receiving water/s including the natural flow rate
f) any details (including available data) regarding likely impacts on the receiving water(s).

Moranbah North Coal Pty Ltd will submit a report to the administering authority daily during the release of contaminants under this Transitional Environmental Program, detailing:

a) all in situ monitoring data for that day
b) the receiving water flow rate
c) the release flow rate.

Moranbah North Coal Pty Ltd will notify the administering authority, in writing, within twenty-four hours of ceasing a release of contaminants uner this Transitional Environmental Program, detailing:

a) release cessation date/time
b) natural flow volume in receiving water
c) volume of water released
d) details regarding the compliance of the release with the conditions of this Transitional Environmental Program (i.e. contamination limits, natural flow, discharge volume)
e) all in-situ water quality monitoring results
f) any other matters pertinent to the water release event.

Moranbah North Coal Pty Ltd will submit a report to the administering authority on the fifth business day of each month detailing:

a) all activities undertaken under the Transitional Environmental Program,
b) b) how the Transitional Environmental Program holder has met the objectives of the Transitional Environmental Program, taking into account:
    i. the best practice environmental management for the activity, and
    ii. the risks of environmental harm being caused by the activity, and
c) how the Transitional Environmental Program holder has complied with all conditions contained within the Transitional Environmental Program.

Moranbah North Coal Pty Ltd will submit a report to the administering authority by **27 May 2011** including:

a) details of the completion of the Transitional Environmental Program,
b) details on all activities undertaken under the Transitional Environmental Program,
c) identification of how the Transitional Environmental Program holder has met the objectives of the Transitional Environmental Program, taking into account:
    i. the best practice environmental management for the activity, and
    ii. the risks of environmental harm being caused by the activity,

d) identification of how the Transitional Environmental Program holder has complied with all conditions contained within the Transitional Environmental Program, and
e) confirmation that at closure of the Transitional Environmental Program, the holder will be able to comply with the conditions of the current Environmental Authority issued for the Moranbah North Coal Mine, located at Mining Lease 70108 and the *Environmental Protection Act 1994*.

CONDITIONS

In carrying out this Transitional Environmental Program, Moranbah North Coal Pty Ltd will undertake all activities in accordance with the following conditions.

Undertaking the release of mine affected water

1 Contaminants that will, or have the potential to cause environmental harm must not be released directly or indirectly to any waters except as permitted under this Transitional Environmental Approval – Certificate of Approval, unless otherwise authorised to under the *Environmental Protection Act 1994*.

2 The release of contaminants to waters must only occur from the release points specified in Table 2 of this Transitional Environmental Program.

3 The release of contaminants to waters must not exceed the release limits stated in Table 4 at the monitoring points specified in Table 2 and Table 3 of this Transitional Environmental Program.

4 The release of contaminants to waters from the release points must be monitored at the locations specified in Table 2 and Table 3 for each quality characteristic and at the frequency specified in Table 4 and Table 5 of this Transitional Environmental Program.

5 If quality characteristics of the release exceed any of the trigger levels specified in Table 5 during a release event, the Transitional Environmental Program holder must compare the downstream results in the receiving waters identified in Table 7 to the trigger values specified in Table 5 and:
   a) where the trigger values are not exceeded then no action is to be taken
   b) where the downstream results exceed the trigger values specified Table 5 for any quality characteristic, compare the results of the downstream site to the data from background monitoring sites and
      i) if the result is less than the background monitoring site data, then no action is to be taken or
      ii) if the result is greater than the background monitoring site data, complete an investigation in accordance with the ANZECC & ARMCANZ 2000 methodology, into the potential for environmental harm and provide a written report to the administering authority in the next annual return, outlining
         1) details of the investigations carried out
         2) actions taken to prevent environmental harm.

6 If an exceedance in accordance with condition 5(a)(ii)(2) is identified, the holder of the Transitional Environmental Program must notify the administering authority within 24 hours of receiving the result. The notification must include written verification of the exceedance forwarded to the administering authority either via facsimile [redacted] or email to [redacted]

Contaminant Release Events

7 The Transitional Environmental Program holder must install, operate and maintain a stream flow gauging station to determine and record stream flows at the locations

upstream of each release point specified in Table 2 for any receiving waters into which a release occurs.

8 Notwithstanding any other condition of this Transitional Environmental Program, the release of contaminants to waters must only take place during periods of natural flow events specified as minimum flow in Table 6 for the contaminant release point(s) specified in Table 2.

9 Contaminant release flow rate from RP 2 must not exceed a release rate of 100l/s.

10 Contaminant release flow rate from RP 3 must not exceed a release rate of 100l/s.

11 Contaminant release flow rate from RP 4 must not exceed a release rate of 100l/s.

12 The daily quantity of contaminants released from each release point must be measured and recorded at the monitoring points in Table 2.

Erosions and Sediment Control

13 Releases to waters must be undertaken so as not to cause erosion of the bed and banks of the receiving waters, or cause a material build up of sediment in such waters.

14 Erosion protection must be designed, installed and maintained at each release point authorised by this Transitional Environmental Program and must:
a) designed and constructed by a suitably qualified and experienced person, and
b) be inspected by a suitably qualified and experienced person
    1. prior to the commencement of dewatering operations; and
    2. following the cessation of release in accordance with the conditions of this Transitional Environmental Program.

15 The holder of this Transitional Environmental Program must provide a report to the administering authority within 10 business days following the cessation of release of mine affected water authorised under authority of this Transitional Environmental Program. The report must detail the performance of erosion protection measures, including:
a) identification of erosion, slumping and scour impacts to vegetation,
b) rehabilitation, including earthworks, scour protection and flow velocity controls undertaken to minimise environmental harm, and
c) detailed engineering assessment of erosion protection works completed to date and any proposed works to be undertaken.

Notification of Release Events

16 The Transitional Environmental Program holder must notify the administering authority within 6 hours of having commenced releasing mine affected water to the receiving environment. Notification must include the submission of written verification to the administering authority (either via facsimile [redacted] or email to [redacted] of the following information:
a) release commencement date/time
b) expected release cessation date/time
c) release point/s
d) release volume (estimated)
e) receiving water/s including the natural flow rate
f) any details (including available data) regarding likely impacts on the receiving water(s).

17 The Transitional Environmental Program holder must provide the administering authority daily during the release of mine affected water, in writing (either via facsimile [redacted] or email to [redacted] of the following information:
a) all in situ monitoring data for that day

b) the receiving water flow rate
c) the release flow rate.

18 The Transitional Environmental Program holder must notify the administering authority as soon as practicable, (no later than within 24 hours after cessation of a release) of the cessation of a release notified under condition 14 and within 28 days provide the following information in writing:
a) release cessation date/time
b) natural flow volume in receiving water
c) volume of water released
d) details regarding the compliance of the release with the conditions of this Transitional Environmental Program (i.e. contamination limits, natural flow, discharge volume)
e) all in-situ water quality monitoring results
f) any other matters pertinent to the water release event.

Notification of release event exceedence

19 If the release limits defined in Table 3 are exceeded, the holder of the Transitional Environmental Program must notify the administering authority within 24 hours of receiving the results.

20 The Transitional Environmental Program holder must, within 28 days of a release that exceeds the conditions of this Transitional Environmental Program, provide a report to the administering authority detailing:
a) the reason for the release
b) the location of the release
c) all water quality monitoring results
d) any general observations
e) all calculations
f) any other matters pertinent to the water release event.

Requirements to cease the release of mine affected water

21 The release of mine affected waters must cease immediately if any water quality limit as specified in Table 4 is exceeded.

22 The release of mine affected waters must cease immediately if identified that the release of mine affected waters is causing erosion of the bed and banks of the receiving waters, or is causing a material build up of sediment in such waters.

23 The release of mine affected waters must cease immediately if the holder of this Transitional Environmental Program is directed to do so by the administering authority.

24 The release of mine affected waters authorised under this Transitional Environmental Program must cease by **13 May 2011**.

Monitoring Requirements

25 Where monitoring is a requirement of this Transitional Environmental Program, ensure that a competent person(s) conducts all monitoring.

26 All monitoring undertaken as a requirement of this Transitional Environmental Program must be undertaken in accordance with the administering authority's Water Sampling Manual.

Notification of emergencies, incidents and exceptions

27 As soon as practicable after becoming aware of any emergency or incident which results in the release of contaminants not in accordance, or reasonably expected to be not in accordance with the conditions of this Transitional Environmental Program, the administering authority must be notified of the release by telephone, facsimile or email.

28 The notification of emergencies or incidents must include but not be limited to the following:

a) the holder of the Transitional Environmental Program
b) the location of the emergency or incident
c) the number of the Transitional Environmental Program
d) the name and telephone number of the designated contact person
e) the time of the release
f) the time the holder of the Transitional Environmental Program became aware of the release
g) the suspected cause of the release
h) the environmental harm caused, threatened, or suspected to be caused by the release, and
i) actions taken to prevent any further release and mitigate any environmental harm caused by the release.

29 Not more than fourteen days following the initial notification of an emergency or incident, written advice must be provided of the information supplied to the administering authority in relation to:

a) proposed actions to prevent a recurrence of the emergency or incident, and
b) outcomes of actions taken at the time to prevent or minimise environmental harm.

ANGLO AMERICAN

20th December 2010

Moranbah North Mine/SHE Department

[redacted]
Environmental Superintendent

Direct Line [redacted]

e-mail : [redacted]

Dear [redacted]

I am writing to request an Emergency Direction to discharge water from [redacted] discharge point, identified in our environmental authority as RP 2[redacted]spillway via pipeline). Moranbah North Mine is currently discharging via the Worked Water TEP through the Environmental Dam spillway and from the Production Dam to the Isaac River via pipe under the Emergency Direction provided yesterday.

The current situation is we are still trying to stabilise the Production and Environmental Dams which are significantly above capacity due to the large amount of inflow. We are not able to wash coal (and consume water) currently due to water cutting off one co-disposal pump and the railway loop inundation.

The persistent rainfall over recent times has also increased the amount of recharge and water inflow to the pit. To stop pit inundation 6-8ML is pumped to Dam 4. Dam 4 has a current freeboard of 45.8 to MRL and 64.8 to spill. There is the potential for uncontrolled discharge from Dam 4 spillway within the next ten days.

The Isaac River is currently flowing at ~320m^3/sec. If rainfall continues as predicted there is no ability to pump to the Production Dam and unlicensed discharge will occur. Proposed discharge via pump from Dam 4 would be at 0.1m^3/sec. Electrical conductivity at Dam 4 was at 7662µm/cm and pH 8.6 on 15 December. Inflows monitored daily at the upstream monitoring point (MP1) from 12 December have averaged to 237µm/cm. The calculation to mitigate environmental harm provided a maximum potential input of 1:27 units or 185l/sec (or 0.185m^3/sec) at flow of 5m^3/sec, comparably to the 0.1m^3/sec pump capacity to meet a value of 500µm/cm 500m downstream of release. The pumps would be turned off when flow decreased to 5m^3/sec.

The mines intention is to continue to develop a secondary TEP to address the additional discharge points and provide as soon as possible, however more rain is predicted daily, with potentially significant falls from Wednesday through to Sunday. Given the current high flow and expectation of this continuing for some days we would appreciate your consideration of our proposal.

Please feel free to contact me for any questions or [redacted].

Yours sincerely,

[redacted]

DRAFT TRANSITIONAL ENVIRONMENTAL PROGRAM UNDER SECTION 333 OF THE *ENVIRONMENTAL PROTECTION ACT 1994*

Principal Holder: [redacted] l Pty Ltd
[redacted] d
Moranbah QLD 4744

EA Number: MIN1005577107

Title: Worked Water TEP - Additional Discharge Locations

Date: 20th December 2010

Finish Date: 30th June 2011

BACKGROUND

Changes to the MNM Environmental Authority (EA) in 2009, restricted the mines ability to discharge Worked Water to the Isaac River during natural flow events. These changes, and other influences, have seen the total Worked Water stored onsite increase to levels approaching Mandatory Reporting Level (MRL). This information has been communicated to DERM as required under Section A8 of the EA and a Program Notice was subsequently submitted. In response DERM requested submission of a TEP detailing the considerations and recommended actions required to bring the water balance at Moranbah North into Compliance with the current EA requirements.

Moranbah North has worked towards reducing the site worked water inventory through the actions identified within the approved TEP for Worked Water and the associated Certificate of Approval MAN10140. However, due to significant rainfall seen to date this wet season, the dam's onsite are again filling to MRL. Given the height of the Isaac River and the consistent rainfall currently being experienced, discharges from site water storages (in addition to the Environmental Dam Spillway already identified within the approved TEP MAN 10140) would experience significant dilution and therefore reduce the potential for environmental harm to occur.

The additional locations proposed are:

- Production Dam via pipeline (RP1 within current EA).
  Discharge rates from this location would be approximately 100l/s
  Water quality was 5300µS/cm at 15 December

- [redacted] via pipeline (RP2 within current EA)
  Discharge rates from this location would be approximately 70l/s
  Water quality is approximately 7700µS/cm at 15 December

- [redacted] via pipeline (RP3 within current EA)
  Discharge rates from this location would be approximately 100l/s
  Dam 2 is approximately 11,300µS/cm at 15 December

Please see the tables within the Monitoring section of the TEP which outline reporting, monitoring and compliance limits to be achieved. Assessment of the pumping capabilities, minimum flow requirements and distances from release have identified targeted quality levels of 500µS/cm can be achieved.

Given the significant dilution of the worked water within the Isaac River, stakeholders who would potentially be impacted by discharge activities have not raised any concerns. MNM will extend an open invitation to DERM, the Fitzroy Water Quality Advisory Group and the Isaac Regional Council to attend site for the purposes of discussing this TEP or any other environmental topic.

OBJECTIVES

The objective of this TEP is to identify actions required to deliver compliance with the site EA within the nominated TEP period while providing mitigation of potential environmental harm and damage to mine infrastructure.

HOW OBJECTIVES ARE TO BE ACHIEVED

The TEP will achieve its objectives by discharging water harvested by the mine with a view to best proactive environmental management by mitigating harm in controlled active discharge while maximum dilution is available.

Table 1 – achieving TEP objectives

OBJECTIVE	ACTION	RESPONSIBILITY	TIME FRAME	PERFORMANCE INDICATOR
Manage worked water captured on site	Actively discharge contaminants from nominated points via existing pumping infrastructure	Environmental Superintendent	The release of contaminants under this approval will cease on **13 May 2011**	No discharges not in compliance with the TEP occur

MONITORING

Table 2 - Contaminant release points, sources and receiving waters

Release point (TEP RP)	Easting GDA94	Northing GDA94	Contaminant source and location	Monitoring point	Receiving waters
TEP RP 2	[redacted]	[redacted]	Production Dam	TEP MP 2 TEP MP 5 TEP MP 8	Isaac River
TEP RP 3	[redacted]	[redacted]	Dam **4**	TEP MP 3 TEP MP 6 TEP MP 8	Isaac River
TEP RP 4	[redacted]	[redacted]	Dam 2	TEP MP 4 TEP MP 7 TEP MP 8	Isaac River

Table 3 - Contaminant release monitoring points

Monitoring point	Easting GDA94	Northing GDA94	Contaminant source and location	Monitoring point location	Receiving waters
TEP MP 2			Production Dam	750m downstream of junction of Production Dam pipeline & Isaac River	Isaac River
TEP MP 3			Dam 4	650m downstream of junction of Dam 4 overflow flume and Isaac River	Isaac River
TEP MP 4			Dam 2	500m downstream of junction of Dams 1 & 2 pipeline & Isaac River	Isaac River
TEP MP 5			Production Dam	TEP RP 2, End of Pipe	Isaac River
TEP MP 6			Dam 4	TEP RP 3, End of Pipe	Isaac River
TEP MP 7			Dam 2	TEP RP 4, End of Pipe	Isaac River
TEP MP 8	0		Production Dam Dam 4 Dam 2	2200m downstream of RP 4	Isaac River

Table 4 - Contaminant release limits

Quality characteristic	Compliance Limit	Monitoring Frequency	Sample Type	Monitoring Point
Electrical Conductivity (uS/cm)	5,500	Daily during release (the first sample must be taken within 8 hours of commencement of release)	*In situ*[1]	TEP MP 5
			Samples require laboratory analysis[2]	TEP MP 5
	8,000	Daily during release (the first sample must be taken within 8 hours of commencement of release)	*In situ*[1]	TEP MP 6
			Samples require laboratory analysis[2]	TEP MP 6
	11,500	Daily during release (the first sample	*In situ*[1]	TEP MP 7

		must be taken within 8 hours of commencement of release)	Samples require laboratory analysis[2]	TEP MP 7
	400	Daily during release (the first sample must be taken within 8 hours of commencement of release)	*In situ*[1]	TEP MP 2 TEP MP 3 TEP MP 4 TEP MP 8
			Samples require laboratory analysis[2]	TEP MP 2 TEP MP 3 TEP MP 4 TEP MP 8
pH (pH Unit)	6.5 (minimum) 9.0 (maximum)	Daily during release (the first sample must be taken within 8 hours of commencement of release)	*In situ*[1]	TEP MP 2 TEP MP 3 TEP MP 4 TEP MP 5 TEP MP 6 TEP MP 7 TEP MP 8
			Samples require laboratory analysis[2]	TEP MP 2 TEP MP 3 TEP MP 4 TEP MP 5 TEP MP 6 TEP MP 7 TEP MP 8
TSS	Limit = 80th percentile of upstream background[3] sites	Daily during release (the first sample must be taken within 8 hours of commencement of release)	Samples require laboratory analysis[2]	TEP MP 5 TEP MP 6 TEP MP 7
Sulphate (SO_4^{2-}) (mg/L)	250	Daily during release (the first sample must be taken within 8 hours of commencement of release)	Samples require laboratory analysis[2]	TEP MP 5 TEP MP 6 TEP MP 7

[1] In situ samples can be taken using electronic sampling equipment.
[2] Samples are required to be analysed at a NATA accredited facility in accordance with this Transitional Environmental Program.
[3] Upstream background sites are defined in Table 7. For release points 'TEP RP 2', 'TEP RP 3' and 'TEP RP 3' monitoring for Total Suspended Solids, the associated upstream background site is TEP Reference Monitoring Point

Table 5 - Release contaminant trigger investigation levels

Quality characteristic	Trigger levels (µg/L)	Monitoring frequency	Monitoring Point
Aluminium	55	Commencement of release and thereafter weekly during release	TEP MP 5 TEP MP 6 TEP MP 7
Arsenic	13		
Cadmium	0.2		
Chromium	1.0		
Copper	2.0		
Iron	300		
Lead	10		
Mercury	0.2		
Nickel	11		
Zinc	8.0		
Boron	370		
Cobalt	90		
Manganese	1900		
Molybdenum	34		
Selenium	10		
Silver	1.0		
Uranium	1.0		
Vanadium	10		
Ammonia	900		
Nitrate	1100		
Petroleum hydrocarbons (C6-C9)	20		
Petroleum hydrocarbons (C10-C36)	100		
Fluoride (total)	2000		

Table 6 - Contaminant release during flow events

Receiving waters	Release point (TEP RP)	Gauging station description	Longitude (GDA94)	Latitude (GDA94)	Minimum flow in receiving water required for a release event	Flow recording frequency
Isaac River	TEP RP 2	Isaac River @ Goonyella Site ID:130414A			=> $20m^3$/sec	Continuous (minimum daily)
Isaac River	TEP RP 3	Isaac River @ Goonyella Site ID:130414A			=> $20m^3$/sec	Continuous (minimum daily)
Isaac River	TEP RP 4	Isaac River @ Goonyella Site ID:130414A			=> $50m^3$/sec	Continuous (minimum daily)

Table 7 - Receiving water downstream monitoring points

Monitoring points (TEP MP)	Receiving waters location description	Easting (GDA94)	Northing (GDA94)
TEP Impact Monitoring Point 1	TEP Impact Monitoring Point 1 is located south of the downstream Automatic Water Station on the Isaac River.		

REPORTING

Moranbah North Coal Pty Ltd will notify the administering authority, in writing, within eight hours of commencing a release of contaminants under this Transitional Environmental Program, detailing:

a) release commencement date/time
b) expected release cessation date/time
c) release point/s
d) release volume (estimated)
e) receiving water/s including the natural flow rate
f) any details (including available data) regarding likely impacts on the receiving water(s).

Moranbah North Coal Pty Ltd will submit a report to the administering authority daily during the release of contaminants under this Transitional Environmental Program, detailing:

a) all in situ monitoring data for that day
b) the receiving water flow rate
c) the release flow rate.

Moranbah North Coal Pty Ltd will notify the administering authority, in writing, within twenty-four hours of ceasing a release of contaminants uner this Transitional Environmental Program, detailing:

a) release cessation date/time
b) natural flow volume in receiving water
c) volume of water released
d) details regarding the compliance of the release with the conditions of this Transitional Environmental Program (i.e. contamination limits, natural flow, discharge volume)
e) all in-situ water quality monitoring results
f) any other matters pertinent to the water release event.

Moranbah North Coal Pty Ltd will submit a report to the administering authority on the fifth business day of each month detailing:

a) all activities undertaken under the Transitional Environmental Program,
b) b) how the Transitional Environmental Program holder has met the objectives of the Transitional Environmental Program, taking into account:
    i. the best practice environmental management for the activity, and
    ii. the risks of environmental harm being caused by the activity, and
c) how the Transitional Environmental Program holder has complied with all conditions contained within the Transitional Environmental Program.

Moranbah North Coal Pty Ltd will submit a report to the administering authority by **27 May 2011** including:

a) details of the completion of the Transitional Environmental Program,
b) details on all activities undertaken under the Transitional Environmental Program,
c) identification of how the Transitional Environmental Program holder has met the objectives of the Transitional Environmental Program, taking into account:
    i. the best practice environmental management for the activity, and
    ii. the risks of environmental harm being caused by the activity,

d) identification of how the Transitional Environmental Program holder has complied with all conditions contained within the Transitional Environmental Program, and
e) confirmation that at closure of the Transitional Environmental Program, the holder will be able to comply with the conditions of the current Environmental Authority issued for the Moranbah North Coal Mine, located at Mining Lease 70108 and the *Environmental Protection Act 1994*.

CONDITIONS

In carrying out this Transitional Environmental Program, Moranbah North Coal Pty Ltd will undertake all activities in accordance with the following conditions.

Undertaking the release of mine affected water

1 Contaminants that will, or have the potential to cause environmental harm must not be released directly or indirectly to any waters except as permitted under this Transitional Environmental Approval – Certificate of Approval, unless otherwise authorised to under the *Environmental Protection Act 1994*.

2 The release of contaminants to waters must only occur from the release points specified in Table 2 of this Transitional Environmental Program.

3 The release of contaminants to waters must not exceed the release limits stated in Table 4 at the monitoring points specified in Table 2 and Table 3 of this Transitional Environmental Program.

4 The release of contaminants to waters from the release points must be monitored at the locations specified in Table 2 and Table 3 for each quality characteristic and at the frequency specified in Table 4 and Table 5 of this Transitional Environmental Program.

5 If quality characteristics of the release exceed any of the trigger levels specified in Table 5 during a release event, the Transitional Environmental Program holder must compare the downstream results in the receiving waters identified in Table 7 to the trigger values specified in Table 5 and:
   a) where the trigger values are not exceeded then no action is to be taken
   b) where the downstream results exceed the trigger values specified Table 5 for any quality characteristic, compare the results of the downstream site to the data from background monitoring sites and
      i) if the result is less than the background monitoring site data, then no action is to be taken or
      ii) if the result is greater than the background monitoring site data, complete an investigation in accordance with the ANZECC & ARMCANZ 2000 methodology, into the potential for environmental harm and provide a written report to the administering authority in the next annual return, outlining
         1) details of the investigations carried out
         2) actions taken to prevent environmental harm.

6 If an exceedance in accordance with condition 5(a)(ii)(2) is identified, the holder of the Transitional Environmental Program must notify the administering authority within 24 hours of receiving the result. The notification must include written verification of the exceedance forwarded to the administering authority either via facsimile [redacted] or email to [redacted]

Contaminant Release Events

7 The Transitional Environmental Program holder must install, operate and maintain a stream flow gauging station to determine and record stream flows at the locations

upstream of each release point specified in Table 2 for any receiving waters into which a release occurs.

8 Notwithstanding any other condition of this Transitional Environmental Program, the release of contaminants to waters must only take place during periods of natural flow events specified as minimum flow in Table 6 for the contaminant release point(s) specified in Table 2.

9 Contaminant release flow rate from RP 2 must not exceed a release rate of 100l/s.

10 Contaminant release flow rate from RP 3 must not exceed a release rate of 100l/s.

11 Contaminant release flow rate from RP 4 must not exceed a release rate of 100l/s.

12 The daily quantity of contaminants released from each release point must be measured and recorded at the monitoring points in Table 2.

Erosions and Sediment Control

13 Releases to waters must be undertaken so as not to cause erosion of the bed and banks of the receiving waters, or cause a material build up of sediment in such waters.

14 Erosion protection must be designed, installed and maintained at each release point authorised by this Transitional Environmental Program and must:
a) designed and constructed by a suitably qualified and experienced person, and
b) be inspected by a suitably qualified and experienced person
    1. prior to the commencement of dewatering operations; and
    2. following the cessation of release in accordance with the conditions of this Transitional Environmental Program.

15 The holder of this Transitional Environmental Program must provide a report to the administering authority within 10 business days following the cessation of release of mine affected water authorised under authority of this Transitional Environmental Program. The report must detail the performance of erosion protection measures, including:
a) identification of erosion, slumping and scour impacts to vegetation,
b) rehabilitation, including earthworks, scour protection and flow velocity controls undertaken to minimise environmental harm, and
c) detailed engineering assessment of erosion protection works completed to date and any proposed works to be undertaken.

Notification of Release Events

16 The Transitional Environmental Program holder must notify the administering authority within 6 hours of having commenced releasing mine affected water to the receiving environment. Notification must include the submission of written verification to the administering authority (either via facsimile [redacted] or email to [redacted] of the following information:
a) release commencement date/time
b) expected release cessation date/time
c) release point/s
d) release volume (estimated)
e) receiving water/s including the natural flow rate
f) any details (including available data) regarding likely impacts on the receiving water(s).

17 The Transitional Environmental Program holder must provide the administering authority daily during the release of mine affected water, in writing (either via facsimile [redacted] r email to [redacted] of the following information:
a) all in situ monitoring data for that day

b) the receiving water flow rate
c) the release flow rate.

18 The Transitional Environmental Program holder must notify the administering authority as soon as practicable, (no later than within 24 hours after cessation of a release) of the cessation of a release notified under condition 14 and within 28 days provide the following information in writing:
a) release cessation date/time
b) natural flow volume in receiving water
c) volume of water released
d) details regarding the compliance of the release with the conditions of this Transitional Environmental Program (i.e. contamination limits, natural flow, discharge volume)
e) all in-situ water quality monitoring results
f) any other matters pertinent to the water release event.

Notification of release event exceedence

19 If the release limits defined in Table 3 are exceeded, the holder of the Transitional Environmental Program must notify the administering authority within 24 hours of receiving the results.

20 The Transitional Environmental Program holder must, within 28 days of a release that exceeds the conditions of this Transitional Environmental Program, provide a report to the administering authority detailing:
a) the reason for the release
b) the location of the release
c) all water quality monitoring results
d) any general observations
e) all calculations
f) any other matters pertinent to the water release event.

Requirements to cease the release of mine affected water

21 The release of mine affected waters must cease immediately if any water quality limit as specified in Table 4 is exceeded.

22 The release of mine affected waters must cease immediately if identified that the release of mine affected waters is causing erosion of the bed and banks of the receiving waters, or is causing a material build up of sediment in such waters.

23 The release of mine affected waters must cease immediately if the holder of this Transitional Environmental Program is directed to do so by the administering authority.

24 The release of mine affected waters authorised under this Transitional Environmental Program must cease by **13 May 2011**.

Monitoring Requirements

25 Where monitoring is a requirement of this Transitional Environmental Program, ensure that a competent person(s) conducts all monitoring.

26 All monitoring undertaken as a requirement of this Transitional Environmental Program must be undertaken in accordance with the administering authority's Water Sampling Manual.

Notification of emergencies, incidents and exceptions

27 As soon as practicable after becoming aware of any emergency or incident which results in the release of contaminants not in accordance, or reasonably expected to be not in accordance with the conditions of this Transitional Environmental Program, the administering authority must be notified of the release by telephone, facsimile or email.

28 The notification of emergencies or incidents must include but not be limited to the following:
   a) the holder of the Transitional Environmental Program
   b) the location of the emergency or incident
   c) the number of the Transitional Environmental Program
   d) the name and telephone number of the designated contact person
   e) the time of the release
   f) the time the holder of the Transitional Environmental Program became aware of the release
   g) the suspected cause of the release
   h) the environmental harm caused, threatened, or suspected to be caused by the release, and
   i) actions taken to prevent any further release and mitigate any environmental harm caused by the release.

29 Not more than fourteen days following the initial notification of an emergency or incident, written advice must be provided of the information supplied to the administering authority in relation to:
   a) proposed actions to prevent a recurrence of the emergency or incident, and
   b) outcomes of actions taken at the time to prevent or minimise environmental harm.

Request for Statutory Approval

Department of Environment and Resource Management

s337 of the *Environmental Protection Act 1994*
CONSIDERATION OF A TRANSITIONAL ENVIRONMENTAL PROGRAM (TEP)

CLIENT:	ty Ltd
REGISTERED OFFICE ADDRESS:	Qld 4744
TENEMENT:	
ENV AUTHORITY NO.:	MIN100557107
FILE NO.:	EMD136
PROGRAM NOTICE/REQUIRED:	N/A
REASON FOR TEP:	Release of mine affected water not in compliance with EA
DATE SUBMITTED:	20 December 2010
DECISION DUE DATE:	24 January 2011
(if approval required)	
TIME SPENT:	20 hours

1.0 SUMMARY

Moranbah North Coal Pty Ltd currently have an approved TEP to release mine affected water from the Environment Dam to Service Area Creek and then the Isaac River when the Isaac River is receiving natural flows of $5m^3$/second or greater and may continue the release when flows drop below $5m^3$/second for a either 24 hours to until the flow reaches $2.5m^3$/second, whichever is sooner.

Moranbah North Coal Pty Ltd applied for a second TEP to approve the release of contaminated water into the Isaac River from an additional three points. The release is to be conducted through a pipe which can be manually opened and closed for control of the release.

The releases are from

- Production Dam which averages 5300uS/cm,
- Dam 4 which averages 7,700uS/cm, and
- Dam 2 which averages 11,300uS/cm.

Through negotiation with the department, the following outcomes were amended into the TEP (resubmitted 23 December 2010):

- The release of water from the Production Dam may commence when the natural flow rate within the Isaac River is $20m^3$/second or higher.
    - The limits to authorised a release from the Production Dam, when measured at the release point are:
        - Electrical Conductivity at or below 5,500uS/cm;
        - pH between 6.5 and 9;
        - Total Suspended Solids at an 80^{th} percentile of the background level; and
        - Sulphate (SO_4^{2-}) at or below 250mg/L
    - Moranbah North Coal Pty Ltd must ensure sufficient dilution with the Isaac River to meet the following limits measured within the Isaac River, 750m downstream of the release point:
        - Electrical Conductivity at or below 400uS/cm;
    - Moranbah North Coal Pty Ltd must ensure sufficient dilution with the Isaac River to meet the following limits measured within the Isaac River (this is cumulative with the release of water from Dam 4 and Dam 2), at the downstream monitoring point:
        - Electrical Conductivity at or below 400uS/cm;
    - These limits were based on the site receiving dilution with the Isaac River at flow rates greater than $20m^3$/second and background water quality of between 230 – 250uS/cm, and considering

the water quality objectives contained within the draft Quality Guidelines and Water Quality objectives for Fitzroy Basin Waters (department of Environment and resource Management).

- The release of water from the Dam 4 may commence when the natural flow rate within the Isaac River is $20m^3$/second or higher.
    - The limits to authorised a release from the Dam 4, when measured at the release point are:
        - Electrical Conductivity at or below 8,000uS/cm;
        - pH between 6.5 and 9;
        - Total Suspended Solids at an 80^{th} percentile of the background level; and
        - Sulphate (SO_4^{2-}) at or below 250mg/L
    - Moranbah North Coal Pty Ltd must ensure sufficient dilution with the Isaac River to meet the following limits measured within the Isaac River (this is cumulative with the release occurring from the Production Dam), 650m downstream of the release point:
        - Electrical Conductivity at or below 400uS/cm;
    - Moranbah North Coal Pty Ltd must ensure sufficient dilution with the Isaac River to meet the following limits measured within the Isaac River (this is cumulative with the release of contaminants from the Production Dam and Dam 2), at the downstream monitoring point:
        - Electrical Conductivity at or below 400uS/cm;
    - These limits were based on the site receiving dilution with the Isaac River at flow rates greater than $20m^3$/second and background water quality of between 230 – 250uS/cm, and considering the water quality objectives contained within the draft Quality Guidelines and Water Quality objectives for Fitzroy Basin Waters.
- The release of water from the Dam 2 may commence when the natural flow rate within the Isaac River is $50m^3$/second or higher.
    - The limits to authorised a release from the Dam 2, when measured at the release point are:
        - Electrical Conductivity at or below 11,500uS/cm;
        - pH between 6.5 and 9;
        - Total Suspended Solids at an 80^{th} percentile of the background level; and
        - Sulphate (SO_4^{2-}) at or below 250mg/L
    - Moranbah North Coal Pty Ltd must ensure sufficient dilution with the Isaac River to meet the following limits measured within the Isaac River (this is cumulative with the release occurring from the Production Dam and Dam 4), 500m downstream of the release point:
        - Electrical Conductivity at or below 400uS/cm;
    - Moranbah North Coal Pty Ltd must ensure sufficient dilution with the Isaac River to meet the following limits measured within the Isaac River (this is cumulative with the release of contaminants from Production Dam and Dam 4), at the downstream monitoring point:
        - Electrical Conductivity at or below 400uS/cm;
    - These limits were based on the site receiving dilution with the Isaac River at flow rates greater than $50m^3$/second and background water quality of between 230 – 250uS/cm, and considering the water quality objectives contained within the draft Quality Guidelines and Water Quality objectives for Fitzroy Basin Waters.

Has the TEP been entered in EcoTrack:	Yes
EcoTrack Compliance Reference (if applicable): -	CA21980
EcoTrack TEP Reference Number: -	MAN11420

If Approving the TEP

Has a notice approving the TEP been completed:	Yes
Has a certificate of approval been developed:	Yes
Were additional conditions set on the certificate of approval:	Yes

2.0 STATUTORY REQUIREMENTS

330 What is a transitional environmental program
A transitional environmental program is a specific program that, when approved, achieves compliance with this Act for the matters dealt with by the program by—
(a) reducing environmental harm; or
(b) detailing the transition to an environmental standard.

The TEP is required to allow the Moranbah North Coal Mine to operate while constructing further design storage allowance (under another TEP) to transition into the Model Fitzroy Water Conditions included into EA MIN100557107 in December 2009. At the completion of this TEP (30 June 2011) the site should have sufficient water storage to continue to operate.

337 Administering authority to consider draft programs
(1) The administering authority must decide whether to approve a draft transitional environmental program submitted to it within 20 business days after the application date.

The decision has been made within 20 Business Days.

(2) If public notice is required to be given of the submission of the draft program, the administering authority must be satisfied public notice has been properly given before making a decision.

N/A

338 Criteria for deciding draft program
(1) In deciding whether to approve or refuse to approve the draft program or the conditions (if any) of the approval, the administering authority—
(a) must comply with any relevant regulatory requirement;

In making this decision the administering authority has considered the regulatory requirements under Chapter 4 of the *Environmental Protection Regulation 2008.*

Environmental Protection Regulation 2008
Chapter 4 Regulatory Requirements

Part 2 Regulatory Requirements for all environmental management decisions

s51 Matters to be considered for environmental management decisions

In making this decision, the administering authority has considered each of the following under any relevant environmental protection policies:

- the management hierarchy;
- environmental values;
- quality objectives; and
- the management intent;

and incorporated these, through negotiation with the applicant into the TEP. The administering authority considered the draft Quality Guidelines and Water Quality objectives for Fitzroy Basin Waters.

The characteristics of the contaminants or materials released from carrying out the activity have been considered.

The nature and management of, including the use and availability of technology relating to, the processes being, or to be, used in carrying out the activity have been considered.

The impact of the release of contaminants or materials from carrying out the activity on the receiving environment, including the cumulative impact of the release with other known releases of contaminants, materials or wastes has been considered. The remaining capacity of the receiving environment to accept contaminants or wastes released from future activities while protecting the environmental values has been considered. In making this decision the administering authority considered the cumulative impact of the

release of contaminants from nearby activities (coal mines and coal seam gas activities) on the Isaac River. TEP's have currently been issued for:

- Goonyella Riverside Coal Mine;
- Isaac Plains Coal Mine; and
- Arrow Energy Coal Seam Gas.

This issuing of this TEP, and amending the current TEP for the Moranbah North Coal Mine is considered to utilising the remaining capacity of this section of the Isaac River to assimilate contaminants.

The characteristics of the receiving environment and the potential impact on it from carrying out the activity has been considered.

The effected persons have been considered, including the order of occupancy or use between the activity and the effected person.

s52 Conditions to be considered for environmental management decisions

The administering authority has considered imposing conditions within the TEP Certificate of Approval on the following matters:

- implementing a system for managing risks to the environment;
- implementing measures for avoiding or minimising the release of contaminants or waste;
- ensuring an adequate distance between any sensitive receptors and the relevant site for the activity to which the decision relates;
- limiting or reducing the size of the initial mixing zone or attenuation zone, if any, that may be effected by the release of contaminants;
- treating contaminants before they are released;
- restricting the type, quality, quantity, concentration or characteristics of contaminants that can be released;
- the way in which contaminants may be released;
- ensuring a minimum degree of dispersion happens when a contaminant is released.

However, it was determined that the TEP was written adequately to address the above concerns without the requirement for additional conditions.

The administering authority has considered imposing conditions within the TEP Certificate of Approval on the following matter:

- protecting environmental values, and meeting quality objectives, under relevant environmental protection policies;

The administering authority imposed the following condition:

10. The release of mine affected water under authority of this Transitional Environmental Program may be reviewed at any time in accordance with Table 1: Trigger Values at Downstream Locations. The department may require the Transitional Environmental Program holder to cease any release if values are met or exceeded at these locations.

Table 1: Trigger Values at Downstream Locations (Isaac River)

Quality characteristic	Trigger Value	Flow Trigger	Monitoring Point
Electrical conductivity (uS/cm)	525	<5m³/s	DERM Gauging Station 130410A (Deverill)
	400	>5m³/s	DERM Gauging Station 130410A (Deverill)
	400	All Flows	DERM Gauging Station 130401A (Yatton)

This condition was imposed considering the quality values described within the draft Quality Guidelines and Water Quality objectives for Fitzroy Basin Waters, to ensure these quality values can be met.

s53 Matters to be considered for decisions imposing monitoring conditions

The administering authority considered whether to impose monitoring conditions about the release of contaminants from the activity on the receiving environment.

The determination for monitoring conditions included:

- the potential impact on the receiving environment of –
  - the activity to which the decision related; and
  - the release of the contaminant.
- the characteristics of the contaminant;
- the potential for a control measure to fail and the effect of a failure of a control measure on the receiving environment;
- the protocols relevant to monitoring the release of the contaminant;
- whether the monitoring should be continuous or intermittent.

However, it was determined that the TEP was written adequately to address the above concerns without the requirement for additional conditions.

Part 3 Additional regulatory requirements for particular environmental management decisions

s55 Release of water or waste to land
N/A

s56 Release of water, other than stormwater, to surface water

The administering authority must consider –

- any available toxicity data relevant to the release and the receiving environment;
- if there is an initial mixing zone –
  - whether there is any practicable alternative that would reduce or eliminate the initial mixing zone;
  - whether the size of the initial mixing zone is likely to adversely affect an environmental value of the ecological condition of the receiving environment, including, for example, a watercourse or wetland; and
  - whether concentrations of contaminants in the initial mixing zone are acutely toxic to the biota.

The administering authority considered that:

- for the releases from the Production Dam and Dam 4 in flows greater than 20m^3/second there would be an initial mixing zone for water from the Isaac River,
- the receiving environment is considered be able to assimilate the release of water without adversely affecting an environmental value of the ecological condition of the receiving environment, and
- the concentrations of contaminants up to 8,000uS/cm within the initial mixing zone would not be acutely toxic to the biota when receiving water flow was 20m3/second.
- for the releases from the Dam 2 in flows greater than 50m^3/second there would be an initial mixing zone for water from the Isaac River,
- the receiving environment is considered be able to assimilate the release of water without adversely affecting an environmental value of the ecological condition of the receiving environment when flows are 50m^3/second or higher, and
- the concentrations of contaminants up to 11,500uS/cm within the initial mixing zone would be acutely toxic to the biota, however a receiving water flow of 50m^3/second would disperse the contaminants adequately without the use of a diffuser to minimise this impact.

The administering authority must consider if whether to impose conditions for:

- releasing the water to tidal waters only during particular tidal conditions;

- releasing the water to non-tidal waters only of the rate of flow of the surface water is greater than a particular level.

The TEP is written to ensure the release of contaminated water to non-tidal waters occurs only after the flow rate of the surface water is greater than a particular level.

s57 Release of stormwater
N/A

s58 Release of water or waste to particular wetlands for treatment
N/A

s59 Activity involving berthing, docking or mooring a boat
N/A

s60 Activity involving storing or moving bulk material
N/A

s61 Activity involving acid sulphate soil
N/A

s62 Activity involving acid-producing rock
N/A

s63 Activity involving direct release of waste to groundwater
N/A

s64 Activity involving indirect release of contaminants to groundwater
N/A

(b) subject to paragraph (a), must also consider the following—
(i) the standard criteria;

- *The principles of ecological sustainable development as set out in the 'National Strategy for Ecologically Sustainable Development'.*

  Considered

- *Any applicable environmental protection policy.*

  The *Environmental Protection (Water) Policy 2009* was considered.

- *Any applicable Commonwealth, State or local government plans, standards, agreements or requirements.*

  The draft Quality Guidelines and Water Quality objectives for Fitzroy Basin waters was considered.
  The Queensland Water Quality Guidelines 2006 was considered.
  The administering authorities Monitoring and Sampling Manual 2009 – EPP Water was considered.
  The National Water Quality Management Strategy was considered.
  The Australian and New Zealand Environment and Conversation Council (ANZECC) 2000 Guidelines for Fresh and Marine Water Quality was considered.

- *Any applicable environmental impact study, assessment or report.*

  Review of the Fitzroy River Water Quality Issues by Professor Barry Hart was considered.
  A study of the cumulative impacts on water quality of mining activities in the Fitzroy River Basin was considered.

- *The character, resilience and values of the receiving environment.*

Considered

- *All submissions made by the applicant and submitters.*

  Considered

- *The best practice environmental management for activities under any relevant instrument, or proposed instrument, as follows – a transitional environmental program.*

  Considered

  s21 of the *Environmental Protection Act 1994* - Best practice environmental management
  *(1) The **best practice environmental management** of an activity is the management of the activity to achieve an ongoing minimisation of the activity's environmental harm through cost-effective measures assessed against the measures currently used nationally and internationally for the activity.*
  *(2) In deciding the **best practice environmental management** of an activity, regard must be had to the following measures—*
  (a) strategic planning by the person carrying out, or proposing to carry out, the activity;
  (b) administrative systems put into effect by the person, including staff training and monitoring and review of the systems;
  (c) public consultation carried out by the person;
  (d) product and process design;
  (e) waste prevention, treatment and disposal.
  *(3) Subsection (2) does not limit the measures to which regard may be had in deciding the **best practice environmental management** of an activity.*

- *The financial implications of the requirements under an instrument, or proposed instrument, mentioned in paragraph (g) (above) as they would relate to the type of activity or industry carried out, or proposed to be carried out, under the instrument.*

  Considered

- *The public interest.*

  Considered

- *Any applicable site management plan.*

  Considered

- *Any relevant integrated environmental management system or proposed integrated environmental management system.*

  Considered

- *Any other matter prescribed under a regulation.*

  Considered

  (ii) additional information given in relation to the draft program;

  Maps and background information was submitted and considered.

  (iii) the views expressed at a conference held in relation to the draft program.

  Moranbah North Coal Mine representative Michael Rodgerson met with department representatives, Rebecca Blades and Louise Pinn on 17 December 2010 to discuss prelodgement of the TEP.

(2) If the draft program is prepared because of a requirement of a development condition of a development approval, the authority may approve the draft program only if it is not inconsistent with other conditions of the approval.
N/A

331 Content of program
A transitional environmental program must—
(a) state the objectives to be achieved and maintained under the program for an activity; and

The TEP states the objectives to be achieved and maintained under the program.

(b) state how the objectives are to be achieved, and a timetable to achieve the objectives, taking into account—
(i) the best practice environmental management for the activity; and

(ii) the risks of environmental harm being caused by the activity; and

The TEP states how the objectives are to be achieved, taking into account best practice environmental management and the risks of environmental harm being caused by the activity.

(c) state appropriate performance indicators at intervals of not more than 6 months; and

The TEP states appropriate performance indicators at intervals of not more than 6 months.

(d) make provision for monitoring and reporting compliance with the program.

The TEP makes provisions for monitoring and reporting compliance with the TEP. Moranbah North Coal Pty Ltd is required to undertake reporting to the administering authority daily during releases, monthly and provide a final report one month prior to the end of the TEP. These requirements are stated clearly within the TEP and have been reinforced within the Certificate of Approval.

343 Failure to approve draft program taken to be refusal
N/A

4.0 RECOMMENDATION
It is recommended that the Transitional Environmental Program be approved.
A decision notice dated 24 December 2010 is required to be issued.
A Certificate of Approval with conditions, dated 24 December 2010, is required to be issued under the approval number: MAN11420.

[redacted]
Principal Environmental Officer

Signed –

Date -

Reviewed & Endorsed By	
[redacted] Senior Environmental Officer Signed – Date:	**Delegate** Christopher Loveday Manager - Emerald Signed – Date:

Queensland Government

Enquiries [redacted]
Telephone [redacted]
Your reference Ensham Pit Dewatering
Our reference EMD6-12

Environmental Protection Agency
Incorporating the
Queensland **Parks and Wildlife Service**

28 April 2008

[redacted]
Ensham Resources Pty Ltd
PO Box 1565
EMERALD QLD 4720

Attention: [redacted]

Dear [redacted]

Transitional Environmental Program - Amended Certificate of Approval

I write in regard to a Certificate of Approval issued to Ensham Resources on 6 March 2008 for the Ensham Mine Flood Dewatering Transitional Environmental Program (TEP) approved by the EPA on 29 February 2008.

As discussed at a meeting on 24 April 2008 between representatives of Ensham Resources, Environmental Protection Agency (EPA) and Department of Natural Resources and Water (NR&W) please find attached an amended Certificate of Approval to clarify the intent of the conditions of approval. The amendments to the Certificate include clarifying:

(a) Condition 4 – weekly inspections requirements;
(b) Condition 5 – actions to be undertaken if weekly inspections identify impacts;
(c) Condition 6 – the water quality monitoring locations for each discharge point; and
(d) Condition 7 – the water quality discharge limits at the downstream monitoring location.

The Certificate has been amended according to Section 24AA of the *Acts Interpretation Act 1954* which states:

24AA Power to make instrument or decision includes power to amend or repeal

"If an Act authorises or requires the making of an instrument or decision—
(a) the power includes power to amend or repeal the instrument or decision; and
(b) the power to amend or repeal the instrument or decision is exercisable in the same way, and subject to the same conditions, as the power to make the instrument or decision."

99 Hospital Road EMERALD
Queensland 4720 Australia
PO Box 902 EMERALD
Queensland 4720 Australia
Telephone (07) 4982 4555
Facsimile (07) 4982 2568
Website www.epa.qld.gov.au
ABN 87 221 158 786

I also wish to advise you that the background water quality data provided by Ensham Resources and NR&W has been given to our water quality scientists for interpretation and consideration when reviewing the water quality limits specified in the TEP Certificate of Approval. The EPA will discuss with you the outcomes of the review as soon as the information becomes available.

Should you have any inquires regarding this information [redacted] of the EPA on telephone [redacted] would be happy to assist.

Yours sincerely

[redacted]

District Manager

ecoaccess
environmental licences and permits

Environmental Operations

Transitional environmental program certificate of approval number EMD 001-08

This certificate of approval is issued by the administering authority pursuant to section 339 of the Environmental Protection Act 1994. *An transitional environmental program is a specific program that, when approved, achieves compliance with the* Environmental Protection Act 1994 *for the matters dealt with by the program by reducing environmental harm, or detailing the transition to an environmental standard.*

Under the provisions of the *Environmental Protection Act 1994*, this certificate of approval is hereby granted to:

Ensham Resources Pty Ltd
PO Box 1565
EMERALD QLD 4720

approving the draft transitional environmental program; titled Ensham Mine Flood Dewatering Transitional Environmental Program for management of pit detwatering at ML7459.

The draft transitional environmental program, dated 29 February 2008, was received by this office on 29 February 2008.

The draft transitional environmental program is approved subject to the following conditions:

1. – The release or removal of mine affected water must not cause flooding beyond the high bank of any watercourse and all reasonable and practical measures must be implemented to minimise erosion, scour, slumping and impacts to vegetation from the discharge point through to the bed and banks of any watercourse.

2. – The release of mine affected water into any watercourse flowing through an adjoining property is permitted subject to landholder approval being obtained in writing.

3. – A suitably qualified and experienced person must undertake an inspection of all proposed discharge flow paths prior to the release of mine affected water, and a record (including a photographic record) made of the condition and form of the proposed flow path including any vegetative cover in the bed and on the banks.

4. – The release of mine affected water to any watercourse is permitted to occur on a seven day cycle. At the end of each seven days, the release of mine affected water must cease and a suitably qualified and experienced person must undertake an inspection (including making a photographic record) of the discharge flow path to the mining lease boundary in any watercourse under no flow, or background flow conditions, noting areas of erosion, scour, slumping and impacts to vegetation.

5. – If on inspection, significant erosion, scour, slumping or impacts to vegetation of any watercourse, including discharge flow paths to any watercourse, is detected, or flooding occurs:

(a) discharge of mine affected water must not resume; and

(b) the EPA must be notified; and

(c) appropriate rehabilitation, including earthworks, scour protection and flow velocity controls must be installed and approved by a suitably qualified and experienced person before the release of mine effected water continues.

6. – Mine affected water quality must be monitored twice daily for pH, electrical conductivity (EC), and total

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

suspended solids (TSS) (including a comparative analysis of TSS and turbidity), and monthly for metals, including aluminium, arsenic, cadmium, chromium, copper, lead, iron, nickel, zinc and selenium:

(a) within 100m of the active pumping locations in pits A, B, C and D; and

(b) within 500m downstream of the end-of-pipe discharge points into any watercourse; and

(c) at the upstream and downstream lease boundary Nogoa River compliance points 1 and 2 specified in Schedule C – Table 1 (Water monitoring locations and frequency) of Environmental Authority MIM800086202.

7. – Discharge of mine affected water must immediately cease, and the EPA be notified, and an investigation be undertaken, if:

- the quality of water at the downstream monitoring location exceeds the limits for pH, EC and TSS specified in Schedule C – Table 2 (Receiving water contaminant limits) of Environmental Authority MIM800086202; or
- the concentration of metals specified in Condition 6 at the downstream monitoring location exceeds the Irrigation short term trigger values listed in Table 4.2.10 of the ANZECC 2000 Guidelines.

8. – A report must be submitted to the EPA by the fifth business day of each month setting out the dewatering activities undertaken during the previous month and the scheduled activities for the next month, including, but not limited to, the following matters:

- Pump locations and pumping volumes;
- Dates, times and reasons for scheduled and (if applicable) unscheduled discharge stoppages;
- Details of any complaints, including how complaints were resolved;
- Water quality monitoring results and interpretation of results;
- Outcomes of any investigation of water quality exceedence/s (if applicable), including
  - (i) results, interpretation and possible reasons for any exceedence/s;
  - (ii) outcomes of actions taken at the time to prevent or minimise environmental harm; and
  - (iii) proposed actions to prevent a recurrence of the water quality exceedence/s.
- Weekly photographic records and interpretation of all watercourse and flow paths from the point of discharge to the Nogoa River under no flow conditions, highlighting:
  - (i) performance of any existing erosion protection measures;
  - (ii) identification of any erosion, slumping and scour and impacts to vegetation; and
  - (iii) rehabilitation, including earthworks, scour protection and flow velocity controls undertaken to minimise environmental harm and prevent a recurrence (if applicable).
- Summary of proposed new works, including engineering design plans (if applicable).

The transitional environmental program remains in force until 2 March 2009.

In any case where conditions are imposed upon a certificate of approval, you may apply to the administering authority for a review of the decision. You may also appeal against the decision to the Planning and Environment Court.

Information relating to a review of decisions or appeals under the *Environmental Protection Act 1994* is included with this notice. This information is intended as a guide only. You may have other legal rights and obligations.

Should you have any queries in relation to this Notice, [redacted] of the EPA on telephone [redacted] would be happy to assist you.

Environmental management program certificate of approval

[redacted]

SIGNATURE

28/4/08

DATE

[redacted]
District Manager, Emerald
Environmental Protection Agency

Enquiries:
Emerald District Office
99 Hospital Road Emerald
[redacted]

Environmental Operations

Transitional environmental program certificate of approval number EMD 001-08

This certificate of approval is issued by the administering authority pursuant to section 339 of the Environmental Protection Act 1994. *An transitional environmental program is a specific program that, when approved, achieves compliance with the* Environmental Protection Act 1994 *for the matters dealt with by the program by reducing environmental harm, or detailing the transition to an environmental standard.*

Under the provisions of the *Environmental Protection Act 1994*, this certificate of approval is hereby granted to:

Ensham Resources Pty Ltd
PO Box 1565
EMERALD QLD 4720

approving the draft transitional environmental program; titled Ensham Mine Flood Dewatering Transitional Environmental Program for management of pit detwatering at ML7459.

The draft transitional environmental program, dated 29 February 2008, was received by this office on 29 February 2008.

The draft transitional environmental program is approved subject to the following conditions:

1. – The release or removal of mine affected water must not cause flooding beyond the high bank of any watercourse and all reasonable and practical measures must be implemented to minimise erosion, scour, slumping and impacts to vegetation from the discharge point through to the bed and banks of any watercourse.

2. – The release of mine affected water into any watercourse flowing through an adjoining property is permitted subject to landholder approval being obtained in writing.

3. – The release of mine affected water into Corkscrew Creek is permitted at a maximum discharge volume of 150ML/day with a maximum electrical conductivity (EC) of 1200µS/cm.

4. – The release of mine affected water at an EC limit of 2000µS/cm into Corkscrew Creek is permitted, subject to approval by the EPA of a Discharge Management Plan for all waterways used to discharge mine affected water. The Discharge Management Plan must include:

(a) a riparian flora assessment, noting species composition of the flora community at a minimum of two locations along the affected reaches of Corkscrew Creek; and

(b) a bank erosion monitoring program that focuses on reaches of Corkscrew Creek, Boggy Creek and the Nogoa/Mackenzie Rivers up to the tailwater of Bedford Weir, that are vulnerable to erosion caused by persistent high flows (e.g. the outside bank of bends in the creek and rivers); and

(c) a post-dewatering Rehabilitation and Remediation Program, incorporating the following requirements –

(i) a post-discharge flush flow release down Corkscrew Creek and the Nogoa/Mackenzie Rivers of sufficient volume to restore the Natural Resources and Water water quality monitoring parameters, to within the 80th percentile of observed background data at Duckponds and Bedford Weir - Headwaters listed in Table 1. The post-dewatering water quality targets specified in Table 1 must be achieved within 12 months of the cessation of dewatering operations, for no less than 6 consecutive months of monthly monitoring results. If this cannot be reasonably and practicably

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

achieved, Ensham must provide to the EPA for approval, a case for why alternative remediation arrangements should apply and a specification for those arrangements.

(ii) a rehabilitation program to repair and restabilise areas of the creek and rivers bed and banks exhibiting evidence of significant erosion, and rehabilitate any affected riparian flora communities to a satisfactory (pre-dewatering flow) condition.

5. – Post-dewatering monitoring within 500m upstream of the Sandhurst Creek/Comet River junction and within 500m upstream of the Bedford Weir wall structure must be undertaken for no less than 6 consecutive months and achieve the water quality targets for 6 consecutive months specified in Table 1, unless alternative remediation arrangements are agreed to by the EPA.

Table 1 – Post dewatering water quality targets

Parameter/Toxicant	Post dewatering water quality targets (mg/L and total concentration unless specified)	
	Sandhurst Creek & Comet River Junction (within 500m upstream of junction)	Bedford Weir – Headwater (within 500m upstream of weir structure)
pH	8.2 (pH units)	8.1 (pH units)
TSS	423	168
EC	290µS/cm	241µS/cm
Aluminium	0.5 (soluble)	0.05 (soluble)
Boron	0.1	0.1
Cadmium	0.0009	0.00048
Chromium	0.004	0.001
Copper	0.05 (soluble)	0.02 (soluble)
Iron	0.02 (soluble)	0.084 (soluble)
Lead	0.002	0.002
Manganese	0.02 (soluble)	0.204
Nickel	0.01	0.01
Zinc	0.02 (soluble)	0.018 (soluble)

6. – A suitably qualified and experienced person must undertake an inspection of all proposed discharge flow paths prior to the release of mine affected water, and a record (including a photographic record) made of the condition and form of the proposed flow path including any vegetative cover in the bed and on the banks.

7. – The release of mine affected water to any watercourse is permitted to occur on a seven day cycle. At the end of each seven days, the release of mine affected water must cease and a suitably qualified and experienced person must undertake an inspection (including making a photographic record) of the discharge flow path to the mining lease boundary in any watercourse under no flow, or background flow conditions, noting areas of erosion, scour, slumping and impacts to vegetation.

8. – If on inspection, significant erosion, scour, slumping or impacts to vegetation of any watercourse, including discharge flow paths to any watercourse, is detected, or flooding occurs:

(a) discharge of mine affected water must not resume; and

(b) the EPA must be notified; and

(c) appropriate rehabilitation, including earthworks, scour protection and flow velocity controls must be installed and approved by a suitably qualified and experienced person before the release of mine effected water continues.

9. – Mine affected water quality must be monitored by a suitably trained person[1] twice daily for pH, electrical conductivity (EC), and total suspended solids (TSS) (including a comparative analysis of TSS and turbidity), and weekly for total and dissolved heavy metals and metalloids, including aluminium, arsenic, boron, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, selenium and zinc:

(a) within 100m of the active pumping locations in pits A, B, C and D; and

(b) at the Nogoa River upstream and downstream mining lease (ML7459) boundary (Compliance Points 1 and 2 – Nogoa River, respectively) specified in Schedule C – Table 1 (Water monitoring locations and frequency) of Environmental Authority MIM800086202; and

(c) at the ML boundary on Corkscrew Creek (Compliance Point 3 – Corkscrew Creek).

10. – The combined discharge of mine affected water into the Nogoa/Mackenzie Rivers system (Nogoa River, Boggy Creek and Corkscrew Creek) must be monitored weekly by a suitably trained person[1] for the same parameters and toxicants outlined in Condition 7 at Riley's Crossing on the Mackenzie River downstream of the Comet/Nogoa Rivers confluence (Compliance Point 4 – Riley's Crossing).

11. – Discharge of mine affected water must immediately cease, and the EPA be notified, and an investigation be undertaken, if the rolling median value for the most recent five weeks of water monitoring data at:

(a) Compliance Point 2 (Nogoa River);

(b) Compliance Point 3 (Corkscrew Creek); or

(c) Compliance Point 4 (Riley's Crossing);

exceeds the limits for physicochemical parameters (pH, TSS, EC) or total concentrations of heavy metals and metalloids specified in Table 2.

Table 2 – Downstream water quality limits

Total concentrations for physicochemical parameters, heavy metals and metalloids	
Parameter/Toxicant (mg/L unless specified)	**Limit (Rolling median of most recent five weeks water monitoring data)**
pH	6.5-8.5 (pH units)
TSS	1150
EC	1200µS/cm at Compliance Point 2 (Nogoa River) 1200µS/cm at Compliance Point 3 (Corkscrew Creek), or 2000µS/cm subject to Condition 4 1350µS/cm at Compliance Point 4 (Riley's Crossing)

Aluminium	10
Arsenic	0.5
Boron	5
Cadmium	0.01
Chromium	1
Copper	1
Iron	10
Lead	0.1
Manganese	10
Mercury	0.002
Nickel	1
Selenium	0.02
Zinc	5

[1] Suitably Trained Person – means a person trained in and competent with using the sampling procedures and practices described in the current edition of the QLD EPA Water Quality Sampling Manual.

12. Water quality monitoring must be undertaken on a weekly basis at the locations, and using the methods, and for the parameters specified in Table 3, during discharge of mine affected water to any watercourse.

Table 3 – Additional water quality monitoring requirements

Monitoring point	Sampling methods[1]	Parameter/Toxicant (Laboratory analyses)
Mining pit A	Sampling undertaken from a boat positioned mid-pit within 100m of the active pit pumping locations using the following sampling procedures: 1. EC probe (with suitable length cable) – EC depth profiling throughout the water profile with readings taken every 2m of depth (noting at which depth the pump inlet is located). 2. Samples collected from a depth profile comparative to the pump inlet depth for laboratory analysis using, for example, a Van Dorn or Horizontal Alpha Bottle Sampler.	**METALS & METALLOIDS (total and dissolved concentrations)** (mg/L) Aluminium Arsenic (Total) Arsenic (III) ‡ Arsenic (V) ‡ Barium Boron Cadmium Chromium (Total) Chromium (VI)‡ Copper Fluoride Iron Lead
Mining pit B		
Mining pit C		
Mining pit D		
Bedford Weir – 500m upstream)	Sampling undertaken from a boat positioned mid-stream using the following sampling procedures: 1. EC probe (with suitable length cable) – EC	
Bedford Weir – 5km upstream		

Bedford Weir – 10km upstream	depth profiling throughout the water profile with readings taken every 2m of depth. 2. Samples collected from the surface and 2m above the substrate for laboratory analysis using, for example, a Van Dorn or Horizontal Alpha Bottle Sampler.	Manganese Mercury (inorganic) Molybdenum Nickel Selenium Silver Uranium Zinc **NON-METALLIC INORGANICS** (mg/L) Cyanide Hydrogen sulphide **NUTRIENTS** (mg/L) Ammonia (Total) as N Nitrogen (Total) as N Organic Nitrogen as N Oxidised Nitrogen (Nitrate + Nitrite) as N Phosphorus (Total) as P Phosphorus (Filtratable Reactive) as P **AROMATIC HYDROCARBONS** Polycyclic Aromatic Hydrocarbons **ROUTINE ENVIRONMENTAL AND DRINKING WATER QUALITY INDICATORS** pH Dissolved Oxygen (mg/L and % saturation) Electrical Conductivity (µS/cm @ 25ºC) Salinity* (ppt) Silica (mg/L) Temporary Hardness* (as $CaCO_3$) (mg/L) Total Hardness* (as $CaCO_3$) (mg/L) Total Dissolved Solids (mg/L) Total Suspended Solids (mg/L) True Colour (HU) Turbidity (NTU) **CATIONS** (mg/L) Calcium (Ca^{2+}) Hydrogen* (H^{+}) Magnesium (Mg^{2+}) Potassium (K^{+}) Sodium (Na^{+}) **ANIONS** (mg/L) Bicarbonate* (HCO_3^{-}) Carbonate* (CO_3^{-}) Chloride (Cl^{-}) Fluoride (F^{-}) Hydroxide* (OH^{-}) Iodide (I) (moved from above to here) Sulphate (SO_4^{-}) Nitrate (NO_3^{-})

		Nitrite (NO_2^-) **RADIOLOGICAL QUALITY** Gross α & β irradiation (mSv)† ‡

Notes: **1.** All samples collected must comply with the latest edition of EPA's Water Quality Sampling Manual, and depth samples collected using the depth sampling device (e.g. Von Dorn Sampler), including the material the sampler is made from, and appropriate cleaning between samples to prevent cross-contamination.

2. * Parameter is derived from calculation.

3. † A result exceeding the guideline value will warrant individual α & β group analyses.

4. ‡ Repeated analysis results that are below the guideline value may warrant that monitoring of these parameters ceases (to reduce monitoring costs) at the EPA's discretion.

13. – A report must be submitted to the EPA by the fifth business day of each month setting out the dewatering activities undertaken during the previous month and the scheduled activities for the next month, including, but not limited to, the following matters:

- Pump locations and pumping volumes;
- Dates, times and reasons for scheduled and (if applicable) unscheduled discharge stoppages;
- Details of any complaints, including how complaints were resolved;
- Water quality monitoring results and interpretation of results;
- Outcomes of any investigation of water quality exceedence/s (if applicable), including
  - (i) results, interpretation and possible reasons for any exceedence/s;
  - (ii) outcomes of actions taken at the time to prevent or minimise environmental harm; and
  - (iii) proposed actions to prevent a recurrence of the water quality exceedence/s.
- Weekly photographic records and interpretation of all watercourse and flow paths from the point of discharge to the Nogoa River under no flow conditions, highlighting:
  - (i) performance of any existing erosion protection measures;
  - (ii) identification of any erosion, slumping and scour and impacts to vegetation; and
  - (iii) rehabilitation, including earthworks, scour protection and flow velocity controls undertaken to minimise environmental harm and prevent a recurrence (if applicable).
- Summary of proposed new works, including engineering design plans (if applicable).

The transitional environmental program remains in force until 2 March 2009.

In any case where conditions are imposed upon a certificate of approval, you may apply to the administering authority for a review of the decision. You may also appeal against the decision to the Planning and Environment Court.

Information relating to a review of decisions or appeals under the *Environmental Protection Act 1994* is included with this notice. This information is intended as a guide only. You may have other legal rights and obligations.

Should you have any queries in relation to this Notice, [redacted] of the EPA on telephone [redacted] would be happy to assist you.

SIGNATURE

DATE

[redacted]
District Manager, Emerald
Environmental Protection Agency

Enquiries:
Emerald District Office
99 Hospital Road Emerald
[redacted]

Environmental Operations

Transitional environmental program certificate of approval number EMD 001-08

This certificate of approval is issued by the administering authority pursuant to section 339 of the Environmental Protection Act 1994. *An transitional environmental program is a specific program that, when approved, achieves compliance with the* Environmental Protection Act 1994 *for the matters dealt with by the program by reducing environmental harm, or detailing the transition to an environmental standard.*

Under the provisions of the *Environmental Protection Act 1994*, this certificate of approval is hereby granted to:

Ensham Resources Pty Ltd
PO Box 1565
EMERALD QLD 4720

approving the draft transitional environmental program; titled Ensham Mine Flood Dewatering Transitional Environmental Program for management of pit dewatering at ML7459.

The draft transitional environmental program, dated 29 February 2008, was received by this office on 29 February 2008.

The draft transitional environmental program is approved subject to the following conditions:

1. – The release or removal of mine affected water must not cause flooding beyond the high bank of any watercourse and all reasonable and practical measures must be implemented to minimise erosion, scour, slumping and impacts to vegetation from the discharge point through to the bed and banks of any watercourse.

2. – The release of mine affected water into any watercourse flowing through an adjoining property is permitted subject to landholder approval being obtained in writing.

3. – The release of mine affected water into Corkscrew Creek is permitted at a maximum discharge volume of 150ML/day with a maximum electrical conductivity (EC) of 1200µS/cm.

4. – The release of mine affected water at an EC limit of 2000µS/cm into Corkscrew Creek is permitted, subject to approval by the EPA of a Discharge Management Plan for all waterways used to discharge mine affected water. The Discharge Management Plan must include:

(a) a riparian flora assessment, noting species composition of the flora community at a minimum of two locations along the affected reaches of Corkscrew Creek; and

(b) a bank erosion monitoring program that focuses on reaches of Corkscrew Creek, Boggy Creek and the Nogoa/Mackenzie Rivers up to the tailwater of Bedford Weir, that are vulnerable to erosion caused by persistent high flows (e.g. the outside bank of bends in the creek and rivers); and

(c) a post-dewatering Rehabilitation and Remediation Program, incorporating the following requirements –

(i) a post-discharge flush flow release down Corkscrew Creek and the Nogoa/Mackenzie Rivers of sufficient volume to restore the Natural Resources and Water water quality monitoring parameters, to within the 80th percentile of observed background data at Duckponds and Bedford Weir - Headwaters listed in Table 1. The post dewatering water quality targets specified in Table 1 must be achieved within 12 months of the cessation of dewatering operations, for no less than 6 consecutive months of monthly monitoring results. If this cannot be reasonably and practicably

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

achieved, Ensham must provide to the EPA for approval, a case for why alternative remediation arrangements should apply and a specification for those arrangements.

(ii) a rehabilitation program to repair and restabilise areas of the creek and rivers bed and banks exhibiting evidence of significant erosion, and rehabilitate any affected riparian flora communities to a satisfactory (pre-dewatering flow) condition.

5. – Post dewatering monitoring within 500m upstream of the Sandhurst Creek/Comet River junction and within 500m upstream of the Bedford Weir wall structure must be undertaken for no less than 6 consecutive months and achieve the water quality targets for 6 consecutive months specified in Table 1, unless alternative remediation arrangements are agreed to by the EPA.

Table 1 – Post dewatering water quality targets

Parameter/Toxicant	Post dewatering water quality targets (mg/L and total concentration unless specified)	
	Sandhurst Creek & Comet River Junction (within 500m upstream of junction)	Bedford Weir – Headwater (within 500m upstream of weir structure)
pH	8.2 (pH units)	8.1 (pH units)
TSS	423	168
EC	290µS/cm	241µS/cm
Aluminium	0.5 (soluble)	0.05 (soluble)
Boron	0.1	0.1
Cadmium	0.0009	0.00048
Chromium	0.004	0.001
Copper	0.05 (soluble)	0.02 (soluble)
Iron	0.02 (soluble)	0.084 (soluble)
Lead	0.002	0.002
Manganese	0.02 (soluble)	0.204
Nickel	0.01	0.01
Zinc	0.02 (soluble)	0.018 (soluble)

6. – A suitably qualified and experienced person must undertake an inspection of all proposed discharge flow paths prior to the release of mine affected water, and a record (including a photographic record) made of the condition and form of the proposed flow path including any vegetative cover in the bed and on the banks.

7. – The release of mine affected water to any watercourse is permitted to occur on a seven day cycle. At the end of each seven days, the release of mine affected water must cease and a suitably qualified and experienced person must undertake an inspection (including making a photographic record) of the discharge flow path to the mining lease boundary in any watercourse under no flow, or background flow conditions, noting areas of erosion, scour, slumping and impacts to vegetation.

8. – If on inspection, significant erosion, scour, slumping or impacts to vegetation of any watercourse, including discharge flow paths to any watercourse, is detected, or flooding occurs:

(a) discharge of mine affected water must not resume; and

(b) the EPA must be notified; and

(c) appropriate rehabilitation, including earthworks, scour protection and flow velocity controls must be installed and approved by a suitably qualified and experienced person before the release of mine effected water continues.

9. – Mine affected water quality must be monitored by a suitably trained person[1] twice daily for pH, electrical conductivity (EC), and total suspended solids (TSS) (including a comparative analysis of TSS and turbidity), and weekly for total and dissolved heavy metals and metalloids, including aluminium, arsenic, boron, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, selenium and zinc:

(a) within 100m of the active pumping locations in pits A, B, C and D; and

(b) at the Nogoa River upstream and downstream mining lease (ML7459) boundary (Compliance Points 1 and 2 – Nogoa River, respectively) specified in Schedule C – Table 1 (Water monitoring locations and frequency) of Environmental Authority MIM800086202; and

(c) at the ML boundary on Corkscrew Creek (Compliance Point 3 – Corkscrew Creek).

10. – The combined discharge of mine affected water into the Nogoa/Mackenzie Rivers system (Nogoa River, Boggy Creek and Corkscrew Creek) must be monitored weekly by a suitably trained person[1] for the same parameters and toxicants outlined in Condition 7 at Riley's Crossing on the Mackenzie River downstream of the Comet/Nogoa Rivers confluence (Compliance Point 4 – Riley's Crossing).

11. – Discharge of mine affected water must immediately cease, and the EPA be notified, and an investigation be undertaken, if the rolling median value for the most recent five weeks of water monitoring data at:

(a) Compliance Point 2 (Nogoa River);

(b) Compliance Point 3 (Corkscrew Creek); or

(c) Compliance Point 4 (Riley's Crossing),

exceeds the limits for physicochemical parameters (pH, TSS, EC) or total concentrations of heavy metals and metalloids specified in Table 2.

Table 2 – Downstream water quality limits

Total concentrations for physicochemical parameters, heavy metals and metalloids	
Parameter/Toxicant (mg/L unless specified)	**Limit (Rolling median of most recent five weeks water monitoring data)**
pH	6.5-8.5 (pH units)
TSS	1150
EC	1200µS/cm at Compliance Point 2 (Nogoa River) 1200µS/cm at Compliance Point 3 (Corkscrew Creek), or 2000µS/cm subject to Condition 4 1350µS/cm at Compliance Point 4 (Riley's Crossing)

Aluminium	10
Arsenic	0.5
Boron	5
Cadmium	0.01
Chromium	1
Copper	1
Iron	10
Lead	0.1
Manganese	10
Mercury	0.002
Nickel	1
Selenium	0.02
Zinc	5

[1] Suitably Trained Person – means a person trained in and competent with using the sampling procedures and practices described in the current edition of the QLD EPA Water Quality Sampling Manual.

12. Water quality monitoring must be undertaken on a weekly basis at the locations, and using the methods, and for the parameters specified in Table 3, during discharge of mine affected water to any watercourse.

Table 3 – Additional water quality monitoring requirements

Monitoring point	Sampling methods[1]	Parameter/Toxicant (Laboratory analyses)
Mining pit A	Sampling undertaken from a boat positioned mid-pit within 100m of the active pit pumping locations using the following sampling procedures: 1. EC probe (with suitable length cable) – EC depth profiling throughout the water profile with readings taken every 2m of depth (noting at which depth the pump inlet is located). 2. Samples collected from a depth profile comparative to the pump inlet depth for laboratory analysis using, for example, a Van Dorn or Horizontal Alpha Bottle Sampler.	**METALS & METALLOIDS (total and dissolved concentrations)** (mg/L) Aluminium Arsenic (Total) Arsenic (III) ‡ Arsenic (V) ‡ Barium Boron Cadmium Chromium (Total) Chromium (VI) ‡ Copper Fluoride Iron Lead
Mining pit B		
Mining pit C		
Mining pit D		
Bedford Weir – 500m upstream)	Sampling undertaken from a boat positioned mid-stream using the following sampling procedures: 1 EC probe (with suitable length cable) – EC	
Bedford Weir – 5km upstream		

Bedford Weir – 10km upstream	depth profiling throughout the water profile with readings taken every 2m of depth. 2. Samples collected from the surface and 2m above the substrate for laboratory analysis using, for example, a Van Dorn or Horizontal Alpha Bottle Sampler.	Manganese Mercury (inorganic) Molybdenum Nickel Selenium Silver Uranium Zinc **NON-METALLIC INORGANICS** (mg/L) Cyanide Hydrogen sulphide **NUTRIENTS** (mg/L) Ammonia (Total) as N Nitrogen (Total) as N Organic Nitrogen as N Oxidised Nitrogen (Nitrate + Nitrite) as N Phosphorus (Total) as P Phosphorus (Filtratable Reactive) as P **AROMATIC HYDROCARBONS** Polycyclic Aromatic Hydrocarbons **ROUTINE ENVIRONMENTAL AND DRINKING WATER QUALITY INDICATORS** pH Dissolved Oxygen (mg/L and % saturation) Electrical Conductivity (µS/cm @ 25°C) Salinity* (ppt) Silica (mg/L) Temporary Hardness* (as $CaCO_3$) (mg/L) Total Hardness* (as $CaCO_3$) (mg/L) Total Dissolved Solids (mg/L) Total Suspended Solids (mg/L) True Colour (HU) Turbidity (NTU) **CATIONS** (mg/L) Calcium (Ca^{2+}) Hydrogen* (H^+) Magnesium (Mg^{2+}) Potassium (K^+) Sodium (Na^+) **ANIONS** (mg/L) Bicarbonate* (HCO_3^-) Carbonate* (CO_3^{2-}) Chloride (Cl^-) Fluoride (F^-) Hydroxide* (OH^-) Iodide (I) (moved from above to here) Sulphate (SO_4^{2-}) Nitrate (NO_3^-)

		Nitrite (NO_2) **RADIOLOGICAL QUALITY** Gross α & β irradiation (mSv)[†‡]

Notes: 1. All samples collected must comply with the latest edition of EPA's Water Quality Sampling Manual, and depth samples collected using the depth sampling device (e.g. Von Dorn Sampler), including the material the sampler is made from, and appropriate cleaning between samples to prevent cross-contamination.

2. * Parameter is derived from calculation.

3. † A result exceeding the guideline value will warrant individual α & β group analyses.

4. ‡ Repeated analysis results that are below the guideline value may warrant that monitoring of these parameters ceases (to reduce monitoring costs) at the EPA's discretion.

13. – A report must be submitted to the EPA by the fifth business day of each month setting out the dewatering activities undertaken during the previous month and the scheduled activities for the next month, including, but not limited to, the following matters:

- Pump locations and pumping volumes;
- Dates, times and reasons for scheduled and (if applicable) unscheduled discharge stoppages;
- Details of any complaints, including how complaints were resolved;
- Water quality monitoring results and interpretation of results;
- Outcomes of any investigation of water quality exceedence/s (if applicable), including
  - (i) results, interpretation and possible reasons for any exceedence/s;
  - (ii) outcomes of actions taken at the time to prevent or minimise environmental harm; and
  - (iii) proposed actions to prevent a recurrence of the water quality exceedence/s
- Weekly photographic records and interpretation of all watercourse and flow paths from the point of discharge to the Nogoa River under no flow conditions, highlighting:
  - (i) performance of any existing erosion protection measures;
  - (ii) identification of any erosion, slumping and scour and impacts to vegetation; and
  - (iii) rehabilitation, including earthworks, scour protection and flow velocity controls undertaken to minimise environmental harm and prevent a recurrence (if applicable).
- Summary of proposed new works, including engineering design plans (if applicable).

The transitional environmental program remains in force until 2 March 2009.

In any case where conditions are imposed upon a certificate of approval, you may apply to the administering authority for a review of the decision. You may also appeal against the decision to the Planning and Environment Court.

Information relating to a review of decisions or appeals under the *Environmental Protection Act 1994* is included with this notice. This information is intended as a guide only. You may have other legal rights and obligations.

Should you have any queries in relation to this Notice, Glen Schulz of the EPA on telephone [redacted] would be happy to assist you.

Notice

Environmental management program certificate of approval

[redacted]

SIGNATURE

3/6/08

DATE

[redacted]
District Manager, Emerald
Environmental Protection Agency

Enquiries:
Emerald District Office
99 Hospital Road Emerald
[redacted]

From [redacted] **Date** Wednesday, 22 December 2010 11:38:22 AM
To
Cc
Subject RE: 101221 Notification

image001.jpg (3 KB HTML)

Hello [redacted]

My apologies, under the emergency direction discharge from Dam 4 commenced at approximately 11:45 yesterday.

Regards
[redacted]

From: [redacted]
Sent: Wednesday, 22 December 2010 10:30 AM
To: [redacted]
Subject: RE: 101221 Notification

[redacted]

Thanks for the notification – have you got any of the notification data for the Dam 4 Emergency Direction? I note you mentioned the discharge was on-going but I haven't yet received the formal notification that the discharge had commenced.

Cheers,

[redacted]
Principal Environmental Officer, Environmental Services - Mining
Telephone: [redacted] **Facsimile** [redacted] **mail:** [redacted]
www.derm.qld.gov.au
Department of Environment and Resource Management
99 Hospital Road, Emerald, Q 4720
PO Box 19, Emerald Q 4720

From: [redacted]
Sent: Wednesday, 22 December 2010 8:23 AM
To: [redacted] Manager MiningCWR
Cc: [redacted]
Subject: 101221 Notification

Hello [redacted]

Please see attached discharge information for yesterday 21th December.

Flow in Isaac River at time of sampling;
21/12/2010: 55m3/sec

Discharge:
21/12/2010: 0.55m3/sec

Enviro Dam (Discharge Point)					
	EC (mS)	pH	Temp	Time	Height on Spillway
12/12/2010	5130	8.27			
13/12/2010	4850	8.66	20.5	9.40	0.18
14/12/2010	2310	7.71	23.6	9.14	0.2
15/12/2010	3800	8.31	26.8	4.27	0.18
16/12/2010	930	8.02	26.1	11.55	0.14
17/12/2010	5650	8.46	28.4	2.45	0.02

18/12/2010	4530	7.93	22.5	6.10	0.04
19/12/2010	Site shut				
20/12/2010	2670	8.19	23.5	2:07	0.35
21/12/2010	2889	8.30	18.1	2.45	0.4
Upper Isaac Monitoring Site					
	EC (uS/cm)	pH	Temp		
12/12/2010					
13/12/2010	240	8.43	21.3	10.00	
14/12/2010	280	8.12	24.2	9.07	
15/12/2010	290	8.29	27.3	3.50	
16/12/2010	200	8.04	27	11.40	
17/12/2010	280	8.64	26.5	12.45	
18/12/2010	220	8.21	24.2	7.45	
19/12/2010	Site shut				
20/12/2010	220	8.19	23.6	2:19	
21/12/2010	220	7.76	18.9	2.30	
Lower Isaac Monitoring Site					
	EC (mS)	pH	Temp		
12/12/2010					
13/12/2010	150	8.16	22.6	10.40	
14/12/2010	220	8.01	24.6	9.40	
15/12/2010	200	8.03	27.5	4.55	
16/12/2010	160	7.99	28.4	12.28	
17/12/2010	180	8.31	28.1	1.15	
18/12/2010	160	8.09	25.9	8.45	
19/12/2010	Site shut				
20/12/2010	120	7.79	24.2	3:00	
21/12/2010	220	7.75	18.2	3.20	
TEP Monitoring Site					
	EC (mS)	pH	Temp		
12/12/2010	510	8.38			Note bridge site
13/12/2010	190	8.16	25.9	12.00	
14/12/2010	390	7.94	25.4	10.00	
15/12/2010	450	7.97	27.1	4.10	
16/12/2010	190	7.97	28.4	1.35	
17/12/2010	360	8.66	30.8	2.19	
18/12/2010	180	8.13	25.2	8.10	
19/12/2010	120	8.15	25.8	8.00	Note bridge site
20/12/2010	140	8.04	23.9	2.35	Note bridge site
21/12/2010	190	7.81	18	9.20	Note bridge site

Please call if I can assist in any other way.

Regards

[redacted]

cid:image001.png@01CB2808.C292535

[redacted]

Environment Superintendent

Anglo American Metallurgical Coal P/L

Moranbah North Mine
1164 Goonyella Road
GPO Box 172 Moranbah QLD 4744

Ph: +61
Mobile:
Fax: [redacted]
Email: [redacted]

Our mission is to create value from coal responsibly.

From: [redacted]
Sent: Tuesday, 18 January 2011 3:15 PM
To: [redacted]
Subject: FW: 101223 Notification

[redacted]
Principal Environmental Officer, Environmental Services - Mining
Telephone: [redacted] **Facsimile:** [redacted] **Email:** [redacted]
www.derm.qld.gov.au
Department of Environment and Resource Management
99 Hospital Road, Emerald, Q 4720
PO Box 19, Emerald Q 4720

From: [redacted]
Sent: Thursday, 23 December 2010 7:57 PM
To: [redacted]
Subject: Fw: 101223 Notification

[redacted] missed giving written notification of cease of discharge from dam 4 at 43o today.

From: [redacted]
To: [redacted]
Cc: [redacted]
Sent: Thu Dec 23 18:13:32 2010
Subject: 101223 Notification

Hello [redacted]

Please see attached discharge information for 23 December.

Flow in Isaac River at time of sampling;
23/12/2010: 16m3/sec

Discharge Environment Dam:
23/12/2010: 0.125m3/sec (please note this includes pump discharge of 75l/sec)

Enviro Dam (Discharge Point)					
	EC (mS)	pH	Temp	Time	Height on Spillway
12/12/2010	5130	8.27			
13/12/2010	4850	8.66	20.5	9.40	0.18
14/12/2010	2310	7.71	23.6	9.14	0.2
15/12/2010	3800	8.31	26.8	4.27	0.18
16/12/2010	930	8.02	26.1	11.55	0.14
17/12/2010	5650	8.46	28.4	2.45	0.02
18/12/2010	4530	7.93	22.5	6.10	0.04
19/12/2010	Site shut				
20/12/2010	2670	8.19	23.5	2:07	0.35
21/12/2010	2889	8.30	18.1	2.45	0.4

22/12/2010	2910	8.19	11.7	9:30	0.4
23/12/2010	3450	8.26	24.7	10.50	0.05
Upper Isaac Monitoring Site					
	EC (uS/cm)	pH	Temp		
12/12/2010					
13/12/2010	240	8.43	21.3	10.00	
14/12/2010	280	8.12	24.2	9.07	
15/12/2010	290	8.29	27.3	3.50	
16/12/2010	200	8.04	27	11.40	
17/12/2010	280	8.64	26.5	12.45	
18/12/2010	220	8.21	24.2	7.45	
19/12/2010	Site shut				
20/12/2010	220	8.19	23.6	2:19	
21/12/2010	220	7.76	18.9	2.30	
22/12/2010	370	8.56	12.8	9.48	
23/12/2010	320	8.08	24.2	11.06	
Lower Isaac Monitoring Site					
	EC (mS)	pH	Temp		
12/12/2010					
13/12/2010	150	8.16	22.6	10.40	
14/12/2010	220	8.01	24.6	9.40	
15/12/2010	200	8.03	27.5	4.55	
16/12/2010	160	7.99	28.4	12.28	
17/12/2010	180	8.31	28.1	1.15	
18/12/2010	160	8.09	25.9	8.45	
19/12/2010	Site shut				
20/12/2010	120	7.79	24.2	3:00	
21/12/2010	220	7.75	18.2	3.20	
22/12/2010					Unable to access
23/12/2010	360	7.99	24.4	11.51	
TEP Monitoring Site					
	EC (mS)	pH	Temp		
12/12/2010	510	8.38			Note bridge site
13/12/2010	190	8.16	25.9	12.00	
14/12/2010	390	7.94	25.4	10.00	
15/12/2010	450	7.97	27.1	4.10	
16/12/2010	190	7.97	28.4	1.35	
17/12/2010	360	8.66	30.8	2.19	
18/12/2010	180	8.13	25.2	8.10	
19/12/2010	120	8.15	25.8	8.00	Note bridge site
20/12/2010	140	8.04	23.9	2.35	Note bridge site
21/12/2010	190	7.81	18	9.20	Note bridge site
22/12/2010	320	8.11	13	10.00	Note bridge site
23/12/2010	330	8.03	24.5	12.10	Note bridge site
Dam 4					
Date	EC (mS)	pH	Temp	Time	Note
23/12/2010	7100	8.52	24.8	12:35	Flow 70l/sec
Dam 4 MP					
Date	EC (mS)	pH	Temp	Time	

23/12/2010	490	8.24	24,.5	4:32	

Please call if I can assist in any other way.

Regards

[redacted]
Environment Superintendent

Anglo American Metallurgical Coal P/L
Moranbah North Mine
1164 Goonyella Road
GPO Box 172 Moranbah QLD 4744

Ph: [redacted]
Mobile: + [redacted]
Fax: + [redacted]
Email: [redacted]

Our mission is to create value from coal responsibly.

[redacted]

From: [redacted]
Sent: Tuesday, 18 January 2011 3:31 PM
To: [redacted]
Subject: FW: Emergency Direction Discharge report
Attachments: 101221ED Discharge Report Finalx.pdf; Discharge cover letter.pdf

[redacted]
Principal Environmental Officer, Environmental Services - Mining
Telephone: [redacted] **Facsimile:** [redacted] **Email:** rebecca.blade[redacted]
www.derm.qld.gov.au
Department of Environment and Resource Management
99 Hospital Road, Emerald, Q 4720
PO Box 19, Emerald Q 4720

From: [redacted]
Sent: Monday, 17 January 2011 1:32 PM
To: [redacted]
Cc: [redacted]
Subject: Emergency Direction Discharge report

Dear [redacted]

Please find attached the cover letter and discharge report for Dam 4 under the Emergency Direction issued 20 December 2010. Please call if I can assist in answer any questions.

Regards
[redacted]

cid:image001.png@01CB2808.C292535

[redacted]
Environment Superintendent

Anglo American Metallurgical Coal P/L
Moranbah North Mine
1164 Goonyella Road
GPO Box 172 Moranbah QLD 4744

Ph: +[redacted]
Mobile: [redacted] 962
Fax: +[redacted]
Email: Michael.Rodg[redacted]

Our mission is to create value from coal responsibly.

Time and Date	130414A 140 Discharge (Cumecs) Min	Qual	130414A 140 Discharge (Cumecs) Max	Qual	130414A 140 Discharge (Cumecs) Mean	Qual
########	21.9653	130	66.161	130	45.212	130
########	4.7502	130	27.0969	130	13.8305	130
########	4.7502	130	421.9121	130	235.0174	130
########	32.5471	130	124.9031	130	60.4283	130
########	12.1492	130	32.5471	130	20.572	130
########	7.4061	130	12.1492	130	9.0773	130
########	6.273	130	9.1356	130	7.3289	130
########	5.2832	130	41.1675	130	22.6435	130
########	4.2744	130	14.9766	130	7.9474	130
########	1.9855	130	4.2744	130	3.0397	130
########	1.9855	130	12.6503	130	8.3479	130
########	8.2413	130	220.7144	130	94.0995	130
########	43.5199	130	233.7672	130	117.5147	130
########	19.6851	130	43.5199	130	29.2781	130
########	13.0779	130	30.5294	130	21.3215	130
########	7.564	130	13.0779	130	9.7414	130
########	5.3554	130	7.564	130	6.3294	130
########	4.2327	130	5.6258	130	4.8199	130
########	5.6258	130	917.8957	130	618.0641	130
########	120.0415	130	597.2791	130	304.8103	130
########	42.6898	130	120.0415	130	67.3865	130
########	26.7358	130	42.6898	130	34.1312	130
########	18.2027	130	26.7358	130	21.3984	130
########	17.789	130	154.7354	130	85.4832	130
########	90.3126	130	201.3907	130	116.9033	130
########	107.8059	130	282.7572	130	192.3261	130
########	65.9392	130	458.2783	130	111.4712	130
########	141.9138	130	649.5793	130	392.0809	130
########	70.6564	130	141.9138	130	94.876	130
########	80.4253	130	106.3244	130	95.248	130
########	43.0617	130	88.2147	130	59.5786	130
########	29.381	130	43.0617	130	35.6194	130
########	22.4759	130	75.1483	130	29.4478	130
########	26.5644	130	88.5479	130	49.3214	130
########	21.2472	130	33.6425	130	28.9209	130
########	13.0769	130	21.2472	130	16.4703	130
########	12.5937	130	17.5614	130	14.6524	130
########		160		160		160
########	7.4043	130	11.3788	130	9.1512	130
########	5.8073	130	7.4396	130	6.5671	130
########	5.3122	130	7.334	130	5.8479	130
########	7.0572	130	21.7545	130	14.1503	130
########	8.8416	130	12.3077	130	10.5746	130
########	4.2423	130	8.8416	130	6.8433	130
########	4.375	130	24.0119	130	14.4111	130
########	3.6531	130	8.1322	130	5.4773	130
########	1.9071	130	3.6531	130	2.6402	130
########	1.2866	130	1.9071	130	1.576	130
########	1.1987	130	2.6893	130	1.6608	130
########	1.9277	130	15.1231	130	5.9021	130
########	11.0072	130	26.1102	130	18.5438	130

########	3.6825	130	11.9033	130	7.3745	130
########	1.8461	130	3.6825	130	2.7926	130
########	0.963	130	1.9908	130	1.5756	130
########	0.509	130	1.3325	130	0.857	130
########	0.3855	130	0.5855	130	0.5001	130
########	0.3012	130	0.4216	130	0.3751	130
########	0.2917	130	0.3798	130	0.3311	130
########	0.2257	130	0.4537	130	0.3316	130
########	0.1609	130	0.2304	130	0.1917	130
########	0.1831	130	0.5855	130	0.2939	130
########	0.5855	130	472.924	130	210.0569	130
########	39.4228	130	125.7956	130	67.1944	130
########	26.5074	130	39.4228	130	30.8756	130
########	29.0803	130	125.0532	130	79.46	130
########	38.2261	130	102.3889	130	59.6602	130
########	23.5826	130	38.2261	130	28.7331	130
########	24.9937	130	40.6401	130	32.6334	130
########	16.4042	130	25.1041	130	20.1241	130
########	10.7113	130	16.4042	130	13.3428	130
########		255		255		255

Department of Environment and Resource Management

Procedural guide

Environmental Protection Act 1994
Transitional environmental program (TEP)

Part 1 – Notice requiring a draft TEP

This document is designed to assist Environmental Services officers to issue a notice requiring a draft TEP under the provisions of Chapter 7, Part 3 of the Environmental Protection Act 1994.

What is a TEP?

Section 330 of the *Environmental Protection Act 1994* (the Act) provides that a transitional environmental program (TEP) is a specific program which, when complied with, facilitates compliance with the Act for the activity to which the TEP relates by doing one or more of the following—

- reducing environmental harm caused by the activity
- detailing the transition of the activity to an environmental standard
- detailing the transition of the activity to comply with:
  - a condition (including a standard environmental condition) of an environmental authority or code of environmental compliance or
  - a development condition.

The legislative provisions in respect to TEPs can be found in Chapter 7, Parts 3 and 4 (ss330-357) of the Act.

Who can enter into a TEP?

A person or public authority may enter into a TEP voluntarily or may be required to submit a draft TEP by the Department.

When can a TEP be used?

TEPs are intended to be used where a significant change or changes are needed to be made by a person to achieve compliance. One of the reasons for this is that a person has some protection from prosecution for actions conducted under the TEP for the duration of the TEP.

(a) Requirement to submit a draft TEP

There are certain circumstances when the Department may require a person or public authority to prepare and submit for approval a draft TEP. These circumstances are set out in Section 332 of the Act.

(b) Voluntary TEP

Section 333 of the Act provides that a person or public authority may also, at any time, submit a draft TEP to the Department for an activity the person or public authority is carrying out or proposes to carry out.

Department of Environment and Resource Management
www.derm.qld.gov.au ABN 46 640 294 485

(c) Program notices

A person intending to prepare and submit a voluntary TEP may give the Department a program notice under s350 of the Act. For further information in regard to program notices, see: Procedural Guide - Program notices TEP

(d) Fee for consideration of draft TEP

A person or public authority that submits a draft TEP to the Department for consideration and approval must pay the Department the fee prescribed by regulation. See: Operational policy - Transitional Environmental Program (TEP) fees

An invoice for the fees incurred should be issued to the person or public authority that has submitted the draft TEP for approval at the time when the notice stating the Department's decision is issued.

How do I successfully issue a notice requiring a draft TEP?

Officers must complete an assessment report to document the decision to issue a notice requiring a draft TEP, as well as completing the notice.

Step 1 - Complete the Assessment Report

Before completing the notice requiring a draft TEP, officers must complete an assessment report. The assessment report sets out the facts and circumstances relating to the matter and documents the decision-making process of the Department in determining whether or not to issue the notice.

The following sections of the procedural guide are a guide to completing the assessment report. The numbering and headings of the sections in the procedural guide correlate with those in the assessment report for ease of reference.

The assessment report is not intended to replicate the Departmental file. Rather it should capture all critical aspects considered by the Department in making a decision. Accordingly, officers should include relevant points only. A template assessment report may be found on the Compliance Support Materials page on the Departmental intranet.

1. Brief history of the matter

Briefly outline any historical information relevant to the decision. This information should be presented in succinct chronological dot points and include how the Department became aware of the issues that led the Department to consider issuing a notice requiring a draft TEP.

For example:

- *Previous compliance inspections have identified risks with stormwater controls and management on the site (CA123 – Ecotrack – May 2008) (CA456 – Ecotrack – May 2009).*
- *The operator made significant investments in stormwater management infrastructure in 2002, however the business has grown substantially since this period with no changes to stormwater management.*
- *Discussions with the operator during a compliance inspection on 10 May 2010 indicated an acceptance of the need to investigate and pursue further stormwater management improvements and included a discussion of the potential submission of a draft TEP.*

- *The Department wrote to the operator on 1 June 2010 to advise of the outcomes of the May compliance inspection.*
- *The Department received an Annual Return Form from the operator attaching stormwater release monitoring results demonstrating non-compliance with development approval conditions C11 and C12.*
- *The Department issued a notice requiring a draft TEP to another timber preservation/treatment operator in the region for non-compliance with development approval conditions associated with stormwater management issues.*

2. Grounds for issuing a notice requiring a draft TEP

The legislation provides in Section 332 that the Department may require the submission of a draft TEP—

- as a condition of an environmental authority or
- as a development condition of a development approval.

The Department may also require the preparation and submission of a draft TEP if satisfied that—

- an activity carried out, or proposed to be carried out by the person or authority is causing, or may cause unlawful environmental harm or
- it is not practicable for the person or public authority to comply with an environmental protection policy or regulation on its commencement or
- a condition of an environmental authority held by the person or public authority is, or has been, contravened or
- a standard environmental condition of a code of environmental compliance for a chapter 4 activity is, or has been, contravened by the person or public authority or
- a development condition of a development approval is, or has been, contravened and the person or public authority is:
  - an owner of the land for which the approval is granted or
  - another person in whom the benefit of the approval vests.

In this section, an officer must identify the relevant grounds upon which the decision to issue the notice requiring a draft TEP is based. For example:

A timber preservation/treatment operator is required under development approval conditions to ensure that stormwater released from the site meets specific limits. A compliance inspection was undertaken on the site that identified some issues with stormwater controls and management. Following the inspection, a letter was sent by the Department to the operator advising of the outcomes of the inspection and reminding the operator of its responsibilities. The operator submitted monitoring results indicating that on occasion, stormwater was released from the site in breach of the release limits.

A notice requiring a draft TEP was issued to the operator based on the following grounds:

1. *that an activity carried out, or proposed to be carried out, by the person is causing, or may cause, environmental harm and/or*
2. *that a development condition of a development approval is, or has been, contravened and the person is an owner of the land for which the approval is granted.*

3. Expand upon the grounds

The purpose of this section is to clearly identify the elements, or what the Department must 'prove' before deciding to use a notice requiring a draft TEP, and should be used to expand upon the grounds which have previously been identified. This can include identifying the specific offence or breach under investigation or any statutory requirements listed in the legislation which must be met by the Department prior to issuing the notice.

In instances where one action has resulted in multiple breaches, each breach should be listed independently. For example, a site inspection could potentially detect a number of breached conditions associated with a single development approval. In this situation each breach would need to be proven on its own merits and should be listed separately.

Each ground (including breaches or requirements) should be allocated a separate number.

4. Detail the matters considered

The purpose of the table in the assessment report is to link the elements of the breach to the evidence gathered and the conclusions formed. This is achieved by identifying:

- the elements of any specific breach or allegation
- the evidence which has been considered for each element and
- the conclusion that has been reached by the officer after considering the information sourced.

When documenting the evidence, officers should limit the information to relevant points only. This can include (but is not limited to):

- notes recorded in an officer's official notebook
- samples collected for analysis and any subsequent lab reports
- photographs and copies of documents and
- any observed actions and direct testimony received from individuals.

The last column in the table requires officers to detail the relevant facts and circumstances. Officers are encouraged to consider the accuracy and relevance of available evidence, historical details, professional expertise and the weight attributed to any direct testimony provided.

After considering the details, evidence, facts and circumstances, officers are required to set out how the TEP would deal with the issues.

5. Provide for Natural Justice

Prior to the Department making a decision which may adversely impact on an individual or group it must:

- **Notify** - Notify the individual that the Department is considering issuing a notice requiring a draft TEP
- **Respond** - Provide the individual with an opportunity to respond to the allegation and
- **Consider** - Consider any representations made by the affected person before finalising the decision.

The seriousness of the matter will dictate the process by which natural justice is provided and is likely to vary from case to case. Accordingly, officers should use their discretion in determining how to best ensure natural justice is afforded and the amount of time provided to the affected person to respond. In some circumstances it may be appropriate for an officer to discuss the above information with the affected person during a site

inspection or a telephone interview and to take contemporaneous notes. In more serious circumstances a written notification which includes a specific closing date for submissions should be used.

Regardless of the manner in which natural justice is afforded, any information provided by the affected person is to be documented. The summary of information should include how natural justice was provided as well as any responses given by the affected person. For example:

Following each of the compliance inspections, the Department wrote to the site operator advising of the outcomes of the inspections and the risks identified with stormwater management on the site:

- *CA123 – May 2008*
- *CA456 – May 2009*
- *CA780 – May 2010*

On-site discussions with the operator during the May 2010 compliance inspection indicated an acceptance of the need to investigate and pursue further stormwater management improvements and included commitments to consider drafting a voluntary TEP.

Since the May 2010 compliance inspection the Department has had further discussions with the operator, raising the implications of the exceedances of the release limits observed in the stormwater quality monitoring results for the last 12 months. The operator was also informed that the Department's intention was to issue a notice requiring a draft TEP and given a period of five business days to submit any further information for consideration by the Department. The operator did not submit any formal submissions to the Department but has advised by telephone of an intention to engage a suitably qualified consultant to assist with drafting a plan of action for site upgrades.

6. Proposed requirements of the TEP

Officers are required to include the following things (amongst other things as set out in s332(4)) in the notice requiring a draft TEP—

- the matters to be addressed by the program and
- the period over which the program is to be carried out and
- the day (at least a reasonable period after the notice is given) by which the program must be prepared and submitted to the Department.

In instances where it is recommended that requirements are imposed upon the affected person, officers are required to develop proposed requirements for consideration by the delegate. As affected persons are able to seek a review of the Department's decision to impose one or more conditions/requirements, it is necessary for officers to provide justification for their inclusion.

Requirements must be specific, measureable, achievable, relevant to the activity and time-specific. For further information, refer to the Procedural Guide - Writing effective and enforceable conditions. For example:

Proposed requirement	Justification
The draft TEP must include a stormwater management plan in order to cease all unlawful releases of stormwater from the site on or before 30 November 2011 and be submitted to DERM by 1 July 2011.	*The development of a stormwater management plan is considered to be best practice and is a requirement which is currently being met at other ABC Pty Ltd development sites in Queensland.* *Compliance inspections conducted in May 2008, 2009*

The stormwater management plan must include the following— 1. *An assessment of the existing site infrastructure, including but not limited to:* *(a) a determination of the effectiveness of existing stormwater infrastructure in controlling stormwater runoff and capturing contaminants to prevent or minimise the release of contaminants to waters and* *(b) a determination of the effectiveness of existing containment facilities associated with the storage, transport and production of materials in minimising the release of contaminants to the stormwater system and* *(c) a determination of the effectiveness of current management practices and procedures regarding the minimisation of stormwater contamination.* 2. *An identification of measures to improve stormwater management on site, which must:* *(a) assess the adequacy of existing pollution control measures and* *(b) identify opportunities to reduce areas of surface contamination and minimise contact of stormwater with contaminants and* *(c) identify opportunities to separate the clean and contaminated stormwater catchments and* *(d) identify opportunities for harvesting clean stormwater for beneficial reuse and* *(e) identify the infrastructure (including its appropriate structural design) required to effectively manage stormwater in each of the stormwater catchments.* 3. *A program of activities to construct measures to improve stormwater management on the site, including but not limited to:* *(a) a program of activities informed by 1 and 2 above and* *(b) stormwater quality monitoring to inform the effectiveness of (a) above.* 4. *The operator is required to propose a reasonable timetable for consideration of approval by the*	*and 2010 have identified a number of exceedances of release limits of stormwater, with an increase in the last 12 months.* *The Department has consulted with the operator on a number of occasions and discussed the implications of the exceedances. However, such consultation has not resulted in any action by the operator in relation to reducing unlawful stormwater releases.* *The Department estimates that it will take at least 12 months for the operator to upgrade the site to a standard that results in compliance with stormwater release limits.* *After considering all of the issues and the estimated time-frame for the operator to achieve compliance, the Department considers that requiring the operator to provide a draft TEP is the most appropriate and effective course of action.* *As ABC Pty Ltd is currently operating in a regional area, the Department has allowed ABC Pty Ltd 9 weeks (5 weeks more than for an urban area) to develop the plan.*

administering authority for the above actions to be completed.	

7. Recommendation

The responsible officer is required to make a recommendation in relation to the alleged breach. For example:

It is the opinion of the Department that ABC Pty Ltd failed to comply with development conditions D11 and D12 of development approval IPDE123456 by allowing stormwater to leave 24 Jones Road and enter Murphy Creek. After considering all factors the Department has determined that requiring a draft TEP would be the most effective way of achieving the operator's compliance with the development conditions. It is recommended that a notice requiring a draft TEP be issued.

Administrative decisions are made based upon the balance of probabilities. This means that the decision-maker must be able to determine whether, based upon the information available, it was more likely than not that the event occurred.

Officers are encouraged to consider alternative actions/tools, the Department's enforcement guidelines, details of any consultations including site visit details and discussions with the ERA contact officer (if applicable) prior to making a recommendation. The reasonableness of proposed timeframes for the completion and submission of the draft TEP for consideration and approval, and the period over which the TEP is to be carried out, should be taken into account. For example, if the location is geographically isolated, or there is an impending wet season, the Department may consider allowing additional time for the recipient of the notice to prepare the draft TEP.

6. Approval

The assessment report is to be approved by an appropriately delegated officer. The Department's list of delegations can be found at: http://insite2.dnr.qld.gov.au/derm/delegations/

Step 2 - Complete the notice requiring a TEP

The notice requiring a draft TEP must meet a number of legislative requirements in order to be legally binding. A requirement to prepare and submit a draft TEP must be made by written notice which must state—

- the grounds on which the requirement is made and
- the matters to be addressed by the TEP and
- the period over which the TEP is to be carried out and
- the day (at least a reasonable period after the notice is given) by which the TEP must be prepared and submitted to the Department and
- the review or appeal details.

A template notice requiring a draft TEP is included in the TEP material.

The notice and the assessment report must be signed by the decision-maker.

Service of a notice requiring a draft TEP

Service means delivery to the party who will be responsible for actioning the notice. Officers are encouraged to use their discretion as to the most appropriate form of service, having regard to the recipient in question. Methods of service are provided for in ss39 and 39A of the *Acts Interpretation Act 1954* (AI Act).

A notice requiring a draft TEP may be served:

- on a person:
  - by delivering it to the person personally or
  - by leaving at, or by sending it by post, facsimile or similar facility (e.g. email) to the person's last known place of residence or business or
- on a body corporate - by leaving it at, or sending it by post, facsimile or similar facility (e.g. email) to the head office, a registered office or a principal office of the body corporate.

The date, time and method of service should be documented by contemporaneous notes, a file note, any receipts arising from the postage or any facsimile confirmations and email 'read' receipts.

What follow-up is required?

It is important that the matter is appropriately followed up to make sure that the person to whom the notice requiring a draft TEP is issued complies within the required time-frame. Follow-up is to be scheduled by the relevant officer and confirmed with the business area manager. The business area manager is responsible for ensuring follow-up is undertaken within the agreed time frame.

Once a notice has been issued, dates for the submission of the draft TEP and the review and appeal periods should be diarised and monitored. If the draft TEP is not submitted by the due date, follow-up should be carried out by way of a site visit or telephone call. The recipient should be reminded that the time-frame has expired and that non-compliance with the notice could lead to prosecution.

The recipient of the notice requiring a draft TEP may contact the Department during the period of the notice and establish legitimate reasons for non-compliance with the relevant time frame. In this instance the Department may consider granting an extension of time. However, it must be remembered that the affected person should communicate any issues with time-frames prior to their expiration. For further information regarding amendments to an issued notice requiring a draft TEP, please see the paragraph below headed 'Amendments to an issued notice requiring a draft TEP'.

What are my record-keeping responsibilities?

Officers are required to record all allegations of non-compliance in the EcoTrack system. This includes creating a complaint report, uploading copies of any relevant documents, updating the description field with commentary on actions and recording any decisions made on the enforcement measures screen (this includes a decision to take no further action). Hard copies of any relevant documents should be placed on the paper file. The Department is required to make and record an informed decision about all allegations of non-compliance.

Amendments to an issued notice requiring a draft TEP

If minor changes to the notice requiring a draft TEP or an extension of time to respond are required, the recipient of the notice should be notified in writing.

If significant changes are required, officers should, in order to avoid confusion, repeal (revoke) the original notice, and issue a fresh one on the same grounds with the necessary changes.

The repeal and issue of a fresh notice requiring a draft TEP should be carried out in the same way, and subject to the same conditions as the issuing of the original notice. Accordingly, a new assessment report should be completed and endorsed by the appropriate delegate.

It is preferable if the decision to issue a fresh notice is made by the original decision-maker. If this is not possible the decision should be made by a person with the appropriate delegation who holds a position equal to or higher than that of the original decision-maker.

Officers should also update and record the changes or the decision to repeal and re-issue the notice in EcoTrack or CIRaM and place hard copies of any documents on the paper file.

Review of decisions and appeals

The provisions regarding review of decisions and appeals may be found in Chapter 11, Part 3 of the Act.

The Act specifies that a person who is dissatisfied by a decision made by the Department in respect to a notice requiring a draft TEP may apply for a review of an original decision by submitting an application on the approved form to the Department—

- within 10 business days after the day on which the person received notice of the original decision or the Department is taken to have made the decision, or
- if there are special circumstances, whatever longer period the Department allows.

An approved form for the review of an original decision may be found at Application form - Review of Original Decision

A person who has made an application for review of an original decision may immediately apply to the Planning and Environment Court for a stay of the decision.

If the person is dissatisfied with the review decision, the person may appeal against that decision to the Planning and Environment Court by filing written notice of appeal with the registrar of the Court within 22 business days after the day the person receives notice of the decision or the decision is taken to have been made, unless the Court extends the period for filing the notice of appeal.

The court may grant a stay of a decision appealed against until such time the appeal is decided. An appeal against a decision does not affect the operation or the carrying out of a decision unless the decision is stayed.

Further information about review of decisions and appeals may be found in the Information sheet - Internal review (DERM) and appeal to the Planning and Environment Court

Non-Compliance with a notice requiring a draft TEP

Officers must respond and may take further action in relation to non-compliance with a notice requiring a draft TEP. The following issues should be considered—

- **Providing extra time** – If extra time to comply has been granted, officers should document the details of the extra time allowed and the reasons for giving the extension of time. Confirmation of these details should be provided in writing to the recipient of the notice.
- **Other tools** – It may be that using another compliance tool would be more likely to achieve compliance. For example, issuing an Environmental Protection Order (EPO) in relation to the non-compliance may be a more appropriate way to achieve compliance due to the far higher penalty for breaching the EPO.
- **Prosecution** – If no other action is likely to be effective, officers should consider prosecuting a non-compliant recipient of a notice requiring a TEP for both failure to comply with the notice as well as for the environmental harm being caused.

What penalties exist for non-compliance with a notice requiring a draft TEP?

A person must comply with a notice requiring a draft TEP, unless the person has a reasonable excuse (s332(5)).

Maximum penalty for non-compliance with a notice requiring a TEP—

For an individual – 100 penalty units or $10,000.00.

For a corporation – 500 penalty units or $50,000.00.

Department of Environment and Resource Management

Procedural guide

Environmental Protection Act 1994
Transitional environmental program (TEP)

Part 2 - Considering and making a decision about a draft TEP

This document is designed to assist users to critically evaluate the content of a draft TEP and assess whether or not the proposed objectives and actions meet the legislative requirements.

Consideration of a draft TEP submitted by a person or public authority

If a person submits a draft TEP to the Department of Environment and Resource Management (the Department), the Department is required to consider the draft TEP and make a decision whether to approve or refuse the draft TEP, or to approve it with conditions.

Section 337 of the *Environmental Protection Act 1994* (the Act) provides that the Department must make its decision within 20 business days after—

- if a public notice is required under s335—the day stated in the notice as the day by which public submissions may be made to the Department or
- otherwise—the application date.

The terms *application date* and *person* are defined below.

Application date (s552)

The *application date* is important because many actions in relation to a draft TEP must be made within a certain number of days from the application date. Subsection 552(2) of the Act states that the application date relating to a draft TEP is 10 business days after the day it has been submitted to the Department.

However, if the Department requires additional information about the draft TEP within 8 business days after the day it has been submitted, the application date is the day the Department states in a written notice to the applicant as being the application date (s552(3)). This day must not be earlier than two business days after the person has received the written notice (s552(6)).

If, within 8 business days after a person submits a draft TEP, the Department advises the person who made the submission that the TEP (or proposed amended TEP) does not contain or provide for a matter mentioned in s331 (content of a program), and the person is required by the Department to amend the submission so that the TEP (or proposed amended TEP) is compliant with s331 and to resubmit the submission to the Department, the application date is the day that is 10 business days after the day the amended TEP is submitted to the Department.

Or, if the Department requires additional information about the amended TEP within 8 business days after the day the amended TEP is submitted to the Department, the application date is the day the Department states in a written notice to the applicant as being the application date (s552(5)). This day must not be earlier than 2 business days after the person has received the written notice (s552(6)).

Person

The term *person* includes an individual, public authority or corporation.

Department of Environment and Resource Management
www.derm.qld.gov.au ABN 46 640 294 485

Fee for consideration of a draft TEP (s334)

A person that submits a draft TEP to the Department for consideration and approval must pay to the Department the fee prescribed by regulation. See: Operational policy - Transitional Environmental Program (TEP) fees

An invoice for the fees incurred should be issued to the person that has submitted the draft TEP for approval at the time when the notice stating the Department's decision is issued.

What must be included in the content of a draft TEP? (s331)

Section 331 of the Act requires that a draft TEP must, for the activity to which it relates—

(a) state the objectives to be achieved and maintained under the TEP for the activity and

(b) state the particular actions required to achieve the objectives, and the day by which each action must be carried out, taking into account:

  (i) the best practice environmental management for the activity and

  (ii) the risks of environmental harm being caused by the activity and

(c) state how any environmental harm that may be caused by the activity will be prevented or minimised, including any interim measures that are to be implemented and

(d) if the activity is to transition to an environmental standard, state:

  (i) details of the standard and

  (ii) how the activity is to transition to the standard before the TEP ends and

(e) if the activity is to transition to comply with a condition of an environmental authority or code of environmental compliance, or a development condition, state:

  (i) details of the condition and how the activity does not comply with it and

  (ii) how compliance with the condition will be achieved before the TEP ends and

(f) state the period over which the TEP is to be carried out and

(g) state appropriate performance indicators at intervals of not more than six months and

(h) provide for monitoring and reporting on compliance with the program.

Is public notice required? (s335)

Public notice is required where the person submits a draft TEP for approval that states the TEP is to be carried out over a period of longer than three years. Within 2 business days after the application date, the person must give public notice of the submission by:

- an advertisement published in a newspaper circulating generally in the area in which the activity to which the draft program relates is, or is proposed to be, carried out and
- if the program relates to premises, a notice must also be placed on the premises and served on the occupiers of all adjoining premises

- invite submissions on the draft TEP (s335(3)(b)) and state the day (at least 10 business days after the advertisement and service of notice) nominated by the Department as the day by which submissions may be made to the Department.

The notice must meet the requirements of the Act,

In what circumstances may the Department call a Conference? (s336)

The Department may invite the person that has submitted a draft TEP, and another person that has made a submission under section 335 about the TEP, to a conference to help it decide whether or not to approve the draft TEP. See section 336 of the Act for details of notice and other requirements regarding conferences.

Other consultation and considerations

Depending on the content of the draft TEP, officers may need to consult with other business units or Departments in order to ensure that the risks from, and effects of, the draft TEP have been fully understood. For example, if the draft TEP involves releases of water, Queensland Health and/or the Office of the Water Supply Regulator should be consulted. Releases to air may also require consultation with Queensland Health.

Officers should consider whether a formal risk assessment should be undertaken to ensure that any risks from approving the draft TEP are identified and adequately managed.

Consideration of draft TEPs (s337)

The Department must decide whether to approve a draft TEP submitted to it within 20 business days after the application date. Or, if a public notice is required under s335, the Department must make a decision 20 business days after the day stated in the notice as the day by which submissions may be made to the Department. If public notice of the submission of the draft TEP is required to be given, the Department must be satisfied that public notice has been properly given before making a decision (s337(2)).

If the Department fails to decide whether to approve or refuse a TEP within the time it is required to make a decision, the failure is taken to be a decision by the Department to refuse to approve the program at the end of the time (s343).

What must be taken into consideration? (s338)

When deciding whether or not to approve the draft TEP or the conditions (if any) of the approval, the Department—

- must comply with any relevant regulatory requirement and
- subject to the above, must also consider the following:
  - the standard criteria
  - additional information given in relation to the draft TEP and
  - the views expressed at a conference held in relation to the draft TEP.

If the draft TEP is prepared because of a requirement of a development condition of a development approval, the Department may approve the draft TEP only if it is not inconsistent with other conditions of the approval.

Decision about draft TEP (s339)

Section 339 of the Act provides that the Department may—

- approve a draft TEP as submitted or
- approve a draft TEP as amended at the request, or with the agreement, of the Department or
- refuse to approve a draft TEP.

If the Department approves the draft TEP it may impose—

- any conditions the Department must impose under a regulatory requirement and
- any other conditions considered appropriate by the Department.

If the draft TEP is approved, the approval remains in force for the period stated in the notice of the approval given pursuant to s340 of the Act.

How does an officer successfully consider and make a decision about a draft TEP?

Officers must complete an assessment report to document the decision whether to accept the draft TEP (with or without conditions), to require amendments to the draft TEP or to reject the draft TEP. If the draft TEP is accepted (with or without conditions) or rejected, a notice of decision must be issued under s340 of the Act.

Step 1 - Complete the assessment report

Before issuing a notice of decision under s340 of the Act, officers are required to complete an assessment report which sets out the facts and circumstances relating to the matter and documents the decision-making process used in determining whether to approve or refuse the draft TEP (with or without conditions).

The assessment report lists all the matters that must be considered by officers during the decision-making process. This includes the criteria by which the TEP must be assessed, the matters that must be addressed by the draft TEP and the matters that officers must consider when making a decision about the draft TEP. Each matter has checkboxes beside it, as well as text fields for officers to provide further information if necessary. The text fields contain explanatory notes indicating the types of information that is to be provided. Officers should check the relevant checkboxes to indicate that the particular matter has either been adequately addressed or is not applicable to that particular draft TEP. If a matter is applicable, but has not been adequately addressed, the checkbox should not be checked, and details as to how the particular matter has not been adequately addressed should be inserted in the text field provided.

The following sections of the procedural guide are a guide to completing the assessment report. The numbering and headings of the sections in the procedural guide correlate with those in the assessment report for ease of reference. Officers should refer to the procedural guide for information while completing the assessment report.

The assessment report is not intended to replicate the Departmental file. Rather, it is designed to capture all critical aspects that have let to the Department's decision. Accordingly, officers should limit the information included to relevant points only.

A template assessment report may be accessed at the Compliance Support Materials site on the DERM intranet.

1. Brief history of the matter

Briefly outline any historical information relevant to this decision. This information should be presented in succinct, chronological dot points and should include the reasons why a draft TEP is now being considered, for example, as a result of a program notice, voluntary submission or in response to a notice requesting the submission of a TEP.

2. Matters that must be considered when making a decision about the draft TEP (s338)

A significant amount of care should go into checking and considering the potential effects of the draft TEP, because by approving the draft TEP, the officer is authorising everything it permits.

Accordingly, the assessment criteria are an instrumental part of the decision-making process. Firstly, they establish the critical objectives that the draft TEP must achieve and how the content of the draft TEP will deliver on these objectives. Secondly, from the view of compliance and enforceability, and to establish that the draft TEP passes the *SMART* test, the requirements must be specific, measureable, achievable, relevant and time-specific. These are vital considerations given that in future, the Department may have to establish beyond a reasonable doubt that the TEP has not been complied with in order to take action against the person for failure to comply with the TEP. For this reason, the contents of the draft TEP must be clearly drafted, unambiguous and easily auditable.

More information about drafting SMART requirements and conditions may be found in the Procedural guide - Writing effective and enforceable conditions

Achieving compliance with the Act (s330)

A TEP should, for the activity to which it is concerned, achieve compliance with the Act by doing one or more of the following things—

- reducing environmental harm caused by the activity
- detailing the transition of the activity to an environmental standard
- detailing the transition of the activity to comply with:
    - a condition, including a standard environmental condition, of an environmental authority or code of environmental compliance or
    - a development condition.

The term *environmental standard* is defined as being:

- an environmental standard (however called) set out, or otherwise provided for, in a regulation under the Act or
- an outcome or objective that is directed at protecting or enhancing environmental values set out in an environmental protection policy.

A *standard environmental condition* for an environmental authority or code of environmental compliance means a standard environmental condition approved by the Minister pursuant to s549 of the Act.

A *development condition* of a development approval means a condition of the approval imposed by, or because of a requirement of, the Department if it is the assessment manager or concurrence agency for the application for the approval.

The draft TEP must set out how the activity is currently in non-compliance with the Act and how the person proposes to make the activity compliant. If it is not clear from the information provided in the draft TEP that by

doing one or more of these things compliance with the Act will be achieved by the end of the operative period of the TEP, the draft TEP must not be approved.

Content of the TEP (s331)

A TEP, for the activity to which it relates, must include the following—

(a) Objectives to be achieved and maintained under the TEP

A draft TEP must clearly set out what it is trying to achieve. For example:

EXAMPLE 1
To bring the operator into compliance with conditions G12 and H5 of development approval 123456
EXAMPLE 2
To prevent or minimise environmental harm caused by the migration of landfill gas.

The objectives should be as specific and clear as possible so that, if the draft TEP is approved, the Department can assess whether the objectives have been met.

(b) State the particular actions

The draft TEP must set out the actions that the person will carry out in order to achieve the objectives. It is important that the actions are as definite, specific and as clear as possible. If they are vague or uncertain, it will be difficult for the Department to assess whether the person is doing what they have said they will do, which may prevent the Department from taking enforcement action in future. Each action must have a due date by which it will be completed, and must comply with the SMART principles.

Progress reporting dates and final reporting dates should be included in the actions.

In stating the particular actions required to achieve the objectives, the draft TEP must take into account best practice environmental management. Officers should refer to s21 of the Act for a definition of *best practice environmental management.*

(c) Prevention and minimisation of environmental harm

The risks of environmental harm being caused by the activity should also be taken into account. The draft TEP must state how any environmental harm that may be caused by the activity will be prevented or minimised, including any interim measures that are to be implemented.

(d) Transition to an environmental standard

If the objective of the draft TEP is to transition to meet an environmental standard, the draft TEP must provide details of the standard and set out how the activity is to transition to the standard before the operative period of the TEP comes to an end. Please see 'Achieving compliance with the Act' above for a definition of *environmental standard.*

(e) Transition to comply with a condition of an environmental authority or code of environmental compliance, or a development condition

If the objective of the draft TEP is for an activity to transition to comply with a condition of an environmental authority or code of environmental compliance, or a development condition, the draft TEP must set out each condition and detail how the activity does not comply with the condition. The draft TEP must also state how compliance with the condition will be achieved before the end of the operative period of the TEP.

(f) Period over which the TEP is to be carried out

To be approved, the draft TEP must state the period over which the TEP is to be carried out. If the person has submitted for approval a draft TEP that states it will be carried out over a period longer than three years, the person must give public notice of the submission within 2 business days after the application date in accordance with s335 of the Act.

(g) Performance indicators

The draft TEP must state appropriate performance indicators at intervals of not more than 6 months. The performance indicators must show how the applicant is progressing in achieving the objectives of the TEP. The indicators must also be capable of being measured and be specific enough to enable the Department to assess with certainty whether or not they have been met. The date on which each performance indicator will be met must be set out in the TEP.

(h) Monitoring and reporting

The draft TEP must provide for sufficient monitoring and reporting on compliance with the program. It should provide for the person to monitor and report on—

- the carrying out of the actions
- whether or not the objectives are being achieved
- whether or not the required time-frames are being met and
- any environmental and scientific testing.

The draft TEP should also allow for the person to provide—

- reports on progress with the TEP, including any failure to carry out prescribed actions by the stipulated dates
- reports on any environmental monitoring requirements (including interpretation) and
- a final report to the Department demonstrating that compliance with the Act has been achieved.

Regulatory requirements (s338(1)(a))

Sections 46-64 of the *Environmental Protection Regulation 2008* specify the matters that must be considered when the Department is making environmental management decisions. An *environmental management decision* is a decision under the Act for which the Department is required to comply with regulatory requirements. All matters relevant to the draft TEP must be considered when making a decision about it, for example, if there are certain matters specified where release of water to land is contemplated.

Standard criteria (s338(1)(b)(i))

As stated above, the Department **must** consider the standard criteria, set out below, before deciding whether or not to approve the draft TEP—

- **The principles of ecologically sustainable development as set out in the 'National Strategy for Ecologically Sustainable Development (ESD)'**

  Consider the following guiding principles:

  - Has the decision effectively integrated long- and short-term economic, environmental, social, and equity considerations?

- Has due regard been given to the precautionary principle? In other words, where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.
- Does the decision have due regard to the global dimensions of environmental impacts and policies?
- Does the decision assist in the development of a strong, growing and diversified economy, which can enhance the capacity for environmental protection?
- Has the need to maintain and enhance international competitiveness in an environmentally sound manner been considered when making the decision?
- Have cost effectiveness and flexible policy instruments (for example, improved valuation, pricing and incentive mechanisms) been adopted?
- Does the decision/action allow for broad community involvement on issues that affect them?

- **Any applicable Environmental Protection Policies (EPPs)**
  - Is the draft TEP consistent with the EPPs on water, air, noise and waste (where relevant)?
- **Any applicable Commonwealth, State or local government plans, standards, agreements or requirements**
  - Consider guidelines such as the State and Regional Coastal Plan, National Health and Medical Research Council (NHMRC) and the Australian and New Zealand Environment and Conservation Council (ANZECC) Guidelines.
- **Any applicable environmental impact study, assessment or report**
  - Consider any findings or recommendations that are relevant to the draft TEP.
- **The character, resilience and values of the receiving environment**
  - Does the draft TEP have regard to the environmental values of the receiving environment?
  - What is the impact on the values of the actions contained in the draft TEP?
- **All submissions made by the applicant and submitters**
  - Consider any submissions made by the applicant and anyone who properly makes a submission about the draft TEP.
- **Best practice environmental management for the activity to which the draft TEP relates**
  - Analyse how approving the draft TEP with or without conditions will ensure that best practice environmental management is achieved.
- **The financial implications of the requirements**
  - Explore the financial implications for the client in complying with conditions of the TEP. Are they reasonable in the particular circumstances?
- **The public interest**
  - Is it in the interest of the community that the draft TEP be approved?
- **Any applicable site management plan**
  - If there is a site management plan for contaminated land (approved under Chapter 7, Part 8 of the Act), and is the draft TEP consistent with the site management plan? If not, is the inconsistency necessary for addressing the matters in the draft TEP? How will any inconsistency be reconciled?

Consult with the Contaminated Land Unit as early as possible when there are any contaminated land issues.

- Any **relevant integrated environmental management system or proposed integrated environmental management system (IEMS)**
  - Is the draft TEP consistent with the IEMS? If not, is the inconsistency necessary for addressing the matters in the draft TEP? How will any inconsistency be reconciled?
- Any **other matter prescribed by a regulation**
  - See 'regulatory requirements' above.

Additional information (s338(1)(b)(ii))

The Department must consider any additional information given in relation to the draft TEP. Has all supporting information provided by the applicant been considered? Having considered the draft TEP and any supporting information, is it clear that the draft TEP achieves compliance with the Act?

Views expressed at a conference (s338(1)(b)(iii))

If a conference has been held as part of a public notice process, the views expressed at that conference in relation to the draft TEP must be considered and the reasons for having regard to, or not having regard to, those views must be recorded.

Consistency with development conditions of a development approval (s338(2))

If the draft TEP is prepared because of a development condition of a development approval, the Department must not approve the draft TEP unless it is consistent with other conditions of the development approval.

Public notice of submission of draft TEP (s337(2)) and substantial compliance with the Act (s342)

If public notice is required, before approving the draft TEP, ensure that the person or public authority submitting the draft TEP has properly given public notice and complied with the requirements of s335 of the Act.

The Department must be satisfied that the public notice has been properly given before making a decision (s337 of the Act). If the Department is not satisfied that public notice has been properly given, it may consider and decide whether to approve the draft program if it is satisfied there has been substantial compliance with the public notice requirements of the Act (s342).

See 'Is public notice required?' above for further information regarding public notice.

Satisfaction that the draft TEP meets the requirements of the Act

Having considered all of the above matters, officers completing the assessment report must decide whether they are satisfied the draft TEP adequately addresses all of the relevant matters. If any of the issues in the assessment report were answered 'no', officers should proceed to section 4. Otherwise, proceed to section 3.

3. Request for further information and/or amendments to the draft TEP

In some cases the draft TEP may substantially address the required matters, but cannot be approved because some matters have not been adequately addressed. In this situation, the Department may request that further information be provided or that particular amendments be made to the draft TEP. It is important to recognise that if there are major problems with the draft TEP, or a large number of matters that have not been addressed by the draft TEP, officers should recommend to the Delegate that it not be approved and a notice of decision should be sent to the person or public authority that submitted the draft TEP advising of this decision.

However, if it is likely that the draft TEP would be approved if further information is provided or some changes are made, it is preferable for the Department to write to the person submitting the draft TEP and request the further information and/or amendments, rather than approve the TEP subject to conditions, owing to the fact that conditions may be difficult to enforce. See 'Key considerations regarding conditions' below for further information.

Officers should consult with their supervisor when considering whether to request further information or amendments to the draft TEP, and in formulating the amendments required to be made (if any). A request for amendments to a draft TEP should be made in writing. If, after the draft TEP is amended, it is approved, the amended TEP will form part of the approved TEP.

It is highly recommended that a request for amendments be made within 8 business days after the draft TEP is submitted to the Department, as this means that the application date will then be 10 business days after the date that the amended TEP is submitted to the Department. Consequently, the Department will have additional time to consider the amended TEP and make a decision whether or not to approve it.

Time-frames

For information regarding a change in time-frames if further information is sought or the Department requests amendments to the draft TEP, see the section 'Application date' above.

Minor amendments and/or further information

If only very minor amendments are necessary, officers should consider suspending the decision-making process, so as to provide the opportunity to the person submitting the draft TEP to make the requested amendments. If the requested amendments are made, the assessment report can then be completed to reflect the amendments. Then, if all relevant matters have been adequately addressed, officers may recommend that the Delegate approve the draft TEP.

More significant amendments

If the amendments required are more significant or complicated, officers should list the requested amendments in the assessment report and recommend that the Delegate approve a request for the required amendments. Then, if the amendments are provided by the person submitting the draft TEP, officers must complete a fresh assessment report and provide a new recommendation to the Delegate.

4. Approval of the draft TEP

The assessment report lists all the matters that must be considered by officers during the decision-making process, with checkboxes beside each matter. At least one checkbox must be checked beside each matter before a decision can be made to approve the draft TEP.

Key considerations regarding conditions

The Act does make provision for an approval of a draft TEP to be subject to conditions the Department considers appropriate. However, the enforceability of conditions placed on a TEP is unclear. Accordingly, conditions should not be imposed except for minor matters. Conditions must not be used to alter the terms of the TEP itself. If the TEP is not satisfactory, it must be refused or amendments sought from the applicant. Conditions in the notice of decision should not be used as a quasi-development approval, or to alter or amend the TEP to meed the requirements of the Act.

Financial assurance conditions (ss364-367)

Under s364 of the Act, the Department may, by condition of an approval of a TEP, require the holder of the approval to give the Department financial assurance as security for—

- compliance with any conditions of the TEP and
- costs or expenses, or likely costs or expenses, that the Department incurs, or might reasonably incur, in taking action to:
    - prevent or minimise environmental harm or rehabilitate or restore the environment, in relation to the carrying out of an activity under a TEP approval or
    - secure compliance with the TEP, or any conditions of the TEP, for which financial assurance has been given.

However, under s364(2) the Department may impose a condition requiring a financial assurance to be given only if it is satisfied that the condition is justified, having regard to—

- the degree of risk of environmental harm being caused, or that might reasonably be expected to be caused, by the activity carried out, or to be carried out, under the program and
- the likelihood of action being required to rehabilitate or restore and protect the environment because of environmental harm being caused by the activity and
- the environmental record of the holder.

Section 365 of the Act provides that before approving a draft TEP subject to the condition that financial assurance be given, the Department must give the person who submitted the draft TEP a written notice that must –

- state the grounds for the condition and
- state the form and extent of the financial assurance and
- invite the person to make representations to the Department to show why the approval of the draft TEP should not be subject to the condition and
- state the period (at least 22 business days after the notice is given to the person) within which the representations may be made and
- the representations must be made in writing (s365(3)).

Within 20 business days after the end of the period stated in the notice (s365(4)), the Department must—

- consider the representations properly made by the person and
- if the Department gives the approval subject to the condition that the holder of the approval give financial assurance—the Department must give written notice to the person giving reasons for imposing the condition.

5. Refusal to approve a draft TEP

The draft TEP cannot be approved unless a checkbox has been checked next to each matter listed on the assessment report, either to confirm the matter has been adequately addressed, or to indicate that the matter is not applicable to the draft TEP. If a checkbox has not been checked next to a matter, officers are to provide details in the text field provided.

If any of the required matters are not addressed in the draft TEP, officers should either recommend a refusal of the draft TEP, or seek further information or amendments to the draft TEP from the person that submitted it. (See 'Request for further information and/or amendments to the draft TEP' above). If the deficiencies in the draft TEP are too serious to be addressed by further information and amendments, the Department should refuse to approve the draft TEP.

6. Provide for natural justice

The Department must ensure that decisions are made in a fair and consistent manner. This includes ensuring that the affected individual is provided with 'natural justice' (that they are given an opportunity to make their case for why the decision should go in their favour) and that people involved in making the decision are free from bias or the perception of bias.

Any submissions made by the applicant that have not already been considered earlier in the assessment report process must be documented in section 5 of the assessment report.

7. Recommendation

Officers are required to make a recommendation as to whether or not the draft TEP should be approved (with or without conditions) or refused.

8. Approval

An officer with the appropriate delegation must consider the contents of the assessment report and the recommendation and make a decision about whether to approve (with or without conditions) or refuse the draft TEP. The Department's list of delegations can be found on the Department's intranet at http://insite2.dnr.qld.gov.au/derm/delegations/.

Step 2 – Complete the notice of decision

Section 240 of the Act provides that within 8 business days of making a decision under s339, the Department must give the person or public authority that submitted the draft TEP a written notice of the decision (the notice of decision).

If the delegate approves the draft TEP, the notice of decision must—

- identify the documents forming the approved TEP, including any amendments under s339(1)(a)(ii) and
- state any conditions imposed on the approval by the Department and
- state the day the approval ends.

If the draft TEP is approved, the approval remains in force for the period stated in the notice of decision (s339(3)).

Content of approved program (s341)

An approved TEP consists of the following—

- the draft program submitted under section 332 or 333, as amended at the request, or with the agreement of the Department

- any conditions imposed on the program by the Department.

Information notice

If the Department refuses to approve the draft TEP, or approves it with conditions, the notice of decision given to the person or public authority that submitted the program must be an information notice (s340(3)).

An *information notice* means a written notice stating—

- the decision and
- the reasons for the decision and
- the review and appeal details.

Officers must issue an invoice for the fees for consideration of the draft TEP to the person or public authority that has submitted the draft TEP for approval at the time when the notice stating the Department's decision is issued. See: Operational policy - Transitional Environmental Program (TEP) fees

What is the effect of compliance with the approved TEP? (s346)

An approved TEP protects the holder, or a person acting under the approval, from enforcement action for non-compliance with the relevant—

- regulation or
- environment protection policy (EPP) or
- environmental authority (EA) held by the holder or
- development condition of a development approval (DA) or
- standard environmental condition of a code of environmental compliance for a chapter 4 activity or
- accredited environmental risk management plan (ERMP) under the Great Barrier Reef protection measures.

What follow-up is required?

It is an offence for the holder of an approved TEP to contravene the program. Officers should diarise all performance indicator requirements listed in the program or conditions and ensure they are monitored for compliance.

Officers are encouraged to use tools such as reminders in Microsoft outlook to ensure the matter is followed up in a timely manner.

Review of decisions and appeals

The provisions regarding review of decisions and appeals may be found in Chapter 11, Part 3 of the Act.

The Act specifies that a person who is dissatisfied by a decision made by the Department about a draft TEP, may apply for a review of an original decision by submitting an application on the approved form to the Department—

- within 10 business days after the day on which the person received notice of the original decision or the Department is taken to have made the decision, or

- if there are special circumstances, whatever longer period the Department allows.

An approved form for the review of an original decision may be found at Application form - Review of Original Decision

A person who has made an application for review of an original decision may immediately apply to the Planning and Environment Court for a stay of the decision.

If the person is dissatisfied with the review decision, the person may appeal against that decision to the Planning and Environment Court by filing written notice of appeal with the registrar of the Court within 22 business days after the day the person receives notice of the decision or the decision is taken to have been made, unless the Court extends the period for filing the notice of appeal.

The court may grant a stay of a decision appealed against until such time the appeal is decided. An appeal against a decision does not affect the operation or the carrying-out of a decision unless the decision is stayed.

Further information about review of decisions and appeals may be found in the Information sheet - Internal review (DERM) and appeal to the Planning and Environment Court

What penalties exist for a contravention of a requirement of a TEP (s432)?

The holder of an approval of a TEP, or a person acting under a TEP, must not wilfully contravene a requirement of the program.

Maximum penalty—1665 penalty units ($166,500.00) or 2 years imprisonment.

The holder of an approval of a TEP, or a person acting under a TEP, must not contravene the program.

Maximum penalty—835 penalty units ($83,500.00).

The maximum penalty for a corporation is five times the penalty for an individual.

What penalties exist for contravention of a condition of approval (s432A)?

A person must not, without reasonable excuse, contravene a condition of an approval of a transitional environmental program.

Maximum penalty—835 penalty units ($83,500.00)

The maximum penalty for a corporation is five times the penalty for an individual.

Department of Environment and Resource Management

Assessment report

Environmental Protection Act 1994
Transitional Environmental Program (TEP)

Part 1 – Notice requiring a draft TEP

This document is intended for internal use to assist Environmental Services officers to record the information considered by the Department when deciding to issue a notice requiring a draft TEP.

Identifying Details	
Compliance activity number	Number
EcoTrack number	Number
Permit number:	Permit number (if applicable)
File number:	File Number
Applicant number:	Number
Trading as:	Trading as details (if applicable)
Registered business address:	Registered business address

Note:

1. Assessment reports recommending a decision be made are to be structured in the format shown below.
2. Explanatory notes for completing the report are given under each heading.
3. The report is to be endorsed by the responsible officer, supervisor and the delegated decision-maker.

1. Brief history of the matter

Briefly outline any historical information relevant to this decision in chronological order.

Briefly outline the historical information in chronological order.

2. Grounds for issuing a notice requiring a draft TEP

Section 332 of the *Environmental Protection Act 1994* provides that the Department may require the submission of a draft Transitional Environmental Program (TEP) in certain circumstances. Identify on which of the following grounds the decision to issue a notice requiring a draft TEP is based.

The Department may require a person or public authority to prepare and submit to it for approval a draft TEP:

☐ As a condition of an environmental authority (EA).

OR

☐ As a development condition of a development approval (DA).

The Department may also require a person or public authority to prepare and submit to it for approval a draft Transitional Environmental Program if it is satisfied:

☐ An activity carried out, or proposed to be carried out, by the person or authority is causing, or may cause, unlawful environmental harm.

OR

☐ It is not practicable for the person or public authority to comply with an environmental protection policy or regulation on its commencement.

OR

☐ That a condition of an environmental authority held by the person or public authority is, or has been, contravened.

OR

☐ That a standard environmental condition of a code of environmental compliance for a Chapter 4 activity is, or has been, contravened by the person or public authority.

OR

☐ A development condition of a development approval is, or has been, contravened and the person or public authority is:

- ☐ an owner of the land for which the approval is granted or
- ☐ another person in whom the benefit of the approval vests.

3. Expand Upon the Grounds

Expand upon the grounds identified for issuing the notice requiring a draft TEP. This can include identifying an alleged offence or any statutory requirement which must be met prior to the Department issuing the notice.

Each ground should be listed independently and allocated a separate number.

Number	Specific Ground
1	Example: ABC Pty Ltd is a timber preservation/treatment operator. While conducting timber preservation/treatment activities, ABC Pty Ltd has released stormwater from its operating site that does not comply with release limits, thereby causing unlawful environmental harm. If ABC Pty Ltd does not upgrade its site and improve its stormwater management system, it is likely that non-compliant releases of stormwater from the site will continue, thereby causing further environmental harm.
2	
3	
4	

4. Detail the Matters Considered

The purpose of the following table is to ensure that there is evidence to support the use of the statutory tool. This is achieved by linking the elements of the breach to the evidence gathered and the conclusions formed (I.e. the facts and circumstances).

When analysing evidence or developing the facts and circumstances, officers are encouraged to consider the accuracy and relevance of the information available, historical details, professional expertise and the weight attributed to any direct testimony provided.

Elements of the offence or legislative requirement *List the elements of any grounds for issuing the notice requiring a TEP*	**Evidence** *Identify the evidence considered which is relevant to the elements or requirement (i.e. statements, photographs, and recordings)*	**Facts and Circumstances** *Detail the facts and circumstance that support the Department's findings.*
Number 1 (Number taken from Section 2)		
An activity carried out, or proposed to be carried out by the person.....	Compliance Inspection CA123: Notes from officer's official notebook taken during site inspection on 20 May 2008.	ABC Pty Ltd carries out timber preservation and treatment activities at its site at 123 Creek Road, Murphyville. The inspection has shown that whilst the operators have some stormwater controls in place, it is apparent that the current system would not be able to effectively manage an increase in production and/or increased rain levels.
	Photographs (x20) of the ABC Pty Ltd site taken during the site inspection on 20 May 2008.	Photographs taken of the existing stormwater management infrastructure, including the stormwater catchments show that the catchments are 80% full. An increase in production or heavy rain is likely to fill the catchments to overflowing.
Is causing, or may cause, unlawful environmental harm.....	Compliance inspection CA456: Notes from officer's official notebook taken during compliance inspection on 3 May 2009.	A visual inspection of the stormwater catchments show that they are 90% full.
	Copy of letter to ABC Pty Ltd from the Department dated 12 May 2010.	Letter to ABC Pty Ltd outlining the Department's concerns in relation to stormwater controls and management on the site and reminding the site operator of its responsibilities.

	Copy of the company's stormwater quality monitoring results for the past 12 months.	The stormwater quality monitoring results indicate that ABC Pty Ltd has exceeded its release limits on 2 occasions in the past 12 months.
	Compliance inspection CA780: Copy of the site operator's stormwater quality monitoring results for the previous 12 months collected from the operator during compliance inspection on 15 May 2010.	The stormwater quality monitoring results indicate that the operator has exceeded stormwater release limits on 6 occasions in the past 12 months.
	Compliance inspection CA780: Notes from officer's official notebook taken during compliance inspection on 15 May 2010.	During the site inspection, Departmental officer Mary Green had further discussions with the site operator regarding the implications of the repeated exceedances of the stormwater release limits. The site operator says that ABC Pty Ltd has made significant investment in stormwater management infrustructure in 2005. However, the business has grown substantially since this time. During the discussions the site operator indicated an acceptance of the need to investigate and pursue further stormwater management improvements and included a commitment to consider drafting a voluntary TEP.
	File note written by environmental officer Mary Green on 23 June 2010.	ABC Pty Ltd is carrying out timber preservation/treatment activities at a site at 123 Creek Road, Murphyville. Visual inspections of the site in 2008, 2009 and 2010 have indicated that the business has grown substantially and the stormwater managment system and infrastructure are no longer coping and require improvements. Annual stormwater release quality monitoring records for 2009 and 2010 indicate that ABC Pty Ltd has exceeded its stormwater relase limits on a number

		of occasions. The repeated exceedences of the stormwater release limits by ABC Pty Ltd are causing unlawful environmental harm and may cause further unlawful environmental harm. The operator indicated that it would voluntarily submit a draft TEP. However, a voluntary draft TEP has not been submitted. In the circumstances, the Deparment considers that a notice requiring a draft TEP should be issued to ABC Pty Ltd.
Number 2		
Number 3		

5. Natural Justice

The investigating officer is required to notify the affected person that the Department is considering issuing a notice requiring a TEP and that the individual may make representations to the Department as to why this action should not be taken. Any information provided by the affected person is to be documented and considered.

☐ The person has been provided with the opportunity to put their side of the story forward.

Describe how this was achieved.

☐ All information and/or defences provided were considered.

Describe any information or defences provided.

☐ The Department has considered the information or defences provided.

Describe the consideration given and the conclusions formed by the Department based on the information provided.

☐ The decision-maker and the environmental officer are free from bias or the perception of bias.

6. Recommended Conditions (if appropriate)

If appropriate, please list any proposed conditions below. In order to ensure conditions are enforceable, they should be SMART - Specific, Measureable, Achievable, Relevant and Time-specific. Refer to the Procedural Guide - Writing effective and enforceable conditions

To ensure the conditions are reasonable, officers are required to provide justification for the inclusion of the condition.

Proposed Requirement	Justification
Proposed requirement	Justification
Proposed requirement	Justification
Proposed requirement	Justification
Proposed requirement	Justification
Proposed requirement	Justification
Proposed requirement	Justification
Proposed requirement	Justification
Proposed requirement	Justification
Proposed requirement	Justification
Proposed requirement	Justification
Proposed requirement	Justification
Proposed requirement	Justification
Proposed requirement	Justification

7. Recommendation

The responsible officer is required to make a recommendation in relation to the allegation.

Recommendation:

8. Approval

Environmental Officer	Supervisor
Print Name:	**Print Name:**
Position:	**Position:**
Date:	**Date:**

Delegate Decision-Maker	Approve / Reject Recommendation (Circle One)

Reasons for Decision *For example:* *I approve this recommendation based upon the information set out above.* *Or, I approve this decision for the reasons set out above and I note Mr Rodgers has previously received a warning letter in relation to this matter.* *Or, I reject the above recommendation as I consider it more appropriate for the Department to take an educational approach to this breach.*
Print Name:
Position:
Date:

Department of Environment and Resource Management

Assessment Report

Environmental Protection Act 1994
Transitional environmental program (TEP)

Part 2 - Considering and making a decision about a draft TEP

This document is for internal use to assist users in critically evaluating the content of a draft TEP and making a decision to either approve (with or without conditions) or refuse a draft TEP.

Identifying details	
Compliance activity number	Compliance activity number
Ecotrack number	Ecotrack number
Permit number	Permit number
File number	File number
Applicant name	Applicant name
Registered office or place of business	Registered office or place of business
Date draft TEP received.	Date *Note: The department has 20 business days after the application date in which to make a decision in relation to the draft TEP.*

Note:

1. Assessment reports recommending a decision be made are to be structured in the format shown below.
2. Explanatory notes for completing the report are given under each heading.
3. The report is to be signed by the investigating officer, supervisor and the delegated decision-maker.

Considering and making a decision about a draft TEP

The legislative provisions in regard to transitional environmental programs (TEPs) are found in Chapter 7, Part 3 of the *Environmental Protection Act 1994* (the Act).

A person or public authority may submit a draft TEP to the Department for consideration, either voluntarily under s333 of the Act or pursuant to a notice requiring a draft TEP issued by the Department under s332 of the Act. Once a draft TEP is received, the Department must consider it and decide whether or not to approve it within 20 business days after the application date or, if public notice is required under s335, within 20 business days of the day stated in the notice as the day by which submissions must be made to the Department. Detailed below are the matters that the Department must consider when making a decision about a draft TEP.

Department of Environment and Resource Management
www.derm.qld.gov.au ABN 46 640 294 485

1. Brief history of the matter

Briefly outline any historical information relevant to this decision.

Provide historical information relating to the matter in succinct, dot point form.

2. Matters that must be considered when making a decision about the draft TEP

Achieving compliance with the Act (s330)

Identify how, if approved, the draft TEP will achieve compliance with the *Environmental Protection Act 1994* (the Act) by doing one or more of the following things—

☐ reducing environmental harm caused by the activity

☐ detailing the transition of the activity to an environmental standard

☐ detailing the transition of the activity to comply with:

- ☐ a condition, including a standard environmental condition, or an environmental authority or code of environmental compliance or
- ☐ a development condition.

Content of the TEP (s331)

To be approved, the draft TEP, for the activity to which it relates, must accomplish the following—

(a) Objectives to be achieved and maintained under the TEP

☐ The draft TEP clearly sets out the objectives to be achieved and maintained under the TEP (i.e. what the draft TEP is trying to achieve).

Provide a brief summary of the objectives to be achieved and maintained under the TEP.

(b) State the particular actions

☐ The draft TEP states the particular actions required to achieve the objectives, and the date by which each action must be completed.

Briefly state the actions required to achieve the objectives and the dates by which each action must be completed.

☐ When stating the required actions, the draft TEP takes into account—

- ☐ the best practice environmental management for the activity and

  Provide brief notes about how, when stating the required actions, the draft TEP takes into account the best practice environmental management for the activity.

- ☐ the risks of environmental harm being caused by the activity.

  Provide brief notes about how, when stating the required actions, the draft TEP takes into account the risks of environmental harm being caused by the activity.

(c) Prevention and minimisation of environmental harm

☐ The draft TEP states how any environmental harm that may be caused by the activity will be prevented or minimised, including any interim measures that are to be implemented.

Briefly describe how any environmental harm that may be caused by the activity will be prevented or minimised, including any interim measures that are to be implemented.

(d) Transition to an environmental standard

☐ If an objective of the draft TEP is for the activity to transition to an environmental standard, the draft TEP states—

- ☐ details of the standard and
- ☐ how the activity is to transition to the standard before the TEP ends.

Provide details of the standard and briefly describe how the activity is to transition to the standard before the TEP ends.

OR

☐ It is not an objective of the draft TEP for the activity to transition to an environmental standard.

(e) Transition to comply with a condition of an environmental authority or code of environmental compliance, or a development condition

☐ If an objective of the draft TEP is for an activity to transition to comply with a condition of an environmental authority or code of environmental compliance, or a development condition, the draft TEP states—

- ☐ details of the condition and how the activity does not comply with it and
- ☐ how compliance will be achieved before the end of the TEP.

Provide details of the relevant condition and how the activity does not comply with it, and describe briefly how compliance will be achieved before the end of the TEP.

OR

☐ It is not an objective of the draft TEP for the activity to transition to compliance with an environmental authority, or code of environmental compliance or a development condition.

(f) Period over which TEP is to be carried out

☐ The draft TEP states the period over which the TEP is to be carried out.

State the period over which the TEP is to be carried out.

(g) Performance indicators

☐ The draft TEP states appropriate performance indicators at intervals of not more than 6 months.

Provide brief details of the performance indicators.

(h) Monitoring and reporting

☐ The draft TEP adequately provides for monitoring and reporting on compliance with the program.

Briefly describe how the draft TEP provides for monitoring and reporting on compliance with the program.

If the Department has issued a notice under s332 requiring a person to prepare and submit a draft TEP to it for approval

☐ If the draft TEP was submitted in response to a written notice issued by the Department under s322 of the Act, the draft TEP has addressed all of the requirements stated in the notice.

If the draft TEP was submitted in response to a written notice under s322, and it does not address all of the matters required to be addressed, provide details of the matters that the draft TEP does not adequately address.

OR

☐ The draft TEP was not submitted in response to a written notice issued under s322 of the Act.

Regulatory requirements (s338(1)(a))

Chapter 4, Part 1 (ss46-64) of the *Environmental Protection Regulation 2008* (the Regulation), sets out the regulatory requirements that the Department is required to comply with when making a decision whether to accept (with or without conditions) or reject a draft TEP.

☐ When deciding whether accept (with or without conditions) or reject the draft TEP, the Department has complied with all relevant regulatory requirements stipulated in ss46-64 of the Regulation.

Briefly describe the relevant sections of the Regulation that were considered and how they relate to the draft TEP.

Note that regulatory requirements may also be contained in environmental protection policies.

☐ All relevant regulatory requirements contained in environmental protection policies have been considered by the Department.

If applicable, briefly describe any regulatory requirements contained in environmental protection policies and how they relate to the draft TEP.

OR

☐ There are no applicable regulatory requirements contained in environmental protection policies.

Standard criteria (s338(1)(b)(i))

☐ The Department has considered all relevant matters in the standard criteria.

Provide brief details in the table below of each relevant standard criterion and how it relates to the Department's consideration of the draft TEP. If a particular criterion is not applicable, write 'N/A'.

Standard criterion	Details
Ecologically sustainable development	
Environmental protection policies (EPPs)	
Plans, standards or agreements	
Environmental impact study, assessment or report	
Receiving environment	
Submissions made by the applicant and submitters	
Best practice environmental management	

Financial implications	
Public interest	
Site management plan	
Environmental management systems (IEMS)	

Additional information (s338(1)(b)(ii))

☐ The Department has considered additional information (if any) given in relation to the draft TEP.

If applicable, briefly describe the additional information provided.

OR

☐ No additional information has been provided.

Views expressed at a conference (s338(1)(b)(iii))

☐ If a conference has been held in relation to the draft TEP, the Department has considered the views expressed at the conference.

If applicable, provide brief notes of the views expressed at the conference and the consideration given to those views.

OR

☐ No conference has been held.

Consistency with development conditions of a development approval (s338(2))

☐ If the draft TEP has been prepared because of a development condition of a development approval, the draft TEP is consistent with other conditions of the development approval.

If applicable, describe how the draft TEP is not consistent with the other conditions of the development approval.

OR

☐ The draft TEP has not been prepared because of a development condition of a development approval.

Public notice of submission of draft TEP (s337(2)) and substantial compliance with the Act (s342)

☐ If public notice is required to be given at the submission of the draft TEP, the Department is satisfied that the public notice has been properly given.

OR

☐ The Department is not satisfied that the required public notice has been properly given, but is satisfied that there has been substantial compliance with the Act and will accept this as compliance.

Provide brief details of how the public notice has not been properly given and why the Department is satisfied that there has been substantial compliance with the Act which it will accept as compliance.

OR

☐ Public notice is not required.

Is the Department satisfied with the draft TEP?

For the draft TEP to be approved, at least one box should be checked next to each of the above matters for consideration. If any of the matters remain unchecked, then the draft TEP can not be approved.

☐ If a box has been checked next to each requirement - Proceed to section 3.

☐ If a box has not been checked next to each requirement - Proceed to section 4.

3. Request for further information and/or amendments to a draft TEP

If the draft TEP substantially addresses all of the relevant matters listed in s331 of the Act, but cannot be approved unless further information is provided or some amendments are made, the Department may request that the person or public authority provide further information or an amended TEP. Note that if there are significant problems with the draft TEP and it will require major changes or re-writing before it can be approved, the Department should refuse to approve it.

If it is appropriate that further information or a request for amendments be made, officers should consider the following alternatives—

☐ Further information is required.

Officers are to list the further information required about the draft TEP and suspend the assessment report process while waiting for the further information to provided.

☐ Minor amendments are required.

Officers are to list the minor amendments required and suspend the assessment report process while waiting for the person to provide the amended TEP.

☐ More substantial amendments are required.

Officers are to list the more substantial amendments required and present them to the Delegate for approval.

4. Approval of the draft TEP

Prior to making a recommendation to issue a notice of decision approving the draft TEP (with or without conditions), it is important to take into account that the Act stipulates that a TEP is a program that achieves compliance with the Act for the activity to which it relates.

If the draft TEP does **not** meet the requirements of the Act it must be refused. Whilst the Act does make provision for the approval to be subject to conditions, the conditions should address relatively minor issues only. Conditions stated in a notice of decision must not be used to rectify significant issues with a draft TEP.

A notice of decision must be issued within 8 business days of making the decision to approve the TEP. If the approval is subject to conditions, the notice of decision must be an information notice.

☐ The notice of decision identifies the documents forming the approved TEP, including any amendments under section 339(1)(a)(ii).

☐ The notice of decision sets out any conditions imposed on the approval by the Department.

☐ The notice of decision states the day the approval ends.

☐ If conditions have been imposed on the approval, the notice of decision is in the form of an information notice.

If the notice is in the form of an information notice, it must include:

☐ the decision and

☐ the reasons for the decision and

☐ any available rights of internal and external review.

5. Refusal to approve a draft TEP

The draft TEP cannot be approved unless at least one checkbox has been checked beside each of the matters required to be addressed by the draft TEP. If the draft TEP does not meet all of the requirements, and any deficiencies will not be addressed by a request for further information and/or amendments to the draft TEP, then the Department should refuse to approve the draft TEP.

If the Department refuses to approve the TEP, the notice of decision must be an information notice. Consequently, the notice of decision must include:

☐ the decision and

☐ the reasons for the decision and

☐ any available rights of internal and external review.

6. Provide for natural justice

In order to provide natural justice, the Department must advise the person that submitted the draft TEP if it intends to do one of the following things—

- request further information about the draft TEP and/or
- request amendments to the draft TEP or
- refuse to approve the draft TEP.

The Department must also provide the person with the opportunity to make submissions in response to the Department's intentions.

☐ The person has been provided with the opportunity to put their side of the story forward.

Describe how this was achieved.

☐ All information provided has been considered.

Describe any information or submissions provided.

☐ The Department has considered the information.

What consideration was provided and what conclusions have the Department formed?

☐ The decision-maker and environmental officer are free from bias or the perception of bias.

6. Recommendation

The environmental officer is required to make a recommendation in relation to the draft TEP.

Recommendation:

For example, "I recommend that the draft TEP be approved OR I recommend that the draft TEP be approved with the amendments agreed in the letter to the company dated XXX OR I recommend that the draft TEP be refused.

7. Approval

Environmental officer	Supervisor
Print name:	**Print name:**
Date:	**Date:**

Delegated decision-maker	Approve / Reject recommendation (circle one)
Reasons for decision.	
Print name:	
Date:	

Request for Statutory Approval

Department of Environment and Resource Management

s337 of the *Environmental Protection Act 1994*
CONSIDERATION OF A TRANSITIONAL ENVIRONMENTAL PROGRAM (TEP)

CLIENT:	Moranbah North Coal Pty Ltd
REGISTERED OFFICE ADDRESS:	Moranbah Qld 4744
TENEMENT:	ML70108
ENV AUTHORITY NO.:	MIN100557107
FILE NO.:	EMD136
PROGRAM NOTICE/REQUIRED:	N/A
REASON FOR TEP:	**Voluntary** - Non compliance with EA conditions
DATE SUBMITTED:	1 April 2010
DECISION DUE DATE: (if approval required)	11 June 2010
TIME SPENT:	5 hours

1.0 SUMMARY

The Transitional Environmental Program was voluntarily submitted by Moranbah North Coal Pty Ltd as the site was not in compliance with EA conditions.

This TEP identifies the water management infrastructure that will be required to ensure compliance with the current approved EA (refer Section 1.3 (e)). Section G6, Table 21: Specification of regulated dams; identifies the Production Dam and Environmental Dam as having a hazard category of 'Significant'. Condition G7, Table 22: Hydraulic performance of regulated dams; stipulates that the DSA for both of these dams is to be the 0.1 AEP 3 month wet season. This figure has not however been adopted for the reason contained in the following paragraphs.

Condition G2 of the EA stipulates that 'The holder of this EA must arrange for a hazard assessment of all dams by a suitably qualified and experienced person not less frequently than on an annual basis'. A Dam Hazard Category Assessment was consequently carried out for the site and was completed in December 2009 (Henderson 2009b). A copy of this report has been included in Appendix B of the TEP. Chapter 7 and 8 of this document identify both the Production Dam and the Environmental Dam as having a 'low' hazard category.

The report has identified the DSA criterion as the 0.05 AEP 3 month wet season based on the Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland (Department of Mines and Energy, 1995).

This TEP has adopted the result of the Dam Hazard Category Assessment, as adoption was a condition of the current EA, and provides a more stringent condition. As such, the DSA adopted in the TEP is the 0.05 AEP 3 month wet season.

Advice provided to the department's regional office from the department's containment systems unit on 10 June 2010 stated that the department:

- Does **not** accept the hazard assessment of 'low' for the Production Dam and Environmental Dam – interpreted by PB from the Henderson report;
- Does accept the performance criteria set within the TEP for a significant hazard dam under DME 1995.

Has the TEP been entered in EcoTrack:	Yes
EcoTrack Compliance Reference (if applicable): -	CA20779
EcoTrack TEP Reference Number: -	MAN10137

If Approving the TEP

Has a notice approving the TEP been completed:	Yes
Has a certificate of approval been developed:	Yes
Were additional conditions set on the certificate of approval:	Yes

2.0 ADDITIONAL CONDITIONS

The following additional conditions have been attached to the Certificate of Approval.

Notification of emergencies, incidents and exceptions

1. As soon as practicable after becoming aware of any emergency or incident which results in the release of contaminants not in accordance, or reasonably expected to be not in accordance with this Transitional Environmental Program, the administering authority must be notified of the release by telephone, facsimile or email.

2. The notification of emergencies or incidents as required by condition 1 must include but not be limited to the following:
   a) the holder of the transitional environmental program;
   b) the location of the emergency or incident;
   c) the number of the transitional environmental program;
   d) the name and telephone number of the designated contact person;
   e) the time of the release;
   f) the time the holder of the environmental authority became aware of the release;
   g) the suspected cause of the release;
   h) the environmental harm caused, threatened, or suspected to be caused by the release; and
   i) actions taken to prevent any further release and mitigate any environmental harm caused by the release.

3. Not more than fourteen days following the initial notification of an emergency or incident, written advice must be provided of the information supplied in accordance with condition 1 in relation to:
   a) proposed actions to prevent a recurrence of the emergency or incident; and
   b) outcomes of actions taken at the time to prevent or minimise environmental harm.

4. As soon as practicable, but not more than six weeks following the conduct of any environmental monitoring performed in relation to the emergency or incident, which results in the release of contaminants not in accordance, or reasonably expected to be not in accordance with the conditions of this environmental authority, written advice must be provided of the results of any such monitoring performed to the administering authority.

Certification and operation

5. The holder of this transitional environmental program must not commence construction of Dam 5 unless:
   a) the holder has submitted to the administering authority two copies of a design plan, together with the certification of a suitably qualified and experienced person that the design of the regulated dam is fit for purpose, compliant in all respects with this environmental authority and in accordance with engineering best practice, and
   b) at least 28 days has passed since the submission of the design plan.

6. When construction of Dam 5 is complete the holder of this transitional environmental program must submit to the administering authority two copies of a set of 'as constructed' drawings, together with the certification by a suitably qualified and experienced person that the dam 'as constructed' is fit for purpose, compliant in all respects with this environmental authority and in accordance with engineering best practice.

Water Balance Modelling

7. The design plan for Dam 5, must include the outcomes from water balance modelling. This information must be presented graphically at a monthly and daily timestep and be able to compare the incident rainfall, runoff and environmental releases for all regulated dams.

Design Storage Allowance

8. The design storage allowance must be calculated using the deciles method, outlined in the Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland (Department of Mines and Energy, 1995).

3.0 STATUTORY REQUIREMENTS

337 Administering authority to consider draft programs

(1) The administering authority must decide whether to approve a draft transitional environmental program submitted to it within 20 business days after the application date.

The administering authority issued an extension notice under section 555 of the *Environmental Protection Act 1994*, extending the decision date for the TEP to 11 June 2010. Section 555 of the Act states that

555 Extension of decision period

(1) This section applies if the administering authority is deciding, or is required to decide—
(a) an application for or in relation to an environmental authority; or
(b) a TEP submission.

(2) If public notice is required to be given of the submission of the draft program, the administering authority must be satisfied public notice has been properly given before making a decision.

No public notice is required to accompany the TEP.

338 Criteria for deciding draft program

(1) In deciding whether to approve or refuse to approve the draft program or the conditions (if any) of the approval, the administering authority—
(a) must comply with any relevant regulatory requirement;
and

At completion of the TEP, regulated structures at the Moranbah North Coal Mine are required to be in compliance with Environmental Authority MIN100557107.

(b) subject to paragraph (a), must also consider the following—
(i) the standard criteria;

- *The principles of ecological sustainable development as set out in the 'National Strategy for Ecologically Sustainable Development'.*
- *Any applicable environmental protection policy.*
- *Any applicable Commonwealth, State or local govemment plans, standards, agreements or requirements.*
- *Any applicable environmental impact study, assessment or report.*
- *The character, resilience and values of the receiving environment.*
- *All submissions made by the applicant and submitters.*
- *The best practice environmental management for activities under any relevant instrument, or proposed instrument, as follows – a transitional environmental program.*
- *The financial implications of the requirements under an instrument, or proposed instrument, mentioned in paragraph (g) (above) as they would relate to the type of activity or industry carried out, or proposed to be carried out, under the instrument.*
- *The public interest.*
- *Any applicable site management plan.*
- *Any relevant integrated environmental management system or proposed integrated environmental management system.*
- *Any other matter prescribed under a regulation.*

The administering authority has considered the standard criteria in assessing the application.

(ii) additional information given in relation to the draft program;

The applicant supplied additional information in relation to the TEP on 3 May, 4 May and 7 May.

On 5 May 2010, the administering authority issued an information request under section 556 of the *Environmental Protection Act 1994*. On 3 June 2010 the applicant re-submitted the TEP document with the required information.

(iii) the views expressed at a conference held in relation to the draft program.

No conference was held in relation to the TEP.

(2) If the draft program is prepared because of a requirement of a development condition of a development approval, the authority may approve the draft program only if it is not inconsistent with other conditions of the approval.

The draft TEP was not required to be prepared as a requirement of a development condition of a development approval.

<u>331 Content of program</u>
A transitional environmental program must—
(a) state the objectives to be achieved and maintained under the program for an activity; and

The submitted TEP clearly states the objectives to be achieved under the program.

(b) state how the objectives are to be achieved, and a timetable to achieve the objectives, taking into account—
(i) the best practice environmental management for the activity; and

(ii) the risks of environmental harm being caused by the activity; and

Increasing the amount of Design Storage Allowance at the Moranbah North Coal Mine will allow the site to effectively manage onsite water contaminated by mining activities. The effective management of onsite water will reduce the risks of releasing contaminants to the environment and is considered to be best practice environmental management.

(c) state appropriate performance indicators at intervals of not more than 6 months; and

The TEP has stated appropriate performance indicators in section 4.1 at no more than 6 monthly intervals.

(d) make provision for monitoring and reporting compliance with the program.

The TEP makes provisions for monitoring and reporting compliance with the program to the administering authority at 4 weekly intervals.

343 Failure to approve draft program taken to be refusal
The draft TEP is recommended to be approved.

4.0 RECOMMENDATION

It is recommended that the Transitional Environmental Program titled Transitional Environmental Program for DSA Compliance, received on 1 April 2010 and revised on 3 June 2010 be approved.

[redacted]
Principal Environmental Officer
Ph – 4980 6200

Signed –

Date -

Reviewed & Endorsed By	
[redacted] Senior Environmental Officer Signed – Date:	**Delegate** [redacted] Manager - Emerald Signed – Date:

Department of Environment and Resource Management

Assessment Report

Environmental Protection Act 1994

Assessment of a transitional environmental program (TEP)

This document will assist users in critically evaluating the content of a draft TEP and make a decision to either to approve (with or without conditions) or refuse the draft TEP.

Identifying details	
Compliance activity number	CA20744
Ecotrack number	MAN12579
Permit number	MIN100557107
File number	EMD137
Applicant name	Moranbah North Coal Pty Ltd
Registered office or place of business	Mining Lease 70108
Date draft TEP received.	*22 February 2011* *Note: The department has 20 business days in which to make a decision in relation to the draft TEP.*

Note:

1. Assessment reports recommending a decision be made are to be structured in the format shown below.
2. Explanatory notes for completing the report are given under each heading.
3. The report is to be endorsed by the investigating officer, supervisory review and the delegated decision maker.

1. Brief history of the matter.

Please briefly outline any historical information relevant to this decision.

The application is to amend the Moranbah North Coal Mine's Worked Water Management TEP, originaly approved on 4 August 2010, and amended on 24 December 2010. The amendment proposes to remove the requirement to utilise water atomisers/misters to reduce the volume of water on site. Since the introduction of the water misters on 4 August 2010, Moranbah North Coal Pty Ltd has monitored the reduction of site water from their use and has found the misters to be ineffective. All other water management proposals within the TEP will remain in force.

2. Criteria and considerations in assessing the content of a draft TEP.

Will the draft TEP, if approved, achieve compliance with the *Environmental Protection Act 1994* (the Act) by reducing environmental harm or detailing the transition to an environmental standard?

☒ Yes.

☐ No.

The removal of the water misters from the TEP will not impact the TEP's ability to achieve compliance with the legislation.

Does the draft TEP clearly set out the objectives that will be achieved and maintained under the program?

☒ Yes.

☐ No.

The removal of the water misters from the TEP will not alter the TEP's objectives.

Does the draft TEP clearly set out the proposed actions to achieve the stated objectives, including the date by which each action will be completed?

☒ Yes.

☐ No.

The proposed actions remain the same with the exception of the utilisation of water misters. .

Does the draft TEP take into account best practice environmental management for the activity?

☒ Yes.

☐ No.

Note: Refer to s21 of the Act for more information about best practice environmental management.

Have all of the risks of environmental harm associated with the activity been appropriately identified and addressed by the proposed actions?

☒ Yes.

☐ No.

Note: The draft TEP should contain sufficient detail on how each risk will be prevented or minimised including what specific interim measures are to be implemented and how these will be measured.

If the draft TEP has been prepared to transition an activity to comply with a condition of a development approval or environmental authority, is each condition that has been breached addressed by the proposed actions?

☐ Yes.

☐ No.

☒ Not applicable.

Note: There should be sufficient information provided in the draft TEP to show how the activity does not comply at present and detail how compliance with the condition will be achieved by the end of the program.

If the draft TEP has been prepared to transition an activity to meet an environmental standard, has each standard been appropriately identified and addressed by the proposed actions?

- ☐ Yes.
- ☐ No.
- ☒ Not applicable.

If the draft TEP is prepared because of a requirement of a condition of a development approval or environmental authority, has the program been checked for inconsistencies with other conditions of the approval or authority?

- ☐ Yes.
- ☐ No.
- ☒ Not applicable.

Is end date of the TEP clearly stated?

- ☒ Yes.
- ☐ No.

Note: The date on which the TEP will expire should be clearly stated. Consideration should also be given to the viability of the timeframe proposed to achieve the objectives of the program.

Have appropriate performance indicators at intervals of not more than 6 months been included in the draft TEP?

- ☒ Yes.
- ☐ No.

Note: The performance indicators must be clearly defined and measurable and set out the date on which each indicator will be assessed.

Does the draft TEP provide for sufficient monitoring and reporting on compliance with the program?

- ☒ Yes.
- ☐ No.

Note: Specific details on the frequency and level of the monitoring and reporting must be provided e.g. what information should be given to the department and when.

Is the proposed monitoring sufficient to allow the company and DERM to assess progress with the TEP, and to assess compliance with the requirements of the TEP?

- ☒ Yes.
- ☐ No.

Is the draft TEP acceptable in terms of any relevant regulatory requirements?

- ☒ Yes.
- ☐ No.

Note: Regulatory requirements are set out in ss46-64 of the Environmental Protection Regulation 2008 and may also be contained in environmental protection policies.

If the answer is yes, provide brief details on which regulatory requirements were considered and why the draft TEP is acceptable how this will be achieved.

If the answer is no, provide brief details of which regulatory requirements were considered and why the draft TEP is not acceptable.

Please see previous RSA for overall considerations to approve the original TEP.

Is the draft TEP acceptable in terms of the standard criteria?

☒ Yes.

☐ No.

For each of the standard criteria, provide brief details of your assessment of the draft TEP. If a criterion is not applicable, write 'N/A'.

Standard criteria	Detailed comments
Ecologically sustainable development	The removal of the water misters meets the objectives of ecologically sustainable development. The water misters were considered ineffective in reducing the volume of water on site, however were using a lot of energy to run. By removing the use of the spray misters the power consumption required for the operation of the TEP is reduced.
Environmental protection polices (EPPs)	N/A for amendment - please see previous RSA for approval of entire TEP
Plans, standards or agreements	N/A for amendment - please see previous RSA for approval of entire TEP
Environmental impact study, assessment or report	N/A for amendment - please see previous RSA for approval of entire TEP
Receiving environment	N/A for amendment - please see previous RSA for approval of entire TEP
Submissions made by the applicant and submitters	N/A for amendment - please see previous RSA for approval of entire TEP
Best practice environmental management	N/A for amendment - please see previous RSA for approval of entire TEP
Financial implications	N/A for amendment - please see previous RSA for approval of entire TEP
Public interest	N/A for amendment - please see previous RSA for approval of entire TEP
Site management plan	N/A for amendment - please see previous RSA for approval of entire TEP
Environmental management	N/A for amendment - please see previous RSA for

systems (IEMS)	approval of entire TEP

Has all additional information given in relation to the draft TEP been considered?

☐ Yes.

☐ No.

☒ Not applicable.

If the answer is yes, provide brief notes on the information contained within the additional documents e.g. do they recommend further investigations or propose specific works that have been incorporated into the draft TEP.

If the answer is no, list reasons why.

If applicable, have any views expressed at a conference held in relation to the draft program been considered?

☐ Yes.

☐ No.

☒ Not applicable.

Are you satisfied that the draft TEP meets all of the requirements of the Act and should be approved?

If the answer to all of the above questions was "Yes" or "Not applicable", the draft TEP may be approved. If the answer to any question about was "No", the draft TEP may not be approved.

☒ Yes - Proceed to section 3.

☐ No - Proceed to section 4.

3. If you are satisfied with the draft TEP.

Prior to making a recommendation to issue a certificate of approval it is important to bear in mind that the Act stipulates that the draft TEP be a program that achieves compliance with the Act for the matters dealt within it.

If the draft TEP does **NOT** meet the requirements of the Act it must be refused. Whilst the Act does make provision for the approval to be subject to conditions, the conditions should address relatively minor issues only. Conditions on a certificate of approval must not be used to rectify significant issues with a draft TEP.

A certificate of approval must be issued within 8 business days of making the decision to approve the TEP. If the approval is subject to conditions, an information notice about the decision to impose conditions must also be provided.

Certificate of approval checklist.

☒ Does the certificate of approval identify the documents forming the approved TEP, including any amendments under s339(1)(a)?

☒ Does the certificate of approval specify any conditions imposed?

☒ Does the certificate of approval state the date the approval ends?

☒ If conditions have been added, has an information notice been drafted?

4. If administrating authority is not satisfied with the draft TEP.

If a decision is made to refuse the draft TEP, an information notice must be given to the person or public authority that submitted the program. The information notice should include:

- ☐ the reasons for the decision.
- ☐ any available rights of internal and external review.

5. Provide for natural justice.

If you are making a decision that is not the decision requested by the person or company submitting the TEP (for example, to refuse to approve the draft TEP), summarise below any submissions put forward by the person or company in favour of the draft TEP and your response to those submissions.

<List any submissions made.>

<State the reasons why you accept or reject the submissions.>

Are the decision maker and recommending officer free from bias or the perception of bias?

- ☐ Yes.
- ☐ No.

<If the answer is no, the person should not be involved in recommending or making a decision about the draft TEP.>

6. Recommendation.

The recommending officer is required to make a recommendation in relation to the draft TEP.

Recommendation:.

I recommend that the draft TEP be approved.

7. Endorsement

Recommending officer	Supervisory review
Print name: [redacted]	**Print name:** [redacted]
Date: 22 March 2011	**Date: 22 March 2011**

Delegated decision maker	Approve / Reject recommendation (circle one)
Reasons for decision.	
Print name: Christopher Loveday	
Date: 22 March 2011	

standard criteria means—

(a) the principles of ecologically sustainable development as set out in the 'National Strategy for Ecologically Sustainable Development'; and

(b) any applicable environmental protection policy; and

(c) any applicable Commonwealth, State or local government plans, standards, agreements or requirements; and

(d) any applicable environmental impact study, assessment or report; and

(e) the character, resilience and values of the receiving environment; and

(f) all submissions made by the applicant and submitters; and

(g) the best practice environmental management for activities under any relevant instrument, or proposed instrument, as follows—

(i) an environmental authority;

(ii) a transitional environmental program;

(iii) an environmental protection order;

(iv) a disposal permit;

(v) a development approval; and

(h) the financial implications of the requirements under an instrument, or proposed instrument, mentioned in paragraph (g) as they would relate to the type of activity or industry carried out, or proposed to be carried out, under the instrument; and

(i) the public interest; and

(j) any applicable site management plan; and

(k) any relevant integrated environmental management system or proposed integrated environmental management system; and

(l) any other matter prescribed under a regulation.

standard environmental conditions, for an environmental authority or a chapter 4 activity, means the standard environmental conditions approved for the authority or activity under section 549.

Part 2 Regulatory requirements for all environmental management decisions

50 Application of pt 2

This part applies to the administering authority for making any environmental management decision.

51 Matters to be considered for environmental management decisions

(1) The administering authority must, for making an environmental management decision relating to an activity, consider the following matters—

(a) each of the following under any relevant environmental protection policies—

(i) the management hierarchy;

(ii) environmental values;

(iii) quality objectives;

(iv) the management intent;

(aa) environmental values declared under this regulation;

(b) the characteristics of the contaminants or materials released from carrying out the activity;

(c) the nature and management of, including the use and availability of technology relating to, the processes being, or to be, used in carrying out the activity;

(d) the impact of the release of contaminants or materials from carrying out the activity on the receiving environment, including the cumulative impact of the release with other known releases of contaminants, materials or wastes;

(e) the characteristics of the receiving environment and the potential impact on it from carrying out the activity;

(f) for each affected person for the activity—the order of occupancy or use between the person carrying out the activity and the affected person;

(g) the remaining capacity of the receiving environment to accept contaminants or wastes released from future activities while protecting environmental values;

(h) the quantity and type of greenhouse gases released, and the measures proposed to demonstrate the release is minimised using best practice methods that include strategies for continuous improvement.

(2) In this section—

affected person, for an activity, means a person affected, or who may be affected, by the release of a contaminant or waste from carrying out the activity.

52 Conditions to be considered for environmental management decisions

(1) The administering authority must, for making an environmental management decision relating to an activity, consider whether to impose conditions about the following matters—

(a) implementing a system for managing risks to the environment;

(b) implementing measures for avoiding or minimising the release of contaminants or waste;

(c) ensuring an adequate distance between any sensitive receptors and the relevant site for the activity to which the decision relates;

Examples of a condition for paragraph (c)—

a condition requiring riparian buffers, noise buffers or buffers for protecting endangered regional ecosystems

(d) limiting or reducing the size of the initial mixing zone or attenuation zone, if any, that may be affected by the release of contaminants;

(e) treating contaminants before they are released;

(f) restricting the type, quality, quantity, concentration or characteristics of contaminants that can be released;

(g) the way in which contaminants may be released;

Examples of a condition for paragraph (g)—

- a condition restricting the release of a contaminant at a particular temperature, velocity or rate or during particular meteorological conditions or water flows
- a condition restricting the release of a contaminant to a depth below the level of surface waters

(h) ensuring a minimum degree of dispersion happens when a contaminant is released;

Example of a condition for paragraph (h)—

a condition requiring the use of a diffuser for releasing a contaminant

(i) protecting environmental values, and meeting quality objectives, under relevant environmental protection policies;

(j) recycling, storing, transferring or disposing of waste in a particular way;

(k) rehabilitating land to achieve particular outcomes;

(l) measures for the ongoing protection of environmental values that are, or may be, adversely affected by the activity.

(2) In this section—

attenuation zone means the area around a release of contaminants to groundwater in which the concentration of the contaminants in the release is reduced to ambient levels through physico-chemical and microbiological processes.

sensitive receptor means a sensitive receptor under any relevant environmental protection policies.

53 Matters to be considered for decisions imposing monitoring conditions

(1) The administering authority must, for making an environmental management decision relating to an activity, consider whether to impose monitoring conditions about the release of contaminants from the activity on the receiving environment.

(2) For considering whether to impose a monitoring condition, the administering authority must consider the following matters—

(a) the potential impact on the receiving environment of—

(i) the activity to which the decision relates; and

(ii) the release of the contaminant;

(b) the characteristics of the contaminant;

(c) the potential for a control measure to fail and the effect of a failure of a control measure on the receiving environment;

(d) the protocols relevant to monitoring the release of the contaminant;

(e) whether the monitoring should be continuous or intermittent.

(3) In this section—

monitoring condition, about the release of contaminants from an activity on the receiving environment, means a condition about any of the following matters—

(a) monitoring the quantity, quality, characteristics, timing and variability of the release;

(b) monitoring indicators of the effective operation of control measures;

(c) monitoring the characteristics of the receiving environment;

(d) assessing the effectiveness of remedial or rehabilitation measures;

(e) monitoring the impact of the release on the values, objectives and biota in the receiving environment;

(f) analysing monitoring data against objectives and standards including, for example, by predictive modelling;

(g) reporting the results of monitoring in a stated form and timeframe;

(h) reporting on the time and way in which the release is made to the receiving environment.

Part 3 Additional regulatory requirements for particular environmental management decisions

54 Application of pt 3

If an environmental management decision relates to an activity mentioned in a provision in this part, the administering authority making the decision must comply with the provision in addition to part 2.

55 Release of water or waste to land

(1) This section applies to the administering authority for making an environmental management decision relating to an activity that involves, or may involve, the release of water or waste to land (the *relevant land*).

(2) The administering authority must consider the following matters—

(a) the topography, including the flooding potential of the relevant land;

(b) the climatic conditions affecting the relevant land;

(c) the available land on which the water or waste can be released;

(d) the storage of the water or waste in wet weather;

Example—

storage of water or waste in ponds or tanks

(e) the way in which the water or waste will be released to the relevant land;

(f) the need to protect soil and plants on the relevant land from damage;

(g) the potential for infiltration of the water or waste to groundwater;

(h) the potential for generation of aerosols or odours from the water or waste;

(i) the impact of any transfer or run-off of contaminants from the relevant land to surface waters;

(j) the ongoing availability of the land for the release of the water or waste.

(3) The administering authority must also consider whether to impose conditions about each of the following matters—

(a) developing and implementing a land release management plan for the relevant area that protects the environmental values affected, or that may be affected, by the activity;

(b) the way in which, or rate at which, the water or waste may be released;

(c) releasing the water or waste in a way that minimises infiltration to groundwater;

(d) if the water or waste is to be transferred to another entity—the circumstances under which the transfer may occur;

(e) releasing the water to a bio-retention system, including, for example, a constructed wetland, for the removal of nutrients from the water.

(4) In this section—

land release management plan, for the relevant area, means a plan that achieves the following outcomes for the area—

(a) the efficient application of water or waste using best practice methods;

(b) control of sodicity in the soil;

(c) minimal degradation of soil structure;

(d) control of the build-up, from water, waste or other sources, of nutrients and contaminants in the soil and subsoil;

(e) prevention of subterranean flows of contaminants to waters;

(f) prevention of impact of infiltration on groundwater resources;

(g) prevention of run-off by controlling the rate of application of water or waste, and by using structures, including, for example, tailwater dams;

(h) prevention of surface ponding;

(i) prevention of spraydrift or overspray from the relevant area;

(j) prevention of damage to native vegetation;

(k) reporting the results of monitoring, and an assessment of the impact on the groundwater in the relevant area of the release of the water or waste.

56 Release of water, other than stormwater, to surface water

(1) This section applies to the administering authority for making an environmental management decision relating to an activity that involves, or may involve, the release of water, other than stormwater, to surface water.

(2) The administering authority must consider each of the following matters—

(a) any available toxicity data relevant to the release and the receiving environment;

(b) if there is an initial mixing zone—

(i) whether there is any practicable alternative that would reduce or eliminate the initial mixing zone; and

(ii) whether the size of the initial mixing zone is likely to adversely affect an environmental value or the ecological condition of the receiving environment, including, for example, a watercourse or wetland; and

(iii) whether concentrations of contaminants in the initial mixing zone are acutely toxic to the biota.

(3) The administering authority must also consider whether to impose conditions about the following matters—

(a) releasing the water to tidal waters only during particular tidal conditions, including, for example, phases of the tide;

(b) releasing the water to non-tidal waters only if the rate of flow of the surface water is greater than a particular level.

57 Release of stormwater

(1) This section applies to the administering authority for making an environmental management decision relating to an activity

that involves, or may involve, the release of stormwater to the receiving environment.

(2) The administering authority must consider the following matters—

(a) the topography of, and climatic conditions affecting, the receiving environment;

(b) if the activity involves exposing or disturbing soil—the soil type, its characteristics and the way it is managed;

(c) if the activity involves the storage of materials or wastes that are exposed to rainfall or stormwater run-off—the characteristics and containment of the material or waste;

(3) The administering authority must also consider whether to impose conditions about the following matters—

(a) diverting upstream stormwater run-off away from the area contaminated or disturbed by the activity (the *affected area*);

(b) minimising the size of the affected area;

(c) covering, paving, roofing and cleaning the affected area;

(d) cleaning the affected area without using water;

(e) analysing and managing soil;

(f) installing and maintaining appropriate control measures;

Examples of control measures—

bio-retention system, buffers for improving waste water quality, first flush stormwater diversion systems, oil separators, rubbish traps, sediment fences, sediment traps

(g) treating the affected area.

Examples—

mulching, revegetating, using surface covers or soil agglomerants

58 Release of water or waste to particular wetlands for treatment

(1) This section applies to the administering authority for making an environmental management decision relating to an activity that involves, or may involve, the release of water or waste to a referable wetland or a significant coastal wetland for treatment.

(2) The administering authority must refuse to grant the application if the authority considers that, because of the activity—

(a) the wetland will be destroyed or reduced in size; or

(b) the biological integrity of the wetland may not be maintained.

(3) In this section—

referable wetland means an area shown as a wetland on a document called 'Map of referable wetlands' made available by the chief executive.

Editor's note—

On the day this regulation was notified in the gazette, the document was available on the department's website.

significant coastal wetland has the same meaning as in the State coastal management plan.

State coastal management plan means the State coastal management plan prepared under the *Coastal Protection and Management Act 1995*.

Editor's note—

On the day this regulation was notified, the State coastal management plan was published on the department's website.

59 Activity involving berthing, docking or mooring a boat

(1) This section applies to the administering authority for making an environmental management decision relating to an activity

that involves, or may involve, berthing, docking or mooring a boat.

(2) The administering authority must consider the following matters—

(a) the availability of facilities for collecting and disposing of wastes generated from the boat;

(b) whether to impose a condition to provide facilities for collecting and disposing of wastes generated from the boat.

Examples of waste generated from a boat—

bilge waste, garbage, sewage

60 Activity involving storing or moving bulk material

(1) This section applies to the administering authority for making an environmental management decision relating to an activity that involves, or may involve, storing or moving bulk material.

Examples of bulk material—

alumina, cement, coal, grain, metaliferous ores, quarried materials, woodchips

(2) The administering authority must consider each of the following matters—

(a) the chemical and physical characteristics of the material;

(b) the way in which the material is, or is to be, contained during each stage of the storage or movement of the material;

(c) the methods of cleaning up any spillage during movement of the material;

(d) if storage or movement of the material is likely to result in the release of part of the material into waters, the impact of the accumulation of the material on the bed of the waters.

(3) The administering authority must also consider whether to impose conditions about the following matters—

(a) installing and maintaining appropriate control measures;

Examples—

- installing devices for collecting dust at places where bulk material is being moved
- installing dust collectors at transfer points
- enclosing, roofing or screening equipment used for storing or moving bulk material

(b) managing stockpiles of the material in a particular way;

Example—

setting a maximum height for a stockpile

(c) collecting, removing or disposing of spillage released while moving the material;

(d) monitoring the impact of releases of contaminants or waste from storing or moving bulk materials on the receiving environment including, for example, the impact of environmental nuisance and impacts on the biota of adjacent waters.

61 Activity involving acid sulfate soil

(1) This section applies to the administering authority for making an environmental management decision relating to an activity that involves, or may involve, disturbance of acid sulfate soil.

(2) The administering authority must consider—

(a) 'State Planning Policy 2/02—Planning and Managing Development Involving Acid Sulfate Soils' (***SPP 2/02***); and

(b) the guideline for SPP 2/02 (the ***guideline***).

Note—

The guideline states that it may be used as a source of general advice on investigation and management of acid sulfate soils for situations outside the scope of SPP 2/02.

Editor's note—

On the day this regulation was notified, SPP 2/02 and the guideline were available on the website of the Department of Infrastructure and Planning at <www.dip.qld.gov.au>.

(3) The administering authority must also consider whether to impose conditions about the following matters—

(a) minimising the generation of contaminated water;

(b) treating acid sulfate soils;

(c) treating or disposing of leachate and run-off;

(d) managing the fluctuations in the watertable;

(e) maintaining minimum levels of cover over any buried acid sulfate soils.

(4) In this section—

acid sulfate soil means actual acid sulfate soil or potential acid sulfate soil.

actual acid sulfate soil means soil or sediment containing highly acidic soil horizons or layers affected by the oxidation of iron sulfides.

disturbance, of acid sulfate soil, means disturbance of the soil by—

(a) excavating or removing the soil; or

(b) exposing the soil to air; or

(c) changing the level of groundwater.

potential acid sulfate soil means soil or sediment containing iron sulfides or other sulfidic material that has not been exposed to air and oxidised.

62 Activity involving acid-producing rock

(1) This section applies to the administering authority for making an environmental management decision relating to an activity

that involves, or may involve, disturbance of acid-producing rock.

Example of an activity involving disturbance of acid-producing rock—

tailings from processing acid-producing rock in a mining operation

(2) The administering authority must consider the following matters—

(a) the physical and chemical characteristics of the rock;

(b) the potential of the rock to generate or neutralise acidity;

(c) the characteristics of the leachate leaching from, or potentially leaching from, the rock including, in particular, contaminants in the leachate that are likely to cause environmental harm if released to the environment.

(3) The administering authority must also consider whether to impose conditions about the following matters—

(a) the ways in which waste may be disposed of or stored, including for example, the location of areas for waste disposal or storage;

(b) minimising the ingress of oxygen or water to areas used, or to be used, for waste disposal or storage;

(c) inhibiting the generation of acidity from waste rock, including for example, through using particular treatments;

(d) processes for collecting, storing and treating any generated leachate;

(e) monitoring of the waste disposal and storage areas including, for example, the water balance and oxygen levels;

(f) monitoring the potential seepage zone for indications of the formation of acid rock drainage.

(4) In this section—

acid-producing rock means rock containing sulfidic minerals that have the potential to oxidise and generate acidity.

disturbance, of acid-generating rock, means disturbance of the rock by—

(a) excavating or removing the rock; or

(b) exposing the rock to air; or

(c) changing the level of groundwater.

63 Activity involving direct release of waste to groundwater

(1) This section applies to the administering authority for making an environmental management decision relating to an activity that involves, or may involve, the release of waste directly to groundwater (the ***receiving groundwater***).

Example of direct release of waste to groundwater—

an activity involving the release of contaminated water to groundwater through a well, deep-well injection or a bore

(2) The administering authority must refuse to grant the application if the authority considers—

(a) for an application other than an application relating to an environmental authority for a petroleum activity—the waste is not being, or may not be, released entirely within a confined aquifer; or

(b) the release of the waste is affecting adversely, or may affect adversely, a surface ecological system; or

(c) the waste is likely to result in a deterioration in the environmental values of the receiving groundwater.

(3) In this section—

confined aquifer means an aquifer that is contained entirely within impermeable strata.

64 Activity involving indirect release of contaminants to groundwater

(1) This section applies to the administering authority for making an environmental management decision relating to an activity that involves, or may involve, the release of contaminants indirectly to groundwater (the ***receiving groundwater***).

Example of indirect release of waste to groundwater—

storage of contaminated water in a pond allowing infiltration of contaminated water to groundwater

(2) The administering authority must consider the following matters—

(a) the geological stability of the relevant site for the activity;

(b) the location, quality and use, or potential use, of the receiving groundwater;

(c) the permeability of the earth under the place where the activity is carried out;

(d) the presence of containment devices at the relevant site for the activity and their effectiveness in preventing or minimising the release of the waste;

Example of a containment device—

a liner for a storage pond

(e) the distance separating the receiving groundwater from any containment device;

(f) the potential for fluctuations in the level of the receiving groundwater;

(g) the way in which materials, including contaminants, will be removed from the containment system;

(h) whether or not materials, including contaminants, will be removed from the containment devices and if so, the effectiveness of the methods that will be used for the removal.

(3) The administering authority must also consider whether to impose conditions about the following matters—

(a) the design, construction, function, protection and maintenance of containment devices;

(b) maintaining a particular distance between the receiving groundwater and the point of contact between each containment device and the underlying earth;

(c) removing materials from the containment devices.

From: [redacted]
Sent: Wednesday, 24 November 2010 1:01 PM
To: [redacted]
Cc:
Subject: Notification
Hello [redacted]

As discussed on the phone earlier today, Moranbah North has continued to discharge mine-affected water from the Environmental Dam spillway as per the notification provided to you in writing on 20 November.

Today the flow rate in the Isaac River decreased to below the required $5m^3$/sec limit specified within the site Environmental Authority.
Until this point, the contribution of the discharge to the flow rate of the Isaac River ranged between 0.6-2.1% of the daily flow in the Isaac River.
At no time did the contaminant release flow rate exceed 20% of the receiving water flow rate.

Sampling at the compliance point for TEP MAN10140 shows compliance against release limits specified within the Moranbah North TEP for Worked Water.
Field results for Electrical Conductivity and pH are shown in the table below.

Field testing of TEP compliance point;

	EC	pH
20/11/10	580	7.45
21/11/10	690	8.16
22/11/10	640	7.88
23/11/10	520	8.27
24/11/10	410	8.22

The volume released as a consequence of the recent rainfall periods has been managed to a significant extent by moving to minimise discharge.
If no further rainfall occurs discharge will cease in the near future.

An inspection of the discharge volume will be performed this afternoon, and again tomorrow morning.
I will provide you with an update on the discharge once these inspections have been completed.

If the river height continues to drop, Moranbah North has the ability to dilute its discharge water quality through mixing the mine affected water with fresh runoff contained within the Stilling Basin.
Sample results from the Stilling Basin today show an Electrical Conductivity of $230us/cm^2$ and pH of 7.93.

A decision whether to dilute with water from the Stilling Basin will be discussed with yourself prior to any action being taken.

Please call if you have any further questions.

Regards
[redacted]

[redacted]
Environment Superintendent

Anglo American Metallurgical Coal P/L
Moranbah North Mine
1164 Goonyella Road
GPO Box 172 Moranbah QLD 4744

Ph: [redacted]
Mobile: [redacted]
Fax: [redacted]
Email: [redacted]

Our mission is to create value from coal responsibly.

File/Ref EMD137; MAN10140

3 December 2010

Health, Safety and Environment Superintendent
North Coal Mine
Qld 4744

Attention: (Environment Superintendent)

Dear

Warning letter for non compliance

As you are aware, the Department of Environment and Resource Management (the department) has been investigating an incident in which contaminants were released from the Environment Dam release point between 24 November 2010 and 26 November 2010 not in accordance with the Worked Water Management Transitional Environmental Program (TEP) and certificate of approval MAN10140 approved on 4 August 2010.

Notification supplied by Moranbah North Coal Pty Ltd identified that the mine affected water being released from the Environmental Dam spillway into Service Area Creek was occurring when the natural flow in the Isaac River was lower than $5m^3$/second. The TEP, for which Moranbah North Coal Pty Ltd is the holder, requires the Isaac River to maintain a natural flow rate of $5m^3$/second to undertake the release of mine affected water from the spillway of the Environment Dam. This release is a contravention of the proposed actions contained in page 17 of the approved TEP.

I draw your attention to Section 432 of the *Environmental Protection Act 1994* (the Act) that states that it is an offence for the holder of an approved TEP to contravene the program. A copy of this section is enclosed for your information.

The department has a responsibility to respond to any non-compliance with legislative requirements. In the event of a non-compliance with the legislation and the environmental performance standards, the department has the ability to use a number of enforcement measures. In this instance the department has exercised its discretion to provide a written warning for the offence.

Department of Environment and Resource Management
99 Hospital Road
PO Box 19
Emerald Qld 4720
Telephone 07 4980 6200
Facsimile 07 4982 2568
Website www.derm.qld.gov.au
ABN 46 640 294 485

You are reminded that section 319 of the Act, which sets out the general environmental duty, requires anyone who carries out an activity that causes or is likely to cause environmental harm to take all reasonable and practicable measures to prevent or minimise the harm. In that regard, you are encouraged to actively identify all of the environmental risks associated with the activities conducted on the site on an ongoing basis, and to implement strategies to effectively address them.

Should the department obtain evidence indicating that the alleged offence is more serious than first thought, the department may consider taking further action under the Act's provisions.

If you have any questions regarding the content of this letter please phone [redacted] Principal Environmental Officer on phone [redacted]

Yours sincerely

Chris Loveday
Manager (Environmental Services – Mining)
Central West Region

432 Contravention of program

(1) The holder of an approval of a transitional environmental program, or a person acting under a transitional environmental program, must not wilfully contravene the program.

Maximum penalty—1665 penalty units or 2 years imprisonment.

(2) The holder of an approval of a transitional environmental program, or a person acting under a transitional environmental program, must not contravene the program.

Maximum penalty—835 penalty units.

(3) In a proceeding for an offence against subsection (1), if the court is not satisfied the defendant is guilty of the offence charged but is satisfied the defendant is guilty of an offence against subsection (2), the court may find the defendant guilty of the offence against subsection (2).

File/Ref EMD137; CA21980

28 January 2011

Health, Safety and Environment Superintendent
rth Coal Mine
d 4744

Attention: (Environment Superintendent)

Dear

Warning Notice: 000800

The Department of Environment and Resource Management (the department) refers to the investigation of an incident in which water was released from Dam 4 into the Isaac River between 3:00AM 22 December 2010 to 4:30PM 23 December 2010 which is not in accordance with the Emergency Direction (ED) issued 20 December 2010.

Notification supplied by Moranbah North Coal Pty Ltd identified that the mine affected water was being released from Dam 4 to the Isaac River when flow rates in the Isaac River were below 39m^3/sec. The release of water after flow rates fell below 39m^3/sec is a contravention of the Emergency Direction condition 6:

> *The release of contaminants to waters must only take place during periods of natural flow events specified as minimum flow in Table 4 for the contaminant release point(s) specified in Table 2.*

Table 4 – Contaminant Release during flow events

Receiving waters	***Release Point (ED RP)***	***Gauging station description***	***Longitude (GDA94)***	***Latitude (GDA94)***	***Minimum flow in receiving required for a release event***	***Flow recording frequency***
Isaac River	*ED RP1*	*Issac River @ Goonyella Site ID: 130414A*			*= > 39m^3/sec*	*Continuous (minimum daily)*

I draw your attention to section 479 of the *Environmental Protection Act 1994* (the Act) which states that it is an offence for the holder of an emergency direction to contravene the program. A copy of this section is enclosed for your information.

Department of Environment and Resource Management
99 Hospital Road
PO Box 19
Emerald Qld 4720
Telephone 07 4980 6200
Facsimile 07 4982 2568
Website www.derm.qld.gov.au
ABN 46 640 294 485

The department has a responsibility to respond to any non-compliance with legislative requirements. In the event of a non-compliance with the legislation and the environmental performance standards, the department has the ability to use a number of enforcement measures. In this instance the department has exercised its discretion to provide a warning notice for the offence.

You are reminded that section 319 of the Act, which sets out the general environmental duty, requires anyone who carries out an activity that causes or is likely to cause environmental harm to take all reasonable and practicable measures to prevent or minimise the harm. In that regard, you are encouraged to actively identify all of the environmental risks associated with the activities conducted on the site on an ongoing basis, and to implement strategies to effectively address them.

Should the department obtain evidence indicating that the alleged offence is more serious than first thought, the department may consider taking further action under the Act's provisions.

If you have any questions regarding the content of this letter please phone [redacted] Senior Environmental Officer on phone [redacted].

Yours sincerely

Christopher Loveday
Manager (Environmental Services – Mining)
Central West Region

479 Offences in relation to release of contaminant in emergency

A person to whom an emergency direction is given must –

(a) comply with the direction (including a condition of the direction), unless the person has a reasonable excuse for not complying with it; and

(b) take all reasonable and practicable precautions to prevent or minimise –

i. environmental harm being caused; and

ii. the risk of death of injury to humans and animals; and

iii. loss or damage to property

Maximum penalty – 100 penalty units.

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

Warning notice

Recipient's copy

No. 000800

To: Moranbah North Coal Pty Ltd

Residential or company address: [redacted] Qld 4744

Date of EPA inspection and/or observation: 23 December 2010

Location: (of event or concern) Moranbah North Coal Mine – Mining Lease 70108

Details of EPA concerns: Contravention of Section 479 of the Environmental Protection Act 1994. Moranbah North Coal Pty Ltd discharged mine affected water from Dam 4 between 3:30AM 22 December 2010 to 4:30PM 23 December 2010 which is not consistent with the Emergency Direction issued on 20 December 2010.

The relevant law to which this concern relates:

(tick where applicable)

- ☑ Environmental Protection Act 1994
- ☐ Nature Conservation Act 1992
- ☐ Recreation Areas Management Act 1988
- ☐ Marine Parks Act 1982
- ☐ Forestry Act 1959
- ☐ Other (specify) _____

Purpose of this Notice

This notice formally notifies you that:

a) It is your responsibility to ensure that you comply with the law.

b) ☐ (tick if applicable) The EPA will carry out a further inspection on or after _____

c) If, on a subsequent inspection, EPA records show that you have previously been warned about the matters referred to above and you have not addressed these matters, you should expect that formal compliance action will be taken without further notice. Legislation provides the EPA with a range of compliance tools including on-the-spot fines, prosecution, statutory orders and injunctions.

d) This notice may be withdrawn and formal compliance action pursued if it is shown that this matter is more serious than first thought.

Issuing officer's details (print)

name [redacted] signature [redacted] date: 28.01.2011

Any inquiries regarding this notice should be directed to:

position and/or office [redacted] telephone [redacted]

EM657 July 09

Department of Environment and Resource Management

Procedural guide

Environmental Protection Act 1994
Transitional environmental program (TEP)

Part 1 – Notice requiring a draft TEP

This document is designed to assist Environmental Services officers to issue a notice requiring a draft TEP under the provisions of Chapter 7, Part 3 of the Environmental Protection Act 1994.

What is a TEP?

Section 330 of the *Environmental Protection Act 1994* (the Act) provides that a transitional environmental program (TEP) is a specific program which, when complied with, facilitates compliance with the Act for the activity to which the TEP relates by doing one or more of the following—

- reducing environmental harm caused by the activity
- detailing the transition of the activity to an environmental standard
- detailing the transition of the activity to comply with:
  - a condition (including a standard environmental condition) of an environmental authority or code of environmental compliance or
  - a development condition.

The legislative provisions in respect to TEPs can be found in Chapter 7, Parts 3 and 4 (ss330-357) of the Act.

Who can enter into a TEP?

A person or public authority may enter into a TEP voluntarily or may be required to submit a draft TEP by the Department.

When can a TEP be used?

TEPs are intended to be used where a significant change or changes are needed to be made by a person to achieve compliance. One of the reasons for this is that a person has some protection from prosecution for actions conducted under the TEP for the duration of the TEP.

(a) Requirement to submit a draft TEP

There are certain circumstances when the Department may require a person or public authority to prepare and submit for approval a draft TEP. These circumstances are set out in Section 332 of the Act.

(b) Voluntary TEP

Section 333 of the Act provides that a person or public authority may also, at any time, submit a draft TEP to the Department for an activity the person or public authority is carrying out or proposes to carry out.

Department of Environment and Resource Management
www.derm.qld.gov.au ABN 46 640 294 485

(c) Program notices

A person intending to prepare and submit a voluntary TEP may give the Department a program notice under s350 of the Act. For further information in regard to program notices, see: Procedural Guide - Program notices TEP

(d) Fee for consideration of draft TEP

A person or public authority that submits a draft TEP to the Department for consideration and approval must pay the Department the fee prescribed by regulation. See: Operational policy - Transitional Environmental Program (TEP) fees

An invoice for the fees incurred should be issued to the person or public authority that has submitted the draft TEP for approval at the time when the notice stating the Department's decision is issued.

How do I successfully issue a notice requiring a draft TEP?

Officers must complete an assessment report to document the decision to issue a notice requiring a draft TEP, as well as completing the notice.

Step 1 - Complete the Assessment Report

Before completing the notice requiring a draft TEP, officers must complete an assessment report. The assessment report sets out the facts and circumstances relating to the matter and documents the decision-making process of the Department in determining whether or not to issue the notice.

The following sections of the procedural guide are a guide to completing the assessment report. The numbering and headings of the sections in the procedural guide correlate with those in the assessment report for ease of reference.

The assessment report is not intended to replicate the Departmental file. Rather it should capture all critical aspects considered by the Department in making a decision. Accordingly, officers should include relevant points only. A template assessment report may be found on the Compliance Support Materials page on the Departmental intranet.

1. Brief history of the matter

Briefly outline any historical information relevant to the decision. This information should be presented in succinct chronological dot points and include how the Department became aware of the issues that led the Department to consider issuing a notice requiring a draft TEP.

For example:

- *Previous compliance inspections have identified risks with stormwater controls and management on the site (CA123 – Ecotrack – May 2008) (CA456 – Ecotrack – May 2009).*
- *The operator made significant investments in stormwater management infrastructure in 2002, however the business has grown substantially since this period with no changes to stormwater management.*
- *Discussions with the operator during a compliance inspection on 10 May 2010 indicated an acceptance of the need to investigate and pursue further stormwater management improvements and included a discussion of the potential submission of a draft TEP.*

- *The Department wrote to the operator on 1 June 2010 to advise of the outcomes of the May compliance inspection.*
- *The Department received an Annual Return Form from the operator attaching stormwater release monitoring results demonstrating non-compliance with development approval conditions C11 and C12.*
- *The Department issued a notice requiring a draft TEP to another timber preservation/treatment operator in the region for non-compliance with development approval conditions associated with stormwater management issues.*

2. Grounds for issuing a notice requiring a draft TEP

The legislation provides in Section 332 that the Department may require the submission of a draft TEP—

- as a condition of an environmental authority or
- as a development condition of a development approval.

The Department may also require the preparation and submission of a draft TEP if satisfied that—

- an activity carried out, or proposed to be carried out by the person or authority is causing, or may cause unlawful environmental harm or
- it is not practicable for the person or public authority to comply with an environmental protection policy or regulation on its commencement or
- a condition of an environmental authority held by the person or public authority is, or has been, contravened or
- a standard environmental condition of a code of environmental compliance for a chapter 4 activity is, or has been, contravened by the person or public authority or
- a development condition of a development approval is, or has been, contravened and the person or public authority is:
  - an owner of the land for which the approval is granted or
  - another person in whom the benefit of the approval vests.

In this section, an officer must identify the relevant grounds upon which the decision to issue the notice requiring a draft TEP is based. For example:

A timber preservation/treatment operator is required under development approval conditions to ensure that stormwater released from the site meets specific limits. A compliance inspection was undertaken on the site that identified some issues with stormwater controls and management. Following the inspection, a letter was sent by the Department to the operator advising of the outcomes of the inspection and reminding the operator of its responsibilities. The operator submitted monitoring results indicating that on occasion, stormwater was released from the site in breach of the release limits.

A notice requiring a draft TEP was issued to the operator based on the following grounds:

1. *that an activity carried out, or proposed to be carried out, by the person is causing, or may cause, environmental harm and/or*
2. *that a development condition of a development approval is, or has been, contravened and the person is an owner of the land for which the approval is granted.*

3. Expand upon the grounds

The purpose of this section is to clearly identify the elements, or what the Department must 'prove' before deciding to use a notice requiring a draft TEP, and should be used to expand upon the grounds which have previously been identified. This can include identifying the specific offence or breach under investigation or any statutory requirements listed in the legislation which must be met by the Department prior to issuing the notice.

In instances where one action has resulted in multiple breaches, each breach should be listed independently. For example, a site inspection could potentially detect a number of breached conditions associated with a single development approval. In this situation each breach would need to be proven on its own merits and should be listed separately.

Each ground (including breaches or requirements) should be allocated a separate number.

4. Detail the matters considered

The purpose of the table in the assessment report is to link the elements of the breach to the evidence gathered and the conclusions formed. This is achieved by identifying:

- the elements of any specific breach or allegation
- the evidence which has been considered for each element and
- the conclusion that has been reached by the officer after considering the information sourced.

When documenting the evidence, officers should limit the information to relevant points only. This can include (but is not limited to):

- notes recorded in an officer's official notebook
- samples collected for analysis and any subsequent lab reports
- photographs and copies of documents and
- any observed actions and direct testimony received from individuals.

The last column in the table requires officers to detail the relevant facts and circumstances. Officers are encouraged to consider the accuracy and relevance of available evidence, historical details, professional expertise and the weight attributed to any direct testimony provided.

After considering the details, evidence, facts and circumstances, officers are required to set out how the TEP would deal with the issues.

5. Provide for Natural Justice

Prior to the Department making a decision which may adversely impact on an individual or group it must:

- **Notify** - Notify the individual that the Department is considering issuing a notice requiring a draft TEP
- **Respond** - Provide the individual with an opportunity to respond to the allegation and
- **Consider** - Consider any representations made by the affected person before finalising the decision.

The seriousness of the matter will dictate the process by which natural justice is provided and is likely to vary from case to case. Accordingly, officers should use their discretion in determining how to best ensure natural justice is afforded and the amount of time provided to the affected person to respond. In some circumstances it may be appropriate for an officer to discuss the above information with the affected person during a site

inspection or a telephone interview and to take contemporaneous notes. In more serious circumstances a written notification which includes a specific closing date for submissions should be used.

Regardless of the manner in which natural justice is afforded, any information provided by the affected person is to be documented. The summary of information should include how natural justice was provided as well as any responses given by the affected person. For example:

Following each of the compliance inspections, the Department wrote to the site operator advising of the outcomes of the inspections and the risks identified with stormwater management on the site:

- *CA123 – May 2008*
- *CA456 – May 2009*
- *CA780 – May 2010*

On-site discussions with the operator during the May 2010 compliance inspection indicated an acceptance of the need to investigate and pursue further stormwater management improvements and included commitments to consider drafting a voluntary TEP.

Since the May 2010 compliance inspection the Department has had further discussions with the operator, raising the implications of the exceedances of the release limits observed in the stormwater quality monitoring results for the last 12 months. The operator was also informed that the Department's intention was to issue a notice requiring a draft TEP and given a period of five business days to submit any further information for consideration by the Department. The operator did not submit any formal submissions to the Department but has advised by telephone of an intention to engage a suitably qualified consultant to assist with drafting a plan of action for site upgrades.

6. Proposed requirements of the TEP

Officers are required to include the following things (amongst other things as set out in s332(4)) in the notice requiring a draft TEP—

- the matters to be addressed by the program and
- the period over which the program is to be carried out and
- the day (at least a reasonable period after the notice is given) by which the program must be prepared and submitted to the Department.

In instances where it is recommended that requirements are imposed upon the affected person, officers are required to develop proposed requirements for consideration by the delegate. As affected persons are able to seek a review of the Department's decision to impose one or more conditions/requirements, it is necessary for officers to provide justification for their inclusion.

Requirements must be specific, measureable, achievable, relevant to the activity and time-specific. For further information, refer to the Procedural Guide - Writing effective and enforceable conditions. For example:

Proposed requirement	**Justification**
The draft TEP must include a stormwater management plan in order to cease all unlawful releases of stormwater from the site on or before 30 November 2011 and be submitted to DERM by 1 July 2011.	*The development of a stormwater management plan is considered to be best practice and is a requirement which is currently being met at other ABC Pty Ltd development sites in Queensland.* *Compliance inspections conducted in May 2008, 2009*

The stormwater management plan must include the following— 1. *An assessment of the existing site infrastructure, including but not limited to:* *(a) a determination of the effectiveness of existing stormwater infrastructure in controlling stormwater runoff and capturing contaminants to prevent or minimise the release of contaminants to waters and* *(b) a determination of the effectiveness of existing containment facilities associated with the storage, transport and production of materials in minimising the release of contaminants to the stormwater system and* *(c) a determination of the effectiveness of current management practices and procedures regarding the minimisation of stormwater contamination.* 2. *An identification of measures to improve stormwater management on site, which must:* *(a) assess the adequacy of existing pollution control measures and* *(b) identify opportunities to reduce areas of surface contamination and minimise contact of stormwater with contaminants and* *(c) identify opportunities to separate the clean and contaminated stormwater catchments and* *(d) identify opportunities for harvesting clean stormwater for beneficial reuse and* *(e) identify the infrastructure (including its appropriate structural design) required to effectively manage stormwater in each of the stormwater catchments.* 3. *A program of activities to construct measures to improve stormwater management on the site, including but not limited to:* *(a) a program of activities informed by 1 and 2 above and* *(b) stormwater quality monitoring to inform the effectiveness of (a) above.* 4. *The operator is required to propose a reasonable timetable for consideration of approval by the*	*and 2010 have identified a number of exceedances of release limits of stormwater, with an increase in the last 12 months.* *The Department has consulted with the operator on a number of occasions and discussed the implications of the exceedances. However, such consultation has not resulted in any action by the operator in relation to reducing unlawful stormwater releases.* *The Department estimates that it will take at least 12 months for the operator to upgrade the site to a standard that results in compliance with stormwater release limits.* *After considering all of the issues and the estimated time-frame for the operator to achieve compliance, the Department considers that requiring the operator to provide a draft TEP is the most appropriate and effective course of action.* *As ABC Pty Ltd is currently operating in a regional area, the Department has allowed ABC Pty Ltd 9 weeks (5 weeks more than for an urban area) to develop the plan.*

administering authority for the above actions to be completed.	

7. Recommendation

The responsible officer is required to make a recommendation in relation to the alleged breach. For example:

It is the opinion of the Department that ABC Pty Ltd failed to comply with development conditions D11 and D12 of development approval IPDE123456 by allowing stormwater to leave 24 Jones Road and enter Murphy Creek. After considering all factors the Department has determined that requiring a draft TEP would be the most effective way of achieving the operator's compliance with the development conditions. It is recommended that a notice requiring a draft TEP be issued.

Administrative decisions are made based upon the balance of probabilities. This means that the decision-maker must be able to determine whether, based upon the information available, it was more likely than not that the event occurred.

Officers are encouraged to consider alternative actions/tools, the Department's enforcement guidelines, details of any consultations including site visit details and discussions with the ERA contact officer (if applicable) prior to making a recommendation. The reasonableness of proposed timeframes for the completion and submission of the draft TEP for consideration and approval, and the period over which the TEP is to be carried out, should be taken into account. For example, if the location is geographically isolated, or there is an impending wet season, the Department may consider allowing additional time for the recipient of the notice to prepare the draft TEP.

6. Approval

The assessment report is to be approved by an appropriately delegated officer. The Department's list of delegations can be found at: http://insite2.dnr.qld.gov.au/derm/delegations/

Step 2 - Complete the notice requiring a TEP

The notice requiring a draft TEP must meet a number of legislative requirements in order to be legally binding. A requirement to prepare and submit a draft TEP must be made by written notice which must state—

- the grounds on which the requirement is made and
- the matters to be addressed by the TEP and
- the period over which the TEP is to be carried out and
- the day (at least a reasonable period after the notice is given) by which the TEP must be prepared and submitted to the Department and
- the review or appeal details.

A template notice requiring a draft TEP is included in the TEP material.

The notice and the assessment report must be signed by the decision-maker.

Service of a notice requiring a draft TEP

Service means delivery to the party who will be responsible for actioning the notice. Officers are encouraged to use their discretion as to the most appropriate form of service, having regard to the recipient in question. Methods of service are provided for in ss39 and 39A of the *Acts Interpretation Act 1954* (AI Act).

A notice requiring a draft TEP may be served:

- on a person:
  - by delivering it to the person personally or
  - by leaving at, or by sending it by post, facsimile or similar facility (e.g. email) to the person's last known place of residence or business or
- on a body corporate - by leaving it at, or sending it by post, facsimile or similar facility (e.g. email) to the head office, a registered office or a principal office of the body corporate.

The date, time and method of service should be documented by contemporaneous notes, a file note, any receipts arising from the postage or any facsimile confirmations and email 'read' receipts.

What follow-up is required?

It is important that the matter is appropriately followed up to make sure that the person to whom the notice requiring a draft TEP is issued complies within the required time-frame. Follow-up is to be scheduled by the relevant officer and confirmed with the business area manager. The business area manager is responsible for ensuring follow-up is undertaken within the agreed time frame.

Once a notice has been issued, dates for the submission of the draft TEP and the review and appeal periods should be diarised and monitored. If the draft TEP is not submitted by the due date, follow-up should be carried out by way of a site visit or telephone call. The recipient should be reminded that the time-frame has expired and that non-compliance with the notice could lead to prosecution.

The recipient of the notice requiring a draft TEP may contact the Department during the period of the notice and establish legitimate reasons for non-compliance with the relevant time frame. In this instance the Department may consider granting an extension of time. However, it must be remembered that the affected person should communicate any issues with time-frames prior to their expiration. For further information regarding amendments to an issued notice requiring a draft TEP, please see the paragraph below headed 'Amendments to an issued notice requiring a draft TEP'.

What are my record-keeping responsibilities?

Officers are required to record all allegations of non-compliance in the EcoTrack system. This includes creating a complaint report, uploading copies of any relevant documents, updating the description field with commentary on actions and recording any decisions made on the enforcement measures screen (this includes a decision to take no further action). Hard copies of any relevant documents should be placed on the paper file. The Department is required to make and record an informed decision about all allegations of non-compliance.

Amendments to an issued notice requiring a draft TEP

If minor changes to the notice requiring a draft TEP or an extension of time to respond are required, the recipient of the notice should be notified in writing.

If significant changes are required, officers should, in order to avoid confusion, repeal (revoke) the original notice, and issue a fresh one on the same grounds with the necessary changes.

The repeal and issue of a fresh notice requiring a draft TEP should be carried out in the same way, and subject to the same conditions as the issuing of the original notice. Accordingly, a new assessment report should be completed and endorsed by the appropriate delegate.

It is preferable if the decision to issue a fresh notice is made by the original decision-maker. If this is not possible the decision should be made by a person with the appropriate delegation who holds a position equal to or higher than that of the original decision-maker.

Officers should also update and record the changes or the decision to repeal and re-issue the notice in EcoTrack or CIRaM and place hard copies of any documents on the paper file.

Review of decisions and appeals

The provisions regarding review of decisions and appeals may be found in Chapter 11, Part 3 of the Act.

The Act specifies that a person who is dissatisfied by a decision made by the Department in respect to a notice requiring a draft TEP may apply for a review of an original decision by submitting an application on the approved form to the Department—

- within 10 business days after the day on which the person received notice of the original decision or the Department is taken to have made the decision, or
- if there are special circumstances, whatever longer period the Department allows.

An approved form for the review of an original decision may be found at Application form - Review of Original Decision

A person who has made an application for review of an original decision may immediately apply to the Planning and Environment Court for a stay of the decision.

If the person is dissatisfied with the review decision, the person may appeal against that decision to the Planning and Environment Court by filing written notice of appeal with the registrar of the Court within 22 business days after the day the person receives notice of the decision or the decision is taken to have been made, unless the Court extends the period for filing the notice of appeal.

The court may grant a stay of a decision appealed against until such time the appeal is decided. An appeal against a decision does not affect the operation or the carrying out of a decision unless the decision is stayed.

Further information about review of decisions and appeals may be found in the Information sheet - Internal review (DERM) and appeal to the Planning and Environment Court

Non-Compliance with a notice requiring a draft TEP

Officers must respond and may take further action in relation to non-compliance with a notice requiring a draft TEP. The following issues should be considered—

- **Providing extra time** – If extra time to comply has been granted, officers should document the details of the extra time allowed and the reasons for giving the extension of time. Confirmation of these details should be provided in writing to the recipient of the notice.
- **Other tools** – It may be that using another compliance tool would be more likely to achieve compliance. For example, issuing an Environmental Protection Order (EPO) in relation to the non-compliance may be a more appropriate way to achieve compliance due to the far higher penalty for breaching the EPO.
- **Prosecution** – If no other action is likely to be effective, officers should consider prosecuting a non-compliant recipient of a notice requiring a TEP for both failure to comply with the notice as well as for the environmental harm being caused.

What penalties exist for non-compliance with a notice requiring a draft TEP?

A person must comply with a notice requiring a draft TEP, unless the person has a reasonable excuse (s332(5)).

Maximum penalty for non-compliance with a notice requiring a TEP—

For an individual – 100 penalty units or $10,000.00.

For a corporation – 500 penalty units or $50,000.00.

329 Failure to make decision on environmental report taken to be refusal

If the administering authority fails to decide whether or not to accept an environmental report within the time it is required to make a decision on the report, the failure is taken to be a decision by the authority to refuse to accept the report at the end of the time.

Part 3 Transitional environmental programs

Division 1 Preliminary

330 What is a transitional environmental program

A *transitional environmental program* is a specific program that, when complied with, achieves compliance with this Act for the activity to which it relates by doing 1 or more of the following—

(a) reducing environmental harm caused by the activity;

(b) detailing the transition of the activity to an environmental standard;

(c) detailing the transition of the activity to comply with—

(i) a condition, including a standard environmental condition, of an environmental authority or code of environmental compliance; or

(ii) a development condition.

331 Content of program

A transitional environmental program must, for the activity to which it relates—

(a) state the objectives to be achieved and maintained under the program for the activity; and

(b) state the particular actions required to achieve the objectives, and the day by which each action must be carried out, taking into account—

(i) the best practice environmental management for the activity; and

(ii) the risks of environmental harm being caused by the activity; and

(c) state how any environmental harm that may be caused by the activity will be prevented or minimised, including any interim measures that are to be implemented; and

(d) if the activity is to transition to an environmental standard, state—

(i) details of the standard; and

(ii) how the activity is to transition to the standard before the program ends; and

(e) if the activity is to transition to comply with a condition of an environmental authority or code of environmental compliance, or a development condition, state—

(i) details of the condition and how the activity does not comply with it; and

(ii) how compliance with the condition will be achieved before the program ends; and

(f) state the period over which the program is to be carried out; and

(g) state appropriate performance indicators at intervals of not more than 6 months; and

(h) provide for monitoring and reporting on compliance with the program.

Division 2 Submission and approval of transitional environmental programs

332 Administering authority may require draft program

(1) The administering authority may require a person or public authority to prepare and submit to it for approval a draft trausitional environmental program—

(a) as a condition of an environmental authority; or

(b) as a development condition of a development approval.

(2) The administering authority may also require a person or public authority to prepare and submit to it for approval a draft transitional environmental program if it is satisfied—

(a) an activity carried out, or proposed to be carried out, by the person or authority is causing, or may cause, unlawful environmental harm; or

(b) it is not practicable for the person or public authority to comply with an environmental protection policy or regulation on its commencement; or

(c) that a condition of an environmental authority held by the person or public authority is, or has been, contravened; or

(ca) that a standard environmental condition of a code of environmental compliance for a chapter 4 activity is, or has been, contravened by the person or public authority; or

(d) a development condition of a development approval is, or has been, contravened and the person or public authority is—

(i) an owner of the land for which the approval is granted; or

(ii) another person in whom the benefit of the approval vests.

(3) A requirement under subsection (1) or (2) must be made by written notice given to the person or public authority.

(4) The notice must state—

(a) the grounds on which the requirement is made; and

(b) the matters to be addressed by the program; and

(c) the period over which the program is to be carried out; and

(d) the day (at least a reasonable period after the notice is given) by which the program must be prepared and submitted to the administering authority; and

(e) the review or appeal details.

(5) A person of whom a requirement under subsection (1) or (2) has been made must comply with the requirement unless the person has a reasonable excuse.

Maximum penalty for subsection (5)—100 penalty units.

333 Voluntary submission of draft program

(1) A person or public authority may, at any time, submit for approval a draft transitional environmental program to the administering authority for an activity the person or public authority is carrying out or proposes to carry out.

(2) A person or public authority may submit a document under subsection (1) if it contains or provides for the matters mentioned in section 331, even though the document was not originally prepared for this Act.

(3) The document is taken to be a draft transitional environmental program.

334 Fee for consideration of draft program

A person or public authority that submits a draft transitional environmental program to an administering authority for

approval must pay the authority the fee prescribed by regulation.

335 Public notice of submission for approval of certain draft programs

(1) This section applies if a person or public authority submits for approval a draft transitional environmental program that states a period longer than 3 years over which the program is to be carried out.

(2) Within 2 business days after the application date, the person or public authority must give public notice of the submission by—

(a) advertisement published in a newspaper circulating generally in the area in which the activity to which the draft program relates is, or is proposed to be, carried out; and

(b) if the program relates to premises—

(i) placing a notice on the premises; and

(ii) serving a notice on the occupiers of all premises adjoining the premises.

(3) The notice must—

(a) be in the approved form; and

(b) invite submissions on the draft program from government departments, public authorities, local governments, land-holders, industry, interested groups and persons and members of the public; and

(c) state the day (at least 10 business days after compliance with subsection (2)) nominated by the administering authority as the day by which submissions may be made to the authority.

336 Authority may call conference

(1) The administering authority may invite the person or public authority that has submitted a draft transitional environmental program and another person who has made a submission under section 335 about the program, to a conference to help it in deciding whether or not to approve the program.

(2) The administering authority must give written notice to all persons invited to attend the conference of when and where the conference is to be held.

(3) However, if the administering authority considers it is impracticable to give notice to all persons invited to attend the conference, the authority may give notice of the conference by publishing a notice in the newspapers the authority decides.

(4) The administering authority must endeavour to appoint an independent person to mediate the conference.

337 Administering authority to consider draft programs

(1) The administering authority must decide whether to approve a draft transitional environmental program submitted to it within 20 business days after—

(a) if public notice is required under section 335—the day stated in the notice as the day by which submissions may be made to the administering authority; or

(b) otherwise—the application date.

(2) If public notice is required to be given of the submission of the draft program, the administering authority must be satisfied public notice has been properly given before making a decision.

338 Criteria for deciding draft program

(1) In deciding whether to approve or refuse to approve the draft program or the conditions (if any) of the approval, the administering authority—

(a) must comply with any relevant regulatory requirement; and

(b) subject to paragraph (a), must also consider the following—

(i) the standard criteria;

(ii) additional information given in relation to the draft program;

(iii) the views expressed at a conference held in relation to the draft program.

(2) If the draft program is prepared because of a requirement of a development condition of a development approval, the authority may approve the draft program only if it is not inconsistent with other conditions of the approval.

339 Decision about draft program

(1) The administering authority may—

(a) approve a draft transitional environmental program—

(i) as submitted; or

(ii) as amended at the request, or with the agreement, of the administering authority; or

(b) refuse to approve a draft transitional environmental program.

(2) The administering authority may impose on an approval of a draft transitional environmental program—

(a) any conditions the authority must impose under a regulatory requirement; and

(b) any other conditions the administering authority considers appropriate.

(3) If the draft transitional environmental program is approved, the approval remains in force for the period stated in the notice of the approval given under section 340.

340 Notice of decision

(1) The administering authority must, within 8 business days after making a decision under section 339, give the person or public authority that submitted the program a written notice about the decision.

(2) If the administering authority approves the program, the notice must—

(a) identify the documents forming the approved transitional program, including any amendments under section 339(1)(a)(ii); and

(b) state any conditions imposed on the approval by the administering authority; and

(c) state the day the approval ends.

(3) If the administering authority refuses to approve the program or approves the program with conditions, the notice must be an information notice.

341 Content of approved program

An approved transitional environmental program consists of the following—

(a) the draft of the program submitted under section 332 or 333, as amended at the request, or with the agreement, of the administering authority;

(b) any conditions imposed on the program by the administering authority.

342 Substantial compliance with Act may be accepted as compliance

(1) This section applies if, under this Act, a person or public authority is required to give public notice of the submission of a transitional environmental program and the administering authority is not satisfied public notice has been properly given.

(2) The administering authority may consider and decide whether to approve the draft program if it is satisfied there has been substantial compliance with this Act.

343 Failure to approve draft program taken to be refusal

If the administering authority fails to decide whether to approve or refuse a transitional environmental program within the time it is required to make a decision on the program, the failure is taken to be a decision by the authority to refuse to approve the program at the end of the time.

Division 3 Amendment of approval for transitional environmental programs

344 Application

(1) Division 2 (other than section 335(1)) applies, with all necessary changes, to a submission by the holder of an approval for a transitional environmental program for an environmentally relevant activity to amend the approval.

(2) Without limiting subsection (1), if the holder submits for approval an amendment of the approval that extends the period over which the program is to be carried out to longer than 5 years, section 335(2) and (3) applies to the submission as if the submission were for the approval of a draft transitional environmental program.

(3) Also, the administering authority may approve the amendment only if it is reasonably satisfied it will not result in increased environmental harm being caused by the carrying out of the activity under the amended approval than the environmental harm that would be caused by carrying out the activity if the approval were not granted.

(4) Without limiting the matters to be considered in deciding the application, the administering authority must have regard to—

(a) the period under the original approval; and

(b) the period that remains under the original approval; and

(c) any change to the period under the original approval; and

(d) the nature of the risk of environmental harm being caused by the activity.

Division 4 Miscellaneous

345 Annual return

The holder of an approval of a transitional environmental program must, within 22 business days after each anniversary of the day of approval of the program, give to the administering authority an annual return in the approved form.

Maximum penalty—100 penalty units.

346 Effect of compliance with program

(1) This section applies if an approved transitional environmental program authorises the holder to do, or not to do, something under the program.

(2) The holder, or a person acting under the approval may do, or not do, the thing under the program despite anything in—

(a) a regulation; or

(b) an environmental protection policy; or

(c) an environmental authority held by the holder; or

(d) a development condition of a development approval; or

(e) a standard environmental condition of a code of environmental compliance for a chapter 4 activity; or

(f) an accredited ERMP.

(3) Without limiting subsection (2), the doing, or not doing, of the thing under the program is not a contravention of—

(a) a regulation; or

(b) an environmental protection policy; or

(c) a condition of an environmental authority held by the holder; or

(d) a development condition of a development approval; or

(e) a standard environmental condition of a code of environmental compliance for a chapter 4 activity; or

(f) an accredited ERMP.

347 Notice of disposal by holder of program approval

(1) This section applies if the holder of an approval of a transitional environmental program proposes to dispose of the place or business to which the program relates to someone else (the ***buyer***).

(2) Before agreeing to dispose of the place or business, the holder must give written notice to the buyer of the existence of the program.

Maximum penalty—50 penalty units.

(3) If the holder does not comply with subsection (2), the buyer may rescind the agreement by written notice given to the holder before the completion of the agreement or possession under the agreement, whichever is the earlier.

(4) On rescission of the agreement under subsection (3)—

(a) a person who was paid amounts by the buyer under the agreement must refund the amounts to the buyer; and

(b) the buyer must return to the holder any documents about the disposal (other than the buyer's copy of the agreement).

(5) Subsections (3) and (4) have effect despite any other Act or anything to the contrary in the agreement.

(6) Within 10 business days after agreeing to dispose of the place or business, the holder must give written notice of the disposal to the administering authority.

Maximum penalty for subsection (6)—50 penalty units.

348 Notice of ceasing activity by holder of program approval

Within 10 business days after ceasing to carry out the activity to which a transitional environmental program relates, the holder of the approval for the program must give written notice of the ceasing the activity to the administering authority.

Maximum penalty—50 penalty units.

349 Compliance with Act at completion of program

The holder of an approval for a transitional environmental program must achieve full compliance with this Act for the matters dealt with by the program at the end of the period over which the program is carried out.

338 Criteria for deciding draft program

(1) In deciding whether to approve or refuse to approve the draft program or the conditions (if any) of the approval, the administering authority—

(a) must comply with any relevant regulatory requirement; and

(b) subject to paragraph (a), must also consider the following—

(i) the standard criteria;

(ii) additional information given in relation to the draft program;

(iii) the views expressed at a conference held in relation to the draft program.

(2) If the draft program is prepared because of a requirement of a development condition of a development approval, the authority may approve the draft program only if it is not inconsistent with other conditions of the approval.

Administrative Practice Note x/10

Environmental Protection Act 1994

Assessing draft Transitional Environmental Programs

The following administrative practice is to be followed when assessing draft Transitional Environmental Programs under the Environmental Protection Act 1994. *In the Report of November 2008 by* [redacted] *to the Queensland Premier a recommendation was made that the procedures used to develop TEPs be reviewed. This administrative practice note is the outcome of that review.*

Background

A Transitional Environmental Program (TEP) is an environmental compliance program, drafted by the holder of a development approval or an environmental authority for an environmentally relevant activity or an environmental authority, for which approval is applied for to the administering authority.

Section 330 of the Environmental Protection Act 1994 provides the definition for a TEP:

A transitional environmental program is a specific program that, when approved, achieves compliance with this Act for the matters dealt with by the program by:

(a) reducing environmental harm; or

(b) detailing the transition to an environmental standard.

There are three ways in which a client may develop a TEP:

1. the administering authority may require a client to develop a TEP to address a specific issue (a compliance tool), by issuing a 'Notice to Prepare' under section 332 of the *Environmental Protection Act 1994*;
2. the client may voluntarily develop and submit a TEP under section 333 of the *Environmental Protection Act 1994*; or
3. a client may lodge a Program Notice to the administering authority under section 350 of the *Environmental Protection Act 1994* and be required to develop and lodge a TEP.

In circumstances where a person has given the administering authority a Program Notice about an act or omission that has caused or threatened environmental harm in the carrying out of an activity by the person and the activity is lawful apart from the provisions of the *Environmental Protection Act 1994*, the administering authority is required to give the person a notice nominating a day by which a draft TEP must be submitted.

The information given in a Program Notice is privileged and can not be used in evidence by the administering authority.

Formatted: Space Before: 0 pt, After: 0 pt, Line spacing: 1.5 lines, Don't adjust space between Latin and Asian text

Formatted: Space After: 0 pt, Line spacing: 1.5 lines

Formatted: Line spacing: 1.5 lines

Formatted: Indent: First line: 0 pt, Line spacing: 1.5 lines

Formatted: Font: Bold, Italic

Formatted: Normal, Indent: First line: 36 pt, Line spacing: 1.5 lines, Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers

Formatted: Font: Bold, Italic, Font color: Red

Formatted: Space After: 0 pt, Line spacing: 1.5 lines

Formatted: Bullets and Numbering

Formatted: Font: Italic

Formatted: Font: Italic

Formatted: Font: Italic

Deleted: <#>The administering authority may require the preparation of a TEP or a person or public authority may voluntarily submit a TEP.¶

Department of Environment and Resource Management
www.derm.qld.gov.au

Assessing draft Transitional Environmental Programs

A TEP is similar to a contract, in which the contents of the program are legally binding on its approval.
A person will make an application for approval of a TEP for some or all of the following reasons:

- An approved TEP can result in a person being provided immunity from charges specifically related to an incident which is the subject of a Program Notice;
- An approved TEP can result in a person being given a period of time in which to carry out certain specified activities that will enable them to comply with the conditions of an environmental authority or achieve an environmental standard. The person can not be prosecuted for non-compliance while the matters are being addressed in accordance with the requirements of the TEP.

A TEP especially when combined with a Program Notice is an extremely powerful tool so its approval should always be approached with care and due diligence as to the consequences of the shield that it may provide with respect to activities that may cause or potentially cause environmental harm.

Duties of the administering authority

Requiring a draft TEP to be prepared

The administering authority can require a TEP be drafted by a person if it is satisfied that the following events have occurred:

- The activity currently being carried out, or proposed to be carried out, is or may cause unlawful environmental harm;
- It is impractical for a person to comply with any policy or regulation on its commencement;
- That a condition of an environmental authority is or has been contravened;
- That a standard environmental condition of a Code of Environmental Compliance for a Chapter 4 activity is or has been contravened; or
- A development condition of a development approval is or has been contravened.

The administering authority may make this requirement as a condition of an environmental authority or development approval or by issuing a statutory notice.

Where a statutory notice is issued it must state:

- The grounds on which the requirement to prepare a draft TEP is made;
- The matters that are to be addressed by the TEP. These must be stated with sufficient particularity for the person to whom the notice is issued to understand and supply a draft document that meets these requirements;
- The period over which the TEP is to be carried out;
- The day by which the draft TEP must be prepared and submitted; and

- The review and appeal details that apply to the decision to require the submission of a draft TEP.

If the statutory notice clearly sets out the matters to be addressed (particularly in terms of setting up what will ultimately be the objectives or outcomes to be achieved through the TEP), then the negotiation of an approved TEP is more likely to result in the objectives or outcomes sought.

In drafting the statutory notice the administering authority should have regard to the matters that it is required to give consideration to in deciding to approve or refuse a draft TEP. These matters are set out in the *Environmental Protection Act 1994*, and the *Environmental Protection Regulation 2008*. Inclusion of details about relevant information that should be submitted as part of the draft TEP in the statutory notice will assist in the assessment of a draft TEP and avoid requests for additional information.

Assessing a draft TEP

General

A draft TEP must meet the content requirements of section 331 of the *Environmental Protection Act 1994*, while also meeting the purpose of a TEP. The legislation states that a TEP must:

- state the objectives to be achieved and maintained under the TEP,
- state how the objectives are to be achieved, taking into account:
  - the best practice environmental management for the activity, and
  - the risk of environmental harm being cause by the activity,
- state a timetable of the actions to be undertaken to achieve the objectives,
- state the performance indicators to be used to identify both the progress and completion of the objectives. The performance indicators are not to be spaced at intervals greater than six months, and
- make provisions for monitoring and reporting compliance with the TEP.

As an approved TEP can protect the holder from enforcement action for non-compliances with *the Act*, the commitments or terms of the TEP need to be clearly drafted, unambiguous and easily auditable.

Note: Failure to comply with the terms of a TEP is an offence so the terms outlined within the document act in a similar way to conditions contained within a Development Approval or Environmental Authority.

In deciding whether to approve or refuse a draft TEP, the criteria for making the decision outlined in section 338 of the *Environmental Protection Act 1994* must be considered. This section refers the assessor to:

- any relevant regulatory requirement, and
- the standard criteria.

The decision whether to approve or refuse a draft TEP is an "environmental management decision" as per the *Environmental Protection Regulation 2008*. In assessing a TEP the administering authority must comply with the regulatory requirements for making an environmental management decision, consider the standard criteria, any additional information that has been given in relation to the draft TEP, and the views that have been

Formatted: Font: Italic

Formatted: Bullets and Numbering

Formatted: Line spacing: 1.5 lines

Formatted: Font: Italic

Formatted: Space After: 0 pt, Line spacing: 1.5 lines

Formatted: Font: Italic

Formatted: Bullets and Numbering

Formatted: Font: Italic

expressed at any conference called by the administering authority to help it decide whether to approve or refuse a draft TEP.

It is also important for the assessor to consider, if the TEP was lodged due to a 'notice to prepare', whether the TEP meets the requirements of the statutory notice. If the administering authority considers that the submitted draft TEP will not achieve the objectives or outcomes specified in the statutory notice then it is critically important that all changes required by the administering authority to ensure that the TEP achieves the required objectives or outcomes are incorporated into the TEP before it is approved.

Deleted: ¶

Formatted: Line spacing: 1.5 lines

The assessment of a draft TEP must result in the preparation of an assessment report that is sufficiently detailed to demonstrate that all mandatory aspects have been considered. The assessment report must be provided to the delegate of the administering authority to assist with decision making and must be kept on the permanent file record to document the decision making process.

Where the assessment requires specific environmental and / or environmental knowledge or skills, and these are not available within the office with the responsibility for assessing the application, these shall be sought to assist with the assessment and the advice or information documented as part of the assessment report.

Risk Assessment

Undertaking a review of all the matters that must be statutorily considered will provide an informal risk assessment.

Notwithstanding the matters for consideration set out in the statute, should the nature of a proposed TEP be significantly complex and / or the nature of the receiving environment (including the potential impacts on people) be significantly sensitive, consideration must be given to undertaking a formal risk assessment in accordance with the Australian Standard AS/NZS ISO 31000:2009 Risk management –Principles and guidelines.

When deciding whether to undertake a formal risk assessment to assist with consideration of whether to approve or refuse a draft TEP the administering authority will consider the importance, including, but not limited to, aspects such as:

- The nature and quantity of any contaminants proposed to be released;
- The nature (e.g. pristine or otherwise) of the receiving environment;
- The number of people potentially affected by any release and the manner in which they may be affected.

Context of draft TEP

Assessing draft Transitional Environmental Programs

When assessing the draft TEP against the regulatory requirements set out in the *Environmental Protection Regulation 2008*, the requirements must be considered in the context of the proposal e.g. if the proposal is for a release to surface waters, assessment against subsections (1) (d) and (e) must be considered along with the additional requirements for the release of water, other than stormwater, to surface water, in the context of the nature of the waterway and the impact of the release on users of the waterway such as irrigators, local governments and others who draw water supplies from the waterway.

Community Interest

Where there is, or there is expected to be, significant public interest in the draft TEP and any decision to approve it, the administering authority will consider seeking comment from the public (or other interested parties) prior to making a decision. This will, if necessary, be done under the relevant provisions of the *Environmental Protection Act 1994*. Where this action is proposed by the administering authority, comments will be sought at least through a public notice in local newspapers.

Such information may also be sought by the administering authority directly contacting interested persons or organisations which may be able to contribute to the assessment process (e.g. local governments, other government departments).

Information obtained by such means must be considered by the administering authority when making a decision to approve or refuse a draft TEP.

Where there is likely to be ongoing community interest in the progress of the implementation of a TEP during its life, the administering authority will consider requiring the applicant to include community consultation as part of the TEP.

Assessing draft Transitional Environmental Programs

Approval of a TEP

A draft TEP may be approved, approved with conditions, or refused.

A draft TEP must only be approved if the administering authority is satisfied that it covers all of the matters and includes a program of specific actions that will allow it when complete to achieve the objectives or outcomes specified in the TEP.

A certificate of approval for a TEP may contain conditions, those conditions are not enforceable, therefore it is critically important that the draft TEP contains all of the matters that the administering authority considers are required to achieve the objective or outcomes of the TEP. The administering authority must negotiate variations to the draft TEP and not rely on the certificate of approval to vary or modify a draft TEP.

Delegation for decision making

The responsibility for decision making with respect to approving or refusing a draft TEP must be in accordance with the current Environmental Protection Delegation. Where it is appropriate, due to the technical complexity of the assessment and / or the potential impacts of the decision, the decision may be made by a delegate with greater seniority in the organisation.

Formatted: Space After: 0 pt, Line spacing: 1.5 lines

Formatted: Line spacing: 1.5 lines

Refusal of a TEP

If the administering authority is not satisfied with a draft TEP, and is unable to negotiate a satisfactory TEP, it may refuse an application for approval.

If a decision on whether to approve or refuse a draft TEP is not given within the statutory time, the decision is deemed to have been a refusal.

If the administering authority refuses a draft TEP it must provide an information notice about the decision.

Fees for assessment of a TEP

The *Environmental Protection Act 1994* provides for the administering authority to charge a person or public authority, the fee prescribed by regulation, for submitting a draft TEP for approval. For further information on the charging of fees for the assessment of a TEP refer to Operational Policy titled, *Transitional Environmental Program (TEP) fees.*

Amending a TEP

Assessing draft Transitional Environmental Programs

The administrative authority must give the same consideration to an application to amend an approved TEP as it would an original application for approval of a draft TEP.

If the amendment of an approved TEP would extend the period in which the TEP is carried out to longer than 5 years then the applicant must give public notice of the application to amend the approved TEP. In assessing the amendment application, the administering authority will look for evidence that these requirements have been complied with.

The administering authority may only approve an amendment application if it is reasonably satisfied that it will not result in increased environmental harm being caused by the carrying out of the activity under the amended approval than the environmental harm that would be caused were the approval not granted.

Annual Return

The holder of an approved TEP must, within 22 days of the anniversary day of the approval of the TEP, give to the administering authority an annual return in the approved form.

The administering authority should discuss the requirements for the content of the annual return at the time that the TEP is applied for and include in the draft TEP the form and content of the information that is to be provided in the annual return.

Notice of disposal of the benefit of a TEP

If the holder of an approved TEP proposes to dispose of the place or business to which the TEP relates to another person they must give written notice to the buyer of the place or business of the existence of the TEP. The importance of any failure of the holder of a TEP to give such notice is that it is a statutory grounds for rescinding any agreement.

The holder of an approved TEP must give the administering authority written notice within 10 days of the disposal of a place or business that is subject to an approved TEP.

Enforcing a TEP

If the holder of an approved TEP does not comply with the requirements of the TEP, as distinct from the requirements of a certificate of approval, the administering authority may prosecute the holder for a breach of the TEP.

Formatted: Space After: 0 pt, Line spacing: 1.5 lines

Assessing draft Transitional Environmental Programs

Where the TEP contains defined milestones that are clear and quantifiable, the administering authority may also prosecute the holder of an approved TEP for breach of those milestones. Given the time and effort required to compile a brief of evidence, it is, in the face of an investigation and action for breach, possible for the holder of an approved TEP to bring themselves into compliance, and thereby frustrate or mitigate the action for breach of the TEP.

Where the holder of an approval is recalcitrant in performing the obligations imposed through the approved TEP, action for breach of milestones should be considered, especially where the approved TEP has a period of more than a year.

All non-compliances with an approved TEP must be responded to in a timely and appropriate manner keeping in mind that the approval of a TEP is already a mechanism for dealing with an inability for the holder to comply with environmental requirements.

Approved by:
X
X
Department of Environment and Resource Management

Date: xx/mm/2010

Enquiries:
Permit and Licence Management
Ph: **1300 368 326**
Fax: (07) 3115 9600
Email:
eco.access@derm.qld.gov.au

Request for Statutory Approval

Department of Environment and Resource Management

s337 of the *Environmental Protection Act 1994*
CONSIDERATION OF A TRANSITIONAL ENVIRONMENTAL PROGRAM (TEP)

CLIENT:	XXXX
REGISTERED OFFICE ADDRESS:	XXXX
	XXXX
	XXXX
	XXXX
	XXXX
TENEMENT:	XXXX
ENV AUTHORITY NO.:	XXXX
	XXXX
FILE NO.:	XXXX
PROGRAM NOTICE/REQUIRED:	XXXX
REASON FOR TEP:	XXXX
DATE SUBMITTED:	XXXX
DECISION DUE DATE:	XXXX
(if approval required)	
TIME SPENT:	XXXX

1.0 SUMMARY

XXXX

Has the TEP been entered in EcoTrack:	Yes/No
EcoTrack Compliance Reference (if applicable): -	XXXX
EcoTrack TEP Reference Number: -	XXXX

If Approving the TEP

Has a notice approving the TEP been completed:	Yes/No
Has a certificate of approval been developed:	Yes/No
Were additional conditions set on the certificate of approval:	Yes/No

2.0 STAT UTORY REQUIREMENTS

330 What is a transitional environmental program
A transitional environmental program is a specific program that, when approved, achieves compliance with this Act for the matters dealt with by the program by—
(a) reducing environmental harm; or
(b) detailing the transition to an environmental standard.
XXXX

337 Administering authority to consider draft programs
(1) The administering authority must decide whether to approve a draft transitional environmental program submitted to it within 20 business days after the application date.

XXXX

(2) If public notice is required to be given of the submission of the draft program, the administering authority must be satisfied public notice has been properly given before making a decision.

XXXX
338 Criteria for deciding draft program
(1) In deciding whether to approve or refuse to approve the draft program or the conditions (if any) of the approval, the administering authority—
(a) must comply with any relevant regulatory requirement;
and

XXXX

Environmental Protection Regulation 2008
Chapter 4 Regulatory Requirements

Part 2 Regulatory Requirements for all environmental management decisions

s51 Matters to be considered for environmental management decisions
XXXX

s52 Conditions to be considered for environmental management decisions
XXXX

s53 Matters to be considered for decisions imposing monitoring conditions
XXXX

Part 3 Additional regulatory requirements for particular environmental management decisions

s55 Release of water or waste to land
XXXX

s56 Release of water, other than stormwater, to surface water
XXXX

s57 Release of stormwater
XXXX

s58 Release of water or waste to particular wetlands for treatment
XXXX

s59 Activity involving berthing, docking or mooring a boat
XXXX

s60 Activity involving storing or moving bulk material
XXXX

s61 Activity involving acid sulphate soil
XXXX

s62 Activity involving acid-producing rock
XXXX

s63 Activity involving direct release of waste to groundwater
XXXX

s64 Activity involving indirect release of contaminants to groundwater
XXXX

(b) subject to paragraph (a), must also consider the following—
(i) the standard criteria;

- *The principles of ecological sustainable development as set out in the 'National Strategy for Ecologically Sustainable Development'.*
  XXXX

- *Any applicable environmental protection policy.*
  XXXX

- *Any applicable Commonwealth, State or local government plans, standards, agreements or requirements.*
  XXXX

- *Any applicable environmental impact study, assessment or report.*
  XXXX

- *The character, resilience and values of the receiving environment.*
  XXXX

- *All submissions made by the applicant and submitters.*
  XXXX

- *The best practice environmental management for activities under any relevant instrument, or proposed instrument, as follows – a transitional environmental program.*
  XXXX

s21 of the *Environmental Protection Act 1994* - Best practice environmental management
*(1) The **best practice environmental management** of an activity is the management of the activity to achieve an ongoing minimisation of the activity's environmental harm through cost-effective measures assessed against the measures currently used nationally and internationally for the activity.*
*(2) In deciding the **best practice environmental management** of an activity, regard must be had to the following measures—*
(a) strategic planning by the person carrying out, or proposing to carry out, the activity;
(b) administrative systems put into effect by the person, including staff training and monitoring and review of the systems;
(c) public consultation carried out by the person;
(d) product and process design;
(e) waste prevention, treatment and disposal.
*(3) Subsection (2) does not limit the measures to which regard may be had in deciding the **best practice environmental management** of an activity.*

- *The financial implications of the requirements under an instrument, or proposed instrument, mentioned in paragraph (g) (above) as they would relate to the type of activity or industry carried out, or proposed to be carried out, under the instrument.*
  XXXX

- *The public interest.*
  XXXX

- *Any applicable site management plan.*
  XXXX

- *Any relevant integrated environmental management system or proposed integrated environmental management system.*
  XXXX

- *Any other matter prescribed under a regulation.*
  XXXX

(ii) additional information given in relation to the draft program;
Maps and background information was submitted and considered.

(iii) the views expressed at a conference held in relation to the draft program.
N/A.

(2) If the draft program is prepared because of a requirement of a development condition of a development approval, the authority may approve the draft program only if it is not inconsistent with other conditions of the approval.
XXXX

331 Content of program
A transitional environmental program must—
(a) state the objectives to be achieved and maintained under the program for an activity; and
XXXX

(b) state how the objectives are to be achieved, and a timetable to achieve the objectives, taking into account—

(i) the best practice environmental management for the activity; and
XXXX

(ii) the risks of environmental harm being caused by the activity; and
XXXX

(c) state appropriate performance indicators at intervals of not more than 6 months; and
XXXX

(d) make provision for monitoring and reporting compliance with the program.
XXXX

343 Failure to approve draft program taken to be refusal
XXXX

4.0 RECO MMENDATION

XXXX

XXXX
Senior Environmental Officer

Signed –

Date -

Reviewed & Endorsed By	
XXXX Senior Environmental Officer	**Delegate** Manager - Emerald

Signed – Date:	Signed – Date:

1. Unverified data from telemetry and uncorrected. All sites have been serviced and field calibrated in the last two months.

Electrical Conductivity in µS/cm

Catchment	Gauging Station	Draft Fitzroy WQ Targets	Date **Last month**	Date **Last Week**	**Date This week**	Remarks
			19th Aug 2011	**9th Sept 2011**	**16th Sept 2011**	Service Date Flow in cumecs
Callide	Goovigen Rannes	1220	605 1575	550 1575	**565** **1585**	07/06/11 0.53 28/06/11 0.15
Upper Dawson	Utopia Downs Taroom	360	NA 600	 870	 **620**	23/06/11 0.56 handheld 464. Still Unable to fix until streamflow recedes. 20/06/11 0.75
Lower Dawson	Woodleigh Beckers	340	715 510 fluctuating	800 450	**815** **470**	26/07/11 0.90 03/08/11 1.3
Comet	Lake Brown The Lake Comet Weir	338	745 645 790	745 650 770	**765** **655** **772**	25/05/11 0.14 07/09/11 1.18 22/08/11 0.22
Upper Nogoa	Craigmore	275	1050	1140	**1080**	**24/08/11** 0.64
Lower Nogoa/ Theresa Creek	Sandy Ck Valeria Gregory Hwy Duckponds	340/720	525 1970 800 820	535 1990 510 445	**540** **-** **725** **450**	12/07/11 0.004 13/07/11 dry 07/07/11 0.14 15/07/11 2.45
Lower Isaac	Yatton	400	720	695	**680**	10/08/2011 4.3
Connors	Pink Lagoon	465	740	655	**660**	24/06/11 4.0
Mackenzie	Riley's Xing Coolmaringa	330	830 700	670 590	**610** **610**	22/08/11 2.8 29/06/11 8.6
Fitzroy	The Gap	445	715	760	**820**	08/08/11 20.0
Isaac	- - Bee Ck u/s Hail Ck Rd Bee Ck Hail Ck Rd Bee Ck Suttor Dev Rd Cooper Ck at Suttor Dev Rd Nebo Ck at Suttor Dev Rd Denison Ck Oxford Dns-Sarina Rd Funnel Ck Marlbrough Sarina Rd Boothill Ck Marlbrough Sarina Rd Connors R Marlborough Sarina Rd	720	25h August - - 2520 1370 1730 820 740/750 584 794 728	**2nd** September - 3540 3120 1720 - 675 770/770 510 792 598		Spot readings from calibrated instrument. Sites not sampled where flow has ceased. U/S rail/ D/S rail

Queensland

Environmental Protection Act 1994

Environmental Protection (Water) Policy 2009

Reprinted as in force on 16 July 2010

Reprint No. 1B

This reprint is prepared by
the Office of the Queensland Parliamentary Counsel

Information about this reprint

This policy is reprinted as at 16 July 2010. The reprint—

- shows the law as amended by all amendments that commenced on or before that day (Reprints Act 1992 s 5(c))
- incorporates all necessary consequential amendments, whether of punctuation, numbering or another kind (Reprints Act 1992 s 5(d)).

The reprint includes a reference to the law by which each amendment was made—see list of legislation and list of annotations in endnotes. Also see list of legislation for any uncommenced amendments.

This page is specific to this reprint. See previous reprints for information about earlier changes made under the Reprints Act 1992. A table of reprints is included in the endnotes.

Also see endnotes for information about—

- **when provisions commenced**
- **editorial changes made in earlier reprints.**

Spelling

The spelling of certain words or phrases may be inconsistent in this reprint or with other reprints because of changes made in various editions of the Macquarie Dictionary (for example, in the dictionary, 'lodgement' has replaced 'lodgment'). Variations of spelling will be updated in the next authorised reprint.

Dates shown on reprints

Reprints dated at last amendment All reprints produced on or after 1 July 2002, authorised (that is, hard copy) and unauthorised (that is, electronic), are dated as at the last date of amendment. Previously reprints were dated as at the date of publication. If an authorised reprint is dated earlier than an unauthorised version published before 1 July 2002, it means the legislation was not further amended and the reprint date is the commencement of the last amendment.

If the date of an authorised reprint is the same as the date shown for an unauthorised version previously published, it merely means that the unauthorised version was published before the authorised version. Also, any revised edition of the previously published unauthorised version will have the same date as that version.

Replacement reprint date If the date of an authorised reprint is the same as the date shown on another authorised reprint it means that one is the replacement of the other.

Queensland

Environmental Protection (Water) Policy 2009

Contents

Contents

Environmental Protection (Water) Policy 2009

[as amended by all amendments that commenced on or before 16 July 2010]

Part 1 Preliminary

1 Short title

This policy may be cited as the *Environmental Protection (Water) Policy 2009*.

2 Definitions

The dictionary in schedule 2 defines particular words used in this policy.

Part 2 Application and purpose of policy

3 Application of policy

This policy applies to all Queensland waters.

4 Purpose of policy

The purpose of this policy is to achieve the object of the Act in relation to Queensland waters.

Note—

See section 3 of the Act.

5 How purpose of policy is achieved

The purpose of this policy is achieved by—

(a) identifying environmental values and management goals for Queensland waters; and

(b) stating water quality guidelines and water quality objectives to enhance or protect the environmental values; and

(c) providing a framework for making consistent, equitable and informed decisions about Queensland waters; and

(d) monitoring and reporting on the condition of Queensland waters.

Part 3 Basic concepts

6 Environmental values to be enhanced or protected

(1) The environmental values of waters to be enhanced or protected under this policy are—

(a) for water mentioned in schedule 1, column 1—the environmental values stated in the document opposite the water in schedule 1, column 2; or

(b) for other water—the environmental values stated in subsection (2).

(2) For subsection (1)(b), the environmental values are as follows—

(a) for high ecological value waters—the biological integrity of an aquatic ecosystem that is effectively unmodified or highly valued;

(b) for slightly disturbed waters—the biological integrity of an aquatic ecosystem that has effectively unmodified biological indicators, but slightly modified physical, chemical or other indicators;

(c) for moderately disturbed waters—the biological integrity of an aquatic ecosystem that is adversely affected by human activity to a relatively small but measurable degree;

(d) for highly disturbed waters—the biological integrity of an aquatic ecosystem that is measurably degraded and of lower ecological value than waters mentioned in paragraphs (a) to (c);

(e) for waters that may be used for producing aquatic foods for human consumption—the suitability of the water for producing the foods for human consumption;

(f) for waters that may be used for aquaculture—the suitability of the water for aquacultural use;

(g) for waters that may be used for agricultural purposes—the suitability of the water for agricultural purposes;

(h) for waters that may be used for recreation or aesthetic purposes, the suitability of the water for—

(i) primary recreational use; or

(ii) secondary recreational use; or

(iii) visual recreational use;

(i) for waters that may be used for drinking water—the suitability of the water for supply as drinking water;

(j) for waters that may be used for industrial purposes—the suitability of the water for industrial use;

(k) the cultural and spiritual values of the water.

(3) In this section—

cultural and spiritual values, of water, means its aesthetic, historical, scientific, social or other significance, to the present generation or past or future generations.

primary recreational use, of water, means full body contact with the water, including, for example, diving, swimming, surfing, waterskiing and windsurfing.

secondary recreational use, of water, means contact other than full body contact with the water, including, for example, boating and fishing.

visual recreational use, of water, means viewing the water without contact with it.

7 Indicators and water quality guidelines for environmental values

(1) An ***indicator*** for an environmental value is a physical, chemical, biological or other property that can be measured or decided in a quantitative way.

Examples—

- The concentration of nutrients and pH value are types of chemical indicators.
- Secchi disc clarity is a type of physical indicator.
- Seagrass depth range, macro-invertebrate family richness and percentage of exotic fish are types of biological indicators.

(2) ***Water quality guidelines*** are quantitative measures or statements for indicators, including contaminant concentration or sustainable load measures of water, that protect a stated environmental value.

(3) For particular water, the indicators and water quality guidelines for an environmental value are—

(a) decided using the following documents—

(i) site specific documents for the water;

(ii) the QWQ guidelines;

(iii) the AWQ guidelines;

(iv) other relevant documents published by a recognised entity; and

(b) for water mentioned in schedule 1, column 1—the indicators stated in the document opposite the water in schedule 1, column 2.

(4) To the extent of any inconsistency between the documents mentioned in subsection (3)(a) for a particular water quality guideline, the documents are to be used in the order in which they are listed in that subsection.

(5) In this section—

sustainable load measure, of water, means the maximum concentration of contaminants the water can accommodate while achieving the water quality objectives for the water.

8 When environmental values are protected

For this policy, the environmental values for particular water are protected if the measures for all indicators do not exceed the water quality guidelines stated for the indicators.

Part 4 Management goals and water quality objectives for waters

9 Management goals

The management goals for water mentioned in schedule 1, column 1 are the goals, if any, stated in the document opposite the water in schedule 1, column 2.

Examples of management goals—

- to maintain an area, composition and condition of seagrass beds, reefs or mangroves
- to maintain a stated level of diversity of fish species

10 Water quality objectives

(1) The water quality objectives for water mentioned in schedule 1, column 1 are—

(a) the objectives stated in the document opposite the water in schedule 1, column 2; or

(b) if water quality objectives for the water are not stated in the document—the set of water quality guidelines that will protect all environmental values stated in the document.

(2) The water quality objectives for water not mentioned in schedule 1, column 1 are the set of water quality guidelines for all indicators that will protect all environmental values for the water.

(3) However, water quality objectives do not apply to—

(a) water in swimming pools; and

(b) drinking water in a domestic water supply system, including, for example, water in a local government or privately owned water supply system; and

(c) waste water in a storage including, for example, a sewage lagoon, mine tailings dam, irrigation tailwater dam and piggery or dairy waste water pond; and

(d) water in a pond used for aquaculture; and

(e) water in a stormwater treatment system.

11 Identifying environmental values etc. for waters

(1) This section applies to water not mentioned in schedule 1, column 1.

(2) For developing a document about particular water for inclusion in schedule 1, the chief executive may, in cooperation with the chief executive (fisheries), identify—

(a) the environmental values to be protected for the water; and

(b) the water quality objectives for the water; and

(c) ways to improve the quality of the water.

(3) In identifying the matters mentioned in subsection (2), the chief executive must ensure there has been—

(a) consultation with the community, including industry and commerce sectors; and

(b) consideration of the economic and social impacts of protecting environmental values for the water.

(4) Also, the chief executive may identify water quality objectives for the water that provide a lower level of protection of the environmental values for the water than the water quality guidelines mentioned in section 10(2) only if—

(a) the adoption of the water quality guidelines would involve unacceptable economic or social impacts on the community; and

(b) the water quality objectives are an improvement on existing water quality.

12 Amending waters in sch 1

(1) The chief executive may replace a document stated in schedule 1, column 2 for particular water only if—

(a) there has been consultation with the community, including industry and commerce sectors; and

(b) the chief executive has considered the economic and social impacts of protecting environmental values for the water.

(2) However, subsection (1) does not apply to a replacement document if—

(a) the purpose of the replacement is only to correct a minor error, or make another change that is not a change of substance; or

(b) the document being replaced states that an amendment of a stated type may be made to the document under this subsection, and the purpose of the replacement is only to make an amendment of the stated type.

Part 5 Management of activities

13 Management hierarchy for surface or ground water

(1) This section states the management hierarchy for an activity that may affect water.

Note—

See the *Environmental Protection Regulation 2008*, section 51.

(2) To the extent it is reasonable to do so, release of waste water or contaminants to waters must be dealt with using the following hierarchy of preferred procedures—

(a) step 1—evaluate water conservation measures to reduce the use of water and the production of waste water or contaminants;

(b) step 2—evaluate waste prevention options and implement appropriate waste prevention measures;

(c) step 3—if waste prevention does not, or is not likely to, eliminate the release of waste water or contaminants to waters, evaluate treatment and recycling options and implement appropriate treatment and recycling;

(d) step 4—if treatment and recycling does not, or is not likely to, eliminate the release of waste water or contaminants to waters, evaluate the following options for waste water or contaminants, in the order in which they are listed—

(i) appropriate treatment and release to a waste facility or sewer;

(ii) appropriate treatment and release to land;

(iii) appropriate treatment and release to surface waters or ground waters.

(3) In this section—

appropriate treatment, of waste water or contaminants, means—

(a) for release to a sewerage service provider's waste facility or sewer—treatment that meets the service provider's requirements for the release to the waste facility or sewer; or

(b) for release to land—treatment that ensures the release to land is ecologically sustainable; or

(c) for release to surface waters or ground waters—treatment that ensures the release will not affect the environmental values for the waters.

waste facility means a facility for the recycling, reprocessing, treatment, storage, incineration, conversion to energy or disposal of waste.

14 Management intent for waters

(1) This section states the management intent for waters subject to an activity that involves the release of waste water or contaminants to the waters.

Note—

See the *Environmental Protection Regulation 2008*, section 51.

(2) It is the management intent for the waters that the decision to release the waste water or contaminant must ensure the following—

(a) for high ecological value waters—the measures for the indicators for all environmental values are maintained;

(b) for slightly disturbed waters—the measures for the slightly modified physical or chemical indicators are progressively improved to achieve the water quality objectives for high ecological value water;

(c) for moderately disturbed waters—

(i) if the measures for indicators of the environmental values achieve the water quality objectives for the water—the measures for the indicators are maintained at levels that achieve the water quality objectives for the water; or

(ii) if the measures for indicators of the environmental values do not achieve the water quality objectives for the water—the measures for indicators of the environmental values are improved to achieve the water quality objectives for the water;

(d) for highly disturbed waters—the measures for the indicators of all environmental values are progressively improved to achieve the water quality objectives for the water.

Part 6 Environmental plans

Division 1 Preliminary

15 Purpose of policy to be considered

In developing and implementing an environmental plan under this part, a local government or sewerage service provider must consider the purpose of this policy and how the purpose is to be achieved.

Notes—

See sections 4 (Purpose of policy) and 5 (How purpose of policy is achieved).

See also section 358 (When order may be issued) of the Act for when the administering authority may issue an environmental protection order to secure compliance with this policy.

16 Development and implementation of environmental plans

(1) If, under this part, a local government or sewerage service provider must develop and implement an environmental plan about trade waste management, it must develop and start implementing the plan within 1 year after the commencement of this policy.

(2) If, under this part, a local government must develop and implement an environmental plan other than a plan about trade waste management, it must develop and start implementing the plan—

(a) for a distributor-retailer's participating local government—before 1 July 2012; or

(b) for a large local government, other than a distributor-retailer's participating local government—before 1 July 2013; or

(c) for another local government—before 1 July 2014.

(3) In this section—

large local government means a local government having a local government area with a population of more than 50000.

17 Reporting and review of environmental plans

(1) The local government or sewerage service provider must—

(a) after an environmental plan has been developed, and certified and endorsed under section 23—publish the plan on its website; and

(b) within 4 years after the plan is published under paragraph (a)—give the chief executive a report on the plan's implementation; and

(c) within 5 years after the plan is published under paragraph (a)—review and update the plan.

(2) The chief executive may at any time require a local government or sewerage service provider to review and amend its environmental plans.

18 Compliance with part

A local government may comply with a requirement under this part to develop and implement an environmental plan by using and implementing a plan prepared by it that complies

with this policy, even though the plan was not originally prepared for this policy.

Division 2 Environmental plans—local governments and sewerage service providers

19 Total water cycle management—general

(1) A following local government must develop and implement an environmental plan about water cycle management for its local government area (a ***total water cycle management plan***)—

(a) a distributor-retailer's participating local government;

(b) a local government, other than a distributor-retailer's participating local government, if its local government area has a population of at least 25000;

(c) another local government if the chief executive requires it to develop and implement a total water cycle management plan, having regard to the water management requirements for the local government's area, including any results of ambient monitoring carried out under section 26.

Note—

In making a water netserv plan under the *South-East Queensland Water (Distribution and Retail Restructuring) Act 2009*, a distributor-retailer must, under section 99BQ(1)(c) of that Act, have regard to each of its participating local governments' total water cycle management plans.

(2) A local government's total water cycle management plan must include provisions about—

(a) the collection, treatment and recycling of waste water, stormwater, ground water and other water sources; and

(b) the integration of water use in its area.

(3) In developing and implementing the plan, the local government must have regard to—

(a) any guidelines published by the department about water cycle management; and

(b) any regional water security program made under the *Water Act 2000*, section 360M applying to its local government area; and

(c) any regional water supply strategy applying to its local government area; and

(d) for a local government within the SEQ region, each of the following plans, to the extent the plan applies to its local government area—

(i) SEQ regional plan;

(ii) any sub-regional total water cycle management plan under the SEQ regional plan.

(4) The local government must consider including in the plan—

(a) a strategy for demand management for water in its local government area; and

(b) ways to increase recycling of waste water and stormwater for purposes including, for example, industrial or agricultural purposes; and

(c) ways to use recycled waste water; and

(d) opportunities for stormwater harvesting for use as a water source; and

(e) the impacts of existing and future land use in the area on water cycle management, including the following—

(i) impacts of the use on the natural flow of waters;

(ii) impacts of the use on water quality objectives for waters;

(iii) the risks to drinking water supplies caused by the use; and

(f) a forecast of the water supply requirements for the area.

Note—

For other matters that must be included in the plan, see sections 20 to 22.

(5) If, under subsection (1)(b), the chief executive requires a local government to develop and implement a total water cycle management plan, the chief executive must advise the local government about the requirement in writing.

(6) In this section—

demand management, for water, see the *Water Supply (Safety and Reliability) Act 2008*, schedule 3.

regional water supply strategy means a document about short-term and long-term water supply security for particular regions, published by the department.

Note—

Regional water supply strategies are available on the department's website at <www.derm.qld.gov.au>.

SEQ regional plan means the regional plan for the SEQ region under the Planning Act.

20 Total water cycle management—sewage management

(1) A local government's total water cycle management plan must include provisions about the following for each waste water treatment plant in its local government area—

(a) effluent management;

(b) waste water recycling;

(c) sewerage system overflows;

(d) biosolids management.

(2) The local government must consider including in the plan provisions about—

(a) ways of improving effluent quality, reducing effluent contaminant loads and toxicity and increasing waste water recycling for the waste water treatment plant; and

(b) for water into which waste water may be released—

(i) the water quality objectives for the water; and

(ii) monitoring and reporting of releases of waste water; and

(iii) ambient monitoring of the water; and

(c) the maintenance of acceptable health risks; and

(d) ways of reducing infiltration to sewers; and

(e) minimising sewerage system overflows in a way that is consistent with the AWQ guidelines; and

(f) if the local government's area includes a boat harbour, marina or mooring, the management of sewage collected from vessels at the boat harbour, marina or mooring; and

(g) the management of biosolids in a way that is consistent with the document called 'Management for beneficial re-use of biosolids for sewage treatment plants July 2006', published by the department; and

(h) the health and safety of people working on the sewerage service.

21 Total water cycle management—urban stormwater quality management

(1) A local government's total water cycle management plan must include provisions about its stormwater quality management to improve the quality and flow of stormwater in ways that protect the environmental values of waters affected by the local government's urban stormwater system.

(2) The local government must consider including in the plan provisions about—

(a) identifying urban stormwater quality management needs for developed and developing areas that are consistent with the local government's priority infrastructure plan under the Planning Act; and

(b) the opportunities for stormwater harvesting, recycling or re-use; and

(c) incorporating water sensitive urban design in developed areas within a stated period; and

(d) managing urban stormwater quality and flows for development in the local government's area, having regard to the following documents—

(i) any site specific documents;

(ii) the QWQ guidelines;

(iii) relevant guidelines published by the department about stormwater quality; and

(e) monitoring and reporting processes for stormwater quality management.

22 Trade waste management

(1) This section applies to a local government or other entity that is a sewerage service provider, if the local government or entity permits trade waste to enter its sewerage services.

Note—

However, see the *South-East Queensland Water (Distribution and Retail Restructuring) Act 2009*, section 100A for how this section applies to a distributor-retailer under that Act.

(2) The local government or entity must develop and implement an environmental plan about trade waste management to control trade waste entering its sewerage services.

(3) The local government or other entity must consider including in the plan—

(a) requirements for waste prevention, treatment and recycling before the release of trade waste to a sewer may be authorised; and

(b) provisions about the effect of trade waste on—

(i) the receiving environment into which the trade waste is released; and

(ii) the end use of waters to which trade waste is being released; and

(iii) the materials used to construct the local government's or entity's sewerage service; and

(iv) the health and safety of people working on the sewerage service; and

(v) the treatment capabilities of waste water treatment plants; and

(c) a process for carrying out regular reviews of the quantity and content of trade waste entering the sewerage service.

(4) If a local government is required under section 19 to develop and implement a total water cycle management plan, the local government's plan about trade waste management must be included in its total water cycle management plan.

23 Certification and endorsement of plans

(1) This section applies to the following—

(a) a plan to which section 18 applies;

(b) a total water cycle management plan;

(c) a management plan about trade waste management.

(2) Each plan must—

(a) be independently certified by a registered professional engineer under the *Professional Engineers Act 2002* as complying with this policy; and

(b) if the plan is developed and implemented by a distributor-retailer's participating local government—be endorsed by the distributor-retailer.

(3) The certification must include the engineer's name and registration details.

Division 3 Other environmental plans

24 Healthy waters management plans

(1) The chief executive may, in cooperation with the chief executive (fisheries), develop and implement an environmental plan about water (a ***healthy waters management plan***) to decide ways to improve the quality of the water.

(2) Also, a recognised entity, in cooperation with the chief executive, may develop and implement a healthy waters management plan.

(3) A healthy waters management plan for water must—

(a) describe the water to which the plan applies; and

(b) include an assessment of the following for the water—

(i) any threats to water-dependent ecosystems;

(ii) any matters that may adversely affect the use of the water as a supply of drinking water;

(iii) any matters that may adversely affect the natural flows of the water; and

(c) if environmental values and water quality objectives for the water are stated in a document mentioned in schedule 1, column 2—include the environmental values and water quality objectives; and

(d) if environmental values and water quality objectives have not been established for the water—include proposed environmental values, management goals and water quality guidelines for the water; and

(e) if a water resource plan under the *Water Act 2000* applies to the water—include the environmental flow objectives for the plan and ecological outcomes stated in the plan for the water; and

(f) identify ways to protect the environmental values for the water, and to monitor and assess the effectiveness of the protection.

(4) In developing and implementing the plan, the chief executive or entity must have regard to any guidelines published by the department about healthy waters management plans.

Part 7 Functions of chief executive

25 Community awareness and involvement

(1) This section applies if the chief executive decides to develop and implement a plan to—

(a) raise community awareness of issues about water quality; and

(b) involve the community in water quality management.

(2) The chief executive must consider including in the plan—

(a) a description of the issues about water quality; and

(b) ways to raise community awareness and understanding about water quality policy, planning and management; and

(c) ways to improve levels of community consultation in relation to water quality management, including consultation carried out under this policy; and

(d) ways to better inform the community of issues about water quality management.

26 Ambient monitoring

(1) If the chief executive carries out a program of ambient monitoring of waters to assess the state of Queensland waters, the chief executive must—

(a) carry out the monitoring under—

(i) the document called 'Monitoring and Sampling Manual 2009' published by the department; and

(ii) the AWQ guidelines; and

Editor's note—

The document called 'Monitoring and Sampling Manual 2009' may be inspected at the department's office at level 3, 400 George Street, Brisbane and on the department's website at <www.derm.qld.gov.au>.

(b) publish the results of the monitoring on the department's website; and

(c) prepare a report about the results of the monitoring.

(2) To the extent of any inconsistency between the documents mentioned in subsection (1)(a), the document mentioned in subsection (1)(a)(i) prevails.

(3) If practicable, a comparison of ambient monitoring results with the water quality objectives for, and freshwater flows to, the water during the time of the monitoring must be included in the report.

(4) For a report prepared under this section, if the measure of an indicator does not comply with a water quality guideline because of a natural property of the water, the measure of the indicator is taken to comply with the water quality guideline.

(5) If the results of monitoring show the water quality objectives for the water have not been met, the chief executive may investigate the reasons why the water fails to meet the water quality objectives.

Part 8 Miscellaneous

27 Operation of sch 1

The boundaries of water mentioned in schedule 1, column 1 are the boundaries identified in the document stated opposite the water in schedule 1, column 2.

Editor's note—

A document mentioned in schedule 1 may be inspected at the department's office at level 3, 400 George Street, Brisbane and on the department's website at <www.derm.qld.gov.au>.

Part 9 Repeal and transitional provisions

Division 1 Repeal provision

28 Repeal

The Environmental Protection (Water) Policy 1997, SL No. 136 is repealed.

Division 2 Transitional provisions

29 Definitions for div 2

In this division—

commencement means the day this section commences.

repealed policy means the repealed *Environmental Protection (Water) Policy 1997*.

30 Effect of particular environmental plans

(1) This section applies if—

(a) a local government must, under this policy, develop and implement a total water cycle management plan; and

(b) on the commencement, the local government has any of the following plans developed under the repealed policy—

(i) an environmental plan about sewage management;

(ii) an environmental plan about stormwater quality management; and

(c) the plans mentioned in paragraph (b) comply with the requirements under this policy for a part of a total water cycle management plan.

(2) The local government's plan developed under the repealed policy is taken to be a plan to which section 18 applies.

31 Effect of trade waste management plan

(1) This section applies if—

(a) a local government must, under this policy, develop and implement an environmental plan about trade waste management; and

(b) on the commencement, the local government has an environmental plan about trade waste management developed under the repealed policy; and

(c) the plan mentioned in paragraph (b) complies with the requirements of this policy for an environmental plan about trade waste management.

(2) The local government's plan about trade waste management developed under the repealed policy is taken to be a plan about trade waste management under section 22.

32 Application of ss 16 and 17 to particular local governments

(1) This section applies to a local government required to develop and implement a total water cycle management plan under 19(1)(b).

(2) Sections 16 and 17 apply to the local government as if the references in the sections to the commencement of this policy were a reference to the day the local government was advised by the chief executive about the requirement under section 19(5).

33 References to repealed policy

In an Act or document, a reference to the repealed policy may, if the context permits, be taken as a reference to this policy.

Schedule 1 Environmental values and water quality objectives for waters

sections 6 and 10

Column 1 Water		Column 2 Document
Name	**Description**	
Albert River, including all tributaries of the river	part of basin 145	Albert River Environmental Values and Water Quality Objectives, published by the department in July 2010
Bloomfield River, including all tributaries of the river	part of basin 108	Bloomfield River Environmental Values and Water Quality Objectives, published by the department in July 2010
Bremer River, including all tributaries of the river	part of basin 143	Bremer River Environmental Values and Water Quality Objectives, published by the department in July 2010
Brisbane River, including all tributaries of the Brisbane River other than Bremer River, Lockyer Creek, Oxley Creek and Stanley River	part of basin 143	Brisbane River Environmental Values and Water Quality Objectives, published by the department in July 2010

Column 1 Water		Column 2 Document
Name	**Description**	
Brisbane creeks—Bramble Bay, including Bald Hills, Cabbage Tree, Downfall, Kedron Brook, Nudgee and Nundah creeks	part of basin 142	Brisbane Creeks—Bramble Bay Environmental Values and Water Quality Objectives, published by the department in July 2010
Broadwater, including— • Biggera and Loders creeks • the Broadwater and all creeks of the Broadwater catchment • Runaway Bay	part of basin 146	Broadwater Environmental Values and Water Quality Objectives, published by the department in July 2010
Burrum, Gregory, Isis, Cherwell and Elliott rivers, including all Hervey Bay coastal rivers and creeks	basin 137	Burrum, Gregory, Isis, Cherwell and Elliott Rivers Environmental Values and Water Quality Objectives, published by the department in July 2010
Caboolture River, including all tributaries of the river	part of basin 142	Caboolture River Environmental Values and Water Quality Objectives, published by the department in July 2010

Column 1 Water		Column 2 Document
Name	**Description**	
Coomera River, including all tributaries of the river	part of basin 146	Coomera River Environmental Values and Water Quality Objectives, published by the department in July 2010
Currumbin and Tallebudgera creeks and Pacific Beaches, including— • all tributaries of Currumbin and Tallebudgera creeks • all creeks of the Pacific Beaches catchment	part of basin 146	Currumbin and Tallebudgera Creeks Environmental Values and Water Quality Objectives, published by the department in July 2010
Daintree River, including all tributaries of the river	part of basin 108	Daintree River Environmental Values and Water Quality Objectives, published by the department in July 2010
Douglas central coastal creeks, including all coastal creeks between Mowbray River and Mossman River	part of basin 109	Douglas Central Coastal Creeks Environmental Values and Water Quality Objectives, published by the department in July 2010
Douglas coastal waters	adjacent to basins 108 and 109	Douglas Coastal Waters Environmental Values and Water Quality Objectives, published by the department in July 2010

Column 1 Water		Column 2 Document
Name	**Description**	
Douglas northern coastal creeks, including all coastal creeks north of Daintree River and east of Bloomfield River	part of basin 108	Douglas Northern Coastal Creeks Environmental Values and Water Quality Objectives, published by the department in July 2010
Douglas southern coastal creeks, including all coastal creeks between Mowbray River and Simpson Point	part of basin 109	Douglas Southern Coastal Creeks Environmental Values and Water Quality Objectives, published by the department in July 2010
Fraser Island waters	basin 139	Fraser Island Environmental Values and Water Quality Objectives, published by the department in July 2010
Great Sandy Strait and coastal creeks	part of basin 140 and adjacent to basins 137, 138 and 139	Great Sandy Strait and Coastal Creeks Environmental Values and Water Quality Objectives, published by the department in July 2010
Hervey Bay	adjacent to basins 137 and 139	Hervey Bay Environmental Values and Water Quality Objectives, published by the department in July 2010
Lockyer Creek, including all tributaries of the creek	part of basin 143	Lockyer Creek Environmental Values and Water Quality Objectives, published by the department in July 2010

Column 1 Water		Column 2 Document
Name	**Description**	
Logan River, including all tributaries of the river	part of basin 145	Logan River Environmental Values and Water Quality Objectives, published by the department in July 2010
Maroochy River, including all tributaries of the river	part of basin 141	Maroochy River Environmental Values and Water Quality Objectives, published by the department in July 2010
Mary River, including all tributaries of the river	basin 138	Mary River Environmental Values and Water Quality Objectives, published by the department in July 2010
Mooloolah River, including all tributaries of the river	part of basin 141	Mooloolah River Environmental Values and Water Quality Objectives, published by the department in July 2010
Moreton Bay	basin 144 and adjacent to basins 141 to 143, 145 and 146	Moreton Bay, North Stradbroke, South Stradbroke, Moreton and Moreton Bay Islands Environmental Values and Water Quality Objectives, published by the department in July 2010
Mossman River, including all tributaries of the river	part of basin 109	Mossman River Environmental Values and Water Quality Objectives, published by the department in July 2010
Mowbray River, including all tributaries of the river	part of basin 109	Mowbray River Environmental Values and Water Quality Objectives, published by the department in July 2010

Column 1 Water		Column 2 Document
Name	**Description**	
Nerang River, including all tributaries of the river	part of basin 146	Nerang River Environmental Values and Water Quality Objectives, published by the department in July 2010
Noosa River, including— • Kin Kin creek • Teewah coastal creeks • lakes Cooroibah, Cootharaba, Doonella and Weyba	part of basin 140	Noosa River Environmental Values and Water Quality Objectives, published by the department in July 2010
Oxley Creek, including all tributaries of the creek	part of basin 143	Oxley Creek Environmental Values and Water Quality Objectives, published by the department in July 2010
Pimpama River, including— • Behm and McCoys creeks • southern Moreton Bay coastal creeks	part of basin 146	Pimpama River Environmental Values and Water Quality Objectives, published by the department in July 2010

Column 1 Water		Column 2 Document
Name	**Description**	
Pine rivers and Redcliffe creeks, including— • Hays Inlet • all tributaries of the North Pine and South Pine rivers	part of basin 142	Pine Rivers and Redcliffe Creeks Environmental Values and Water Quality Objectives, published by the department in July 2010
Pumicestone Passage, including— • waters of Bribie Island • Bells, Coochin, Dux, Elimbah, Mellum, Ningi and Tibrogargan creeks	part of basin 141	Pumicestone Passage Environmental Values and Water Quality Objectives, published by the department in July 2010
Redland creeks, including Coolnwynpin, Eprapah, Hilliards, Lota, Moogurrapum, Tarradarrapin, Tingalpa and Wynnum creeks	part of basin 145	Redland Creeks Environmental Values and Water Quality Objectives, published by the department in July 2010
Saltwater Creek, including all tributaries of the creek	part of basin 108	Saltwater Creek Environmental Values and Water Quality Objectives, published by the department in July 2010

Column 1 Water		Column 2 Document
Name	**Description**	
Sandy, Six Mile, Wolston, Woogaroo and Goodna creeks including all tributaries of the creeks	part of basin 143	Sandy, Six Mile, Wolston, Woogaroo and Goodna Creeks Environmental Values and Water Quality Objectives, published by the department in July 2010
Stanley River, including all tributaries of the river	part of basin 143	Stanley River Environmental Values and Water Quality Objectives, published by the department in July 2010
Trinity Inlet	part of basin 111	Trinity Inlet Environmental Values and Water Quality Objectives, published by the department in July 2010

Editor's note—

A copy of each plan may be inspected on the department's website at <www.derm.qld.gov.au>.

Schedule 2 Dictionary

section 2

ambient monitoring, of water, includes assessing, analysing, examining, inspecting, measuring or reporting on the following—

(a) the quantity, quality and characteristics of water;

(b) the effectiveness of control, remedial or rehabilitation measures on the matters mentioned in paragraph (a).

aquatic ecosystem means a community of organisms living within or adjacent to water, including riparian or foreshore areas.

AWQ guidelines means the national guidelines made by the Commonwealth under the program known as the National Water Quality Management Strategy, published by the Natural Resource Management Ministerial Council.

basin, followed by a number, means the river basin of that number described in 'Australia's River Basins 1997', 3rd edition, published by Geoscience Australia, Commonwealth of Australia, in 2004.

Editor's note—

A map showing the river basins in Queensland can also be viewed on the department's website at <www.derm.qld.gov.au>.

biological integrity, of water, means the water's ability to support and maintain a balanced, integrative, adaptive community of organisms having a species composition, diversity and functional organisation comparable to that of the natural habitat of the locality in which the water is situated.

Examples—

The following are examples of biological integrity of water—

(a) the intrinsic value of an aquatic ecosystem that is effectively unmodified or highly valued;

(b) its ability to support associated wildlife;

(c) its ability to produce food for human consumption.

chief executive (fisheries) means the chief executive of the department in which the *Fisheries Act 1994* is administered.

commencement see section 29.

contaminated stormwater means stormwater that contains a contaminant.

distributor-retailer see the *South-East Queensland Water (Distribution and Retail Restructuring) Act 2009*, schedule.

environmental values means the environmental values mentioned in section 6.

ground water means water that occurs naturally in, or is introduced artificially into, an aquifer.

healthy waters management plan see section 24(1).

high ecological value waters means waters in which the biological integrity of the water is effectively unmodified or highly valued.

highly disturbed waters means waters that are significantly degraded by human activity and have lower ecological value than high ecological value waters or slightly or moderately disturbed waters.

indicator see section 7(1).

moderately disturbed waters means waters in which the biological integrity of the water is adversely affected by human activity to a relatively small but measurable degree.

participating local governments, for a distributor-retailer, see the *South-East Queensland Water (Distribution and Retail Restructuring) Act 2009*, section 5.

Queensland regional NRM body means a Queensland regional natural resource management body under the Commonwealth program known as 'Caring for Our Country'.

QWQ guidelines means the document called 'Queensland water quality guidelines 2009' published by the department.

Editor's note—

A copy of the guidelines may be inspected at the department's office at level 3, 400 George Street, Brisbane and on the department's website at <www.derm.qld.gov.au>.

recognised entity means—

(a) a local government; or

(b) a public sector unit; or

(c) an agency of the Commonwealth or another State, however called, with similar functions to the functions of the chief executive under this policy; or

(d) a ministerial council established by the Council of Australian Governments; or

(e) the Commonwealth Scientific and Industrial Research Organisation; or

(f) a research centre completely or partly funded by the Commonwealth; or

(g) an Australian university; or

(h) a Queensland regional NRM body; or

(i) Healthy Waterways Limited ACN 137 943 554.

recycling, of waste water, means—

(a) re-using the waste water in the process that generated it; or

(b) re-processing the waste water to develop a new product; or

(c) using the waste water (whether on or off the site where it is generated).

repealed policy see section 29.

sewerage service means—

(a) sewage treatment; or

(b) the collection and transmission of sewage through infrastructure; or

(c) the disposal of sewage or effluent.

sewerage service provider see the *Water Supply (Safety and Reliability) Act 2008*, schedule 3.

site specific document means a document that—

(a) contains specific information about a water, or part of a water; and

(b) is recognised by the chief executive as having appropriate scientific authority.

slightly disturbed waters means waters that have the biological integrity of high ecological value waters with slightly modified physical or chemical indicators but effectively unmodified biological indicators.

stormwater treatment system means a system used for managing stormwater quality, quantity and flows.

surface waters means waters other than ground waters.

total water cycle management plan see section 19(1).

trade waste see the *Water Supply (Safety and Reliability) Act 2008*, schedule 3.

waste prevention means the adoption of practices or processes that avoid generating waste or reduce the quantity of waste requiring subsequent treatment, recycling or disposal.

waste water means aqueous waste, and includes contaminated stormwater.

waste water treatment plant includes a sewage treatment plant, advanced waste water treatment plant, water reclamation plant, industrial waste water treatment system and any other plant whose primary function is to treat waste water.

water quality guidelines see section 7(2).

water quality objectives, for water, are the objectives identified under section 10 for protecting the environmental values for the water.

waters includes the bed and banks of waters.

water sensitive urban design means urban planning or design that integrates water cycle management.

Endnotes

1 Index to endnotes

2 Date to which amendments incorporated

This is the reprint date mentioned in the Reprints Act 1992, section 5(c). Accordingly, this reprint includes all amendments that commenced operation on or before 16 July 2010. Future amendments of the Environmental Protection (Water) Policy 2009 may be made in accordance with this reprint under the Reprints Act 1992, section 49.

3 Key

Key to abbreviations in list of legislation and annotations

Key		Explanation	Key		Explanation
AIA	=	Acts Interpretation Act 1954	(prev)	=	previously
amd	=	amended	proc	=	proclamation
amdt	=	amendment	prov	=	provision
ch	=	chapter	pt	=	part
def	=	definition	pubd	=	published
div	=	division	R[X]	=	Reprint No. [X]
exp	=	expires/expired	RA	=	Reprints Act 1992
gaz	=	gazette	reloc	=	relocated
hdg	=	heading	renum	=	renumbered
ins	=	inserted	rep	=	repealed
lap	=	lapsed	(retro)	=	retrospectively
notfd	=	notified	rv	=	revised edition
num	=	numbered	s	=	section
o in c	=	order in council	sch	=	schedule
om	=	omitted	sdiv	=	subdivision
orig	=	original	SIA	=	Statutory Instruments Act 1992
p	=	page	SIR	=	Statutory Instruments Regulation 2002
para	=	paragraph	SL	=	subordinate legislation
prec	=	preceding	sub	=	substituted
pres	=	present	unnum	=	unnumbered
prev	=	previous			

4 Table of reprints

Reprints are issued for both future and past effective dates. For the most up-to-date table of reprints, see the reprint with the latest effective date.

If a reprint number includes a letter of the alphabet, the reprint was released in unauthorised, electronic form only.

Reprint No.	Amendments included	Effective	Notes
1	none	28 August 2009	
1A	2009 SL No. 280	18 December 2009	
1B	2010 SL No. 185	16 July 2010	

5 List of legislation

Environmental Protection (Water) Policy 2009 SL No. 178
made by the Minister for Climate Change and Sustainability on 18 August 2009
notfd gaz 28 August 2009 pp 1491–6
commenced on date of notification
exp 1 September 2019 (see SIA s 54)
Notes—(1) The expiry date may have changed since this reprint was published. See the latest reprint of the SIR for any change.
(2) An explanatory note was prepared.

amending legislation—

Sustainable Planning Regulation 2009 SL No. 280 ss 1–2, pt 9 div 9
notfd gaz 27 November 2009 pp 1001–6
ss 1–2 commenced on date of notification
remaining provisions commenced 18 December 2009 (see s 2)

Environmental Protection (Water) Amendment Policy (No. 1) 2010 SL No. 185
notfd gaz 16 July 2010 pp 1142–3
commenced on date of notification

6 List of annotations

Environmental values to be enhanced or protected
s 6 amd 2010 SL No. 185 s 3

Development and implementation of environmental plans
s 16 sub 2010 SL No. 185 s 4

Reporting and review of environmental plans
s 17 amd 2010 SL No. 185 s 5

Total water cycle management—general
s 19 amd 2010 SL No. 185 s 6

Total water cycle management—urban stormwater quality management
s 21 amd 2009 SL No. 280 s 74

Trade waste management
s 22 amd 2010 SL No. 185 s 7

Certification and endorsement of plans
prov hdg amd 2010 SL No. 185 s 8(1)
s 23 amd 2010 SL No. 185 s 8(2)

SCHEDULE 1—ENVIRONMENTAL VALUES AND WATER QUALITY OBJECTIVES FOR WATERS
amd 2010 SL No. 185 s 9

SCHEDULE 2—DICTIONARY
def **"distributor-retailer"** ins 2010 SL No. 185 s 10
def **"participating local governments"** ins 2010 SL No. 185 s 10

Guideline

Protecting Environmental Values from Coal Seam Gas Water Discharged to Waters

Water and Ecosystem Outcomes Division, Water Quality and Accounting

Version 1.4

28 October 2010

Queensland Government

Guideline
Protecting Environmental Values from Coal Seam Gas Water Discharged to Waters

Version Number: 1.4

SIGN OFF BY DELEGATED OFFICER:

1. Operationally capable of being implemented			
Endorsed by:	**Position:**	Director, Healthy Waters Policy	**Signature:**
	Date:		
2. Meets business policy and legislative needs			
Endorsed by:	**Position:**	General Manager, Water Quality and Accounting	**Signature:**
	Date:		
3.			
Endorsed by:	**Position:**	DDG, Water Division	**Signature:**
	Date:		
4.			
Endorsed by:	**Position:**	DG, DERM	**Signature:**
	Date:		

Metadata

Item	Details
File No.	
WQA Subject leader	[redacted] Principal Policy Officer
Location	
Review trigger	Annual: Next Scheduled Review Date:

Version History

Version Number	Date	Changed by	Nature of amendment
1.0	20/08/10	[redacted]	Document created following internal consultation
1.1	02/09/10		Document review to incorporate internal comments
1.2	24/09/10		Document review to incorporate internal comments
1.3	04/10/10		Title change as per EMG CSG Sub-Committee comments: Interim Policy to Guideline
1.4	28/10/10		Document review to incorporate UWP&M comments

1. Purpose

The purpose of this document is to provide guidance to decision makers and information on the existing legislative framework to ensure that the disposal of Coal Seam Gas (CSG) water to Queensland waters, including surface and ground waters, is managed to avoid or minimise environmental harm. This includes the scenarios where CSG water is:

- Considered as waste water and disposed of to Queensland waters (including surface waters, and groundwaters via aquifer re-injection or re-charge); or

- Approved for re-use and is being transported and/or stored in waters or returned to waters via overland flow or aquifer recharge.

CSG water under the EP Act s310D (7) means underground water brought to the surface of the earth or moved underground in connection with exploring for or producing coal seam gas. The 'Coal Seam Gas Water Management Policy' provides information on the activity and the department's position with regard to the preferred options for the management of CSG water. The options for disposal of CSG water currently include injection into natural underground reservoirs or aquifers of equal or lesser water quality, direct use of treated CSG water and/or discharge of CSG water to surface waters. The disposal of CSG water directly to surface waters is not a preferred management option. Where injection is technically and economically feasible, operators should inject treated water into aquifers that are under developmental stress and/or are at risk of adverse impact from CSG activity, as a first priority for the use of treated CSG water.

2. Scope

This document is a guideline which outlines, and provides some interpretation of the broad statutory requirements, guidelines and supporting documents as they are relevant to the management of CSG water to protect environmental values. Future versions of this guideline document will include additional reference to the following areas:

- Monitoring and reporting standards;
- Approach to cumulative impacts; and
- Mapping the Department of Environment and Resource Management's roles and responsibilities.

3. Statutory Requirements and Supporting Documents

The statutory bases for managing CSG water discharged to Queensland waters along with supporting documents linked to these statutes are primarily as follows:

State Legislation

- *Environmental Protection Act 1994* (EP Act). The object of the EP Act is to 'protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends (*ecologically sustainable development- ESD)'*. Chapter 5A of the EP Act provides for environmental authorities for petroleum activities which includes CSG activities. The supporting documents include:
  - Coal Seam Gas Water Management Policy

- Guideline: Preparing an Environmental Management Plan for Coal Seam Gas activities
- Guideline: Model conditions for level 1 environmental authorities for coal seam gas activities
- Operational Policy: Waste water discharge to Queensland Waters

- *Environmental Protection Regulation 2008* (EP Reg). This is subordinate legislation made under the EP Act to regulate the protection of the environment.

- *Environmental Protection (Water) Policy 2009* (EPP Water). The purpose of the EPP Water is to 'achieve the object of the EP Act in relation to Queensland waters'. Environmental values and water quality objectives are scheduled in this policy. The supporting documents include:
  - Monitoring and Sampling Manual 2009
  - Queensland Water Quality Guidelines 2009

- *Environmental Protection (Waste Management) Policy 2000*. The object of this policy is to achieve the object of the EP Act in relation to waste management. The policy provides a waste management hierarchy to be applied to the management of CSG water, and principle for identifying environmental protection commitments, objectives and control strategies. The supporting documents include:
  - Guideline: Approval of coal seam gas water for beneficial use

- *Water Act 2000*. To advance sustainable management and efficient use of water and other resources by establishing a system for the planning, allocation and use of water. Water Resource Plans (WRPs) and Resource Operation Plans (ROPs) are developed under the Act.

Commonwealth Legislation

- *Environmental Protection and Biodiversity Conservation Act 1999 (Cth)*. This Commonwealth Act provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places - matters of national environmental significance. DERM is not the administering authority for this legislation.

- Murray Darling Basin Agreement - Schedule 1 of the *Water Act 2007 (Cth)*. The purpose of the agreement is to 'promote and co-ordinate effective planning and management for the equitable, efficient and sustainable use of the water and other natural resources of the Murray-Darling Basin, including by implementing arrangements agreed between the Contracting Governments to give effect to the Basin Plan, the *Water Act* and State water entitlements.' DERM is not the administering authority for this legislation.

4. DERM as an Administering Authority

Proponents will be required to meet all relevant statutory requirements as identified in the State and Commonwealth legislation. However, DERM is the administering authority when assessing and conditioning an environmental authority (EA) under the EP Act for discharging CSG water to Queensland waters. The administering authority must comply with any relevant regulatory requirement; consider standard criteria; and any additional information. The EP Reg s5 establishes a range of matters to be considered for environmental management decisions. S51 (1) (a) states that:

(1) The administering authority must, for making an environmental management decision relating to an activity, consider the following matters—

(a) each of the following under any relevant environmental protection policies—

(i) the management hierarchy;

(ii) environmental values;

(iii) quality objectives;

(iv) the management intent;

Section 13 of the *Environmental Protection (Water) Policy 2009* (EPP Water 2009) states the management hierarchy for an activity that may affect a water. The release of waste water or contaminants must be dealt with according to the stated hierarchy of preferred procedures under section 13 (2) (a) to (d).

Environmental values and water quality objectives for waters are addressed under Part 5 of this Guideline.

Section 14 of the EPP Water 2009 states the management intent for waters subject to an activity that involves the release of waste water or contaminants to the waters. The management intent depends on the level of aquatic ecosystem protection for the waters.

In order to protect the environment it is necessary to define any related impact. Under the EP Act, environmental harm is defined as any adverse effect, or potential adverse effect (whether temporary or permanent and of whatever magnitude, duration or frequency) on an environmental value, and includes environmental nuisance (s14). CSG activities are classified as either Level 1 or 2 activities (defined in Schedule 5 of the EP Reg) based on the risk of environmental harm being caused by the activities. Assessment processes for Level 1 activities are more comprehensive and may require the completion of an environmental impact statement (EIS).

An EA application for a Level 1 CSG activity must be accompanied by an environmental management plan (EM Plan) to demonstrate that the applicant has considered all potential impacts of the proposed petroleum activities. EM Plans must be prepared in accordance with s310D of the EP Act. The department has developed the guideline 'Preparing an environmental management plan for coal seam gas activities' to provide information to proponents on EM Plan preparation. The EM Plan as it refers to environmental values must among other things:

(b) describe each of the following—

(iv) the environmental values likely to be affected by the activities;

(v) the potential adverse and beneficial impacts of the activities on the environmental values; and

(c) state the environmental protection commitments the applicant proposes for the activities to protect or enhance the environmental values under best practice environmental management; and

(d) contain enough other information to allow the administering authority to decide the application and conditions to be imposed on

the environmental authority (chapter 5A activities); and

The guideline document 'Model conditions for level 1 environmental authorities for coal seam gas activities' provides a set of model conditions that can form the basis of environmental protection commitments given in the EM Plan and EA.

5. Environmental Values

Environmental values are defined in EP Act s9. For Queensland waters they are the aquatic ecosystem and human use values in s6 (2) of the EPP Water—

(a) for high ecological value waters—the biological integrity of an aquatic ecosystem that is effectively unmodified or highly valued;

(b) for slightly disturbed waters—the biological integrity of an aquatic ecosystem that has effectively unmodified biological indicators, but slightly modified physical, chemical or other indicators;

(c) for moderately disturbed waters—the biological integrity of an aquatic ecosystem that is adversely affected by human activity to a relatively small but measurable degree;

(d) for highly disturbed waters—the biological integrity of an aquatic ecosystem that is measurably degraded and of lower ecological value than waters mentioned in paragraphs (a) to (c);

(e) for waters that may be used in primary industry or for agricultural purposes, the suitability of the water for—
(i) agricultural use; or
(ii) aquacultural use; or
(iii) producing aquatic foods for human consumption;

(f) for waters that may be used for recreation or aesthetic purposes, the suitability of the water for—
(i) primary recreational use; or
(ii) secondary recreational use;

(g) for waters that may be used for drinking water—the suitability of the water for supply as drinking water;

(h) for waters that may be used for industrial purposes—the suitability of the water for industrial use;

(i) the cultural and spiritual values of the water.

If an environmental value for particular water has not been scheduled in Schedule 1 of the EPP Water then s7 states the following:

(3) For particular water, the indicators and water quality guidelines for an environmental value are—
(a) decided using the following documents—
(i) site specific documents for the water;
(ii) the Queensland Water Quality guidelines;

(iii) the Australian Water Quality guidelines;
(iv) other relevant documents published by a recognised entity;

For the management of ground waters, documents that would be identified under s(3) (iv) above include the National Water Quality Management Strategy (NWQMS) Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2): Managed Aquifer Recharge. While it is recognised that this guideline does not specifically deal with injection of CSG water, there are a number of elements that may apply to injection of brine and treated and untreated CSG water. Therefore wherever applicable, this NWQMS guideline may be considered the basis for assessment of injection proposals.

In establishing and scheduling environmental values (EVs) for waters in the EPP Water, and the subsequent derivation of water quality objectives (WQOs) to protect the values, the process is independent of any release to receiving waters. In other words the environmental values are determined before any release to waters is considered, and is a completely independent process. Under s 8 of the EPP Water, the environmental values for a particular water are protected if the measures for all indicators do not exceed the water quality guidelines stated for the indicators. This encompasses a commonly used range of some 20 water quality guidelines but also extends to all measures for all indicators to protect the environmental values. The EPP Water defines water quality guidelines as 'quantitative measures or statements for indicators, including contaminant concentration or sustainable load measures of water, that protect a stated environmental value'. If the environmental values for an area have not been scheduled the ecological assets included in WRPs, which are developed under the Water Act, may also provide information. WRPs are recognised as other relevant documents as per s7 (3) (iv) of the EP Act.

6. Environmental Authorities

There are two key areas of risk to aquatic ecosystem and human use environmental values from the discharge of CSG water to Queensland waters that require management to ensure their protection:

1. Changes to water quality (including physical, chemical and biological characteristics); and
2. Changes to in-stream and groundwater hydrology (including associated ecosystem impacts due to the volume and timing of discharges).

A precautionary and adaptive management approach is advocated to address these areas of risk, which is consistent with the objectives of the EP Act and the EPP Water.

EAs are required under chapter 5A of the EP Act for environmentally relevant activities, including for petroleum activities. The administering authority may impose the conditions on the environmental authority (chapter 5A activities) it considers are necessary or desirable (s309z). For an EA to discharge CSG water to waters conditions to meet specified water quality and hydrological requirements to protect environmental values would be included.

6.1 Water Quality

Background

CSG water at all stages of the process should be fully characterised, this includes the quantity and quality of the water before and after production and treatment and at the point of discharge. This is consistent with the risk-based approach adopted in the National Water Quality Management Strategy (NWQMS). The NWQMS Guidelines for Fresh and Marine Water Quality, EPP Water and the Qld Water Quality Guidelines 2009 state that locally applicable guidelines for indicators should be used in preference to less specific regional and national guidelines. This requires a detailed risk assessment to be undertaken, and indicators of concern to be identified. The indicator for an environmental value is a 'physical, chemical, biological or other property that can be measured or decided in a quantitative way' (EPP Water s7(1)). Indicators are then conditioned in the EA (EP Act Ch 5) for the activity. If detailed characterisation is not undertaken, conditioning in the EA will be necessarily more stringent. This is consistent with the precautionary approach.

The general characterisation of CSG water quality as reported in the literature has identified a range of possible risks to environmental values. These values for aquatic ecosystems and human use (including suitability of the waters used for primary industry or agricultural purposes, primary and secondary recreation, drinking water, industrial purposes and cultural and spiritual values) are enhanced or protected by maintaining the water quality objectives (WQOs) for the receiving waters. To provide for appropriate environmental management, WQOs are identified to protect environmental values and are then scheduled in the EPP Water. In the absence of scheduled WQOs, water quality guidelines for all indicators that will protect environmental values for the water are used. To achieve this legislative requirement, any release of CSG water to receiving waters must be conditioned in accordance with s51 (1) (a) of the EP Reg.

Implementation

The required water quality for CSG water discharged to Queensland waters will be conditioned through an EA issued under the EP Act and in accordance with section 51 of the EP Reg (see Attachment 1).

As previously stated, under the EPP Water, the environmental values (values for aquatic ecosystem and human use) for particular water are protected if the measures for all indicators do not exceed the water quality guidelines stated for the indicators. To achieve this outcome, any proposed release is required to be assessed, in part with s51 of the EP Reg. Monitoring, reporting and incident management requirements will also be identified in the EA. A detailed risk assessment is to be undertaken using appropriate CSG water characterisation data. This will allow for parameters of concern to be identified and then included in the EA conditions for the activity.

To protect environmental values the quality of CSG water discharged to waters will need to be within an acceptable upper and/or lower bounds to ensure the WQOs required to protect the aquatic ecosystem health and relevant human use environmental values are achieved. This is of particular importance in the likely scenario of CSG water being treated with reverse osmosis and then discharged to ephemeral systems where at times CSG water is likely to flush and / or fill natural waterholes and make-up 100% of the flow. Attachment 2 discusses potential issues associated with discharging large quantities of CSG water to waters.

If CSG water is to be reinjected to an aquifer there are some key components of the injection proposal risk assessment to protect the environmental values and the groundwater resource values associated with the water quality impact zone and hydraulic impact zone where fluid is proposed to be injected. These components include:

a) the establishment of baseline data and hydrogeological conceptualisation of the aquifer;

b) the identification of potential hazards of re-injection and related activities and their inherent risk; and

c) the identification of injection standards (including proposed limits for contaminants of concern), requirements, preventative measures and residual risk.

Risk assessments of proposed discharges of CSG water to waters must be sufficient to demonstrate that the regulatory requirements of section 63(2) of the *Environmental Protection Regulation 2008* will be met. A guiding framework for risk assessments is provided in relevant NWQMS guidelines.

The requirements for monitoring programs and reporting should be included in the conditions of the EA for the activity. The monitoring programs and reporting should be designed to ensure EA conditions are being met and that strategic data collection to enhance the understanding of cumulative impacts is undertaken. The collection of this data will ensure that adaptive management to protect environmental values occurs. Specific monitoring programs include:

- Baseline conditions of the receiving environment: For surface waters ambient monitoring in accordance with the *Queensland Water Quality Guidelines (2009)*;
- Quality of the CSG water discharged; and
- Receiving environment impacts: This should include assessment of the impact of the release on the receiving waters with a requirement to implement a multiple before-after control impact design to assess changes as per the Australia New Zealand Guidelines for Fresh and Marine Water Quality (2000).

These requirements are further outlined in Schedule I of the guideline 'Model conditions for coal seam gas activities'. Specific requirements of the Receiving Environment Monitoring Program (REMP) are found in Appendix 1 (BA15-BA18) of the same document. Monitoring should be undertaken in line with the EPP Sampling Manual.

Implementation to align with Water Safety (Supply and Reliability) Act 2008 requirements

Legislative reforms to the *Water Safety (Supply and Reliability) Act 2008* (WS (S&R) Act) are proposed to provide purpose built rigorous requirements for CSG water which has a material impact on town drinking water supply sources, in order to protect public health. In the scenario where CSG water directly or in-directly augments a town drinking water supply source and there is a material impact on the supply source, the proposed reforms in the WS (S&R) Act will require the development of a Recycled Water Management Plan (RWMP). The regulated entity will be required to prove that the treatment process and supporting management arrangements will consistently deliver water of the quality required. Where there is direct supply of treated CSG water to a drinking water service provider for the use in a town drinking water supply source, then the drinking water service provider will also require a Drinking Water Quality Management Plan.

CSG water quality standards will be prescribed by Queensland Health (QH) under the *Public Health Regulation 2005*. This is currently being developed and in the interim, the regulator will set the water quality standard as part of the RWMP consistent with the standard prepared by QH.

If there is no material impact on a town's drinking water supply source, then there may be an exclusion from the requirement for a RWMP (for defined circumstances in a regulation for

discharges into an aquifer or if these are not applicable, then through a regulator's exclusion decision and attached conditions).

The process under the EP Act, EP Reg and EPP Water to protect environmental values (including the suitability of the water for supply as drinking water) through conditions in the EA for the activity will also apply. This means that there will be co-regulation of the activity – both under the EP Act and the WS (S&R) Act. Consequently standards may be imposed under the EP Act as well as under the WS (S&R) Act. If there are different values for a particular indicator, then the holder of the EA/RWMP will need to meet the most stringent of the requirements. To make certain that there are no inadvertent conflicts in the EA conditions and RWMP conditions, DERM Project Managers will ensure that a detailed risk assessment and adaptive management process is undertaken, and that through feedback processes any inconsistencies are identified early and addressed. See Attachment 2. for a discussion on these issues. Conditions in the EA and RWMP will require notification to the relevant administrator of each Act, if the particular values in the EA or RWMP are triggered.

Until the new regulatory framework under the *Water Supply (Safety and Reliability) Act 2008* commences, the regulatory requirements under the EP Act, will be used to regulate CSG water which impacts on town drinking water supply sources.

6.2 Hydrology

Background

Discharge of water to a watercourse is not by default an environmental benefit, as ephemeral streams naturally have periods of dryness as well as periods of wetness. WRPs, under the *Water Act 2000*, are fundamentally designed for sustainable allocation and management of the water resources in the catchment. The management rules in the plan are tailored to minimise the impact of water extraction on the flow patterns that are of most importance to a WRP's ecological assets.

The environmental flow indicators of the WRP are primarily designed to determine how much water could be extracted from the watercourse. In assessing for the protection of the environmental value for aquatic ecosystems, it is not enough to assess if Environmental Flow Objectives (EFO) in Water Resource Plans (WRP) are met. This is because the EFOs are designed as a reference check when allocating water for extraction (which is a 'drying' action) and are not designed as a reference check when approving a discharge (which is a 'wetting' action).

Releases to receiving surface waters need to be regulated to protect environmental values. A water's flow supplemented with CSG water may be at most equivalent to but not in excess of a DERM approved pre-development flow regime. An example of this would be that wetting of the flow regime beyond 'naturalness' for an ephemeral stream would not be acceptable. It is critical that key ecological assets and aquatic ecosystem values are protected from artificial discharges to waters.

The underlying intent of maintaining or moving towards the natural flow regime in surface waters is to:

- Avoid localised erosion of bed and banks (including re-suspension of sediments and riparian zone erosion) and impacts on riparian ecosystems;
- Maintain natural variability in the flow regime. A single release rate will reduce the small scale variability patterns which contribute to maintaining the biological integrity

of a system such as stream habitat, wetting on macrophyte beds, inducing fish movement, entraining organic matter, scouring and primary production;
- Mimic natural seasonality (timing), frequency and duration of events of different magnitudes that support and trigger natural ecosystem processes (eg. nutrient cycling, migration and spawning cues, etc.); and
- Follow natural attenuation patterns, avoid bank slumping, maintain macroinvertebrate communities and minimise fish stranding, etc.

Implementation

The discharge strategy for CSG water discharged to waterways will be conditioned through the EA issued under the EP Act.

If the CSG discharge proposal is part of a beneficial re-use (as defined in *Environmental Protection (Waste Management) Policy 2000*) scheme, an amendment to the applicable resource operations plan may be required (e.g. water sharing rules, dam operating rules) to ensure there are no impacts on other entitlements.

CSG water discharges need to be managed to mimic seasonal flow volumes and allow for periods of low and no flow. A simplified example of this would see the discharge of larger volumes of CSG water during periods of higher natural flow and lower or nil discharges during naturally low and no flow periods. CSG water discharges should meet these variable flow requirements with the conditions incorporated in the environmental authority. These conditions may include volumetric release limits over time periods including per day or season, with modelling of pre-development flows using the Integrated Quality and Quantity Model as a guide in their calculation, and including the key ecological assets identified in the WRP process for the waters.

When CSG water is discharged to waters as part of a Water Supply Scheme or beneficial use approval, it is still necessary that the environmental values are protected.

7.0 Adaptive Management and Cumulative Impacts

To ensure that the conditions included in the EA are appropriate to protect the environmental values of the receiving waters, proponents will be required to undertake adequate monitoring of the implementation and effectiveness of the EA conditions. This includes assessing the effectiveness and reliability of any water treatment process (i.e. reverse osmosis), monitoring for changes in receiving water quality and aquatic ecosystem health, and for any other impacts to environmental values. If new impacts to environmental values are identified, future EAs will include conditions to adequately manage them.

To effectively protect waters from the as-yet unquantified cumulative impacts of CSG water discharged to waters, an adaptive approach will be used. Through this process, information collected through both monitoring and research, can be used to inform both new EAs and future management frameworks.

8.0 Definitions

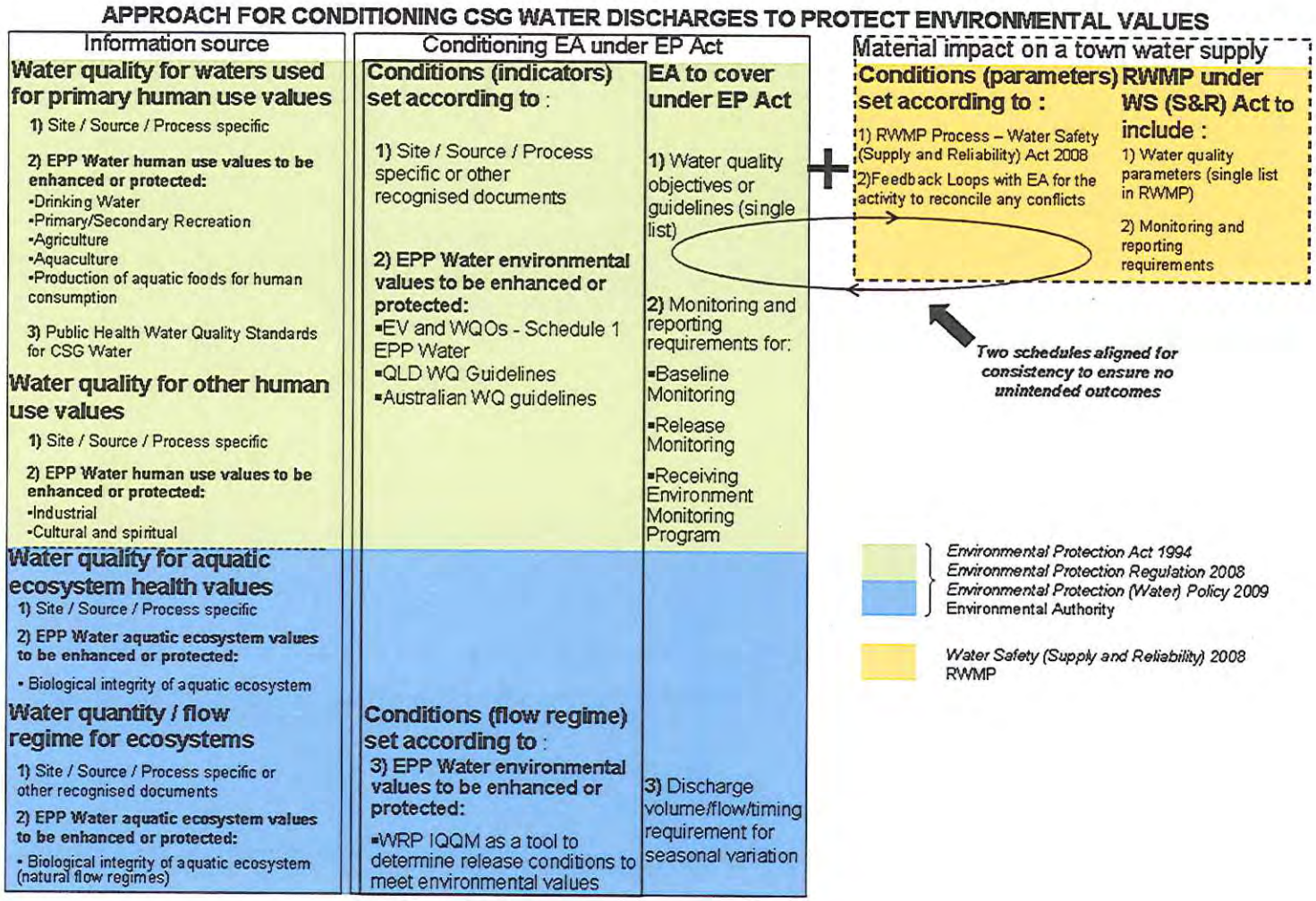
Note: Where a term is not defined in this guideline, the definition in the *Environmental Protection Act 1994*, its regulations and Environmental Protection Policies must be used.

Disclaimer:

While this document has been prepared with care it contains general information and does not profess to offer legal, professional or commercial advice. The Queensland Government accepts no liability for any external decisions or actions taken on the basis of this document. Persons external to the Department of Environment and Resource Management should satisfy themselves independently by consulting their own professional advisors before embarking on any proposed course of action.

Attachment 1.

Approach for Conditioning CSG Water Discharges to Protect Environmental Values



Attachment 2.

Review of Interim Public Health Water Quality Standards and Potential Impacts to Aquatic Ecosystem Values from Coal Seam Gas Water (CSG)

Acknowledgements: Water Quality & Aquatic Ecosystem Health Scientists, Environment & Resource Sciences Division

Background

Under the *Environmental Protection Act 1994* (EP Act), and its subordinate legislation, there is a process for identifying the environmental values of waters. In the scenario where a proponent is proposing to undertake an environmentally relevant activity in Queensland, including discharge of CSG water to waters, an environmental authority (EA) must be issued by the administrative authority - the Department of Environment and Resource Management (DERM). If an EA is issued, it must include conditions to manage any impacts to the identified environmental values of the waters from the activity. These conditions may include indicators for water quality with a set of guidelines / release limits for the discharge. The proposed regulatory reforms to the *Water Supply (Safety and Reliability) Act 2008* and the associated RWMP process will apply along with the process under the EP Act, EP Reg and EPP Water to protect environmental values (including the suitability of the water for supply as drinking water) through conditions in the EA for the activity. This means that there will be co-regulation of the activity – both under the EP Act and the WS (S&R) Act. Consequently standards may be imposed under the EP Act as well as under the WS (S&R) Act. If there are different values for a particular indicator, then the holder of the EA/RWMP will need to meet the most stringent of the requirements. To make certain that there are no inadvertent conflicts in the EA conditions and RWMP conditions, DERM Project Managers will ensure that a detailed risk assessment and adaptive management process is undertaken, and that through feedback processes any inconsistencies are identified early and addressed. This document aims to reconcile any potential conflicts. It also considers other issues for aquatic ecosystem health related to the discharge of CSG water to waters.

Interim Public Health Water Quality Standards under the WS (S&R) Act

Interim Public Health Water Quality Standards have been developed by Queensland Health for use where CSG water will impact on an urban community's drinking water supply source. These standards will be included in the Recycled Water Management Plan (RWMP) that will be required under the WS (S&R) Act. These standards will be prescribed under the *Public Health Regulation 2005.* The levels are set to allow for ingestion by humans of two litres per day for a lifetime. Existing water quality data for CSG water was examined, including Australian and overseas data, to inform the development of these standards. The standards are focused on coal associated compounds of health concern, or any hazards that may be added during treatment, storage or transport of the CSG water. The standards will be amended as more specific information on CSG source water quality in Queensland and associated treatment, storage and transport processes becomes available. It should be noted that this proposed schedule of standards is not intended to represent the ongoing monitoring program for CSG companies, it simply prescribes the health related standard if a particular compound is detected during monitoring.

Scientific Assessment

The following provides a comparison between the Interim Public Health Water Quality Standards (WQS) proposed for CSG and the toxicant trigger guidelines for protection of

aquatic ecosystems. The purpose of this review is to determine potential conflicts between the Interim Public Health WQS and other guidelines. Note that the aquatic ecosystem guidelines are based on biological effects data and are meant to be trigger values. Where exceeded in the environment, background levels should be assessed and the triggers modified to reflect the risk involved.

In general, the review indicates the following:

- There are no obvious conflicts between the list of Public Health WQS and other guidelines for CSG;
- The list of indicators is substantial and it is likely that it could be reduced through source characterisation and associated risk assessment processes;
- For Reverse Osmosis (RO) treated CSG water, many of the indicators are unlikely to be relevant, even in the source water – see the table below;
- Areas of potential conflict where Public Health WQS are listed in an approval (or required to be monitored) and the limit listed is significantly higher than guidelines for aquatic ecosystem health protection. This is shown for 17 indicators in the table below. The major problem here is that a false impression may be given to proponents in terms of satisfactory standard for discharge if the standards in the RWMP are less stringent then those required to meet environmental values. Where these contaminants are of concern, they should be listed with appropriate limits in the EA, with the proponent meeting the most stringent ; and
- Note that such a review could also be done for primary industry guidelines such as irrigation. Similar conclusions from the comparison with aquatic ecosystem guidelines are expected.

For the discharge of 'good quality' RO treated CSG water, the potential risks to receiving water should be relatively small. The major issues that should be assessed on a case by case basis include:

1. The potential deficiency of cations/anions such as calcium that could have a detrimental effect on aquatic ecosystem biota. The proposed management action would be to dose the water to achieve appropriate cation/anion concentrations. Release limits for Sodium Adsorption Ratio, calcium, magnesium etc would generally be applied.
2. The potential change to flow regimes. This risk is potentially greatest for significant continuous releases to ephemeral streams. In most cases, this requires an assessment of key aquatic habitats and the potential extent of effect from the release. In many cases, sandy substrates may mean the water may have a limited extent of effect on surface waters. Alternative discharge locations may need to be considered and ongoing monitoring may be required during operation where potential risks exist.
3. Boron is not generally removed from the RO process and is often elevated in the discharge water. An assessment should be carried out on the potential effect on all downstream environmental values including aquatic ecosystem and irrigation. The levels are not typically high enough to be of major concern and there are limited management actions available to address this issue.
4. Given the water is very clear and the systems receiving the water are generally very turbid, there is potential for the water to impact on aquatic environments. The action risk from this effect is currently unknown and needs further research. In general, management as per issue 2 will also address this issue if it exists.

Table 1. Comparison of the Public Health WQS to Aquatic Ecosystem Toxicant Triggers and typically levels found in CSG Water.

Chemical Compounds/ Parameters of concern	CAS Number	Interim Release Limits (µg/L)	Aquatic Ecosystem TTV*	TOXNET Hazardous Substances Data Bank	Found in CSG source water?	Comments
1,2 Dichloroethane (DI)	107-06-2	3	ID	EV	NNS	Industrial solvent - chlorination of water does not appear to contribute to 1,2-dichloroethane in drinking water - Ethane is a constituent in the paraffin fraction of crude oil and natural gas - **may be produced inadvertently by chlorination reactions which take place during the disinfection of wastewater effluents or drinking water sources**
1,1 Dichloroethene (DI)	75-35-4	30	-	EV	NNS	Used in polymers and organic synthesis - Ethene is a natural product emitted by fruits, flowers, leaves, roots, and tubers, and is released to the atmosphere from biomass combustion and volcanos, and photodegradation of dissolved organic material - **may be produced inadvertently by chlorination reactions which take place during the disinfection of wastewater effluents or drinking water sources.**
1,2 Dichloroethene	540-59-0	60	ID	NHTV	NNS	
1, 2 Dichlorobenzene (DI)	106-46-7	1500	160	EV	NNS	Used as a chemical intermediate for the manufacture of dyes - **may be produced inadvertently by chlorination reactions which take place during the disinfection of wastewater effluents or drinking water sources**
1,4 Dichlorobenzene (DI)	106-46-7	40	60	EV	NNS	
2,2 Dichloropropionic Acid (DPA) (DI)	75-99-0	500	-	EV	NNS	Herbicide

Chemical Compounds/ Parameters of concern	CAS Number	Interim Release Limits (µg/L)	Aquatic Ecosystem TTV*	TOXNET Hazardous Substances Data Bank	Found in CSG source water?	Comments
2,4,5-Trichlorophenol	95-95-4	350	ID	EV	NNS	Chlorophenols - used as a biocide, disinfectant for the home, hospital, and farm, an antiseptic, manufacture of the insecticide profenofos, in the synthesis of the fungicides dichlorophen and triadimefon, in the synthesis of the cholesterol-reducing drug, denaturant for alcohol, and selective solvent in refining mineral oil and in organic syntheses of dyes - **may be produced inadvertently by chlorination reactions which take place during the disinfection of wastewater effluents or drinking water sources**
2,4,6-Trichlorophenol	88-06-2	20	3	EV	NNS	
2,4-Dichlorophenol (DI)	120-83-2	200	120	NHTV	NNS	
2-Chlorophenol (DI)	95-57-8	300	340	EV	NNS	
4-Chlorophenol (DI)	106-48-9	10	220	EV	NNS	
4-Methylphenol (p-cresol)	106-44-5	600	-	EV	NA	Cresols, including p-cresol, are a group of widely distributed natural compounds formed as metabolites of microbial activity and excreted in the urine of mammals. Cresols occur in various plant lipid constituents, including oils from jasmine, cassia and camphor. Oils from conifers, oaks, and sandalwood trees also contain cresols.
4-Nitrophenol	100-02-7	30	ID	EV	NNS	Used in the manufacture of pesticides, dyestuffs as well as a leather treatment agent. It is a photooxidation product of nitrobenzene in air and aromatic hydrocarbons such as benzene, toluene, and phenanthrene with nitric oxide in air. It is emitted in vehicular exhaust from both gasoline and diesel engines. 4-Nitrophenol is also a degradation product of parathion and an impurity in the parathion formulation Thiophos and, therefore, will be released

Chemical Compounds/ Parameters of concern	CAS Number	Interim Release Limits (µg/L)	Aquatic Ecosystem TTV*	TOXNET Hazardous Substances Data Bank	Found in CSG source water?	Comments
						during the application of the insecticide
4-Nonylphenol	104-40-5	500	-	NHTV	NNS	Routinely used as a co-stabilizer with mixed-metal stabilizers for heat stabilization during plastic production; used as starting material for the production of phenolic resins.
Acenaphthene	83-32-9	20	SED	EV	Yes	A natural component of crude oil and coal tar, and is also a product of combustion and can be released to the environment via natural fires associated with lightening, volcanic activity, and spontaneous combustion.
Acenaphthylene	208-96-8	0.014	SED	NHTV	Yes	
Acrylamide	79-06-1	0.2	-	EV	Unlikely	Used in the production of polyacrylamide and amide monomers.
Aluminium		200	55			
Ammonia		500	900			
Anthracene	120-12-7	150	ID - SED	EV	Yes	Anthracene occurs in fossil fuels.
Antimony		3	ID - SED			
Arsenic		7	-			
Arsenic III			24			
Arsenic V			13			
Barium		700				
Benzene	71-43-2	1	950	EV	Yes	Benzene is found naturally in the environment from volcanoes, as a natural constituent of crude oil, from forest fires and as a plant volatile.
Benzo(a)pyrene	50-32-8	0.01	ID - SED	EV	Yes	Occurs naturally in crude oils, shale oils, and coal tars, and is emitted with gases and fly

Chemical Compounds/ Parameters of concern	CAS Number	Interim Release Limits (µg/L)	Aquatic Ecosystem TTV*	TOXNET Hazardous Substances Data Bank	Found in CSG source water?	Comments
						ash from active volcanoes. There is some evidence for biosynthesis by plants, bacteria and algae. Emissions of polycyclic aromatic hydrocarbons, including benzo(a)pyrene, are a product of incomplete combustion of organic matter.
Bisphenol A	80-05-7	200	-	EV	NNS	Used as an intermediate in manufacture of epoxy, polycarbonate, phenoxy, polysulfone and certain polyester resins, rubber chemicals, flame retardants and in food packaging and coatings
Boron		4000	370			
Bromate	NA	20	-	EE	Unlikely	Bromate is a drinking water disinfection by-product formed during the ozonation of source water containing bromide.
Bromide	NA	7000	-			
Bromine	7726-95-6	7000	-	EV	Unlikely	Bromine does not exist in nature in its elemental state, molecular bromine (Br_2).
Bromochloroacetic acid (DI)	5589-96-8	0.014	-	NHTE	NNS	Formed as a chemical by-product of chlorination and chloramination of drinking water.
Bromochloroacetonitrile (DI)	83463-62-1	0.7	-	NHTE	NNS	Formed during the chlorination of water. In experiments bromochloroacetonitrile was found in water treated with chlorine, chlorine with bromide, chlorine with ozone and chloramination with bromide.
Bromochloromethane (DI)	74-97-5	40	-	NHTV	Unlikely	Bromochloromethane was found in remote ocean areas along with other naturally occurring bromo or chloro methanes produced by algae. Although it is possible

Chemical Compounds/ Parameters of concern	CAS Number	Interim Release Limits (µg/L)	Aquatic Ecosystem TTV*	TOXNET Hazardous Substances Data Bank	Found in CSG source water?	Comments
						that bromochloromethane was produced by this natural source, the author suggested that it may be due to long range transport from anthropogenic sources. Bromochloromethane was released from cultivated species of the brown algae, Phaeophyta. This may be a major source of biogenic emissions of bromochloromethane from oceans. Bromochloromethane's production and use as a fire extinguisher fluid, especially in aircraft and portable units.
Bromodichloromethane (DI)	75-27-4	6	-	EV	Unlikely	Bromodichloromethane is biosynthesized and emitted to seawater (and eventually to the atmosphere) by various species of marine macroalgae which are abundant in the various locations of the world's oceans. Ice macroalgae from McMurdo Sound, Antarctic were found to contain and release to sea water bromodichloromethane. Bromodichloromethane's production and use in organic synthesis and as a solvent may result in its release to the environment through various waste streams. However, bromodichloromethane is not produced or used on a large commercial-scale indicating that large releases do not occur from these practices. **The predominant environmental release of bromodichloromethane results from its inadvertent formation during chlorination treatment processes of drinking, waste, and cooling waters.** The amount of bromodichloromethane which may

Chemical Compounds/ Parameters of concern	CAS Number	Interim Release Limits (µg/L)	Aquatic Ecosystem TTV*	TOXNET Hazardous Substances Data Bank	Found in CSG source water?	Comments
						be produced during chlorination processes depends upon a variety of parameters which include temperature, pH, bromide ion concenntration of the water, fulvic and humic substance concentration, and actual chlorination treatment practices.
Bromoform (DI)	75-25-2	100		EV	Unlikely	Bromoform is produced by macroalgae and microalgae.
Cadmium		2	0.2			
Chlorate	NA	0.8mg/L	-	EV	Unlikely	The chlorite ion (ClO_2^-) is a **major degradation product resulting from the reaction of chlorine dioxide with inorganic and organic constituents in the water.** When free chlorine is used after the application of chlorine dioxide in the treatment process, chlorite is oxidized to chlorate. This conversion will continue over time as the water travels through the distribution system. Chlorate ion is also formed by photodecomposition of chlorine dioxide when treated water is exposed to bright sunlight in open basins. The rate at which chlorate forms affects the amount of chlorine dioxide or chlorite that remain in the finished drinking water.
Chlorine (DI)	7782-50-5	5 000	3	EV	Unlikely	The most important manmade emissions of chlorine are from processes involving the production, transportation, and use of chlorine.
Chlorine dioxide (DI)	10049-04-4	1000	-	EV	Unlikely	Chlorine dioxide is used as a disinfectant in water treatment plants in the USA.

Chemical Compounds/ Parameters of concern	CAS Number	Interim Release Limits (µg/L)	Aquatic Ecosystem TTV*	TOXNET Hazardous Substances Data Bank	Found in CSG source water?	Comments
Chlorite (DI)	NA	300	-	EE	Unlikely	Chlorite ion (ClO_2^-) is present in drinking water and there are two possible ways it ends up in the drinking water: 1) chlorine dioxide is produced via sodium chlorite used as a starting material and incomplete conversion of sodium chlorite into chlorine dioxide leaves residual chlorite ion in water and 2) the chlorite ion is a major degradation product resulting from the reaction of chlorine dioxide with inorganic and organic constituents in the water. When free chlorine is used after the application of chlorine dioxide in the treatment process, chlorite is oxidized to chlorate. This conversion will continue over time as the water travels through the distribution system. Chlorate ion is also formed by **photodecomposition of chlorine dioxide when treated water is exposed to bright sunlight in open basins.** The rate at which chlorate forms affects the amount of chlorine dioxide or chlorite that remain in the finished drinking water.
Chloroacetic acid (DI)	79-11-8	150	-	EV	Unlikely	Chloroacetic acid's formation as a **chemical by-product of chlorination and chloramination of drinking water**, and its use as a herbicide and in the manufacture of various dyes and other organic chemicals.
Chlorobenzene (DI)	108-90-7	300	ID	EV	Possible	Chlorobenzene's production and use as a chemical intermediate, solvent, and heat transfer medium.
Chloroform (Trichloromethane) (DI)	67-66-3	200	ID	EV		Chloroform is produced by tropical red algae, and by red seaweed and has been reported

Chemical Compounds/ Parameters of concern	CAS Number	Interim Release Limits (µg/L)	Aquatic Ecosystem TTV*	TOXNET Hazardous Substances Data Bank	Found in CSG source water?	Comments
						to be produced by micro algae, in peat bogs, was produced in spruce forest soil and was found in wood degrading areas. Chloroform's production and use in the synthesis of hydrochlorofluorocarbon 22 (HCFC-22), use as an extractant or solvent, chemical intermediate, dry cleaning agent, fumigant ingredient, synthetic rubber production. Its indirect production in the manufacture of ethylene dichloride and as a **disinfection by-product in the chlorination of drinking water**, municipal sewage, cooling water in electric power generating plants. Chloroform is produced during the atmospheric photodegradation of trichloroethylenes and is produced from auto exhaust.
Chromium III			ID			
Chromium VI		50	1.0			
Copper		2000	1.4			
Cyanide		80	7			
Dibromoacetic acid (DI)	631-64-1	0.014	-	EV	Unlikely	Dibromoacetic acid's formation as a **chemical by-product of chlorination and chloramination of drinking water.**
Dibromochloromethane (DI)	124-48-1	100	-	EV	Unlikely	Chlorodibromomethane is produced naturally by various marine macroalgae and is present naturally in seawater.

Chemical Compounds/ Parameters of concern	CAS Number	Interim Release Limits (µg/L)	Aquatic Ecosystem TTV*	TOXNET Hazardous Substances Data Bank	Found in CSG source water?	Comments
						Chlorodibromomethane's inadvertently formed during **chlorination treatment processes of drinking, waste, and cooling waters**; it is also used as a chemical intermediate.
Dichloroacetic acid (DI)	79-43-6	100	-	EV	Unlikely	Dichloroacetic acid's formation as a **chemical by-product of chlorination and chloramination of drinking water**, and its production and use as a chemical intermediate, in pharmaceuticals and medicine.
Dichloroacetonitrile (DI)	3018-12-0	2	-	EV	Unlikely	Dichloroacetonitrile formation as a **by-product of the chlorination of humic substances, algae and amino acids contained in drinking water** and pulp bleaching processes. Dichloroacetonitrile is a by-product of the chlorination of humic substances, algae and amino acids, such as when humic and fulvic acids from natural waters are chlorinated with sodium hypochlorite.
Ethylbenzene	100-41-4	300	ID	EV	Yes	Ethylbenzene's production and use as an intermediate for the manufacture of styrene and use as a resin solvent, intermediate for the production of diethylbenzene and acetophenone, and its use as a component of automotive and aviation fuels. Ethylbenzene is present in coke-oven tars.
Fluoride		1500	-			
Hydrazine	302-01-2	10 (ng/L)	-	EV	Unlikely	Hydrazine has been found to be a primary product of nitrogen fixation by *Azotobacter*

Chemical Compounds/ Parameters of concern	CAS Number	Interim Release Limits (µg/L)	Aquatic Ecosystem TTV*	TOXNET Hazardous Substances Data Bank	Found in CSG source water?	Comments
						agile. Used as a chemical intermediate, reducing agent, as rocket fuel and as a boiler water treatment agent- **may be produced inadvertently by chlorination reactions which take place during the disinfection of wastewater effluents or drinking water sources**
1,2-diphenylhydrazine	122-66-7		ID	EV	Unlikely	1,2-Diphenylhydrazine's production and use as a chemical intermediate. It also may be produced in wastewater receiving azobenzene where conditions are reducing. This drug is primarily used as a veterinary medication.
Iodide		100	-			
Iodine		60	-			
Iron		300	300**			
Lead		10	3.4			
Manganese		500	1900			
Mercury		1	0.06			
Molybdenum		50	34**			
Monochloramine (DI)	10599-90-3	3000	-	EV	NNS	Chloramine is used as a chemical intermediate in the synthesis of various amines and hydrazine and as a disinfectant in drinking water for systems in which free chlorine radicals are difficult to maintain. Chloramine can be formed in situ by the combination of ammonia and chlorine

Chemical Compounds/ Parameters of concern	CAS Number	Interim Release Limits (µg/L)	Aquatic Ecosystem TTV*	TOXNET Hazardous Substances Data Bank	Found in CSG source water?	Comments
						containing agents under basic conditions.
Nickel		20	11			
Nitrate – as N		50000	7200			
Nitrite		3000	-			
N-Nitrosodiethylamine (DI) (NDEA)	55-18-5	0.01	-	NHTE	Unlikely	Formed by the action of nitrate-reducing bacteria. N-Nitrosodiethylamine's production and use as a gasoline and lubricant additive, antioxidant and stabilizer may result in its release to the environment through various waste streams.
N-Nitrosodimethylamine (DI) (NDMA)	62-75-9	0.01	-	EV	Unlikely	Formation of DMN ... can occur by reaction of nitrites with dimethylamine produced by intestinal bacteria. Formed by the interaction of nitrite with dimethylamine and by the action of nitrate-reducing bacteria. One group that found N-nitrosodimethylamine in tap water concluded that the N-nitrosodimethylamine may have formed from the reaction of low concentrations of nitrite, an oxidizing agent (possibly chlorine), and secondary amines. Another researcher concluded that extensive nitrosamine formation in natural waters is not likely because of low nitrite concentrations, low levels of nitrosatable amines, and expected third order kinetics.
Phenanthrene	85-01-8	150	ID	EV	Likely	Phenanthrene occurs in fossil fuels.

Chemical Compounds/ Parameters of concern	CAS Number	Interim Release Limits (µg/L)	Aquatic Ecosystem TTV*	TOXNET Hazardous Substances Data Bank	Found in CSG source water?	Comments
						Phenanthrene was detected in spruce needles, tree leaves and grass and plants.
Phenol	108-95-2	150	320	EV	Yes	Phenol is present in animal, leaf litter and other organic wastes as a result of decomposition. The level of phenol present in poultry manure has been shown to increase in time as degradation proceeds. Phenol is obtained from coal tar. Phenol's production and use as a chemical intermediate in the production of bisphenol-A, phenolic resins, caprolactam, aniline, alkylphenols and other chemicals, as well as its use as a disinfectant and antiseptic may result in phenol being released to the environment as emissions and in wastewater as a result of its production and use. Wood smoke from fireplaces and wood stoves contain high conc'ns of phenol. Phenol is found in gasoline and diesel engine exhaust, and emissions from refuse combustion, brewing, foundries, wood pulping, plastics mfg, lacquer mfg, and glass fibre mfg. Laboratory tests indicate that phenol would be found in leachate from tires. It is also released from some plastics when heated. Phenol is a photooxidation product of benzene, and would be produced in the atmosphere from benzene emissions.
Pyrene	129-00-0	150	SED	EV	Yes	Pyrene has been isolated in crude oil, coal

Chemical Compounds/ Parameters of concern	CAS Number	Interim Release Limits (µg/L)	Aquatic Ecosystem TTV*	TOXNET Hazardous Substances Data Bank	Found in CSG source water?	Comments
						tar and fossil fuels.
Radiological Compounds		0.5 mSv/year				
Selenium		10	5			
Silver		100	0.05			
Strontium (Stable)(Total)		4000	-			
Sulfate		500 000	-			
Thallium (Stable)(Total)		Detection limit	0.03**			
Titanium (Total)		Detection limit	-			
Toluene	108-88-3	800	ID	EV	Yes	Toluene occurs in nature in natural gas deposits and has been detected in emissions from volcanos, forest fires and crude oil. Toluene is released into the atmosphere principally from the volatilization of petroleum fuels and toluene-based solvents and thinners and from motor vehicle exhaust. Toluene's production and use as an intermediate in the production of benzoic acid, benzaldehyde, explosives, dyes and many other organic compounds may also result in its release to the environment through various waste streams.
Total Petroleum Hydrocarbons (reported as separate fractions)		(Total) 200	-			
Trichloroacetic acid (DI)	76-03-9	100	-	EV	Unlikely	Trichloroacetic acid is produced photoxidatively when chlorinated ethenes and ethanes are converted to trichloroacetylchloride and finally hydrolyzed

Chemical Compounds/ Parameters of concern	CAS Number	Interim Release Limits (µg/L)	Aquatic Ecosystem TTV*	TOXNET Hazardous Substances Data Bank	Found in CSG source water?	Comments
						to the acid ... can also be formed during anthropogenically induced combustion processes if chloride and redox-sensitive elements such as Fe or Cu are present, e.g. forest fires, wood burning, waste incineration, etc. ... **also one of the main disinfection by-products during drinking water chlorination.**
Uranium		20	0.5**			
Vanadium		50	6**			
Xylenes	1330-20-7	600	-	EV	Yes	Common naturally occurring sources of xylenes are petroleum, forest fires, and volatiles of plants. Mixed xylenes are present in petroleum stocks and natural gas in small quantities. Commercial xylene's production and use in petroleum products and as a chemical solvent and intermediate may result in its release to the environment through various waste streams. Xylene use as an aquatic herbicide will result in its direct release to the environment. Xylenes are components of gasoline. Xylenes may be released to the environment through emissions from petroleum refining, coal tar and coal gas distillation, through emissions from the transport and storage of gasoline and from carburetors, and through leaks and evaporation losses during the transport and storage of gasoline and other fuels.
o-xylene	95-47-6		350	EV	Yes	

Chemical Compounds/ Parameters of concern	CAS Number	Interim Release Limits (µg/L)	Aquatic Ecosystem TTV*	TOXNET Hazardous Substances Data Bank	Found in CSG source water?	Comments
Zinc		3000	8			

DI indicates the parameter is a disinfection by-product and is not included in monitoring of active wells.

* TTV – 95% species protection toxicant trigger values taken from ANZECC/ARMCANZ (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality.

** low reliability trigger

SED Appears in ANZECC/ARMCANZ (2000) as a sediment trigger value only

EE Ecotoxicity Excerpts are available in the Hazardous Substances Data Bank

EV Ecotoxicological Values or data are available in the Hazardous Substances Data Bank

NHTE Non-human Toxicity Excerpts are available in the Hazardous Substances Data Bank

NHTV Non-human Toxicity Values are available in the Hazardous Substances Data Bank

NNS – No natural sources

ID – Insufficient Data

Highlighted values are significantly below Public Health WQS

Conditions for Coal Mines in the Fitzroy Basin

Approach to Discharge Licensing

1. Introduction

This document describes the proposed approach for deriving consistent and appropriate limits and conditions for Coal mine discharges and supports the draft Conditions for Coal Mines in the Fitzroy Basin. The proposed approach aims to minimise the risk of discharges on downstream environmental values of receiving waters and be consistent with current legislation, departmental policy and State/National water quality guidelines. This includes the department's Policy for wastewater discharges to Queensland waters (http://www.epa.qld.gov.au/publications?id=2272), the Queensland Water Quality Guidelines (2006) and the ANZECC/ARMCANZ Fresh and Marine Water Guidelines 2000.

2. Managing and Characterising Discharges

The first step in assessing a licence proposing a wastewater discharges is to demonstrate the unavoidable need for that discharge. Water is a resource and most mines require substantial amounts of water even if for coal washing and/or dust suppression. A well planned and effective water management system is essential for having sufficient water for the mine during dry times but also having sufficient available storage/free-board to ensure discharges are infrequent and only associated with major storm events. Effective water management requires separate storage of water with varying water quality (such as storage of process water/groundwater, surface water runoff), appropriate infrastructure to accommodate sufficient water storage and appropriate flood design and control.

Where the need for a discharge is demonstrated, the next step is to characterise the wastewater and identify the potential contaminants or associated hazards that may exist. This may require an understanding of historical wastewater quality and/or information on local groundwater quality, geology types, the process/treatment systems involved and the broader water management strategies to be adopted. Currently, salinity (measured as electrical conductivity) and suspended sediment (and pH to a lesser extent) are known to be major water quality issues that require regulation. However, for other characteristics such as metals/metalloids, a legitimate need for regulation it is likely to vary from case to case. However, in the majority of cases there is currently a lack of data. Further information needs to be collected on both wastewater and natural waters. An interim approach is required for setting discharge conditions where water quality data insufficient or not currently available.

3. Environmental Values and Ephemeral Streams

After characterising the discharge, the next step requires environmental values and water quality objectives for waterways potentially affected by the discharge to be assessed. Depending on the risks from the discharge (based on its volume, contaminant concentrations, duration and location), this step will need to be done to a lesser or greater spatial extent. With greater risk, environmental values and potential impacts will need to be considered further a field. Environmental values and water quality objectives specified in the Environmental Protection (Water) Policy 1997 must be considered for assessment of all waterways including ephemeral streams. Environmental values for drinking water, stock watering, irrigation, recreation, industrial use and aquaculture may exist downstream of the discharge depending on the discharge location. The guidelines for these environmental values will form the basis of default water quality objectives and will typically not differ between permanent and temporary flowing streams. Various published guideline values are shown in Tables 1 to 6.

Many coal mines are situated in areas of ephemeral/intermittent streams. Current reference-based water quality guidelines for aquatic ecosystem protection (for example, in the Queensland Water Quality Guidelines, 2006) are available only for permanent flowing streams. Nonetheless, it is proposed that these guidelines be used for impact assessment and licensing discharges to ephemeral streams until local reference information becomes available. In addition, in mining areas it is common that background concentrations may be elevated as a result of historical anthropogenic activities and/or natural causes (certainly the case for some metals). Deriving local guidelines and background data is ideally needed but requires sufficient reliable data from monitoring of appropriate sites. Monitoring of ephemeral streams can be challenging given the infrequent and unpredictable nature of flow and the logistical issues involved with accessing and taking event related sampling. There is currently insufficient information for some contaminants as to how levels change with rainfall and flow. For electrical conductivity (EC) it is unlikely that high EC is associated with high flows in contrast to suspended sediment solids or turbidity which is typically elevated during rainfall-associated events.

For many sites there will be an absence of suitable monitoring data. In this case, reference-based guidelines from permanent flowing streams can be used for deriving end-of-pipe limits or trigger values in a precautionary sense, although consideration needs to be given to the above points. Where good local referenced data has been collected, this could be used to derive local reference-based guidelines (typically 75th percentiles for median EC, 80th percentiles for other reference-based water quality indicators such as pH, turbidity and suspended sediment). Typically at least 18 data points would be required and collected over at least 3 rain events. This may require 2 years of data but is dependant on rainfall frequency. Data from multiple reference sites could be amalgamated in most situations. The Queensland Water Quality Guidelines propose that this approach also be used for metals/metalloids where local reference conditions may be elevated.

4. Potential Water Quality Impacts

Effects of Salinity on Aquatic Organisms

Salinity has the potential to cause both acute and chronic toxicological effects in aquatic organisms. There is currently no nationally published toxicity trigger for salinity effects in freshwater environments although there is published information on the effects of salinity on fish, macroinvertebrates and other biota. Thus the recommended approach is to consider the ambient reference-based guidelines as discussed in Section 7. Generally, setting EC limits based on reference-based conditions will address potential concerns with toxicity given that discharge levels will typically be below toxicity thresholds. However, for situations where the stream has assimilative capacity for salinity, it may be possible to have discharge levels at or above toxicity thresholds and through dilution, still meet reference-based guidelines in-stream within a short distance downstream. The general policy position in this case is that the discharge should not result in any toxicity witbin the initial mixing zone.

Based on the comments by Hart (2008) in a recent review of water quality in the Fitzroy Basin, EC values of less than 1500 µS/cm are unlikely to affect adult fish although salinity around 1000-1500 µS/cm may effect early life stages of fish. Macroinvertebrates are unlikely to be affected at below around 1000µS/cm. However, for those species adapted to quite low salinity (200-300µS/cm) such as in the south of the Fitzroy Basin, permitting ambient EC concentrations to reach 1000-1500 µS/cm would adversely affect the community structure, especially at a species level. A conservative trigger used in the ANZECC guidelines (1992) was Total Dissolved Solids (TDS) of 1000 mg/L (this converts to an EC of approximately 1500µS/cm) which receiving waters should not exceed.

5. Monitoring of Metals/Metalloids

Metals/metalloids have the potential to cause both acute and chronic toxic effects in the short-term and bioaccumulate to have similar effects in the long-term. The comments on measuring EC in receiving waters are also relevant to applying limits to metals/metalloids in receiving waters. There are few examples of where metals/metalloid limits have been applied end-of-pipe at this stage for coal mines and in most cases, further review of data is required for this to be done. Ascertaining end-of-pipe total and dissolved metal concentrations is recommended. Trigger values for receiving environment monitoring can be applied. Trigger values should be based on relevant environmental values. Conservative trigger values are shown in Tables 5 and 6. For aquatic ecosystem protection (Table 5), the default trigger values are for slightly-to-moderately disturbed (SMD) systems protecting 95% of species. For highly disturbed systems (HDS), ANZECC/ARMCANZ (2000) guidelines recommend adopting SMD levels in the first instance but if there are known high levels naturally occurring, lower lesser level of species protection (such as 90% or even 80%) can be adopted. In some situations such as may occur in highly mineralised mining catchments, natural or historical effects have resulted in even higher background levels for some specific metals/metalloids. Guideline adjustment for metals such as aluminium, copper, iron and zinc is sometimes required. If this is the case, relevant reference data should be assessed to develop locally-relevant guidelines. Where reference data is not available, the use of upstream background could be negotiated as a surrogate where it can be demonstrated that the site has not been influenced by upstream mine or other industry-

related activities that are likely to affect metal/metalloid concentrations. Guideline values for long-term medians can be developed from 80th percentiles of relevant reference data.

For aquatic ecosystems, the metals/metalloid limits could be applied to total (i.e. unfiltered) concentrations. If this is the case and the total concentration exceeds the trigger value, a hardness correction can be applied for some metals (cadmium, chromium III, copper, lead and nickel) up to a salinity of 2500 mg/L. See Table 3.4.3 of ANZECC/ARMCANZ (2000) Guidelines as to how to modify the trigger values for hardness for these metals. However, if exceedances still occur or are likely to occur then dissolved (i.e. filtered) metals/metalloid concentrations should also be measured and compared to the limits. Also note that speciation of some metals/metalloids is usually required for aquatic ecosystem protection (e.g. arsenic and chromium). For event-based sampling, measurement of dissolved metals/metalloids will be more problematic and logistically difficult. Samples need to be filtered, refrigerated and analysed within short time frames and this may not always be possible. However, at this stage it is proposed that for protection of aquatic ecosystem, metals are measured for dissolved metals/metalloids given the likelihood for exceedance of the guidelines. On the other hand, given the potential addition costs of speciated metals, it is proposed that all samples be analysis for dissolved total species (i.e. all species of the metal/metalloid, or 'total' species) for licensing. Where risks are identified, further assessment of speciated components may be required. For other environmental values, assessment of total metals/metalloids is needed to compare to guidelines but only for those that are specified in the guidelines. Where there is an absence of other information on potential sources or levels of metals/metalloids, a standard set of metals/metalloids is recommended until such information is made available. This might include characterising of the wastewater in dams or potential sources of wastewater (such as groundwater, waste characterisation or geological analysis).

6. Monitoring Receiving Waters

Water Quality Monitoring

Where data is available, background receiving water quality typically does not meet reference-base guidelines for all indicators. This may be due to both differences in natural conditions and from anthropogenic pressures. For this reason, application of guidelines to receiving waters as regulatory limits is likely to result in frequent non-compliance, regardless of whether the mine is discharging or not.

Therefore, receiving water assessments using water quality guidelines should only be used for triggering reporting (or investigation purposes) and not as a primary mechanism for regulation. This could include reporting of long-term medians of data (reference-based guidelines) or reporting against 95th percentiles (biological effect data). Maximum trigger values for certain indicators such as EC and pH may be adopted for some near-field monitoring sites as an additional trigger limit.

Reporting against guidelines for environmental values other than aquatic ecosystem protection should also be done where present. Monitoring should be done when the stream is flowing (this flow trigger would preferably be below the discharge flow trigger) and should ideally be done both when the discharge is and is not occurring. Reporting of the receiving environment monitoring program (REMP) could be done.

Water quality measurements of permanent water holes or other specific downstream environmental values are also appropriate where risks of potential impact are identified. For ephemeral streams, the current science suggests that the permanent and semi-permanent water holes need to be protected as a high priority. The concentrations of some water quality characteristics can increase significantly in water holes with time due to evaporation and no flow conditions whilst others decrease in concentration due to changes in water chemistry. Recent mine discharges have resulted in significant changes to salinity profiles within some downstream drinking water reservoirs and therefore impoundments, storages, weirs, dams, etc. should also be monitored given the potential for impacts.

Biological Monitoring

Biological monitoring (e.g. macroinvertebrate sampling) will generally only be required when the discharge quality and circumstances are such that they are considered to pose a significant risk to the affected receiving waters and associated habitat(s). For instance, this situation might arise when end-of-pipe EC levels are above 1000 µS/cm and there is a potential for discharge during times of low flow when limited dilution will be occurring. Having said that, biological monitoring should generally be limited to permanent and semi-permanent water bodies that could be potentially impacted by the discharge (for example, within 50km of the discharge), although this will depend on the quantity and duration of discharge. Note that specific ecosystem-type considerations must be taken into account, for example, in some areas of the catchment even short-term wetting of stream beds can play an extremely important role in the ecological cycle of the system and therefore may warrant biological monitoring.

Monitoring of macroinvertebrates must be carefully designed and interpreted in accordance with (i) the Queensland Australian River Assessment System (AusRivAS) Sampling and Processing Manual (August, 2001) and (ii) Chessman (2003), SIGNAL 2 – A Scoring System for Macro-invertebrate ('Water Bugs') in Australian Rivers, Monitoring River Heath Initiative Technical Report no. 31, Commonwealth of Australia, Canberra. Monitoring should be undertaken at both impact and control sites. (For further advice on this issue, contact Neil Tripodi on 3896 9241)

Sediment Sampling

Sediment sampling for toxicants such as metals and metalloids will generally only be required when the discharge quality and circumstances are such that they pose a significant risk to the receiving waters. This may be the case where end-of-pipe metals/metalloid concentrations are significantly above both background/guideline concentrations, discharge has occurred for extended periods of low flow and ANZECC/ARMCANZ (2000) water quality guideline values and background water quality concentrations are exceeded.

Sediment monitoring should be limited to permanent water bodies (such as weirs, water holes etc) that could be potentially impacted by the discharge and that possess the environment where muds (sediment) can accumulate. Sediment monitoring locations may be of similar nature to macroinvertebrate sampling sites (where required).

8. Setting End-of-pipe Limits and Links to Natural Flow

Discharging linked to natural flow in ephemeral streams is an essential mechanism for ensuring any discharge has reduced risk of impact on downstream environmental values. The specification of upstream monitoring sites and start/stop discharge triggers based in the environmental flow is also needed to ensure that this occurs. Large dilutions factors (e.g. 1 to 10 or 1 to 20) would generally result in reduced risk of both water quality and flow impacts, assuming the monitoring of the stream and discharge flow are closely linked and controlled.

The proponent should provide adequate data and modelling of the flow in their part of the catchment to determine the most suitable environmental flow trigger under which a discharge of certain maximum volume and flow rate should occur. The frequency or percentage of wet weather days that this will be possible should be assessed under a range of rainfall scenarios.

As part of the approval, the following will be required:

- A minimum natural receiving environment flow (m^3/s) should be defined at which wastewater discharge can take place – both commencement and cessation. It should be based on historical measurements of upstream natural flow and be designed to avoid times of poor mixing and permit significant post-discharge flushing (such as $<20^{th}$ percentile flow). Ongoing access to data from a suitably situated gauging station will be required.
- The maximum discharge rate should be set so that it does not exceed 20% of the minimum natural receiving environment flow rate (i.e. 1:4 – 1 part discharge wastewater : 4 parts natural flow).
- Daily discharge in cumecs (m^3/s) should be reliably measured and recorded.

An interim approach is required when no background receiving environment monitoring data is available. In this case, the dilution factors are not considered in setting limits as background water quality may exceed guidelines (i.e. there would be no assimilative capacity for any contaminant), although a 20 percent dilution with receiving waters will still be required.

Where discharge cannot be linked to sufficient natural flow, more detailed risk assessment should be undertaken for the waterways potentially affected by the discharge as the likelihood of impact is significantly increased. Any permanent water bodies (e.g. weirs or water holes) or locations of other environmental values potentially affected by the discharge should be identified. For such situations, more stringent water quality limits would typically be required such that it meets ambient or background water quality levels. Long-term continuous discharges in ephemeral streams should be generally discouraged. In the case of some mines in upper catchment areas, an interim approach may be adopted where discharge is permitted with flow measurements downstream. This will ensure that potential impacts are limited to near-field. Such an approach may be suitable for a transitional environmental program (TEP) or where the potential effects are considered low risk.

Monitoring of relevant physical chemical and toxicant indicators in Tables 1 to 6 should be undertaken end-of-pipe when a discharge is occurring, ideally coinciding with receiving environment monitoring. The limits/triggers are derived from ambient water quality data of permanent flowing streams in the Fitzroy and from drinking water guidelines. It is proposed that the EC discharge limit should vary depending on geographical location and whether a drinking water reservoir is located downstream of the discharge. Other issues that should be considered in setting end-of-pipe indicators and limits/triggers include laboratory detection limits and the relevance of the indicators to the activity and the risks involved.

End-of-pipe limits are required for EC and pH. The information is not currently available to set maximum values based on acute toxicity. A conservative approach would be to ensure discharge limits for EC end-of-pipe do not exceed 1500 µS/cm. Under certain circumstances, a higher end-of-pipe limit may be applicable where large mixing ratios are achieved and discharge is only for smaller durations/volumes. In these cases, the end-of-pipe limit may be increase up to 2250 µS/cm. The need for this would need to be demonstrated. The pH limits would ideally be between 6.5 and 8.5 when linked to 1:4 dilutions. Higher pH limits (say ≤9.0) end-of-pipe may be negotiated where appropriate dilution will be achieved. Limits for suspended solids concentrations can be negotiated with mines for sediment based on expected sediment removal from settling. Turbidity levels should be measured with the view of setting a relevant limit when sufficient background data is obtained.

In terms of metals/metalloid measurements end-of-pipe, it is recommended that no compliance limit be applied to this end-of-pipe monitoring unless adequate receiving environment data is collected and reviewed. However, trigger limits can be proposed for those metals/metalloids that currently have ANZECC/ARMCANZ (2000) trigger values for freshwater. Such trigger limits, if triggered, would firstly require a comparison of down stream water quality to trigger values, if exceeded, and then a comparison should be made to reference site data. If values are within local reference levels, no further action should be required.

There is a range of other indicators that may be monitored and regulated end-of-pipe (and in receiving waters). These include nutrients (ammonia, nitrate, total nitrogen, total phosphorus, filterable reactive phosphorus, phosphate, chlorophyll-a), sulphate, total hydrocarbons, fluoride and pathogens to mention only a few. Nutrients should be monitored where these are likely to be high in the discharge as a result of the activity, for example, where a sewage treatment plant is adopted or where there is a source of nutrients in the process. Ammonia and nitrate are potential toxicants (with toxicant trigger values) while total nitrogen, total phosphorus, ammonia, organic nitrogen, oxidised nitrogen, and filterable reactive phosphorus are indicators relating to potential eutrophication effects (and have related ambient water quality guidelines). Sulphate is currently regulated as a result of potential effects on drinking water (human and stock). Sulphate has no aquatic ecosystem trigger value although can change the interactions of other water quality contaminants. There are also no aquatic ecosystem guidelines for total petroleum hydrocarbons (TPHs) or polycyclic aromatic hydrocarbons (PAHs) other than naphthalene but this may be required to be monitored where mechanical workshops or petroleum-based chemicals/fuels are used on site.

9. Receiving Environment (RE) Monitoring and Triggers

Monitoring of all indicators listed for relevant environmental values in Tables 1 to 6 should be undertaken in the receiving waters at upstream and receiving environment monitoring points. Metals/metalloids as shown in Table 5 (and Table 6 if relevant) should also be monitored at upstream and downstream receiving environment monitoring points, at least until time where sufficient data is available to revise suitable monitoring indicators. Ideally, both total and dissolved metals should be monitored in the receiving environment relevant to the environmental value that the indicator relates to, e.g. total arsenic is required for assessment against drinking water guidelines.

Ideally, any associated local receiving environment monitoring program should include at least one far-field monitoring point situated much further downstream to represent post-mixing water quality. Note that the far-field monitoring point may be off the mining lease but should remain located within the nearest major flowing stream – this monitoring point should not be assessed for compliance purposes (or maximum triggers). A reference site un-impacted by mining activities (e.g. no mines within 20km upstream) should be identified and monitored for the sub-catchment. In situations where this is not possible, the least affected site, or unaffected site from another nearby sub-catchment should be identified for the purpose of collecting reference or "background" data. Collaborative monitoring programs involving more than one mining company may be applicable for monitoring such sites for local creek catchments.

Upstream and downstream receiving environment monitoring should occur during all flow events, not just during periods when discharges are taking place. This requirement is necessary for a number of reasons:

- To allow for condition assessment of these waterways
- To allow for potential assessing of impacts before and after discharge
- To allow assessment of background to assist with limit setting

Where end of pipe compliance limits apply for physical chemical indicators and are considered low risk, receiving environment monitoring and reporting should be based on long term assessment of consecutive measurements over a twelve month period and compared to ambient water quality objectives in the Queensland Water Quality Guidelines (2006) and background water quality.

Where end-of-pipe limits are considered to pose some potential risk to receiving waters, trigger values can be applied to sites immediately downstream from the discharge. The trigger values would generally be more stringent than end-of-pipe conditions but be achievable. For example, based on available information a receiving environment maximum trigger of 1000 µS/cm EC is proposed for near-field monitoring sites. Trigger values for metals/metalloids would typically be ANZECC/ARMCANZ (2000) toxicant trigger values for slightly moderately disturbed systems until sufficient reference data becomes available to review these limits.

Exceedance of these trigger values during discharge should require an in accordance with the ANZECC and ARMCANZ 2000 methodology. Where downstream water quality is within reference data, no further action should be required.

10. Modifying Limits and Triggers

Changes to compliance limits and trigger values may be appropriate where adequate and relevant reference monitoring data is made available and assessed as per the allowance in ANZECC/ARMCANZ (2000) and additional information. A reference site can be defined as a site without mine impacts (e.g. no mines within 20km upstream) for the sub-catchment with other requirements as per Appendix C in the QWQG (2006). In some cases it may be the least impacted site, or an unaffected site from another adjacent sub-catchment. An adequate number of valid data points are required to provide a reasonable confidence limit around the percentile based trigger values/guidelines. For example to develop an 80^{th} percentile guideline, a minimum of 18 samples is required to provide a 95% confidence level. Ideally,

samples should be taken from multiple (minimum 3) flow events over at least a one to two year period.

The objective of water sampling for meta/metalloid concentrations discussed above is to help form an acceptable data set to allow site specific license limits or trigger values to be set for end-of-pipe and receiving waters. Elevated background levels of some metals such as aluminium, zinc, iron and chromium have been observed in the Fitzroy Basin.

Where assimilative capacity has been identified as part of monitoring, additional allowance may be incorporated into discharge limits.

Definitions

Background – In terms of water quality, background would typically be obtained by sampling upstream of the mining activity in times of natural flow. Background should not include times of discharges from other mines upstream or times of no flow.

Reference - A reference site is a site whose condition is considered to be a suitable baseline or benchmark for assessment and management of sites in similar waterbodies. The condition of the site is reference condition and values of individual indicators at that site are the reference values. Most commonly, reference condition refers to sites that are subject to minimal/limited disturbance. The key criteria quoted in the Queensland Water Quality that is applicable for most mining areas in the Fitzroy is that there is no major extractive industry (current of historical) within 20km upstream. Monitoring must occur when the stream is flowing.

Adequate Data – The Queensland Guidelines recommend a minimum of 18 samples collected over at least 12 months for estimates of 20th or 80th percentiles at a site. For 50th percentiles a smaller minimum number of samples (~ 10–12) would generally be adequate. For ephemeral streams, more than one sample should be taken for each flow event and all flow events in the period should be sampled.

Table 1. Reference-based EC guidelines for the protection of aquatic ecosystems in the Fitzroy Catchment (Qld Guidelines 2007). Units in µS/cm.

Sub catchment	95th Percentile Guideline	90th Percentile Guideline	75th Percentile Guideline*
Fitzroy North	1400	1250	720
Fitzroy South	650	510	340

* guideline should be compared to median of long term data set.

Table 2. Guideline Values for EC for other values

	TDS (mg/L)	EC* (µS/cm)
Drinking Water	500	750
Irrigation**		1100
Stockwater***	2400	3600

* using theoretical conversion mg/L TDS = 0.67 x µS/cm EC;
** most stringent field/grass croop trigger - for corn in clay (depends on crop and soil types);
*** for dairy cattle, poultry trigger of 2000mg/L TDS

Table 3. Aquatic Ecosystem Guideline Values (for comparison against long term medians of 10-12 data points)

Parameter	Guideline (lowland)	Guideline (upland)
Ammonia N (ug/L)	20	10
Oxidised N (ug/L)	60	15
Organic N (ug/L)	420	225
Total N (ug/L)	500	250
Filtered Reactive Phosphorus (ug/L)	20	15
Total P (ug/L)	30	10
Chlorophyll-a (ug/L)	5.0	-
Dissolved Oxygen (% saturation)	85 to 110	90 to 110
Turbidity (NTU)	50	25
Suspended Solids (mg/L)	10	-
pH	6.5 to 7.5	6.5 to 8.0

Table 4. Selected Guideline Values for Stock, Crop and Drinking water (units in mg/L).

Parameter	Stock Drinking	Crop Irrigation	Drinking/ Household
Sulfate	1000		250
Chloride		350	
Calcium	1000		
Nitrate	400		
Nitrite	30		

Table 5. Aquatic Ecosystem Protection Toxicant Guideline Values

Parameter	ANZECC Guideline for slightly-moderately disturbed environ. (µg/L)	Comment
Aluminium	55	Trigger value for pH > 6.5
Ammonia	900	Based on a pH of 8
Antimony	9	Low reliability trigger
Arsenic (As III)	24	
Arsenic (As V)	13	
Beryllium	0.13	Low reliability trigger
Boron	370	See Note 1
Cadmium	0.2	
Chromium (Cr VI)	1	See Note 1
Copper	1.4	
Iron	300	Low reliability trigger
Lead	3.4	
Manganese	1900	See Note 1
Mercury (inorganic)	0.06	99% PL as can bioaccumulate
Molybdenum	34	Low reliability trigger.
Nickel	11	
Selenium (Total Speciated)	5	99% PL as can bioaccumulate
Silver	0.05	
Uranium	0.5	Low reliability trigger
Vanadium	6	Low reliability trigger
Zinc	8	See Note 1

Note 1: May not protect key species from chronic toxicity.

Table 6. Metal Guideline Values for Stock, Crops and Drinking Water (units in mg/L)

Parameter	Stock Drinking	Crop Irrigation	Drinking/ Household
Total Aluminium	5	200	0.2
Total Arsenic	0.5	0.1	0.007
Total Boron	5	0.5	4
Total Cadmium	0.01	0.01	0.002
Total Chromium (DW should be Cr (VI)	1	0.1	0.05
Total Cobalt	1		
Total Copper	1	200	1
Total Iron		0.2	0.3
Total Lead	0.1	2	0.01
Total Manganese		0.2	0.1
Total Mercury	0.002	0.001	0.001
Total Molybdenum	0.15	0.01	0.05
Total Nickel	1	0.2	0.02
Total Selenium	0.02	0.02	0.01
Total Zinc	20	2	3

Operational policy

Licensing

Waste water discharge to Queensland waters

Operational policies provide a framework for consistent application and interpretation of legislation by the Environmental Protection Agency, which incorporates the Queensland Parks and Wildlife Service. Operational policies will not be applied inflexibly to all circumstances. Individual circumstances may require an alternative application of policy.

This operational policy[1] *provides both policy advice and technical information for officers assessing development applications or environmental authority applications under the* Environmental Protection Act 1994, Environmental Protection (Water) Policy 1997, Integrated Planning Act 1997 *and* State Development and Public Works Organisation Act 1971 *for environmentally relevant activities discharging residual waste water to Queensland waters, including to waters of high ecological value. The operational policy includes the consideration of mixing zones, assimilative capacity, environmental offsets and environmental values and water quality objectives in assessing and deciding applications. It also informs applicants in preparing applications.*

Table of contents

[1] This operational policy supersedes the EPA Procedural guide *Licensing discharges to aquatic environments* and is informed by the EPA Procedural Guide *Procedural information for the operational policy Waste water discharge to Queensland waters*. (The latter document will remain draft and the subject of consultation until finalised late in the first quarter of calendar 2008.)

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

1. Operational policy overview

1.0 Policy subject

This document summarises and explains the policies that apply when assessing applications under the *Environmental Protection Act 1994* (the EP Act) that may involve discharge of waste water[2] to Queensland waters[3], including to waters of high ecological value (HEV). It also applies when assessing applications under other Acts that involve environmental values (EVs) of water or water quality objectives (WQOs), decisions made under the *State Coastal Management Plan 2001* and Regional Coastal Management Plans.

1.1 Key legislation and policy frameworks

The operational policy is based primarily on the EP Act and the *Environmental Protection (Water) Policy 1997* (the EPP Water). The object of the EP Act is "to protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends (ecologically sustainable development)" (from Section 3 of the EP Act). The explanatory notes to Section 5 of the EP Act (Obligations of persons to achieve object of Act) require "all people who are given power under this Act, to use that power to protect the Queensland environment and do so consistent with the principles of ESD".

The current EPP Water includes statements of policy about assessment and decision making that resulted from consultation on the Regulatory Impact Statement for the *Environmental Protection (Water) Amendment Policy No 1 2006* (the EPP (Water) AP). These are described in the corresponding explanatory notes. This operational policy provides further information on the implications of 'scheduling' EVs and WQOs under the EPP Water for residual waste water discharge. Refer also to the EPA information sheet *Scheduling environmental values and water quality objectives.*

The operational policy also informs officers and applicants on key provisions of the EPP Water, the *Queensland Water Quality Guidelines 2006* and the ANZECC Water Quality Guidelines.

The environmental offsets policy at Section 2.6 is to be used in conjunction with the Queensland Government Environmental Offsets Policy.

Relevant legislation, intergovernmental agreements and other EPA Operational policies are listed at Section 4.

1.2 Application of policy

This operational policy applies when assessing or deciding applications (hereinafter referred to as development applications) relating to activities that are proposing to discharge residual waste water to waters, such as:

- development approvals under the *Integrated Planning Act 1997* (IPA) for EP Act chapter 4 activities (non-mining and non-petroleum environmentally relevant activities (ERAs)) prescribed under the *Environmental Protection Regulation 1998*;
- environmental authorities under the EP Act for mining and petroleum activities;
- the assessment of *Environmental Impact Statements* prepared under the EP Act chapter 3 or the *Environmental Protection and Biodiversity Conservation Act 1999* (the EPBC Act);
- projects declared to be significant projects by the Coordinator General under the *State Development and Public Works Organisation Act 1971* (the SDPWO Act);

[2] Under the EPP Water, waste water means liquid waste and includes contaminated stormwater.
[3] Queensland waters means all waters that are within the limits of the State and includes all tidal (coastal and estuarine) and non-tidal (riverine) waters, groundwaters and wetlands (see the definition in the *Acts Interpretation Act 1954*).

- development that is the subject of designation of land for community infrastructure under the *Integrated Planning Act 1997*;
- when assessing transitional environmental programs or environmental evaluations under the EP Act; and
- when making environmental management decisions under the EPP Water involving waste water release on land, waste water recycling and the release of contaminated stormwater that may impact on surface waters or groundwaters.

In assessing development applications for EP Act chapter 4 activities the administering authority must comply with any relevant Environmental Protection Policy requirement and must consider the standard criteria of schedule 3 of the EP Act (see Glossary of Terms) and additional information given in relation to the application.

If the application seeks an increase in the scale or intensity, the administering authority must assess the application having regard to the proposed activity, the existing activity and the potential environmental harm the proposed activity and the existing activity may cause. Refer to section 73AA of the EP Act for applications in a wild rivers area.

Subject to IPA, the administering authority may impose conditions on the development approval it considers are necessary or desirable, and must include any condition the authority is required to impose under an Environmental Protection Policy requirement. For other conditions that may be imposed, refer to section 73B (3) and (4) of the EP Act.

In assessing and deciding applications for environmental authority (mining activity) for level 1 mining projects the administering authority may in granting the application impose the conditions on the environmental authority it considers necessary or desirable.

In deciding whether to grant or refuse the application or to impose a condition the authority must:

(a) comply with any relevant Environmental Protection Policy requirement; and

(b) subject to paragraph (a), consider - application documents for the application, the standard criteria, the wild river declaration for the area—to the extent the application relates to mining activities in a wild river area, any suitability report obtained for the application and the status of any application under the *Mineral Resources Act 1989* for each relevant mining tenement.

The operational policy also informs the application of EVs and WQOs in the assessment of non-ERA development applications, including under the *State Coastal Management Plan 2001* and Regional Coastal Management Plans (State Planning Policies under IPA). Information on Implementing the State Coastal Management Plan includes the Planning Scheme Guideline and Development Assessment Guideline. These guidelines provide advice on reflecting the relevant policies of the State and Regional Coastal Management Plans into Local Government planning schemes and for development assessment. Relevant policies include 2.4.1 Water quality management, 2.4.4 Stormwater management and 2.4.5 Groundwater.

A glossary of terms is at Appendix 6.1.

2. Policy/technical issues determination

2.0 Policy statements

The statements of policy informing assessment and decision making on applications for ERAs discharging residual waste water to Queensland waters are at Explanatory notes for EPP (Water) AP and summarized as follows. The policy context is considered with respect to receiving waters that have the biological integrity of:

a. **Effectively unmodified (high ecological value) aquatic ecosystems**

"The management intent for high ecological value aquatic ecosystems is to maintain the natural values, including the physico-chemical, biological, habitat and flow attributes. For any new ERA a decision to release waste water to high ecological value surface waters, or groundwater, is the least preferred option. Under the waste management evaluation procedure of section 15 of the Environmental Protection (Water) Policy 1997 (the waste management evaluation procedure), the management hierarchy requires the sequential evaluation of waste water prevention and waste water treatment and recycling before the evaluation of the release of waste water to land, sewer or surface water.

In addition, the activity must be carried out in accordance with best practice environmental management for the activity.

However if some release of waste water from the activity to high ecological value surface water is environmentally acceptable after consideration of the waste evaluation procedure, and there are no practicable alternative surface water discharge locations, the ERA would need to demonstrate:

- *an equivalent outcome of no, or negligible, change[4] to the physico-chemical, biological, habitat and flow attributes beyond natural variation of the water, excepting in limited circumstances, within a defined initial mixing zone measured near the waste water release outfall location. The intent is that beyond the mixing zone boundaries, current environmental quality is maintained and the aquatic ecosystem is conservatively protected over time, taking into account the precautionary principle;*
- *some environmental assimilative capacity[5] is preserved for future ecologically sustainable development;*
- *the proposal is in the public interest[6] and provides outstanding net benefits to the region, or State as a whole[7];*
- *where practicable, the proposal includes a like kind environmental offset[8]; and*
- *compliance with State Government obligations under intergovernmental agreements which include the management and protection of world heritage areas under the UNESCO Convention[9]; the management and conservation of wetlands under the Ramsar Convention on Wetlands[10]; and the management and protection of migratory birds and their environment under JAMBA and CAMBA[11]";* or

[4] The method of assessing 'no change' to the physico-chemical, biological, habitat and flow ecosystem attributes of high ecological waters is given in the Queensland Water Quality Guidelines 2006 (Appendix D Compliance assessment protocols.)
[5] The environmental assimilative capacity is broadly the capacity of the environment to receive some human induced input of contaminants or alteration, without causing unacceptable change.
[6] Refer to the standard criteria listed under Section 3 of the *Environmental Protection Act 1994*.
[7] Refer to the Terms and abbreviations section of the *State Coastal Management Plan 2001*.
[8] To be of a 'like-kind' the environmental offset would need to be based on the same contaminant and preferably in the same water. However the environmental offset proposal would be considered by the administering authority on a case-by-case basis; seeking to deliver a net environmental gain to the water as a whole.
[9] The *Convention Concerning the Protection of the World Cultural and Natural Heritage (UNESCO) 1972.*
[10] *RAMSAR Convention on Wetlands, Iran 1971.*
[11] Japan Australia Migratory Bird Agreement and China Australia Migratory Bird Agreement. Australian Treaty Series, respectively 1981 No.6 and 1988 No.22. Department of Foreign Affairs and Trade. Canberra.

b. Slightly to moderately disturbed aquatic ecosystems

"The management intent for the release of waste water to surface waters having the biological integrity of slightly to moderately disturbed aquatic ecosystems is considered with respect to the existing water quality.

For any new ERA, if after consideration of the waste evaluation procedure the release of contaminants to surface water is environmentally acceptable, the management intent is summarised below:

- *where the existing water quality is better than the scheduled water quality objectives, the management intent is to maintain the current water quality; while allowing in some circumstances the use of some of the remaining assimilative capacity for future development and population growth; and*
- *where the existing water quality corresponds to the scheduled water quality objectives, the management intent is to maintain the water quality; and*
- *where the existing water quality is of a lower quality than the scheduled water quality objectives, the management intent is to improve the water quality and prevent further degradation. Attainment of the scheduled water quality objectives will be sought through continual improvement over time and, depending on existing water quality, may be a long-term goal. Environmental offsets of a 'like kind' may be considered by the administering authority where there are no feasible alternatives to the release of waste water.*

In addition, the activity must be carried out in accordance with best practice environmental management for the activity. For existing ERAs the continuous improvement requirement of development conditions applies...'; or

c. Highly disturbed aquatic ecosystems

"The management intent for the release of waste water to surface waters having the biological integrity of highly disturbed aquatic ecosystems is to halt the decline and reverse the trend in water quality.

For any new ERA, if after consideration of the waste evaluation procedure the release of contaminants to surface water is environmentally acceptable, the management intent is to halt the decline and reverse the trend in existing water quality. However it is recognised that attainment of scheduled water quality objectives is a long-term goal.

In addition, the activity must be carried out in accordance with best practice environmental management for the activity. For existing environmentally relevant activities the continuous improvement requirement of development conditions also applies.

Environmental offsets of a 'like kind' may be considered by the administering authority where there are no feasible alternatives to the release of waste water."

The above statements of policy are considered in the following sections 2.1 to 2.5, in conjunction with the Queensland and ANZECC Water Quality Guidelines and the role of EVs and WQOs in water quality assessment. An overall assessment flowchart is at Figure 1, the corresponding task list for assessing the discharge of residual waste water is at Table 1. A glossary of terms is at Appendix 6.1.

Figure 1 — Assessment flowchart

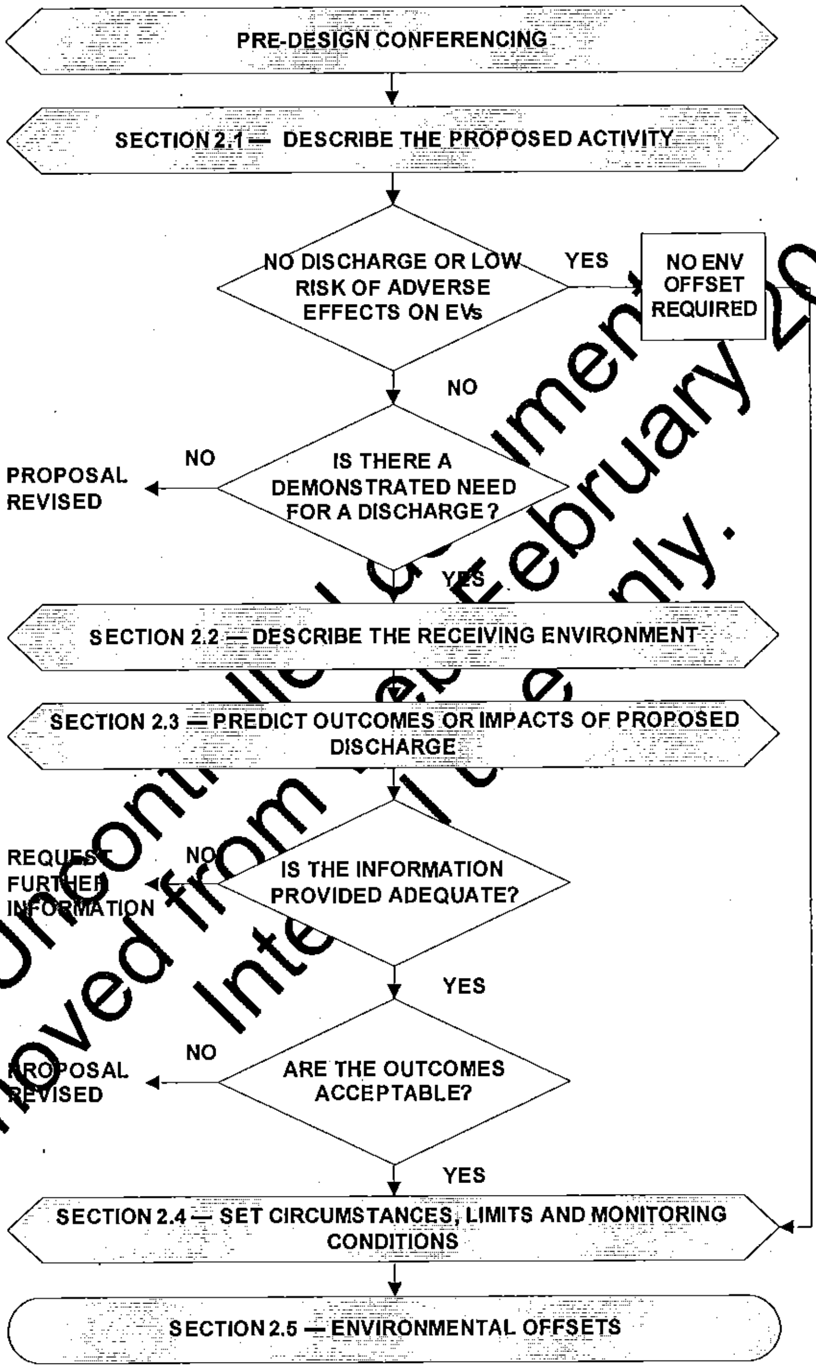


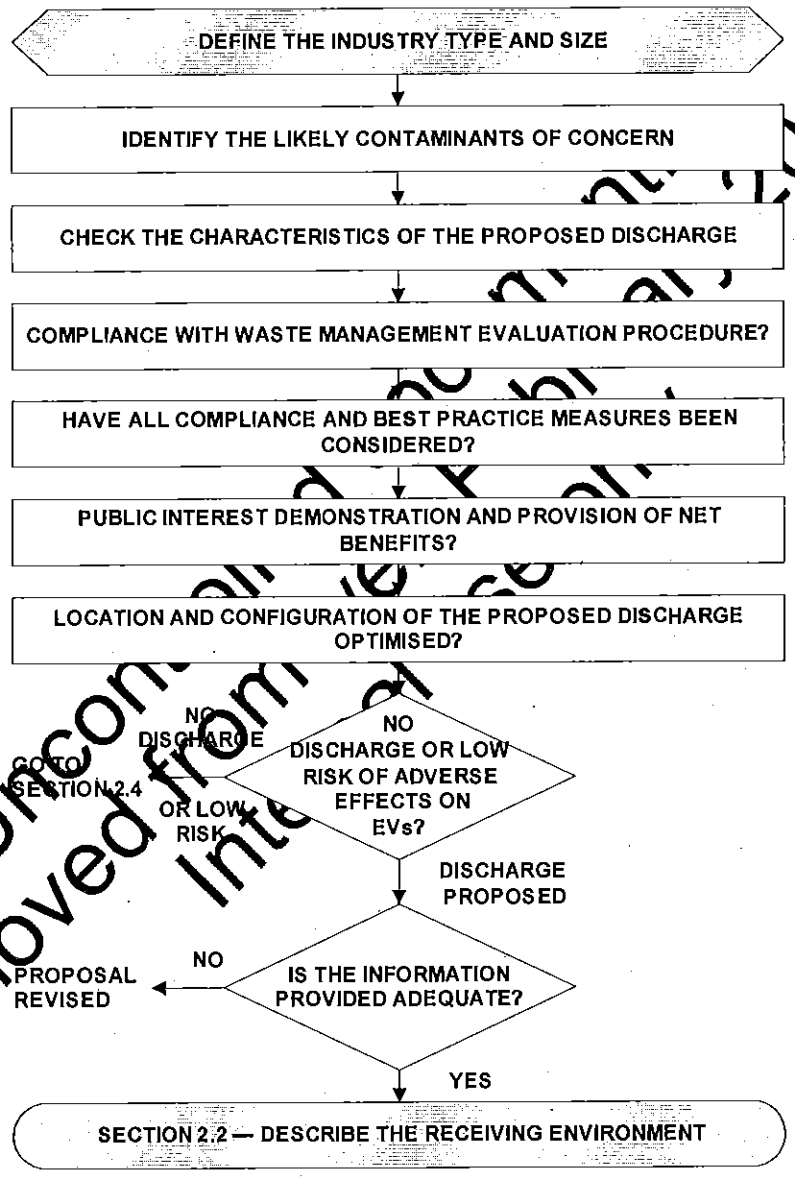
Table 1 — Task list for assessing the discharge of residual waste water

Section	Activity	Tasks list
2.1		Define the industry type and size (proposed production). Is a residual waste water discharge proposed, or is the discharge assessed as low risk of having an adverse effect on an environmental value? Identify the potential contaminants of concern in the proposed discharge. Check the characteristics of the proposed discharge (quality/quantity/variability). Check the location and configuration of the proposed discharge. Have all reasonable and practicable measures been used to avoid or minimise the discharge (for example best practice, source reduction, recycling)?
2.2		Identify water bodies potentially affected by the proposed discharge. For each water body, what are the sustainable loads for key contaminants? What proportion of the sustainable load is used by this proposal? Check government planning requirements that apply to these water bodies (e.g. Ramsar, EPA Referable Wetlands, National Parks and Fish Habitat Areas). Has relevant information on the receiving environment been provided? Is it adequately described given the contaminants and risks associated with the proposed discharge? Are the EVs and WQOs for these waters listed in the EPP Water Schedule 1? (If not EVs and WQOs from the *Queensland Water Quality Guidelines 2006* and ANZECC Water Quality Guidelines apply). Have other sources and loads of contaminants in the catchment, including future loads, and previous history, been considered?
2.3		Identify the need for predicting outcomes of the proposed activity (i.e. is modelling required?) and what predictive methods/models were used. Were the predictive methods used appropriately? If a mixing zone is proposed; check the EPP Water (Section 18) and ANZECC Water Quality Guidelines. For receiving water bodies, are WQOs met and EVs protected? If not, does the activity contribute to achieving them in the future? Determine the need for consideration of environmental offsets.
2.4		Specify any circumstances (for example limitations or timing issues) related to the approved discharge. Derive end-of-pipe limits from approved discharge loads/characteristics. Include compliance monitoring for the end-of-pipe/receiving environment Include reporting requirements for the approved activity. As required, condition the execution of an environmental offset agreement.

2.1 Describe the proposed activity and discharge

This section involves the assessment of information provided by the applicant on the description of the proposed activity, as shown in Figure 2 below and summarised in the following text.

Figure 2 — Activity description and assessment



2.1.1 Define the industry type and size (estimated production)

The industry type and scale will help to classify the potential environmental risk from the proposed activity and discharge of residual waste water. The scale of the activity can be specified in production quantities such as area of production for aquaculture farms, tonnes of throughput for processing industries or equivalent persons in the case of sewage treatment.

2.1.2 Identify the potential contaminants of concern in the discharge from the proposed activity

The first step in assessing the discharge of residual waste water from the proposed activity is identifying the source waste streams and potential contaminants of concern. Contaminants can be a gas, liquid or solid, an odour, an organism, energy (as in a thermal discharge) or a combination of contaminants. Common industry point source discharges and their likely effects are summarised in Table 2.

Note that some industries/ERAs are commonly associated with particular classes of aquatic contamination; for example Waste Water Treatment Plants and nutrients. The National Pollutant Inventory emission estimation technique manuals list 90 priority substances on the basis of health and environmental risk, by industry sector, and the USA EPA Toxic Release Inventory lists 313 priority substances.

These inventories may assist in identifying other key contaminants by industry/ERA. The information can be used as a guide to check information in the application. A search of the academic literature and the internet would be undertaken for more information on specific activities not mentioned. Contaminants are related to process inputs and outputs and can transfer from media other than water (for example leach from solids, scrubber effluent, etc). Contaminants in residual waste water may also occur as unintended by-products of processes (for example dioxins and metal compounds).

Depending on the character and resilience of the receiving environment and the degree of risk, direct toxicity assessment may be required on any available laboratory or pilot plant samples to complement literature evaluation of the additive toxicity of contaminants in the proposed discharge. Such analysis more closely resembles the situation in the natural environment than single chemical testing approach. Refer to the ANZECC Water Quality Guidelines — volume 2, Section 3.3.6.

Table 2 — Potential issues of concern and water quality contaminants

Point source discharges	Potential issues	Water quality contaminants
Sewage effluent		Carbonaceous material, nutrients, pathogens, suspended solids, toxicants (metals/metalloids, pesticides, residual disinfectants and pharmaceuticals).
Abattoir effluent		Carbonaceous material, suspended solids, nutrients, pathogens, residual disinfectants and toxicants.
Mine discharges		pH, sulphate, temperature, suspended solids, turbidity, salinity, toxicants (metals/ metalloids and other chemicals, including fluoride).
Aquaculture discharges		Carbonaceous material, suspended solids, nutrients and toxicants. Diseased organisms and antibiotics may be an issue in some operations.

Point source discharges	Potential issues	Water quality contaminants
Sugar mill cooling waters		Carbonaceous material, temperature and antifouling agents.
Chemical processing plants		pH, sulphate, toxicants (ammonia, metals/metal compounds (including sulphides)/metalloids, pesticides, and other chemicals), suspended solids, carbonaceous material, temperature, nutrients and by-products.
Power stations - blowdown water		Suspended solids, toxicants (metals, metalloids and chemicals), temperature and dissolved salts.

2.1.3 Check the characteristics of the discharge from the proposed activity

The quality and quantity of the discharge from the proposed activity should be clearly characterised. This must include concentrations, typically averages and worst-case values of all potential contaminants of concern, assuming the treatment technology is working effectively. The quantity of the discharge must be similarly expressed for volumes and resulting contaminant loads. The expected variability with time is a further important consideration and percentiles may be used to express this. Wet weather influences must be considered and separate wet weather discharge characteristics defined where applicable.

The method used to estimate these characteristics must be clearly defined and realistically achievable from practical and economic viewpoints. This may be demonstrated with reference to guidelines, pilot plant results or previous applications of the adopted waste water treatment technology. Alternatively, process models may be used to predict these characteristics.

2.1.4 Have all best practice measures been used to avoid or minimise the discharge? Have all compliance matters been addressed?

The mandatory waste management evaluation/assessment consideration is required under the EPP Water and the *Environmental Protection (Waste Management) Policy 2000* (EPP Waste). Assessment usually involves benchmarking against waste management principles, relevant best practice environmental management (BPEM) and evaluation of discharge alternatives. A range of processing options for the proposed activity are usually available to the applicant to prevent, abate or mitigate the waste water discharge and its impacts. These measures include segregating waste streams, source reduction, substitution of chemicals used, cleaning and processing with minimal water, recycling, reuse and best practice treatment and disposal alternatives.

a. Best practice environmental management for the proposed activity

The application should demonstrate that the management of the proposed activity will achieve an on-going minimisation of the activity's environmental harm through cost effective measures assessed against the measures currently used nationally and internationally for the activity. Best practice environmental management technology standards are industry and contaminant specific. Guidance is available from sources including environmental guidelines, research organisations, equipment manufacturers and performance records of industry sector leaders. A technology based standard using best practice environmental management would comprise a benchmark to satisfy the EPP Water waste minimisation provisions.

b. Compliance with the Environmental Protection Policies — waste management evaluation

The application must demonstrate that the proposed activity complies with the EPP Water provisions, including Sections 14 to 24, the EPP Waste provisions, including Sections 10 to 13 and 15 to 17 (as relevant) and consider the *Queensland Water Recycling Guidelines 2005* and the National Water Quality Management Strategy's *Australian Guidelines for Water Recycling: Managing Health and Environmental Risks 2006*.

The latter guidelines provide the framework to encourage the adoption of sustainable water recycling to better manage water resources, and to support economic growth while protecting the environment and safeguarding public health. For industrial waste streams it should also be demonstrated that a release of effluent to sewer, subject to Local Government conditions, is not an acceptable option. A letter from the relevant Local Government advising that discharge to sewer would not be permitted is the common way that this may be demonstrated.

c. Some discharge of residual waste water shown to be unavoidable and environmentally acceptable

Waste water discharge to receiving waters is the least preferred option. The application must demonstrate that waste management evaluation procedures have been addressed and best practice environmental management measures have been used to avoid or minimise the residual discharge to water, and there are no alternate discharge locations or other residual waste water treatment, reuse or disposal options that cause less harm to the environment.

Environmentally acceptable in the context of this paragraph means incorporating all best practice and practicable waste minimization measures.

d. Compliance with State Government obligations under Intergovernmental Agreements and other statutory instruments

The application must comply with, and assessment and approval processes must address matters of State interest, including relevant State Government obligations under inter-government agreements including:

- *Intergovernmental Agreement on the Environment;*
- Agreement under the *Council of Australian Governments* (COAG) *Water Reform Framework;*
- *Convention on Wetlands (Ramsar, Iran, 1971);*
- *UNESCO World Heritage Convention 1972;* and
- International Agreements Relating to Migratory Birds and Wetlands (the Japan-Australia Migratory Bird Agreement (JAMBA), the China-Australia Migratory Bird Agreement (CAMBA) and the Directory of Important Wetlands Australia).

Inter-government agreements contain a range of State obligations. Examples include the promotion the sustainable use and conservation of Ramsar wetlands, protecting world heritage areas and adopting ecologically sustainable development in natural resource decision-making and approval processes. State obligations under COAG include the implementation of the *National Water Quality Management Strategy*.

Matters the subject of the agreements may be of national environmental significance under the EPBC Act and trigger Commonwealth assessment and approval processes. The applicant is responsible for self-assessment and referral to the Australian Government for impact assessment on a matter of national environmental significance. For further information refer to the Department of Environment and Heritage website, EPBC Act Policy Statements — Significant Impact Guidelines/Matters of National Environmental Significance.

Relevant statutory instruments having the effect of State planning policies include the *State Coastal Management Plan 2001,* Regional Coastal Management Plans (Wet Tropical Coast, Cardwell - Hinchinbrook,

Curtis Coast, South-east Queensland) and the *South East Queensland Regional Plan 2005 – 2026.* **State planning policies** include SPP 2/02 (Planning and Managing Development involving Acid Sulphate Soils) and SPP 2/07 (Protection of Extractive Resources) that identifies those extractive resources of State or regional significance where extractive industry development is appropriate in principle, and aims to protect those resources from developments that might prevent or severely constrain current or future extraction when the need for use of the resource arises.

EPA Referable Wetlands datasets are available to State and Local Government through the Queensland Government *Infolink* and development triggers for land in or near are at Assessable development under *Integrated Planning Regulation 1998.*

e. ***For HEV waters — is the proposal in the public interest and does it provide outstanding net benefits to the region, or State as a whole?***

Public interest under the standard criteria of Schedule 3 of the EP Act may be ascribed as meaning the interest of the public as distinct from the interest of the individual(s).

Net benefits to the region, or the State as a whole, has the meaning under the *State Coastal Management Plan 2001.*

These matters may be addressed if, for example:

- the proposal provides a public service such as municipal sewage disposal or provides goods or services to the Queensland community to meet an identified demand and there is no alternative option that is capable of meeting that demand; and
- the potential environmental, economic and social impacts of the project (whether beneficial and adverse) have been assessed at a regional or State level, depending on the project scale; and strongly supports the proposal.

Note the public interest and applicable environmental impact studies, assessments or reports are a part of the standard criteria under Schedule 3 of the EP Act that must be considered in assessing all applications.

2.1.5 Check the location and configuration of the discharge from the proposed activity

The location of the proposed discharge is important as it determines the receiving waters potentially affected. Further, the potential impacts of the proposed discharge are influenced by the configuration under which it is operated (for example some discharges may only occur in the wet season or under slack water, or flood or ebb-tide conditions). A further consideration is the diffuser or outfall configuration. A diffuser may be used to provide better mixing in the initial zone. Outfalls may be submerged to promote mixing or achieve aesthetic goals. The application should explain the rationale behind the proposed discharge location and configuration. Similarly, the rationale for rejecting alternatives to discharge should be explained.

It would typically be necessary and desirable for a discharge pipe to be submerged below low water spring datum, except in cases of denser than ambient waste waters where submergence may exacerbate adverse environmental effects.

2.1.6 ERAs with low assessed risk or no discharge of residual waste water

If the proposed ERA does not involve a direct or indirect discharge of residual waste water to waters, then conditions prohibiting waste water discharge would be included. If the ERA includes a discharge, but represents a low risk of having an adverse effect on an environmental value, then further detailed steps may not be required. Subject to addressing the matters in Section 2.1, and checking for any matters in Section 2.2 that would preclude the discharge, the assessment should proceed to Section 2.4.

A low risk of having an adverse effect on an environmental value would generally occur when pollutant loads are decreasing and are a relatively minor contribution to the receiving water, and when toxicant concentrations in the discharge are below trigger values listed in Section 3.4 of the ANZECC Water Quality Guidelines.

Another case may be a relatively infrequent discharge such as overtopping of waste water storage during flood conditions.

Where no toxicant trigger values are available but published information suggests a chemical may be of concern, direct toxicity assessment may be required on any available laboratory or pilot plant samples to ensure risks are low. Refer to the ANZECC Water Quality Guidelines — volume 2, Section 8.3.6 and Appendix 6.2 of this operational policy.

Development applications involving contaminants found to be low risk or involving no discharge of waste water require no further receiving water quality assessment.

Development conditions would require monitoring and reporting to annually confirm the absence of adverse effects on environmental values or would prohibit waste water discharge (in development applications where no discharge was proposed). Development conditions would also typically specify the nature of the permitted discharge and require monitoring of discharge volume and quality to ensure the activity was carried out as described in the application. In most cases, conditions also typically prohibit discharge of contaminated stormwater. For some activities, stormwater treated to render it less hazardous may comprise a waste water stream that is permitted to be discharged subject to conditions.

Summary

Is there a demonstrated need for a discharge of residual waste water? Are relevant EPP and other compliance issues addressed?

Note that in deciding whether to grant or refuse an application the administering authority must comply with any relevant EPP requirement and must consider the standard criteria of Schedule 3 of the EP Act.

Applications must demonstrate that the discharge of residual waste water from the proposed activity is unavoidable and environmentally acceptable, and other EPP requirements and other compliance requirements are addressed.

If not demonstrated the application should be revised following an information request.

Applicants are encouraged to discuss the above requirements at pre-design conferencing.

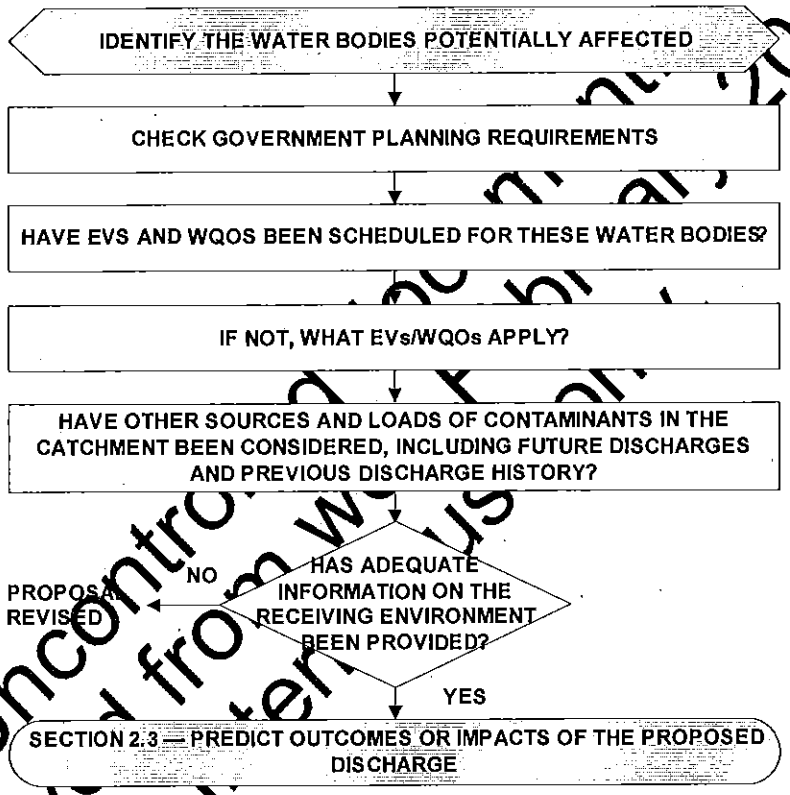
Pre-design conferencing is offered by the EPA to all prospective applicants seeking direction and advice on development applications; including on the preparation of development applications and the necessary documentation to ensure that lodged applications are supported by the requisite information to enable the administering authority to make a decision. Applicants are encouraged to compile information for pre-design conferencing of concepts and plans.

2.2 Describe the receiving environment

This section involves the assessment of information provided by the applicant on the description of the receiving environment, as shown in Figure 3 below and summarised in the following text.

For the receiving waters potentially affected by the proposed discharge, the applicant should identify the EVs and WQOs and provide a description of the existing character, resilience and environmental values of the receiving environment. Refer Appendix 6.1 for the glossary of terms.

Figure 3 — Description of receiving environment

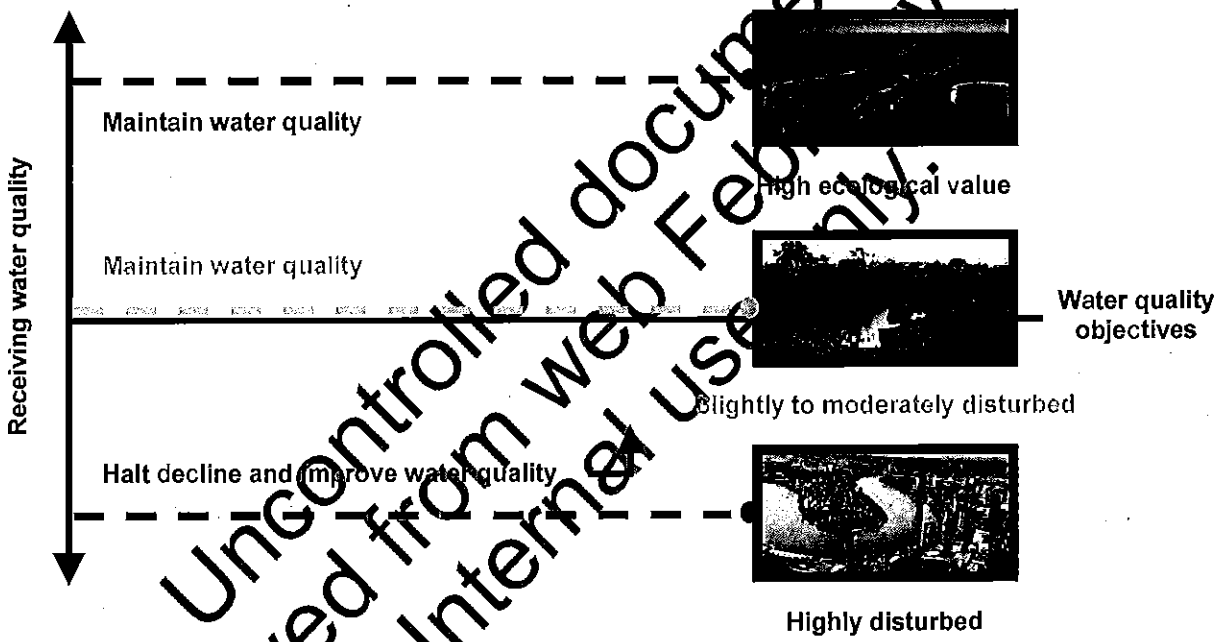


2.2.1 Identify the water bodies potentially affected by the proposed discharge

The intent is to characterize the receiving waters including EVs, WQOs and levels of ecosystem protection. Key information sources are the EPP Water (Schedule 1) and the *Queensland Water Quality Guidelines 2006,* for waters not listed under Schedule 1. As in Section 2.2.2, other State and regional planning documents may also be relevant.

It is important to determine what receiving water ecological health monitoring data is available and how it compares with the relevant water quality objectives and the policy intent (refer Figure 4 below, Section 2.2.3 and Section 2.3).

Figure 4 — Receiving water quality, water quality objectives and management intent



EVs relevant to the receiving waters should be used for the assessment of development applications. For example the affected water body might be a bay, an estuary or riverine waters, and different EVs and WQOs will apply to different parts of the water body. This information is either contained in the documents referenced in Schedule 1 of the EPP Water (accessible via the EPA website) or from the *Queensland Water Quality Guidelines 2006.* Local information may need to be obtained if the latter does not adequately characterise the receiving waters, refer Section 2.2.5.

Further, the levels of aquatic ecosystem protection need to be determined as either high ecological value (HEV) or slightly-to-moderately disturbed (SMD) or highly disturbed (HD). Levels of aquatic ecosystems protection may be available from a number of sources including the EPP Water, State and Regional Coastal Management Plans (Areas of State Significance (Natural Resources)), the Directory of Important Wetlands Australia and Marine Parks and National Parks designations for waters in areas of protected estate. Further guidance in assigning the level of aquatic ecosystem protection is given in Table 3, Section 2.2.2 and the ANZECC Water Quality Guidelines (Section 3.1.3).

2.2.2 Check applicable government plans or requirements

Environmental management objectives, levels of aquatic ecosystem protection and other relevant matters are often specified in applicable planning designations. These matters are a part of the standard criteria of Schedule 3 of the EP Act that must be considered by the administering authority in deciding the application. Examples of Commonwealth requirements include matters of national environmental significance, such as Ramsar listed wetlands and World Heritage Areas, threatened species, as well as Great Barrier Reef Marine Park requirements. Examples of State requirements include the State and Regional Coastal Management Plans, Marine Park zoning plans, Water Resource Plans, Fisheries Habitat Areas, National Parks, EPA Referable Wetlands (refer Section 2.1.4 *d*) and the Great Barrier Reef Water Quality Protection Plan. Local Government information may also include relevant designations in Local Government planning schemes.

2.2.3 Check applicable environmental impact studies, assessments or reports

Relevant information may be available through Commonwealth and State Government Agencies and Authorities, Non-Government Agencies and Local Government web sites, and internet and library searches; or required by the applicant.

2.2.4 Has relevant information on the receiving environment been provided? Is it adequately described given the contaminants and risks associated with the proposed discharge?

It is essential that ecosystem health and catchment information is obtained to assess the outcomes of the proposed activity. Information must be provided on both the character and resilience of the receiving environment to address the standard criteria of Schedule 3 of the EP Act and would include current local ecosystem health and water quality information, potential catchment pollutant sources and local catchment issues. This information may already exist; however it must be current and adequately address temporal and spatial variations to be representative of current conditions. The information may need to be established as part of special investigations prior to lodging the development application. **Pre-design conferencing to address these issues is strongly encouraged.**

Local or regional ecological health monitoring data may be available for the receiving waters (for example from EPA, Department of Natural Resources and Water (DNRW), regional natural resource management bodies or Local Government). The information will be required for comparing the existing water quality of the receiving waters with the WQOs, and must relate to the specific contaminants and assessed risks associated with the proposed residual discharge of waste water to the receiving waters. Current ecological health information may also be required for calibration of predictive models, refer Section 2.3 and Appendix 6.3.

In considering the proposed discharge of residual waste water, the policy intent relates to the level of ecosystem protection and the existing receiving water quality, as shown in Figure 4 and summarised in Table 3.

There may be reports, environmental studies or monitoring results that assist in characterising the receiving environment from sources such as the EPA, the DNRW, the Department of Primary Industries and Fisheries (DPIF), other State Government departments, Local Government, universities, external research organisations and industry groups. This information is a valid consideration under the standard criteria of Schedule 3 of the EP Act.

Note that the precautionary principle must be considered where EVs for waters are threatened and information on the resilience of the system is unknown or limited.

Table 3 — Levels of aquatic ecosystem protection, policy intent and environmental management decisions

High ecological value
The policy intent for high ecological value waters is to afford a high degree of protection of the EVs by ensuring no measurable change to water quality, biological diversity or flow condition. Applications proposing residual waste water discharge to HEV waters should be accompanied by local reference data and local biological effects data. Where practicable the proposal should include a 'like kind' environmental offset, seeking to deliver a net environmental gain to the water. For toxicants listed in Section 3.4 of the ANZECC Water Quality Guidelines, environmental management decisions would include trigger values for toxicants[12] to protect 99 percent of species in the affected water. HEV waters may include fish habitat areas, dugong protection areas, Marine Parks, National Parks and Areas of State Significance (Natural Resources) under State and Regional Coastal Management Plans. Additional HEV waters may be identified through State or regional strategies, ecological studies or stakeholder consultation.
Slightly to moderately disturbed
The policy intent for slightly to moderately disturbed waters is dependent upon current water quality. If the current water quality is better than the WQOs, the intent is to maintain current water quality — using some assimilative capacity. If the current water quality is worse than the WQOs, the intent is to prevent further degradation and improve water quality over time. Environmental offsets of a 'like kind' may be considered by the administering authority where there are no feasible alternatives to discharge of residual waste water. For toxicants listed in Section 3.4 of the ANZECC Water Quality Guidelines, environmental management decisions would include trigger values for toxicants[13] to protect 95 or 99 percent of species in the affected water. The applicant may also use risk analysis techniques, including direct toxicity assessment; all supporting documentation should be supplied with the development application. EPAofficers should request assistance from the Environmental Sciences Division in assessing the validity of the data.
Highly disturbed
The policy intent for highly disturbed waters is that receiving water quality should: a) improve towards achieving the WQOs to protect the EVs, over time; and b) not measurably deteriorate as a result of the proposed discharge. For toxicants listed in Section 3.4 of the ANZECC Water Quality Guidelines, environmental management decisions would include trigger values for toxicants for slightly to moderately ecosystems would be adopted first, although lower levels of protection (for example 90 percent of species) may apply in some cases. An application for a discharge into HD waters should be supported by reference to local monitoring data. Environmental offsets of a 'like kind' may be considered by the administering authority where there are no feasible alternatives to the discharge of residual waste water.

[12] See Table 3.4.2 of the ANZECC Water Quality Guidelines.
[13] Refer above.

2.2.5 Have EVs and WQOs for the waters been listed in Schedule 1 of the EPP Water?

EVs and WQOs for waters listed under Schedule 1 of the EPP Water must be adopted and considered in assessing development applications.

2.2.6 If EVs and WQOs are not listed under Schedule 1 of the EPP Water, what EVs/WQOs apply?

Where EVs and WQOs for the waters have not been specifically set in Schedule 1 of the EPP Water then, under Section 11(2) of the EPP Water, the WQOs are the set of water quality guidelines that will protect all EVs for the waters, including the Queensland and ANZECC Water Quality Guidelines.

Where the default guideline values are inappropriate for the receiving environment, for example due to non–anthropogenic reasons such as high organic carbon, WQOs would be based on water quality guidelines derived from data collected at appropriate local reference sites — refer Section 3.1.

Table 4 lists EVs for waters, refer also to Appendix 6.1. The EPA guideline *Establishing draft environmental values and water quality objectives* sets out the process for establishing EVs and WQOs under the EPP Water.

Table 4 — Environmental values for waters

EVs of water	Examples of suitability for use
[illegible]	Maintain or improve the biological integrity of the respective aquatic ecosystems condition (HEV, SMD, HD). Total to partial complement of aquatic and adjacent terrestrial habitat and biota diversity and abundance (depending on the level of protection), including water associated wildlife.
[illegible]	
[illegible]	Primary contact recreation (e.g. swimming). Secondary contact recreation (e.g. boating). Visual recreation (e.g. natural landscape).
[illegible]	Water sources used for drinking water.
[illegible]	Irrigation, general agricultural use and stock watering. Stock watering. Human consumption of aquatic foods (fish, crustacean and mollusks) — commercial and recreational sources. Aquaculture.
[illegible]	Generic processes (heating and cooling). Specific industries (textile, chemical, paper and pulp). Power generation (hydro-electric).
[illegible]	Protection of cultural resources — places or objects of historic or indigenous significance or value.

2.2.7 Have other sources and loads of contaminants in the catchment been considered, including future discharges and previous discharge history?

For some contaminants such as nutrients and sediment it is necessary to consider other catchment sources and loads, and if the activity will be contributing to these loads. Considering catchments loads is particularly important where WQOs are not currently being achieved in receiving waters potentially affected by the discharge and multiple discharge sources exist.

It should be noted that the EPP Water also requires discharge of waste water from future developments to be considered in the decision making process. Possible sources of information include development applications, Local Government sewerage planning strategies, the EPA Point Source Database and the Department of Infrastructure and Planning. This aspect is important because the administering authority would not allocate all available assimilative capacity to a single application, and an application should not seek the discharge of a contaminant where the proposed load was a significant proportion of the sustainable load, i.e. the contaminant load consistent with the maintenance of the WQOs for the receiving waters. The concept of sustainable load including consideration of assimilative capacity is addressed further under Section 2.3.4.

The sustainable load can be determined by studies of aquatic ecosystem health and modelling to predict the effect of natural catchment and anthropogenic loads (diffuse and point source) on the water quality objectives of the receiving water. This process is generally undertaken in collaboration with regional natural resource management bodies and other relevant stakeholders.

For some receiving waters, previous management actions have resulted in the reduction of contaminant loads in order to achieve water quality objectives. The administering authority would consider it important that improved environmental outcomes be maintained, rather than re-establish discharge loads. Load history may also give insight into the likely effect of certain levels of discharge on water quality. Environmental offsets may be considered by the administering authority for SMD and HD waters with no assimilative capacity for the contaminant, and where there are no feasible alternatives to the discharge of residual waste water.

Summary

Has adequate information been provided to describe the character, resilience and environmental values of the receiving environment? Have applicable government plans, requirements, environmental impact studies, assessments or reports been considered?

Note that the above relates only to part of the standard criteria of Schedule 3 of the EP Act. All the standard criteria and other prescribed matters must be considered by the administering authority in deciding whether to grant or refuse the application.

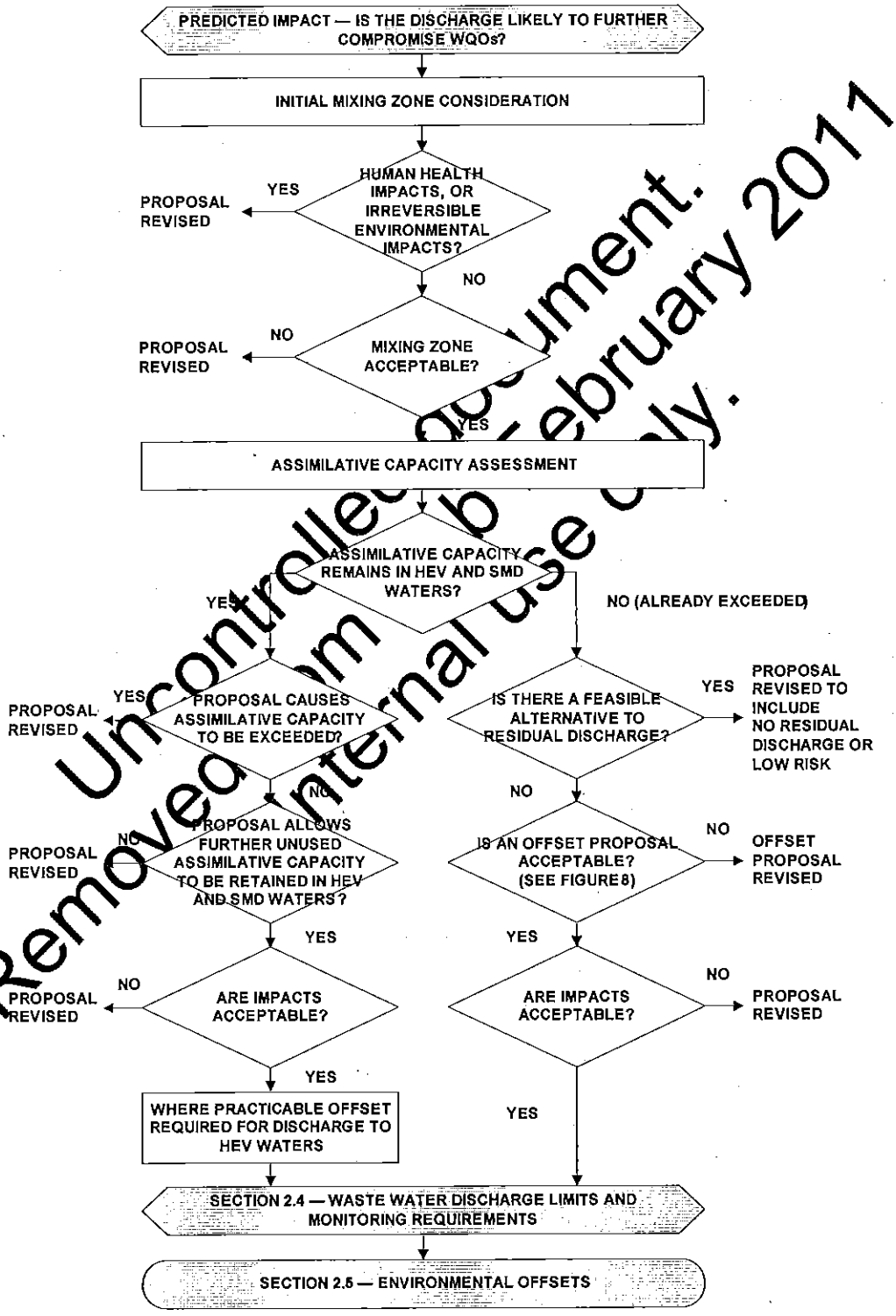
If not demonstrated, the application should be revised following an information request.

Applicants are encouraged to discuss the above requirements at pre-design conferencing.

2.3 Predict outcomes or impacts of the proposed discharge

This section involves the assessment of information provided by the applicant on the predicted outcomes or impacts of the proposed discharge, as summarised in the following text and shown in Figure 5 below.

Figure 5 – Prediction of impacts of proposed discharge



2.3.1 Predicted impact of the proposed discharge of residual waste water on the EVs and WQOs of the receiving waters

Prediction of the environmental outcomes or impacts that would result from the proposed ERA requires the completion of quantitative assessments which may involve numerical modelling procedures to estimate contaminant loads, changes to receiving waters contaminant concentrations and the effects of mitigation actions. Refer to Appendix 6.3 — *Numerical modelling of environmental impacts and mitigation actions.*

Prediction of the impact of the proposed discharge of residual waste water on receiving water quality should be compared to the WQOs — in the context of the policy intent at Section 2.0, which is summarised below and shown at Figure 4. Existing receiving water quality should be the baseline comparison for impact assessment.

a. For the discharge of residual waste water to high ecological value (HEV) receiving waters

The policy intent in considering an application to discharge residual waste water into high ecological value receiving waters is to maintain the natural values; including the physico-chemical, biological, habitat and flow attributes.

b. For the discharge of residual waste water to slightly to moderately disturbed (SMD) receiving waters

The policy intent in considering an application to discharge residual waste water into slightly to moderately disturbed receiving waters is considered with respect to the existing water quality — either maintain (use some assimilative capacity) or improve (over time).

c. For the discharge of residual waste water to highly disturbed (HD) receiving waters

The policy intent in considering an application to discharge residual waste water into highly disturbed receiving waters is to halt the decline and reverse the adverse trend in water quality. Highly disturbed receiving waters do not have any assimilative capacity. It is recognised that attainment of WQOs for highly disturbed receiving waters is a long-term goal.

2.3.2 Where WQOs are not currently being achieved, is the discharge likely to further reduce receiving water quality?

If the WQOs of the receiving waters that are potentially affected by the proposed discharge are not currently being achieved, a significant environment risk is associated with the proposed discharge as further environmental harm is likely to occur. In this case the EVs will not be protected and pre-design conferencing with the applicant should consider alternatives. Where the discharge of residual waste water from the proposed ERA may not otherwise be avoided, reused, recycled or other disposal alternatives adopted; further considerations by the administering authority should include environmental offsets where there are no feasible alternatives to the discharge of residual waste water — refer to Section 2.5.

2.3.3 Initial mixing zone

Mixing zones are a mandatory consideration under the EPP Water and applications must:

- comply with Section 18 of the EPP Water (waste water releases to surface water);
- consider the ANZECC Water Quality Guidelines for mixing zones;
- include the results of the baseline water quality monitoring in the area of the proposed mixing zone; and
- for HEV waters — provide predictive modelling results that demonstrate no or negligible change to the ecological attributes beyond the mixing zone, refer to Appendix 6.2.

A mixing zone is a permitted zone of non-compliance with the receiving WQOs and is primarily for managing soluble toxicants where concentrations in the discharge are above toxicant trigger values in Section 3.4 of the

ANZECC Water Quality Guidelines. Where this is the case, further risk assessment including direct toxicity assessment (DTA) for biological effects, should be considered prior to mixing zone assessment.

Refer to the ANZECC Water Quality Guidelines — volume 2, Section 8.3.6. Where the toxicant concentrations in the discharge are found to not cause toxicity, mixing zone assessment may not be required. Results of DTA will also be used to assess the actual dimensions of the mixing zone.

Various predictive models are available for estimating initial mixing zones, evaluating outfall diffuser designs and defining areas around the outfall where concentrations may exceed WQOs; refer Appendices 6.2 and 6.3.

The administering authority would not approve a mixing zone if inclusion would be likely to result in human health impacts, irreversible environmental impacts, unacceptable impacts to biota or where the discharge of residual waste water was characterised by a lack of effluent plume dispersion.

Mixing zone considerations include:

- only one mixing zone, minimised to the greatest practicable extent in accordance with the waste management hierarchy, is permitted for an ERA;
- spatially defining the mixing zone based on compliance with estimated receiving environment concentrations using mean flows and maximum expected toxicant concentrations for the discharge against chronic toxicant concentration (refer Appendix 6.2). The diameter (as depicted in Figure 6) should be measured from the diffuser port and should be defined by considering the maximum extent from a range of tidal conditions in tidal areas covering at least slack tides and mid-tide conditions for all toxicants present in the discharge. In non-tidal streams, the minimum consecutive seven day average flow with a 10-year recurrence interval is recommended as a guide to minimum dilution conditions;
- ensuring the mixing zone would not provide a barrier to the migration of aquatic fauna in riverine and estuarine waters, i.e. not take up the width of the stream. As a general rule, the maximum lateral dimension should be the lesser of 50m diameter or 30 percent of the waterway width for riverine and estuarine waters and a radius not exceeding 100m from the diffuser port for coastal/marine waters;
- avoiding overlap of mixing zones from neighboring discharges. It is recommended that the edges of the mixing zones be at least 200m apart. The combined affect should be assessed;
- not impinging on the shore line; for example, based on the mean on the low water spring tide (Mean Low Spring Tide);
- the use of mixing zones is not appropriate for managing the discharge of nutrients, bio-accumulatory or particulate substances. For nutrients, see discussion below for management using reference based assessment;
- mixing zones are typically not applicable to waters with significant and regular use for primary contact recreation, existing aquaculture development approvals, areas allocated to aquaculture under planning frameworks, waters of high ecological value, conservation significance or scientific importance or near potable water intakes;
- the discharge limits should be set such that within the mixing zone the residual waste water discharge does not cause odours, surface discolouration, visible floating foam, oils, grease, scum, litter or other objectionable matter;
- contaminant concentrations in the mixing zone must not be acutely toxic to fish, other aquatic vertebrates, commercial species or endangered wildlife, cause significant irreversible harm including objectionable bottom deposits, the growth of undesirable aquatic life or the dominance of nuisance species (such as algal blooms). The use of toxicity-based guidelines or site-specific biological effects

data is usually required to define the boundary of the mixing zone (refer Figure 6 and Appendix 6.3); and

- for large flowing freshwater streams where effluent discharges are unlikely to have significant density difference to the receiving waters, the effluent plume may extend a considerable distance downstream. The applicant would need to confirm the proposed discharge did not violate the WQOs of the receiving waters after full lateral mixing.

When assessing thermal discharges and oxygen demanding substances, acute effects should not occur anywhere in the receiving waters, for example no harmful dissolved oxygen sags are caused. In these cases, maximum concentrations and loads should be modeled and assessed to assess potential impacts. Predicted environmental concentrations and levels should be compared to known acute effect levels.

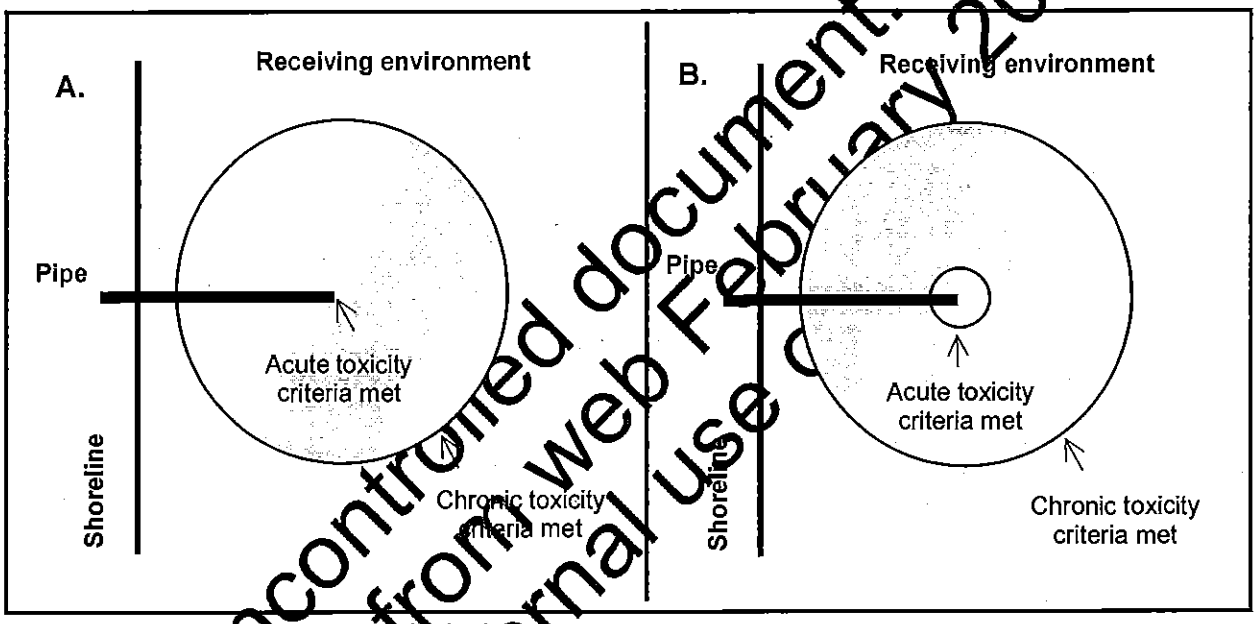


Figure 6 — Spatially defining an initial mixing zone.

A. Low risk configuration where acute toxicity levels are met end-of-pipe.

B. Configuration that involves a small zone within the mixing zone where acute toxicity criteria may not be met but have a low risk of causing acute toxicity.

When assessing effects of contaminants that are based primarily on a reference condition rather than direct effects, for example nitrogen and phosphorus concentrations, assessment typically requires water quality objectives to be met on a percentile basis (for example median concentration). It is not necessary that such concentrations are met directly at the discharge point as effects of dilution, assimilation and average receiving environment conditions should be considered. Prediction of effects of these discharges is typically a far-field issue and needs to consider the assimilative capacity of the waters (see Section 2.3.4).

Monitoring of effects of discharges in these cases is typically undertaken in the centre of waterway channel at various distances from the discharge point. Compliance with reference criteria should be met within 3 stream widths or 300m, whichever is the smaller as a general guide. Approval of zones with exceeded water ambient quality objectives greater than this size may be granted in specific cases where social and economic considerations support the discharge of residual waste water and there are no other feasible alternatives. Regardless, localised environmental harm should not occur, for example smothering of corals with benthic algae from nutrients.

For discharges involving contaminants that are not directly toxic, diffusers are still desirable and may also be required to achieve good initial dilution and avoid undesirable effects such as visible plumes or slicks and biological effects such as avoidance behavior. Modeling may be required to design the diffusers to optimize dilution and location. For example, it would generally be desirable to achieve at least a 1:50 dilution within 100m in any direction from the discharge point of the release. Discharges from pipes should also be located so that they are submerged under all tidal conditions, unless the discharge is denser than ambient. Discharges to poorly mixed waterways should be discouraged, for example upper estuaries, below barrages and small waterways with limited tidal exchange.

In cases where a mixing zone was permitted, development conditions would require the applicant to install measures such as diffusers on which the predictions were based and require a compliance monitoring program to verify that the minimum dilution ratios and concentrations predicted for mixing zone were achieved at the modelled or DTA determined mixing zone boundary.

Specific considerations include:

- Loss of aesthetic enjoyment or generation of an objectionable odour;
- **Public notification.** As the environmental values for waters may be prejudiced by the inclusion of a mixing zone, impact assessable development applications proposing a mixing zone should become public knowledge through the public notification stage of the application. Development conditions may require signage to identify the location of the adjacent mixing zone;
- **The precautionary principle** must be applied where environmental values are threatened and information on the resilience of the system is limited. Consequently the administering authority must, in considering the application and assessing risks to the ecological health of waters outside the mixing zone, adopt the precautionary principle to ensure that the current environmental quality is maintained beyond the mixing zone boundaries and that human health and aquatic ecosystems are conservatively protected within the mixing zone; and
- For HEV waters peer review assessment of the mixing zone proposal is required, including the demonstration of the lack of impacts beyond the mixing zone boundaries, and must be submitted with the development application. The EPA can advise of potential peer reviewers.

2.3 4 Assimilative capacity and sustainable load

a. Policy issues

Refer to Section 2.0

Assimilative capacity is the capacity of the receiving waters to receive some human induced input of contaminants or alteration, while still achieving the water quality objectives.

b. Release of assimilative capacity in HEV and SMD waters for discharge of residual waste water

Decisions about the use of assimilative capacity in HEV and SMD receiving waters for the discharge of residual waste water must be considered after all options to manage the waste water have been assessed and managed by the administering authority in the context of sustainable and efficient use of scarce resources — see also sub-section *d* below, *Assimilative capacity of HEV water not to be exceeded by discharge of residual waste water.*

A development application should demonstrate that the assimilative capacity of the receiving waters is not exceeded and that some assimilative capacity is preserved for future ecologically sustainable development - the proportion proposed to be consumed should be determined.

As a guide, the majority proportion of the assimilative capacity should be retained for future ecologically sustainable development.

The administering authority may consider the role of market-based instruments in managing these issues (for example flexible or incentives based mechanisms). For HEV waters the policy intent is that, where practicable, the application includes an environmental offset proposal seeking to deliver a net environmental gain to the water as a whole, see Section 2.5.

c. What are the sustainable loads for key contaminants?

The sustainable load of a particular contaminant is the maximum amount that a water body can receive without failing to meet the WQOs and therefore adversely affecting EVs. The concept of sustainable load is particularly important for oxygen demanding substances, nutrients, sediments and toxicants. It should be noted that toxicants are generally a near-field issue[14] and that suspended sediments can have an assorbed toxicant load which can adversely affect pelagic species and benthic fauna and flora directly, as well as indirectly through contamination of food sources (for example, seagrass and organic detritus)..

d. Assimilative capacity of HEV water not to be exceeded by discharge of residual waste water

The demonstration of 'no or negligible change' to the ecological indicators beyond the mixing zone boundaries also demonstrates that the HEV water assimilative capacity is not exceeded. Refer to Appendix 6.2.

e. Where assimilative capacity is exceeded — prior to assessment

In some SMD waters the assimilative capacity for specific contaminants may already be exceeded. This may be evident from ecological health monitoring and remedial programs may be underway to restore ecological health by reducing loads of specific contaminants.

Where the current receiving water quality does not meet the WQOs, the policy intent for slightly-to-moderately disturbed (SMD) waters is to prevent further degradation and improve water quality over time.

Highly disturbed (HD) waters do not have any assimilative capacity. The policy intent is to halt the decline and reverse the trend in water quality, recognising the attainment of receiving WQOs is a long term goal.

For ERAs seeking to discharge residual waste water to receiving waters without assimilative capacity, alternatives to the discharge and alternate discharge locations should be re-evaluated before undertaking an assessment of how worse water quality will become. If there are no feasible alternatives to prevent, control or abate the discharge of residual waste water or to mitigate the impacts through alternative discharge strategies, then environmental offsets may be considered by the administering authority — see Section 2.5.

For waters with no assimilative capacity, achieving the receiving WQOs would be sought on a catchment wide basis involving all ERAs discharging waste water to the receiving waters through continual improvement over time, and additionally considering diffuse source (urban and rural) emissions. Depending on the existing receiving water quality, achievement of the WQOs may be a long-term goal. The EPA *Strategic compliance management program* typically includes area/sub-catchment, industry sector and licensed activity inspections that seek, amongst other things, to improve receiving water quality on a catchment basis. The program may involve all activities discharging to a particular water body.

In the case of an existing industry that is a key contributor to the impaired water quality in SMD or HD waters, reductions in discharge loads would be considered for any application to increase scale or intensity, or as part of the above EPA program to restore waterway health.

[14] Sustainable loads should relate to an area of influence based on the issues of concern. For example, effects from sediment bound toxicants on benthic communities may be a localised issue.

The public interest consideration and other considerations under the standard criteria of Schedule 3 of the EP Act may be important in the assessment of applications proposing the discharge of residual waste water to SMD or HD receiving waters, where assimilative capacity is exceeded.

Relevant considerations may include:

- the proposal provides a public service such as municipal sewage disposal or provides goods or services to the Queensland community to meet an identified demand and there is no alternative option that is capable of meeting that demand; and
- applicable environmental impact studies, assessments or reports.

Summary

Is the information provided adequate?

Is sufficient information provided about the proposed activity that addresses the above matters? If necessary, further information should be requested.

Are the outcomes/impacts acceptable?

Further information may also be required to address deficiencies or achieve better environmental outcomes, for example using alternative technologies, management practices, discharge locations. Pre-design conferencing is important in raising issues and exploring options at the earliest possible time, and in seeking advice and direction on documentation, plans and information requirements.

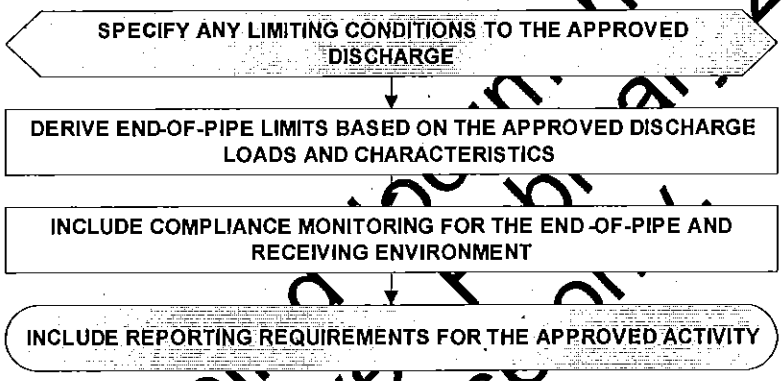
Pre-design conferencing is encouraged to address the prediction of impacts of the discharge on receiving waters, mixing zone and assimilative capacity requirements.

2.4 Set residual waste water discharge limits, discharge and impact monitoring requirements

Once the outcomes of the proposed activity are deemed acceptable, it is necessary to determine the appropriate residual waste water discharge limits and monitoring requirements, the latter in compliance with Sections 26 and 27 of the EPP Water, for inclusion in the development conditions. The derived development conditions, including discharge characteristics, limits, release (discharge) and impact monitoring requirements should reflect the inputs used in predictions.

Other factors for consideration include the environmental risk of the industry type and the use of best practice environmental management for the activity. Appropriate discharge limits and performance monitoring can be decided upon by undertaking the following steps that are summarised at Figure 7.

Figure 7 — Consideration of specific development conditions



2.4.1 Specify any circumstances related to the approved discharge

Approval to discharge must be constrained to the residual waste water, after waste minimisation measures have been implemented. The conditions must state that only approved waste water may be discharged. The location of the discharge, including any need for submergence or a diffuser, should be specified. Certain limitations or timing issues may also be conditional to the approval. For example, the discharge may only be permitted at outgoing tides (ebb-tide release), certain months of the year or only during wet weather flows exceeding a stated level. Outfall submergence below local low water to avoid visual impacts and enhance mixing is generally required, unless the discharge is not buoyant. Other precautions such as signage may be desirable depending upon the nature and the location of the discharge.

The protocols for monitoring must comply with Section 10 of the EPP Water and be in accordance with the EPA Water Quality Sampling Manual and the ANZECC Water Quality Guidelines. Compliance assessment protocols for different levels of aquatic ecosystems protection (HEV, SMD and HD waters) are at the Queensland Water Quality Guidelines.

2.4.2 Derive discharge limits based on the approved discharge loads and characteristics

WQOs would not normally be used directly for regulatory purposes and therefore discharge limits for the end-of-pipe need to be derived that will achieve these WQOs. The process of deriving the limits can be divided into selecting the indicator (for example dissolved oxygen concentration), determining the relevant limit type (for example minimum) and choosing the limit and units (for example 6mg/L). General guidance for setting limits is shown in Table 5. Derived information would be used in conditioning development approvals, environmental authorities, transitional environmental programs and environment protection orders.

a. Indicators

Limits should be placed on any indicators that can be practically measured at the end-of-pipe and are relevant to the discharge quality. These might include toxicants, nutrients, oxygen-consuming substances, suspended solids, dissolved oxygen, pH and pathogen indicators such as *Enteroccocus spp.* The discharge loads proposed for the activity and assessed in the above processes would be used as a basis for setting these limits. For waste streams that may vary over time, for example municipal sewage may receive varied trade waste inputs, an additional qualitative condition that requires that the release must not have any other properties nor contain any other organisms or other contaminants which are capable of causing environmental harm is recommended to address this issue.

b. Discharge volume limits

Maximum volumes permitted for discharge on any one day would be considered, including wet weather flows for waste water treatment plants (WWTPs),

c. Percentiles and frequency

Development conditions may include limits combining percentiles (for example the 80th percentile) and must include maximum values (or minimum values in cases such as dissolved oxygen discharge of very cold water where adverse effects are related to low values rather than high values). Maximum values are particularly important for toxicants that have an acute impact on the environment (refer Table 3 and Table 3.4.2 ANZECC Water Quality Guidelines for trigger values for toxicants to protect 99, 95 and 90 percent of species). In addition, maximum values can be applied for compliance monitoring to a single sampling event whereas percentiles can only be applied over a number of sampling events. Maximum values also ensure a proper standard of treatment applies at all times. Percentiles may be employed when relevant to treatment technology and when percentile performance is used in impact assessment studies to evaluate medium to long term environmental outcomes, for example nutrient loads and risks of nutrient enrichment.

Table 5 — Guidance for setting limits for indicator types

Toxicants		No acute toxicity in initial mixing zone (i.e. end-of-pipe). No chronic effects outside initial mixing zone. Additional multiplying factors may be used in the case of bio-accumulating and bio-concentrating contaminants. No build-up in sediments, exceeding relevant trigger levels. No build-up in seafood species (Food Standards Code). Irrigation, stockwater and drinking water protected where these are relevant values.
Nutrients		50th percentile to achieve mass load (and prevent local impacts). Maximums to prevent local impacts (generally three times limit for 50th percentile). Mass loads based on systems sustainable load or capacity.
Sediments		Use levels achievable by BPEM (e.g. 50 mg/L)
Salinity		Maximum to prevent local impacts.
Pathogenic indicators		Limits based on 2005 National Health and Medical Research Council (NHMRC) Water Guidelines (e.g. for faecal coliforms, *Enterococcus spp.* and pathogenic protozoa).

Temperature		Maximum temperature elevation based on receiving waters.
Residual disinfectant		Maximum based on likely decay time and effects on biota.
Dissolved oxygen concentration		Best practice environmental management.
Oxygen demand and suspended solids		Mass loads based on systems sustainable load or capacity. 80th percentile to achieve mass load (and prevent local impacts). Maximums to prevent local impacts (generally three times limit for 80th percentile).

Minimum values are necessary for dissolved oxygen concentration levels and pH in discharges. Percentiles are important as they encompass ongoing high quality treatment in the longer term, whilst allowing reasonable fluctuation in the treatment process. Note that percentiles are not suitable for some characteristics (for example residual chlorine) and should not be applied without relevant maxima or minima.

Activities with substantial discharges such as large WWTPs would typically be required to meet a long-term percentile (annual), short-term percentile (six week) and maximum limits. As this involves significant sampling effort (for example weekly), this may not be appropriate for a small-scale discharge such as that from a small caravan park's WWTP. In this case, monthly monitoring against maximum limits and annual percentile would be more reasonable. The method of determining maximums and percentiles should incorporate expected and acceptable fluctuations in concentrations and loads consistent with best practice.

Typically loads are implicitly conditioned through a combination of both concentration and volume limits. In some cases, load-based limits may be set (for example daily, weekly or annually).

This is done by setting a limit on the mass of a particular contaminant discharged per day, calculated by multiplying the volume released that day by the most recent monitoring result for the contaminant. Percentile load limits are expressed as the proportion of a number of consecutive daily loads that must meet the relevant limit (for example five out of 10 consecutive daily loads must not exceed a stated mass).

Where loads are used to quantify discharge limits, concentrations should also be included. This prevents the discharge of a smaller volume of very poorly treated effluent that would meet a load limit.

*d. **Limits and units***

Limits need to be set for each quality characteristic in appropriate units based on potential effects and available analytical methods (refer Table 5). Analytical methods are given in the *EPA Water Quality Sampling Manual*. Scientific experts should be consulted where required.

2.4.3 Include requirements for discharge monitoring and receiving environment impact monitoring

The administering authority must consider requiring the applicant to monitor waste water releases and to carry out impact monitoring of the effect of the waste water releases. Compliance monitoring decisions, monitoring frequency and indicators must be in accordance with the provisions of sections 26 and 27 of the EPP Water. Compliance monitoring may be applied to a combination of end-of-pipe, the local receiving environment and the regional receiving environment.

Further information on setting up monitoring programs can be obtained from the *Australian Guidelines for Water Quality Monitoring and Reporting (2000) Australian and New Zealand Environment and Conservation Council (ANZECC) and Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ)*. Refer also to Appendix 6.4 for the application of Multiple Before-After Control-Impact monitoring program for HEV water assessment.

Discharge or end-of-pipe monitoring should relate to the criteria and limits decided above. This type of monitoring is a direct measure of the performance of the activity and is necessary to assess compliance with a condition of a development approval, environmental authority, or transitional environmental program or environment protection order. It may also be required to determine whether a system is working true to its design specifications to avoid environmental harm. End-of-pipe monitoring does not provide direct information on the impact of the discharge on the receiving environment.

Impact or ambient monitoring within the local receiving environment should focus on protecting the EVs of the receiving waters through comparison of monitoring data with the WQOs. The ambient monitoring program may also be designed to monitor those locations near known discharges or other inputs into the waterway, where water quality objectives are most likely not be met (for example mixing zones). Ambient monitoring data may be used for performance assessment and for calibrating water quality models.

As the WQOs for the receiving waters may be affected by other activities in the catchment, non-compliance with WQOs may not be solely attributed to the performance of a particular point source discharge. This is particularly the case where impacts occur over time in tidal estuaries. An example of where ambient monitoring may more immediately relate to effects of an activity is measurement of sediment plumes downstream of a dredging operation and comparing it to up-current conditions. Other reasons for requiring ambient monitoring may be to monitor mixing zone characteristics, verify conclusions of an environmental impact assessment, study or report, to decide future disposal strategies or if there is concern about the levels of a particular contaminant in waters.

Ambient monitoring can provide information on regional ecosystem health and other relevant water quality information required to assess EVs. Such programs may be coordinated through regional partnerships comprising groups of stakeholders involved in the catchment. A contribution by the applicant to existing regional ecological health monitoring programs may be an alternate to applicant monitoring.

Compliance monitoring of residual waste water discharge and the receiving environment would normally commence when the approved activity commences, however baseline ecological health monitoring of receiving waters may be required by the applicant to characterise the receiving environment in the preparation of the development application. For further details refer to the Queensland Water Quality Guidelines Appendix C, Table C3 — Data for stand alone use in developing local guidelines (a minimum of 18 data values, over 12 months at two reference sites).

2.4.4 Include reporting requirements for discharge and impact monitoring

The provision of monitoring data and reports to the administering authority should be set out as development conditions. Requirements should include reporting performance against development approval, environmental authority, transitional environmental program or environment protection order conditions, prompt notification of breaches of development conditions and other incidents likely to cause environmental harm; and the assessment of impact monitoring of the effect of waste water releases. The EPA has a database to receive electronic data from licensees. This is currently available for WWTPs.

Summary

The administering authority must consider requiring the applicant to monitor the discharge of residual waste water against approval conditions and to carry out impact monitoring of the effect of the residual waste water releases.

Pre-design conferencing is encouraged, including addressing any requirement for baseline ecological health monitoring of the receiving waters prior to lodging an application.

2.5 Environmental offsets

a. Policy issues

Refer to Section 2.0 for detail. The policy intent is that for:

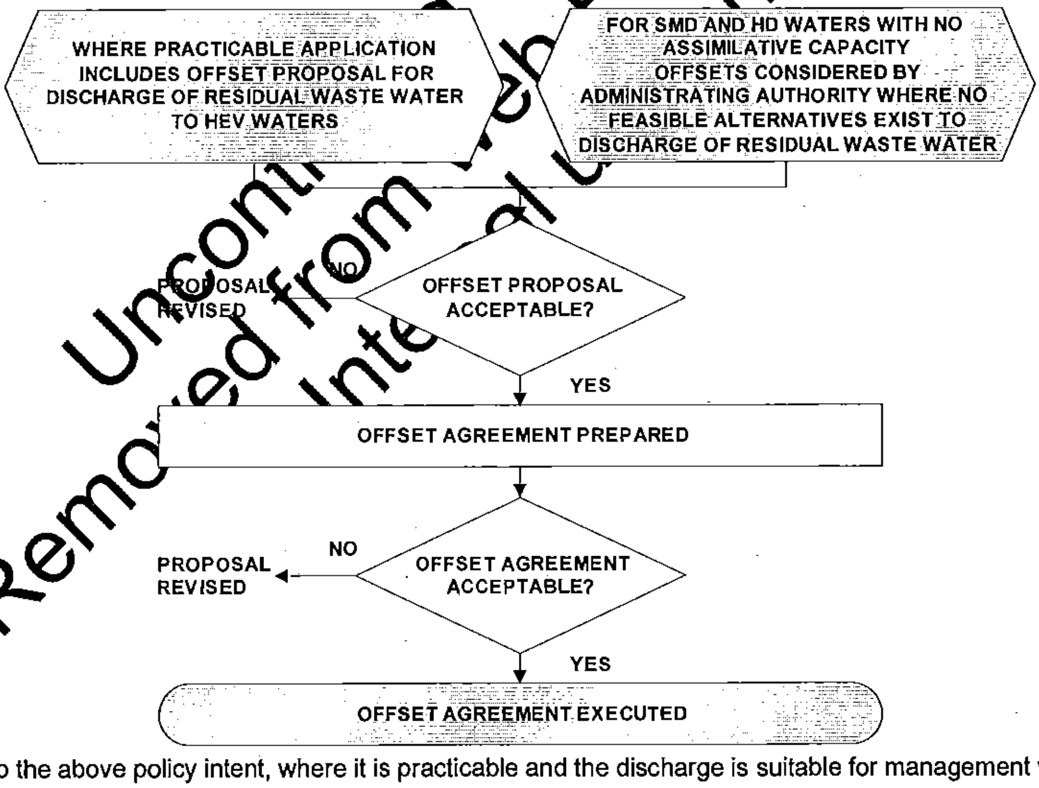
- HEV waters, where practicable the application includes a like kind environmental offset proposal - counterbalancing the discharge of residual waste water (the discharge) from the proposed ERA[15]; and
- SMD and HD waters with no assimilative capacity, environmental offsets (offsets) may be considered by the administering authority where there are no feasible alternatives to residual waste water discharge.

For the purposes of the EPA operational policy, environmental offsets will not apply to SMD waters where assimilative capacity exists. Refer to Section 2.3.4. By definition HD waters have no assimilative capacity.

In accordance with the above, and consistent with the overarching principles of the discussion paper[16] on the proposed Queensland Government Environmental Offsets Policy, the aim of providing environmental offsets is:

- to maintain the biological integrity of HEV waters, by counterbalancing the discharge of residual waste water (the discharge) from the proposed ERA with a like kind environmental offset; and
- to improve the water quality of SMD and HD waters by providing an offset that both counterbalances the proposed residual waste water discharge and provides additional assimilative capacity.

Figure 8 — Environmental offsets



Further to the above policy intent, where it is practicable and the discharge is suitable for management via offsets the application should include a like kind environmental offset proposal (offset proposal) that would be

[15] The Australian Government is considering environmental offsets as approval conditions under the EPBC Act when a proposed development impacts on a matter of national environmental significance. When finalised, EPBC Act requirements should be considered in conjunction with this operational policy.

[16] Subject to the finalisation of the proposed Queensland Government Environmental Offsets Policy in 2008, any inconsistencies will be addressed by further review of this operational policy.

considered by the administering authority on a case-by-case basis seeking to deliver a net environmental gain to the receiving waters as a whole.

The consideration of offsets must only occur after all options to avoid, reuse, recycle or adopt other disposal alternatives have been addressed in accordance with the waste management evaluation procedure under the EPP Water, and the discharge is demonstrated to be unavoidable and environmentally acceptable.

Figure 8 above depicts the matters that are detailed in the following sections.

b. Like kind offsets

To be of a 'like kind' offsets must be of the same contaminant and chemical form and preferably a point source emission impacting on the same waters as the proposed ERA discharge. To avoid further impairment of waters that have no assimilative capacity for the proposed ERA contaminants, offsets should impact on the same waters as the proposed ERA discharge. Where this is not practicable, offsets to waters in the same catchment would be considered by the administering authority.

Where it is not practicable to secure point source offsets, then diffuse urban offsets (from new and existing urban development) or diffuse rural offsets would be considered by the administering authority. The priority and spatial location of diffuse offsets would be advised by the administering authority during pre-design conferencing, reflecting catchment priorities established under planning processes completed by recognised entities under the EPP Water. Offset proposals must reduce contaminant discharges to a level below individual load limits for point sources and beyond minimum performance standards for diffuse sources.

c. Net environmental gain

The offset quantity should seek to deliver a net environmental gain to the water as a whole. Net environmental gain for a water, the subject of discharge from the proposed ERA, is based on a 'nil net discharge' and additionally takes account of the environmental risk and uncertainty and the policy intent for the waters (maintaining natural values or the lack of assimilative capacity and water quality objectives not being met- respectively for HEV and SMD/HD waters).

d. Equivalence ratios

Offset sources are assigned a quantity equivalence (or offset) ratio accounting for:

- environmental risk and uncertainty resulting from the effects of separation distance, attenuation, the nature of the offset (point or diffuse source), performance variation over time, delayed onset time, different chemical forms and bioavailability; and
- the maintenance of the biological integrity of HEV waters and to prevent further degradation and reverse the trend in water quality of SMD and HD waters. The latter aspect would be considered by the administering authority in the context of the whole catchment assessment and the contribution from point source discharges.

For like kind point source offsets emitting to the same water type and effective from the time of the proposed ERA discharge, an equivalence ratio greater than 1 is required.

Equivalence is less likely:

- with increased distance from the proposed ERA discharge location;
- where the offset load reduction is effected in different water types in the same catchment;
- where urban or rural diffuse source offsets are involved; or
- where the timing of offset reductions is delayed from the project commencement date.

Consequently higher quantity offset ratios would be assigned in these circumstances reflecting the increased risk of delivering a net environmental gain, quantified over the project life.

If diffuse rural offsets are included in the offset proposal, the offset should rehabilitate or restore degraded riparian or wetland habitats according to priority locations advised by the administering authority. Other land use management actions that reduce rural diffuse emissions may be considered by the administrating authority. Proposals to include urban diffuse offsets from either new or existing urban development should also be according the priorities advised by the administering authority.

The EPA procedural guide *Procedural information for the operational policy waste water discharge to Queensland waters*, provides guidance in determining environmental equivalence through minimum default offset ratios and determining riparian and wetland buffer widths.

e. Discharge contaminants must be suitable for management by offsets

Discharge contaminants that are potentially suitable for management by offsets include nutrients (nitrogen and phosphorus), sediment (TSS and TDS), organic carbon, contaminated stormwater or other contaminants where the scientific basis can be demonstrated and the contaminants do not have human health impacts, irreversible environmental impacts or unacceptable biota impacts.

f. Development application to include an offset proposal

Where required the development application must include an offsets proposal that meets the acceptability requirements listed below. The onus is on the applicant to provide sufficient information to allow the administering authority to consider whether the offset proposal is acceptable.

g. Acceptability of offset proposal

At pre-design conferencing the administering authority would advise on the requirements for an acceptable offset proposal, that must:

- meet statutory, regulatory and planning requirements and be enforceable—through development conditions, covenants or contracts;
- be additional to the consideration of ERP and EP Act provisions, as summarised in Sections 2.1 to 2.4;
- be enduring—offset the impact of the development from commencement and for the period that the impact occurs. Where onset is delayed, offsets must balance any initial shortfall over the project life;
- be suitable and targeted--contaminants must be suitable for management by offsets, be of the same contaminant and chemical form;
- be capable of being supplied and secured by the applicant or authorised agent;
- be appropriately located--apply to the same waters impacted by the proposed residual waste water discharge, or to other water types in the same catchment;
- initially consider point source offsets and then diffuse urban offsets or diffuse rural offsets (involving the restoration of degraded riparian or wetlands buffers) in accordance with catchment priorities as advised by the administering authority;
- seek to achieve a net environmental gain to the receiving waters;
- demonstrate compliance through emissions monitoring and reporting to the administering authority;
- be compatible with any flexible or incentive based mechanisms such as nutrient trading; and,
- address other elements, pending case by case assessment by the administering authority.

h. Offset agreement

If the offset proposal is acceptable to the administering authority and the application is approved, the administering authority must include development conditions that require the applicant:

- to secure the offsets proposal through an agreement between the applicant and the administering authority; and
- to execute the agreement before the commencement of site works, that:
  - includes a memorandum of agreement if the offset proposal involves either the State or a Local Government;
  - includes a deed of agreement for private developers; and generally use a financial guarantee, refundable on demonstrated offset establishment;
  - requires rural diffuse offsets to be legally secured with covenants or conservation agreements and addresses the on-going management and maintenance of offset sites, where relevant; and
  - requires the offset to be recorded on the appropriate register.

Other elements may need to be considered, pending case by case assessment by the administering authority.

i. Financial contribution

The discussion paper on a proposed Queensland Government Environmental Offsets Policy (QGEOP) provides for financial contributions to be made to meet offset requirements in certain circumstances. The discussion paper outlines several principles that must be complied with for a financial contribution to be acceptable. The use of financial contributions under the operational policy will be considered further upon the implementation of the QGEOP.

Summary

Pre-design conferencing is encouraged to address environmental offset requirements

3. Additional information

3.0 Process for using default EVs and WQOs

Where EVs for the waters have not been specifically set in Schedule 1 of the EPP Water, then, under Section 11(2) of the EPP Water, the WQOs are the set of water quality guidelines (the *Queensland Water Quality Guidelines 2006* and the ANZECC Water Quality Guidelines) that will protect all EVs for the waters.

Where the above guideline values are considered inappropriate for the receiving environment the following provides information on default EVs and WQOs based on water quality guidelines derived from data collected at appropriate local reference sites.

*a. **Define default EVs***

Information on existing and possible future EVs should be obtained from maps, site inspections, surveys, local knowledge, water abstraction licences, planning documents, scientific studies and monitoring data. It is recommended that any changes to default EVs be agreed upon through consultation with key stakeholders, such as representatives of government, community, and industry groups.

EVs may be discounted if sufficient information can be obtained to justify that this value does not currently exist and is unlikely to exist in the future. It should be noted that the protection of the aquatic ecosystems and visual aesthetics should always be included as an environmental value of any water body. However, the level of aquatic ecosystem protection can vary between water bodies or zones of water bodies.

*b. **Define default environmental goals***

Locally specific information on EVs can be used to propose environmental goals. These goals define in more detail what needs to be protected and represent major subdivisions of EVs. Examples of typical environmental goals for EVs include protection of specific habitats (such as seagrass beds), protection of specific aquatic species (such as wallum frogs), minimisation of algal blooms, and maintenance of biodiversity or protection of the public during swimming activities.

*c. **Define default water quality indicators***

The next step involves determining the water quality indicators and concentrations required to protect the identified EVs. This is a technical process to be conducted by the applicant and involves reference to water quality data and guidelines. The indicators and concentrations determined in this step will become the WQOs for the next step of the process.

Water quality indicators may include physical-chemical, biological or toxicant measures applying to a combination of water, sediment and biota. Some sources of information to determine suitable indicators for protection of EVs are included in Table 6 below.

*d. **Define default WQOs***

To determine default WQOs, trigger values can be taken from published guidelines (for all values) or from local reference data (for aquatic ecosystem protection only). Once the numerical criteria are determined, they should be listed in a matrix of water quality indicators versus EVs for each geographical zone that has different EVs. For some indicators in a particular zone, different guideline numbers may be quoted to protect more than one EV or goal. In these cases, the more stringent guideline should be adopted as the default water quality objective for that indicator.

Reference data for Queensland waterways can be obtained from the EPA, or as listed in Table 6. Guidelines for biological, toxicants and sediment indicators and for primary industry, recreational water quality and drinking water values can be obtained from the ANZECC Water Quality Guidelines. Local reference information may be particularly important in determining the water quality characteristics required to protect local aquatic

ecosystems. This would be the case if there are known unique species, such as acid frogs that require low pH conditions.

Determining default WQOs to protect aquatic ecosystems often requires significant technical input and should be considered as trigger values, below which a very low risk to the environment from that pollutant may be assumed. Default WQOs may depend on the levels of aquatic protection assigned for each zone. Further information on how to determine levels of aquatic ecosystem protection is provided in Table 3.

The *Queensland Water Quality Guidelines 2006* will become a repository for such sub-regional and local information for Queensland waters as it becomes available, and should be referenced for the default WQOs. The ANZECC Water Quality Guidelines will remain important for a range of indicators (for example toxicants and pathogens).

3.1 Use of local reference data

The *Queensland Water Quality Guidelines 2006* and ANZECC Water Quality Guidelines recommend using data from local reference sites to derive WQOs. The three main steps in the process are to establish a suitable reference site, collect sufficient data and calculate typical reference ranges and objectives. For further detail refer to Section 7.4.4 of the ANZECC Water Quality Guidelines (Volume 1).

Table 6 — Guideline and reference information for determining WQOs

EVs of Water	Sources of guideline and reference information
[illegible]	EPA website for the Queensland Water Quality Guidelines and physical-chemical reference data. National water targets online for nutrients, turbidity and salinity. National Water Quality Management Strategy website for biological, toxicant and sediment guidelines. Fact sheets on biological indicators and groundwater are at the above site.
[illegible]	National Water Quality Management Strategy website. National water targets online for nutrients, turbidity and salinity. World Health Organisation Guidelines.
[illegible]	Australian Drinking Water Guidelines (NHMRC 2004).
[illegible]	National Water Quality Management Strategy website.
[illegible]	National Water Quality Management Strategy website.
[illegible]	EIS assessments and other site specific information where relevant. Refer also the State Coastal Management Plan.

Reference sites are used to define the condition of a stream without impacts from discharges. They should ideally be in the same stream, a short distance upstream of the proposed discharge being assessed. If monitoring is possible before the discharge commences, a site downstream of the proposed discharge may be appropriate (note that it is not appropriate to use the same waterway to develop water quality criteria if it receives waste discharges or its quality is materially affected by non-point source runoff). If no suitable sites are identified in the stream, sites may be chosen in another local stream with similar hydrological, geological and ecological characteristics.

A list of reference sites for riverine, estuarine and coastal waters is included in the *Queensland Water Quality Guidelines 2006*.

For physical and chemical indicators and toxicants, the ANZECC Water Quality Guidelines recommend a minimum of two years of monthly data to define reference conditions. If objectives are derived from less data, they may be unreliable. Established Queensland or ANZECC Water Quality Guidelines reference conditions are preferred in this case. It is also crucial in researching reference conditions that appropriate quality assurance measures are applied to sample collection, preservation and analysis (refer to the EPA Water Quality Sampling Manual).

Once sufficient data have been collected, WQOs can be determined from the reference range of the data. This is the range from the 20th percentile to the 80th percentile of data and represents the typical range that would be expected for that indicator in the absence of the discharge. Most physical, chemical and toxicant indicators only require an upper water quality objective derived from the 80th percentile. For pH and dissolved oxygen where low values are also undesirable, lower WQOs are also derived from the 20th percentile.

3.2 Temporary streams

Temporary streams are defined as streams that do not flow continuously all year round. They include ephemeral streams, which only flow after significant rainfall, as well as intermittent streams which only stop flowing during extended dry periods. Temporary streams go through a series of hydrological stages, from a wetting stage following rain (including the first flush), through a recessional stage, to a pooled stage or completely dry stage.

Discharge of waste water to temporary streams requires special consideration due to their unique hydrological and ecological characteristics. Such emissions are likely to disrupt the natural ecology and impact the aquatic ecosystem. Continuous or semi-continuous discharges during naturally dry stages should be avoided, and wet weather discharges occur when receiving water flows are sufficient, from a risk based assessment, to achieve the receiving water quality objectives. The nearest upstream gauging station should be used to determine the release period. Feasible alternatives should be investigated such as minimizing the production of waste water, reuse and retention to discharge during wet conditions. Specific mine water disposal issues of a 'one-off' nature would be considered on a case-by-case basis with the administering authority.

Receiving water quality objectives should be based on the most appropriate local reference data collected in the same stream above the discharge or in a similar stream in the area that is not affected by the discharge. Monitoring data should ideally cover the wetting stage as well as recessional or pool stages. In the absence of suitable reference data, default values from the Queensland and ANZECC Water Quality Guidelines should be adopted.

3.3 Hydrological impacts

The discharge of wastewater may have adverse impacts on the hydrology of temporary and permanent surface receiving waters. The impacts relate to the volume and velocity of discharge relative to natural flows, and may include bed and bank erosion and changes to the particle size distribution of sediments. Other effects may occur on biota where there is insufficient time to complete life cycles due to changed flow regime. As a general guide, modelling of flow characteristics should be considered where the waste water flow would exceed 10 percent of the natural minimum flow of the waterway.

3.4 Riparian habitat impacts

Discharge of waste water may adversely affect riparian vegetation. For example, nutrient rich discharges may lead to weed infestation of habitats where vegetation is adapted to a low nutrient regime. Visual recreation is a declared environmental value of a water that likely to be adversely affected if a water way becomes weed infested. Similarly saline groundwater discharged into a freshwater stream or clearing may adversely affect riparian vegetation.

3.5 Public health impacts

Protection of public health usually requires that multiple barriers between effluent and drinking water or contact water be in place. The monitoring for typical water quality indicators such as *Enterococcus spp.* is not for pathogenic organisms, but indicators of possible contamination and hence does not necessarily guarantee safe levels. Apart from effluent treatment trains, barriers usually include dilution and significant distances between outfalls and places where potential exposure and water use occurs.

In some cases these barriers may not be present, for example where:

- the effluent is not substantially diluted by a watercourse/ocean prior to public access; and
- persons may come in contact with the effluent (for example, a beach or recreational area); or
- the waters are essentially fresh, which may encourage children to ingest the waters;

then alternative discharge locations should be evaluated, or more specialised public health assessment approaches adopted. Refer to the Guidelines for Managing Risk in Recreational Waters (NHMRC 2006) for further information on assessing suitability of recreational water quality.

3.6 Groundwater impacts

Additional considerations exist when applying the guidelines to groundwater, or to water bodies directly or indirectly affected by groundwater. An example of a direct impact is where the groundwater is suitable for drinking. In this case, the guideline values should be applied directly to the groundwater. An example of an indirect impact is where the groundwater is not directly used but the movement of the groundwater impacts on a secondary water body with defined values. In this case it is necessary to consider the values to be protected, as well as the effects of the attenuation zone, the flux rate of the groundwater and any dilution achieved.

4. Relevant legislation, intergovernmental agreements and EPA operational policies

Relevant legislation, intergovernmental agreements and EPA operational policies include:

- *Environmental Protection Act 1994*;
- *Environmental Protection (Water) Amendment Policy No 1 2006* — Subordinate Legislation No. 30 of 2006 and its explanatory notes;
- *Environmental Protection (Water) Policy 1997* — Subordinate Legislation No. 136 of 1997, including Sections 15–19 and Schedule 1 and the explanatory notes;
- *Environmental Protection (Waste Management) Policy 2000,* including Part 3 Waste management hierarchy and Part 4 Environmental management decisions concerning waste;
- *Queensland Water Quality Guidelines 2006*;
- *Queensland Water Recycling Guidelines 2005*;
- *State Coastal Management Plan — Queensland's Coastal Plan 2001*;
- *Integrated Planning Act 1997*;
- *State Development and Public Works Organisation Act 1971*;
- *Environment Protection and Biodiversity Conservation Act 2000*;
- *National Water Quality Management Strategy,* including the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000* (the ANZECC Water Quality Guidelines) and the *Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 1) 2006*;
- Intergovernmental Agreement on the Environment;

- Guidelines for Managing Risks in Recreational Water Quality (NHMRC 2005);
- Agreement under the Council of Australian of Australian Governments Water Reform Agenda;
- International agreements relating to migratory birds and wetlands (Japan-Australia Migratory Bird Agreement (JAMBA) and the China-Australia Migratory Bird Agreement (CAMBA));
- Directory of Important Wetlands Australia;
- *Australian and New Zealand Guidelines for Fresh and Marine Waters 2000* (Volume 2. Appendix 1 Mixing zones adjacent to effluent outfalls);
- EPA operational policy *Licensing waste water releases from existing marine prawn farms in Queensland*;
- EPA operational policy *Approval of sewage treatment plants including options for use of reclaimed water*;
- EPA Information sheet *Case study 1 — Licensing discharges from sewage treatment plants*; and
- EPA Information sheet *Case study 2 — Licensing discharges from sewage treatment plants*.

5. Further information

For further information please contact the EPA Ecoaccess Customer Service Unit on:

Ph. 1300 368 326
Fax. (07) 3115 9600
Email eco.access@epa.qld.gov.au

Approved by
[redacted]
Executive Director
Environmental Operations Division
Environmental Protection Agency

Enquiries:
EPA Ecoaccess Customer Service Unit
Ph. 1300 368 326
Fax. (07) 3115 9600
Email eco.access@epa.qld.gov.au

6. Appendices

Appendix 6.1: Glossary of terms

Administering authority means the administering authority under the EP Act, and will be the chief executive of the Environmental Protection Agency or the Local Government's chief executive officer.

The chief executive of the DPIF has delegated authority for ERAs 3 and 4 (i.e. cattle feedlotting and pig farming). These ERAs have been delegated to the DPIF.

Applicant means the applicant for a development approval or environmental authority application. In the context of this operational policy it may also mean employees of organisations contracted by the applicant to assist in the preparation of the application.

Aquatic ecosystems is defined in the ANZECC Water Quality Guidelines as the animals, plants and micro-organisms that live in water, and the physical and chemical environment and climatic regime in which they interact. It is predominantly the physical components (for example light, temperature, mixing, flow, and habitat) and chemical components (for example organic and inorganic carbon, oxygen, nutrients) of an ecosystem that determine what lives and breeds in it, and therefore the structure of the food web. Biological interactions (for example grazing and predation) can also play a part in structuring many aquatic ecosystems.

Assessable development means development specified under Part 1, Schedule 3 of IPA and includes the carrying out of a chapter 4 activity, other than an activity (or part of an activity) for which a code of environmental compliance has been approved.

Assessment manager for an application for a development approval means the Local Government or the entity prescribed under the *Integrated Planning Regulation 1998*.

Assimilative capacity means the capacity of the receiving waters to receive some human induced input of contaminants, or alteration, without causing the water quality to deteriorate so the water quality objectives are no longer met.

Basin means the major hydrological drainage basins in the national spatial database provided by Geoscience Australia. Australia is divided into drainage divisions which are sub-divided into water regions which are in-turn sub-divided into river basins. The data, which includes the name and number of each Queensland drainage division, region and river basin, is available at the Australian Government Geoscience Australia website.

Best practice environmental management is defined in the EP Act as the management of the activity to achieve an on-going minimisation of the activity's environmental harm through cost effective measures assessed against the measures currently used nationally and internationally for the activity. Section 21(2) lists measures to be regarded in deciding best practice environmental management of an activity. These measures include, but are not limited to, strategic planning, systems and training, product and process design, public consultation, waste prevention/treatment and disposal.

Biological integrity of a water is defined in the EPP Water as the water's ability to support and maintain a balanced, integrative, adaptive community of organisms having a species composition, diversity and functional organisation comparable to the natural habitat of the locality in which the water is situated.

Catchment means the total watershed draining into a river, creek, reservoir or other body of water. The limits of a given catchment are the heights of land (such as hills or mountains) separating it from neighbouring catchments. Catchments can be made up of smaller sub-catchments.

Character, resilience and environmental values of the receiving environment – see **Resilience.**

Code of environmental compliance is a document that contains standard environmental conditions for an ERA, or part of an ERA.

Complete mixing means, with reference to mixing zone considerations, the effluent is completely dispersed through the receiving waters.

Compliance monitoring means the activity of monitoring the approved discharge and comparing against the specified development conditions. This will generally occur at the discharge pipe. Monitoring can also be required for the receiving environment. Compliance should not be based on the receiving environment monitoring results alone, particularly where other factors in the catchment may contribute to non-compliance.

Concurrence agency for an application for a development approval under IPA means an entity prescribed under a regulation as a concurrence agency for the application.

Contaminant is defined in Section 11 of the EP Act as a liquid, gas, solid or other forms, that is released into the environment.

Cultural resources is defined in the *State Coastal Management Plan 2001* as places or objects that have anthropological, archaeological, historic, scientific, spiritual, visual or ecological significance or value.

Development application means an application for a development approval or environmental authority under the EP Act and subordinate EPP Water, IPA or the SDRWO Act for ERAs proposing to discharge of residual waste water to Queensland waters.

Decision notice means the written notice issued under IPA by the assessment manager to notify an applicant of the decision for their application in relation to a development approval.

Development condition means a condition of a development approval imposed by the assessment manager or concurrence agency under IPA.

Direct toxicity assessment (DTA) means the assessment of the combined effects of a number of compounds of unknown identity and concentration in an effluent. DTA provides an integrated measure of the aggregate/additive toxicity of chemicals and accounts for interactions between compounds. The DTA approach has been adapted from conventional toxicity testing approaches using the same methods, species selection and extrapolation to receiving waters (refer to ANZECC Water Quality Guidelines Volume 2, Section 8.3.6).

Ecological health is defined in the ANZECC Water Quality Guidelines as the health or condition of an ecosystem. It is the ability of an ecosystem to support and maintain key ecological processes and organisms so that their species compositions, diversity and functional organisations are as comparable as possible to those occurring in natural habitats within a region (also termed ecological integrity). The concept of ecological health is applicable to all complex ecosystems and sustainability is a key element of the concept.

Ecologically sustainable development (ESD) is defined in the EP Act as the protection of Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends. The principles for ESD as published in the *National Strategy for Ecologically Sustainable Development 1992* are a part of the standard criteria of Schedule 3 of the EP Act and include the precautionary principle. They must be considered when making decisions to grant or refuse an application.

Environmental authority application means an application under the EP Act for an environmental authority.

Environmental offsets in the context of this operational policy means the positive measures taken to counterbalance the adverse environmental impacts of the development resulting from the residual waste water discharge that cannot be avoided, reused, recycled or otherwise disposed in accordance with the waste management evaluation procedure under the EPP Water. An offset is to be of a like-kind (i.e. the same

contaminant and chemical form), is located outside the development site and seek to deliver a net environmental gain to the waters.

Environmentally relevant activity (ERA) means a mining activity or an activity prescribed under a regulation as an ERA (where a contaminant will or may be released into the environment when the activity is carried out and the release will or may cause environmental harm). Schedule 1 of the *Environmental Protection Regulation 1998* lists the non-mining ERAs and section 39 (1) lists the ERAs devolved to Local Government.

Environmental values (EVs) is defined in the EPP Water as the qualities of a water that make it suitable for supporting aquatic ecosystems and human water uses (refer also Section 9 of the EP Act). EVs need to be protected from the effects of pollution, waste discharges and deposits to ensure healthy aquatic ecosystems and waterways that are safe for community use. Particular waters may have different EVs. The list of EVs and the waters they can potentially apply to, are tabulated below.

Environmental value	Potentially applicable to:	
	Tidal waters	Fresh (non-tidal) waters
Protection of aquatic ecosystems (Aquatic ecosystem EV)		
Protection of aquatic ecosystems, under three possible levels of protection relating to the following three ecosystem conditions: • High ecological value waters; • Slightly to moderately disturbed waters; and • Highly disturbed waters. (suitability for seagrass has also been specifically identified for some waters as a component of this EV)	✓	✓
EVs other than aquatic ecosystem EV (called human use EVs)		
Suitability for human consumers of wild or stocked fish, shellfish or crustaceans (suitability for oystering has also been specifically identified for some waters)	✓	✓
Suitability for primary contact recreation (for example swimming)	✓	✓
Suitability for secondary contact recreation (for example boating)	✓	✓
Suitability for visual (no contact) recreation	✓	✓
Protection of cultural and spiritual values	✓	✓
Suitability for industrial use (including manufacturing plants, power generation)	✓	✓
Suitability for aquaculture (for example red claw, barramundi)	✓	✓
Suitability for drinking water supplies		✓
Suitability for crop irrigation		✓
Suitability for stock watering		✓
Suitability for farm use		✓

Far-field waters means, in the context of an initial mixing zone, the waters beyond the specified boundaries of the mixing zone.

General environmental duty means the duty that applies to all persons in Queensland to take all reasonable and practicable measures to prevent or minimise environmental harm when carrying out an activity that causes, or is likely to cause, environmental harm. It is defined in Section 319 of the EP Act.

High ecological value (HEV) waters is defined in the *Queensland Water Quality Guidelines 2006*, as amended, as waters that have the biological integrity of effectively unmodified (intact) ecosystems or waters that are highly valued.

Information request means the additional information given about an application that is supplied by the applicant, at the request of the assessment manager or concurrence agency under IPA. It includes an EIS supplement.

Intergovernmental Agreement on the Environment means the agreement made on 1 May 1992 between the Commonwealth, the States, the Australian Capital Territory, the Northern Territory and the Australian Local Government Association.

Level of protection (for aquatic ecosystems) is defined in the *Queensland Water Quality Guidelines 2006*, as amended, as the level of aquatic ecosystem condition that the water quality objectives for that water are intended to achieve. The levels of aquatic ecosystem protection are:

- Level 1 High ecological/conservation value aquatic ecosystems — effectively unmodified or other highly valued systems;
- Level 2 Slightly to moderately disturbed aquatic ecosystems — ecosystems in which aquatic biological diversity may have been adversely affected to a relatively small but measurable degree by human activity; and
- Level 3 Highly disturbed aquatic ecosystems — measurably degraded ecosystems of lower ecological value.

Like kind environmental offsets means the offsetting load reductions from other point source and diffuse source emissions of the same contaminant (and chemical form).

Mixing zone (or initial mixing zone) is defined in the EPP Water as an area where residual waste water mixes rapidly with surface water because of the momentum or buoyancy of the waste water and turbulence of the surface water. Within the initial mixing zone dilution of the effluent contaminants takes place, water quality degradation occurs and certain water quality objectives may be exceeded.

Multiple Before-After Control-Impact (MBACI) means water quality assessment studies that are designed to assess change to the water body from a particular input or disturbance. Such water quality assessments give the greatest confidence that any observed differences between control and impacted sites are not simply a result of natural variation between places or times.

Near-field waters means, in the context of an initial mixing zone, the waters immediately adjacent to the specified boundaries of the mixing zone.

Net environmental gain for a water the subject of residual waste water discharge from the proposed ERA, means the counterbalancing environmental offsets produce a net environmental outcome -- based on a 'nil net discharge' and additionally accounting for the environmental risk/uncertainty and the lack of assimilative capacity and water quality objectives not being met.

Offsets agreement means the agreement between an applicant and the EPA, Local Government or other party that secures the offsets proposal.

Offsets proposal means the proposal acceptable to the administering authority that quantitatively offsets, for the life of the proposed development, the discharge of residual waste water from the ERA to achieve a net environmental gain to the receiving waters.

Peer review or expert peer review means the commissioning, by the applicant, of a nationally or internationally recognised expert in the relevant discipline, to provide independent expert written assessment of the technical/scientific work of either the applicant, or the applicant's consultant for inclusion in the application.

Precautionary principle is defined in the *National Strategy for Ecologically Sustainable Development 1992* as where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In application of the precautionary principle, public and private decisions should be guided by careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment and an assessment of the risk-weighted consequences of various options. Decisions to grant or refuse an application must consider the precautionary principle as part of the standard criteria of Schedule 3 of the EP Act.

Public interest may be ascribed as meaning the interest of the public as distinct from the interest of the individual(s).

Queensland Water Quality Guidelines means the *Queensland Water Quality Guidelines 2006,* as amended, prepared by the EPA.

Queensland waters is defined in the *Acts Interpretation Act 1954* as all waters that are within the limits of the State or coastal waters of the State.

Resilience of the receiving environment means the ability of an ecosystem to adjust or respond to progressive impacts and the ability to recover following cessation of the natural or anthropogenic disturbance. Information on both the recovery and response phases is required to **characterise resilience and the sensitivity of the receiving environment.** In particular, information on the recovery phase is crucial because it is the indicator of reversibility or irreversibility of the impact.

Standard criteria is defined in Schedule 3 of the EP Act as:

(a) the principles of ecologically sustainable development as set out in the 'National Strategy for Ecologically Sustainable Development'; and

(b) any applicable environmental protection policy; and

(c) any applicable Commonwealth, State or Local Government plans, standards, agreements or requirements; and

(d) any applicable environmental impact study, assessment or report; and

(e) the character, resilience and values of the receiving environment; and

(f) all submissions made by the applicant and submitters; and

(g) the best practice environmental management for activities under any relevant instrument, or proposed instrument, as follows—

  (i) an environmental authority;

  (ii) a transitional environmental program;

  (iii) an environmental protection order;

  (iv) a disposal permit; and

  (v) a development approval; and

(h) the financial implications of the requirements under an instrument, or proposed instrument, mentioned in paragraph (g) as they would relate to the type of activity or industry carried out, or proposed to be carried out, under the instrument; and

(i) the public interest; and

(j) any applicable site management plan; and

(k) any relevant integrated environmental management system or proposed integrated environmental management system; and

(l) any other matter prescribed under a regulation.

Stream order is a standard means of describing streams. The smallest streams in a drainage network have no tributary streams. These are called first order streams. Two first order streams unite to form a second order stream. Second order streams only have first-order streams as tributaries. Third order streams only have second and first order streams as tributaries, etc. As the order of the stream increases, the discharge increases, the gradient decreases, the velocity increases, and the channel dimensions (width and depth) increase to accommodate the increased discharge.

Sustainable load of a particular contaminant means the maximum amount of the contaminant that a water body can receive without exceeding the related WQOs, and therefore adversely affecting EVs.

Trigger values means the numerical criteria that if exceeded require further investigation for the pollutant of concern. If not exceeded, a low risk of environmental harm can be assumed.

Waste management evaluation procedure in making environmental management decisions about the release of residual waste water from an ERA means, under the EPP Water, the assessment processes for prioritising waste management practices (waste management hierarchy) to achieve the best environmental outcome.

Waste water treatment plants (WWTPs) means sewage treatment plants, advanced waste water treatment plants, water reclamation plants and all other synonyms for treatment plants whose primary function is to treat a water based waste stream.

Waste water means, under Schedule 2 of the EPP Water, a liquid waste and includes contaminated stormwater.

Water means the whole or any part of surface water or groundwater, tidal or non-tidal, and including any river, stream, lake, lagoon, swamp, wetland, unconfined surface water, natural or artificial watercourse, dam, tidal waters (estuarine, coastal and marine waters to the limit of Queensland waters) and underground or artesian water.

Water quality indicator (for an EV) is defined in the EPP Water as a property that can be measured or decided in a quantitative way. Examples of water quality indicators include physical indicators (for example temperature), chemical indicators (for example nitrogen, phosphorus, metals) and biological indicators (for example macroinvertebrates, seagrass and fish).

Water quality objectives (WQOs) are, the WQOs specified in Schedule 1 of the EPP Water to protect the EVs for waters. WQOs are long term goals for water quality management. They are numerical concentration limits or narrative statements established for receiving waters to support and protect the designated EVs for those waters. They are based on scientific criteria or water quality guidelines, but may be modified by other inputs (for example social, cultural, and economic).

Water types means waters with similar characteristics. The water types covered by this document are based on water types established in the *Queensland Water Quality Guidelines 2006*. Water types include coastal waters (open and enclosed), estuarine waters (lower, middle and upper), tidal canals, constructed estuaries, marinas and boat harbours, freshwaters (lowland, upland and dams/reservoirs), wetlands and ground waters. WQOs applying to different water types are outlined in the documents under Schedule 1 of the EPP Water.

Appendix 6.2: Mixing zone determination

Matters to be addressed in the development application must include:

a. Use of Direct Toxicity Assessment

The development application must demonstrate that the contaminants in the proposed residual waste water discharge are not acutely toxic to aquatic organisms inside the mixing zone or exceed the No Observed Effect Level, or equivalent (for example, the No Observed Adverse Effect Concentration) outside the mixing zone.

Where the proposed residual waste water discharge includes a contaminant(s) for which there is a lack of environmental effects data the development application must include the results of Direct Toxicity Assessment (DTA). Testing may be based on samples from demonstration plant, pilot plant or laboratory scale to complement a literature review.

This information is relevant to DTA of discharged effluent, whether required prior to licensing approval or as part of post-approval monitoring. DTA of effluent is also referred to as Whole of Effluent Toxicity testing.

DTA of an effluent is applicable to discharges that pose a potentially acute toxic exposure risk to aquatic fauna in the receiving environment. Typically, this involves cases where the concentrations of multiple chemical and/or elemental substances in the effluent exceed, or are likely to exceed, the known Toxicant Trigger Values presented in the ANZECC Water Quality Guidelines. The potential for synergistic toxicological effect can also be demonstrated through the use of DTAs. DTA of effluent would generally apply to residual waste water treatment plants that have the potential to receive commercial or industrial effluent as part of the trade waste system, or Advanced Waste water Treatment Plants (AWTPs) that produce a Reverse Osmosis Concentrate (ROC), or other similarly concentrated waste streams.

Specific requirements may include:

- The proponent should submit a DTA program and Toxicity Identification Evaluation (TIE) program for review and approval by the QLD EPA prior to commencement of the DTA program;
- DTA should be conducted on the effluent as it would be deliver to the end-of-pipe;
- The use of toxicity testing for licensing requirements should preferably employ cellular-based (mode of action) methods over whole organism tests where a QLD EPA and National Association of Testing Authorities (NATA) approved method for those tests exist[17]. This would negate any requirement for animal ethics approval (in most cases), standardises tests for marine and freshwater discharges, and provides more defined information on the form of toxicity;
- DTAs should be conducted on samples that are *representative of the discharge*,
- The frequency of licensed DTAs should initially be on at least an annual basis and in cases where there is seasonal variability in the quality of the effluent, on the effluent that represents the worst-case. Case-specific factors, such as the frequency and volume of the discharge, changing influent or effluent quality characteristics, and the Environmental Values (EVs) of the receiving environment should be taken into consideration when determining the frequency of the licensed DTA requirements for the discharge;
- The test organisms to be used for DTAs are to be chosen in accordance with Section 8.3.6.8 of the ANZECC Water Quality Guidelines, taking into consideration locally occurring species, the location of the discharge and nature of the receiving environment;

[17] There are very few validated cellular based/methods currently available. Consequently the great majority of DTA-related bioassays will be Whole of Organisms tests.

- The toxicity tests chosen for the DTA should demonstrate that the effluent is neither acutely toxic within the initial mixing zone, nor exhibit observable chronic (or alternatively sub-lethal) toxicity in the test specimens outside of the mixing zone;
- The toxicity limits derived from the DTA should be reported to the EPA as No Observed Effect Level or No Observed Adverse Effect Concentration (for example NOAEC at 10% effluent concentration);

Applicable TIE procedures, as provided in the approved DTA program, must be undertaken if, following the QLD EPA review of the reported DTA results, the QLD EPA requests in writing that TIEs are required to be performed.

b. Spatial definition

The development application must specify the proposed mixing zone; including the location, boundary and area. In cases where the proposed residual waste water discharge is to a river, the percentage of the width occluded or blocked by the mixing zone must also be specified.

The mixing zone boundary may be determined by indicator concentrations in the residual waste water. Where indicator concentrations are predicted to be statistically indistinguishable from the receiving water concentrations, complete mixing has occurred and the mixing zone is presumed to have ended. Only one mixing zone, minimised to the greatest practicable extent may be included in the development application.

Where the assessed environmental risk is low, spreadsheet calculations may be used to establish plume geometry and the dilution of contaminants. This circumstance may include, for example, a proposed discharge involving a small volume of residual waste water containing one or two well-studied contaminants at concentrations only several times greater than the receiving waters.

Commensurate with increased scale and risk, the use of predictive numerical modelling may be required to evaluate mixing processes and impacts in the near-field. Model outputs would include the prediction of the size and behavior of the effluent plume and mixing zone impacts, in both the water column and sediments, over a range of input conditions. The development application must include both the results of numerical modelling and any experimental work for the assessment of impacts.

Predictive numerical modelling may incorporate relevant functional relationships between the contaminant discharge and environmental quality indicators likely to be affected. Where functional relationships are unknown, consistent with assessed environmental risk, additional laboratory or field experiments may be required to understand the likely effects of a discharge (for example to understand the impact of effluent contaminants on benthic communities in marine sediments).

General information on predictive numerical modelling is at Appendix 6.3.

c. Assessment of no or negligible change to HEV receiving waters

The development application must address both baseline monitoring of relevant indicators in the near-field, beyond the mixing zone boundary, and predictive impact modelling of the effects of the proposed waste water discharge to demonstrate no or negligible change to the physico-chemical, biological, habitat and flow attributes, above natural variation, in the near-field beyond the mixing zone boundaries. These matters and post operational water quality monitoring requirements are addressed below.

1. Establishment of baseline condition

The development application must establish the baseline water quality against which the no or negligible change requirement may be assessed for the natural range of values of physico-chemical, biological, habitat and flow indicators relevant to the proposed ERA.

To characterise the natural condition the baseline water quality monitoring program design should be consistent with the requirements of the *Before* component of a *Multiple Before-After Control-Impact* (MBACI) water quality assessment program (or equivalent assessment program). Refer Appendix 6.4 for MBACI water monitoring experimental design.

The adoption of MBACI water monitoring experimental design would allow the baseline data to be used in the predictive impact modelling of the effects of the proposed discharge to demonstrate no or negligible change in the near-field, beyond the mixing zone boundaries. The data may also be used for post operational compliance monitoring of impacts.

The baseline monitoring design must include at least two near-field monitoring sites adjacent to the proposed boundary of the mixing zone at the impact site. These near-field sites may comprise monitoring sites for the *Impact* location of the MBACI water quality monitoring design. A comparable number of indicators must be monitored at two control sites. Refer Appendix 6.4 for MBACI water monitoring experimental design.

The *Queensland Water Quality Guidelines 2006* recommend collection of a minimum of 24 samples over two years. However, this requirement may need to be adjusted for some biological and habitat indicators (for example indicators that represent an environmental response integrated over a longer timeframe). The two year time period is recommended to allow some measure of inter-annual variation. While two years will not capture the entire range of such variation it must provide some indication of its likely magnitude.

Notwithstanding, the aim is to properly characterise the whole natural range of the selected indicators and maximize the chance of detecting changes in environmental indicators beyond the effect sizes stipulated in the *Queensland Water Quality Guidelines 2006*.

2. Prediction of impacts of the proposed ERA—demonstration of no or negligible change

Having established the natural baseline, the development application must determine the effects of the proposed residual waste water discharge within the initial mixing zone and the near-field immediately beyond the mixing zone boundaries. The no or negligible change test would be satisfied if no significant difference was predicted between the impact site and the two control sites. Operational risks must be addressed.

For technical detail refer to Sections 8.4.2, 8.4.3 and 8.4.4 of the *Queensland Water Quality Guidelines 2006* and Section 3.2.3.1 of the *Australian Guidelines for Water Quality Monitoring and Reporting (2000)*.

Peer review assessment must be submitted with the development application.

3. Post operational monitoring

Development conditions must include the requirement for the applicant to initiate the *After* component of the *Multiple Before-After Control-Impact (MBACI)* monitoring program (or equivalent monitoring program) when the operation is at design capacity, or within 12 months of commissioning, to demonstrate actual compliance with the no or negligible change requirements.

As a guide, 24 sample sets over a 12-month period would be required.

Post operational non-compliance would require the implementation of expedited compliance actions under a *transitional environmental program* or other instruments under the EP Act.

After compliance is demonstrated, on-going water quality monitoring would be required. For some waters and contaminants there is the possibility of achieving this requirement through a contribution to a joint agency/stakeholder ecological health monitoring program.

In the context of continuous improvement the development conditions may also require the preparation and implementation of a *transitional environmental program* to reduce the size of the mixing zone, over time.

Appendix 6.3: Numerical modelling of environmental impacts and mitigation actions

Choice of model

The models used should be "fit for purpose" and any work based upon sound science and the best available information. The size and potential risk of the proposed activity will determine the scope and extent of the modelling required.

Predictive tools such as mathematical models are often required when assessing the benefits of various management options (or scenarios). Different types of computer models exist, including hydrodynamic (mixing and flow), water quality (biogeochemical), catchment (export) and groundwater models. The type of model used will depend on the application but generally a combination hydrodynamic and water quality models would be required to simulate receiving waters for decisions involving continuous point source discharges. Catchment models may be used to provide inputs into receiving water models. Hydrodynamic and water quality models are discussed further below.

The choice of hydrodynamic models needs to account for the properties of the discharge, bathymetry, as well as the local mixing conditions in the receiving waters. Some discharges such as brine concentrates from reverse osmosis plants have elevated salt concentrations or mineral processing effluents may have elevated temperatures. Receiving waters may also not be well mixed in all dimensions. For example some estuaries periodically stratify due to salt wedge formation. The model needs to be able to simulate the appropriate density effects or thermodynamic processes for the specific application.

Mixing models used to assess mixing zones are generally hydrodynamic models that simulate the initial dilution of the discharge with the receiving environment. To obtain concentration predictions in the mixing zone, background levels need to be added to the dilution predictions. These may be sourced from far-field models or estimates from monitoring.

Water quality models simulate the water quality processes occurring within waterways. The model of choice needs to include the relevant biogeochemical processes relevant to the contaminants in the discharge and the characteristics of the receiving environment. For example, for carbonaceous matter, the model will need to simulate the heterogenic bacterial activity that breaks down the carbonaceous matter. This process also consumes oxygen and therefore the models need to simulate surface re-aeration and solubility etc. For nutrients, the model will usually need to simulate the growth of algae and primary production.

A technical description of the model should be provided to the EPA covering the history of the model, development history, published articles and details of the conversion of the model into a software package. Details of the experience and training of the model users should be provided. Other requirements include a statement of objective to explain clearly the situation being modelled and the objectives of the modelling study and outputs required from the model. The choice of model should be justified to demonstrate that the model used is suitable for this study including examples of previous applications in similar situations and a conceptual diagram of how the model represents environmental processes.

Data inputs to the model

The quality of inputs to the model will greatly affect the predicted outcomes. All modelling assumptions should be stated. Initial assessment should include a review of the flows and contaminant concentrations for the proposed activity and other activities to be modelled. These usually form the basis of the scenarios used for the model runs. How well do they represent the likely release in terms of quantity and variability? For constant concentrations and flows, do they represent average or worst-case condition? For what period of time do the worst-case conditions exist, and how frequently? Further data inputs will include initial conditions (particularly for water quality variables) and boundary conditions (tidal flow and elevations at the seaward or upper catchment boundary of the model) of the model and these should be checked. The choice of environmental data such as

rainfall will often be determined by the choice of baseline conditions. It is generally recommended that a statistical dry year is used to assess point source scenarios.

Data used for the modelling study and its source should be clearly defined, including the source, quality assurance and expected errors. Any data manipulation and related assumptions should be detailed. Raw data in electronic form should be made available to the EPA, on request.

Uncertainty of predictions (calibration)

The ability of the model to make reliable predictions will strongly depend on the above issues and should ideally be tested through both calibration (adjustment of model parameters to reproduce measured data) and validation (a comparison of predicted values against measured data). Validation is used to demonstrate the model accuracy. Without calibration or validation, model prediction should only be used for qualitative comparisons, rather than quantitative comparisons against water quality objectives. Sensitivity analysis can be used to demonstrate the effect of varying input data or parameters on key output variables. The uncertainty of model predictions should be stated and incorporated into any conclusions made by the applicant.

Appendix 6.4: Application of Multiple Before-After Control-Impact design to HEV water assessment

Introduction

The purpose of Multiple Before-After Control-Impact (MBACI) sampling designs is to allow a logically and statistically valid assessment of impact in the context of overall environmental variability. A discussion of these designs is available in Underwood (1992). Its application to HEV areas is aimed at determining whether or not the no change criterion has been met following commencement of an activity.

As its name implies, MBACI designs involve collecting samples before and after (BA) an impact may potentially occur to determine the significance of any change. It also involves collecting before and after samples at both control and impact (CI) sites. Inclusion of control sites makes it possible to infer whether changes detected at an impact site are due to the activity under investigation or are simply the result of broader scale natural variations that exist in the environment and are unrelated to the activity. The use of Multiple (M) control sites is to protect against the possibility of drawing erroneous conclusions from results at a single site, where an observed change may also be due the natural cycles occurring at different times in different places.

In scientific methodology, an experimental treatment is applied to some instances (for example fertiliser applied to a field or a new drug given to patients) and the results in these instances compared to those from testing instances where the treatment is absent (for example no fertiliser or a placebo given). An MBACI sampling program is essentially just a scientific experiment in which the experimental treatment is commencement of the subject activity, this being introduced at the project site and but not control sites.

The use of MBACI to assess change within HEV areas is essentially no different to its application elsewhere. It involves identification of adequate control and impact sites and collection of sufficient samples to allow a reasonable chance of detecting a predefined quantum of change. More detailed guidance on these issues with respect to HEV areas is provided below.

Indicators

The selection of indicators will of course be related and sensitive to the type of activity proposed. As a general guide, indicators must include:

- Indicators that reflect the potential direct physico-chemical impact of the activity in the water column;
- Where applicable, indicators that measure the potential impact on sediments; and
- Indicators that measure the biological response to the activity.

Control sites

Under the MBACI design, the smallest number of control sites is two. Additional sites will increase the strength of any inferences drawn from the program. The control sites must have similar hydrological, environmental and biological characteristics to the impact sites (in the before period). This may need to be verified through a pilot survey or existing information. In streams, control sites can be sited upstream of impact sites and/or in nearby similar (un-impacted) waterways. In embayments and estuaries, control sites must be located in physically and biologically similar locations but far enough away from the impact area to be unaffected once the activity commences. For small estuaries, use of similar nearby estuaries is preferable if this is practicable. Control sites must not be in a location in which material human activities take place (for example another waste water discharge or channel dredging).

Impact sites

It is undesirable to replicate the potential impact and thus there will typically be only one impact site. This will be located adjacent to the proposed mixing zone (if any) for the discharge or activity. For water quality assessment,

at least two water quality monitoring sites must be located in the near-field adjacent to the mixing zone at the impact site. In smaller streams, the mixing zone must not be more than one third of the stream width. The near-field may be in the mid point of the stream adjacent and downstream of the mixing zone. In large estuaries or embayments, the near-field zone may be an area within 50m of the boundary of the mixing zone.

Number of samples

Where pre-existing data is unavailable or only available for some indicators, the data from the before phase of the MBACI program will be used establish both the environmental goals for environmental impact assessment and collect the before condition data for the requisite environmental monitoring program. The number of samples required is predicated on the need to achieve a relatively precise definition of existing condition (for the selected indicators) and also to have a reasonable chance of detecting an environmental change occurring at the requisite environmental effect size.

For HEV waters, the management aim is to have no change, but this is not logically or statistically testable. Instead, testing is carried out on the hypothesis that implementing the activity will significantly change monitored environmental variables. If the data do not support this, the null hypothesis that no significant change occurs is accepted.

As the testing is to determine if a change occurs, some minimum detectable environmental change needs to be defined. For physico-chemical water quality indicators, this issue is prescribed through a default method of assessing no change. This method is detailed in the Queensland Water Quality Guidelines in Section 8.4.2.1.1. In brief, during the before period, a minimum of 24 samples must be collected over a period of two years. The two-year time period is recommended to allow some measure of inter-annual variation. While two years will not capture the entire range of such variation it must provide some indication of its likely magnitude. These samples are taken as reasonably practicable at the same time for impact and control sites.

In the after period, an initial collection of 24 samples at each site is required. For continuous discharges or activities, this may need to be undertaken in a period of not less than 12 months. However, for intermittent discharges, the collection of samples must be tailored to the periods of discharge and potential impact.

For biological indicators the default approach described above may not be appropriate. Due to the wide range of possible biological indicators and differing time frames over which biological variables integrate impacts, it is not practicable to provide a prescriptive approach. However, the overriding aim remains the same i.e. to establish the natural range and to be able to detect any change to the natural range of values. The following general guidance is provided.

The before distribution of population values needs to be established with reasonable precision. This means that sufficient numbers of samples must be collected such that reasonably tight confidence intervals[18] (CI) around the estimated population 20/50/80 percentiles are established (CI ranges for the three percentiles must be clearly separated). What constitutes a sufficient number will vary depending on the indicator. The number of samples taken will depend upon natural variability of the chosen indicator(s). The number of samples is a compromise between degree of information gain with increasing replication and time, cost and practicality of increasing sampling effort. However, if the selected indicator is so variable that impractically high numbers of samples are required to achieve the desired outcome, then an alternative indicator must be considered.

The overall objective is to obtain a reasonable estimate of the sample population. A useful technique is to determine the coefficient of variation for increasing degrees of sample replication and sampling effort (for example plot size to estimate which techniques will give a reasonable estimate of variability).

[18] *In the default method for physico-chemical indicators, use of the 75th rather than 95th percentile CIs is recommended. This is similarly recommended for biological indicators. While this leads to an increase in the chance of making Type 1 errors, it considerably tightens up the CI ranges and decreases chance of Type II errors. This is considered a reasonable trade off for these HEV waters*

Sampling in the post-activity period must similarly aim to collect sufficient samples to be able to develop tight confidence intervals around the estimated population 20/50/80 percentiles. The before and after percentiles (with their associated confidence intervals) can then be compared for evidence of change. These percentiles are used so that monitoring may detect changes, which result in shifts in median levels as well as changes in variability.

Use of existing data

Where there is sufficient existing data from relevant sites for a particular indicator, the proponents may make use of this. The existing data could be used to characterise the environment and establish environmental goals for that indicator(s). If an environmental monitoring program is currently being conducted in relevant places, this data may be used for *before conditions* at control sites and/or the impact site as required.

Where long term data sets are available, information gained from assessment of spatial and temporal variation of an indicator could potentially be used to modify the program. For example, if spatial variation in an embayment was found to be very small for a particular indicator, this might justify a reduction in the number of control sites required to the minimum level.

In numerous waterways in Queensland, stakeholders jointly contribute to and carry out monitoring programs, a practice EPA encourages. A proponent proposing to use such data may need to contact stakeholders to discuss mutually acceptable arrangements for use of data and participation in the program.

An important caveat on the use of existing data is that it must be of proven high quality (i.e. it must have documented Quality Assurance information).

Reference

Underwood, A.J. (1992) Beyond BACI: the detection of environmental impacts on populations in the real, but variable world. *Journal of Experimental Marine Biology and Ecology*, 161: 145-178.

Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

This procedural guide informs the EPA Operational Policy Waste water discharge to Queensland water. It provides specific technical information that may assist EPA officers undertaking water quality assessment for strategic planning purposes or when considering development applications or environmental authority applications under the Environmental Protection Act 1994, Environmental Protection (Water) Policy 1997, Integrated Planning Act 1997 and State Development and Public Works Organisation Act 1971.

Table of contents

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

Note this is a draft document for internal EPA purposes only.

It is not Government policy.

For further information please contact the EPA Strategy and Policy Division on:

Ph. 1800 177 291

Interested parties are invited to provide email comments by 28 March 2008 to:

Email [redacted]

Disclaimer

While this document has been prepared with care, it contains general information and does not profess to offer legal, professional or commercial advice. The Queensland Government accepts no liability for any external decisions or actions taken on the basis of this document. Persons external to the Environmental Protection Agency should satisfy themselves independently and by consulting their own professional advisors before embarking on any proposed course of action.

Preamble

The purpose of the *Environmental Protection (Water) Policy 1997* (the EPP Water) is to achieve the protection of Queensland's water environment (surface tidal and non-tidal waters, groundwaters, lakes and wetlands) whilst allowing for development that is ecologically sustainable. The purpose is achieved by:

a) identifying environmental values (EVs) for Queensland waters;

b) deciding and stating water quality guidelines and objectives to enhance or protect the EVs – (ensuring healthy aquatic ecosystems and their ability to support human uses);

c) making consistent and equitable decisions about Queensland waters that promote efficient use of resources and best practice environmental management; and

d) involving the community through consultation and education, and promoting community responsibility.

The EVs for a water are protected if the measures for all indicators do not exceed the water quality objectives for the indicators.

1. Initial assessment of proposed activity

This Section informs Sections 2.1 and 2.4 of the Operational Policy

The initial assessment of the proposed activity should consider the industry type, materials used in processing, content and fate of waste streams and disposal options, reuse, recycling and re-treatment proposals, mass balance and water budget information, likely contaminants discharged in waste water to land or waters (including contaminated stormwater) and likely receiving water ecological and human health indicators potentially impacted by the waste water discharge. The waste management hierarchy for prioritising waste management practices under the EPP Water is at the Attachment to Section 1. Information that characterises the proposed waste water release should be included in applications seeking to discharge waste water to waters or land. Summary information is also at the Attachment to Section 1.

Particular industries and Environmentally Relevant Activities (ERAs) are associated with classes of aquatic ecosystem contaminants, e.g. waste water treatment plants and nutrients. The National Pollutant Inventory emission estimation technique manuals list 90 priority substances on the basis of health and environmental risk, by industry sector, and the USA EPA Toxic Release Inventory lists 313 priority substances. These inventories may assist in determining the likely waste water contaminants that may be associated with specific industry sectors or ERAs, and any potential issues with release to the environment (land or water).

The Modelling and Monitoring Assessment Decision Support System, refer Section 4.1, may also assist in identifying potential contaminants resulting from point or diffuse source emissions from specific industry sectors. The decision support tool includes relevant indicators and stressors and can be requested from water.tools@epa.qld.gov. Further information is at http://www.coastal.crc.org.au/3m/.

The e-Guides, refer Section 4.1, search facility includes links to all ANZECC Guidelines and may also assist in characterizing waste water toxicants that may be associated with specific industry sectors or ERAs. E-Guides are also available on request through **water.tools@epa.qld.gov**.

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

Attachment to Section 1

A. Waste management evaluation procedure

Figure 1 depicts the decision preference hierarchy in order to maximise the resource usage and minimise the impact on the EVs of the receiving waters under the EPP Water waste management evaluation procedure,

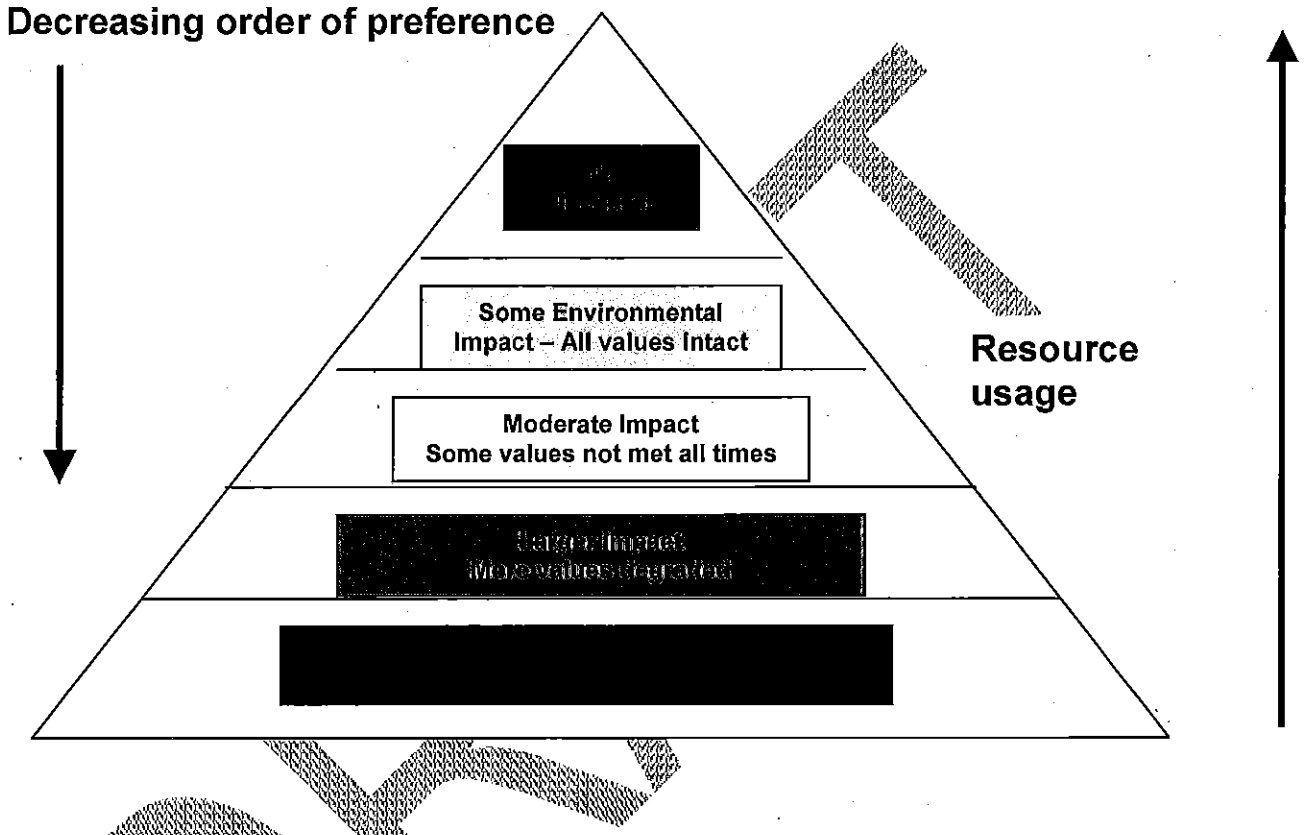


Figure 1. Decision preference hierarchy

Steps under the waste management evaluation procedure include:

Waste avoidance - Preventing the generation of waste water or reducing the amount of waste water generated.

Examples of practices for achieving avoidance include:

- input substitution;
- increased efficiency in the use of raw materials, energy, water or land;
- process redesign;
- product redesign;
- improved maintenance and operation of equipment; and
- closed-loop recycling.

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

Waste water re-use

Examples include:

- applying waste water to land in a way that gives agricultural and ecological benefits; and
- substituting waste water for potable water as input to a production process.

Waste recycling - Treating waste water that is no longer useable in its present form and using it to produce new products.

Energy recovery from waste - Recovering and using energy generated from waste.

Waste disposal - Disposing of waste water, or treating and disposing of waste water in a way that causes the least harm to the environment.

Examples of treatment before disposal include:

- employing a bio-treatment;
- employing a physico-chemical treatment (e.g., evaporation, drying, calcination, catalytic processing, neutralisation or precipitation); and
- blending or mixing waste to obtain a compound or mixture.

Examples of disposal include:

- disposal to storage dams.

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

B. Waste water assessment - contaminants, re-use, recycling, treatment and release, monitoring information

The following information should be included in applications involving waste water release to waters or land:

- source(s) of waste water;
- the key waste water contaminants released under steady state conditions, by concentration and load for key indicators. Identification of any toxicity concerns from the initial assessment and the inclusion of any screening results from direct toxicity assessment;
- the waste water avoidance measures incorporated in the process design and the waste water re-use, recycling and treatment proposals. The waste water disposal options considered prior to the final design should be included -- please attach diagram(s) of the treatment plant or process;
- quantitative comparisons of the above waste management measures with best practice environmental management for the activity;
- the proposed average, maximum and minimum daily and weekly volumes to be discharged, and maximum hourly discharge rate;
- the proposed times of discharge (and whether continuous or intermittent), wet weather and dry weather flow variation;
- the proposed diffuser details and the stated tidal or flow conditions of the waste water release;
- the facilities for measuring the volume or rate of discharge and for waste water discharge monitoring. List the proposed monitoring frequency and the indicators to be monitored;
- the name of the waters proposed to receive the waste water discharge and a plan or map showing the spatial location and latitude and longitude of the discharge outfall;
- the proposed impact monitoring program on the effect on the receiving environment (water or land) of the waste water release, specifying the proposed location of monitoring points (relative to the coordinates of the discharge outfall), the frequency of monitoring and the indicators to be monitored;
- the results of any investigations into the effects of waste waters discharged to land or receiving waters (please attach reports); and
- investigations assessing pre-development groundwater contamination should be in accordance with http://www.ephc.gov.au/pdf/cs/cs_01_inv_levels.pdf and http://www.ephc.gov.au/pdf/cs/cs_06_groundwater.pdf.

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

2. Receiving waters assessment – character, resilience and values of the receiving environment

This Section informs Sections 2.2, 2.3 and Section 3 of the Operational Policy

2.1 What EVs and WQOs and levels of aquatic ecosystems protection apply?

Environmental values (EVs) for waters

The EVs of waters to be enhanced or protected are listed in the documents in Schedule 1 of the EPP Water. For waters not listed in Schedule 1, the EVs are in the *Queensland Water Quality Guidelines 2006* (the QWQGs).

Water quality objectives (WQOs) - to protect or enhance the EVs for waters

The WQOs for a water are contained in the documents listed in Schedule 1. For waters not listed in Schedule 1, the WQOs are the set of water quality guidelines from the QWQGs and the Australian *Water Quality Guidelines for Fresh and Marine Waters 2001* for all indicators that will protect all EVs for the water.

Where do I find the information?

- For waters that are listed in Schedule 1 of the EPP Water the EVs and WQOs are available from the EPA website. The Schedule 1 documents for the water include the EVs and WQOs for different water types (upland and lowland freshwaters, upper, mid and lower estuarine waters, enclosed and open coastal waters, wetlands, lakes and reservoirs), the levels of aquatic ecosystems protection (HEV, SMD or HD) and river basin/sub-basin plans in jpeg format. Alternatively CD copies are available on request by emailing EPA.EV@epa.qld.gov.au, calling the free call 1800 177 291 or contacting the local EPA office.
- For waters that are not listed in Schedule 1 of the EPP Water the Queensland Water Quality Guidelines provide EVs and WQOs for all other water types (see above) for Queensland regions/sub-regions. The default level of aquatic ecosystems protection is slightly to moderately disturbed. Both CD and printed copies are available on request as advised above. Note that the ANZECC Water quality guidelines for fresh and marine water quality provide concentration levels for indicators not included in the Queensland Water Quality Guidelines (for example, toxicants.). Other guidelines may also be relevant (for example food standards and recreation), see below and Section4.1.
- **Water quality guidelines are also available on-line through e-Guides,** refer Section 4.1. The current version contains:
  - ANZECC 2000 Water Quality Guidelines;
  - ANZECC 2000 Monitoring & Reporting Guidelines;
  - NHMRC 2005 Recreational Guidelines;
  - Queensland Water Quality Guidelines; and
  - Coastal CRC Users' Guide to Indicators for Monitoring.

Users can select the document that they would like to manually browse, or select the 'search' tab to search all the guides for key words. The searched items can be viewed, copied to another document or printed out for later reference. E-Guides are available on request from water.tools@epa.qld.gov.au.

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

Spatial datasets and metadata are available for:

- EPA staff through *Ecomaps* - Environment and Conservation category. Schedule 1 documents are available through the EPA Intranet system ROBIN (Fast find/EVs) or the QWQGs (link above);
- EPA GIS staff through Enterprise GIS ('O' drive). Schedule 1 documents as above;
- Other State Government Departments and Local Governments may access spatial data through the Queensland Government *Infolink*, accessible through the *GovNet* homepage at http://wwwhost.env.qld.gov.au/HomePage/GovNet.htm. Schedule 1 documents for the specific waters are available through the EPA website or the QWQGs (link above); and
- Consultants, stakeholders and members of the public, CD copies containing the spatial datasets, metadata and the EPP Water Schedule 1 documents are available on request through the EPA Environmental Information Systems Unit, by email from data.coordinator@epa.qld.gov.au or by telephone (07) 3227 6447.

Notes

1. The EPA has developed Queensland water quality guidelines (QWQGs) based on the ANZECC scientific principles and management protocols. The QWQGs are:

- based on data collected from un-impacted Queensland reference sites, that are listed in Appendix F (by region, site name and location (latitude and longitude.) The QWQGs are derived from the 20th and 80th percentiles of the reference sites' data - the 80th percentiles are used where high values of an indicator cause problems (e.g. nutrients or chlorophyll-a), the 20th percentiles where low values cause problems (Secchi depth) and both the 20th and 80th percentiles where high or low values could cause problems (pH and DO);
- given for different water types, to the limit of Queensland waters (three nautical miles). Water types include open and enclosed coastal waters, lower, mid and upper estuarine waters, lowland and upland fresh or riverine waters, freshwater lakes and reservoirs, wetlands and groundwaters; and
- based on geographic regions and subregions (river basins, sub-basins and localised guidelines) for southern, central and northern Queensland watersheds east of the Great Dividing Range.

2. The level of protection (for aquatic ecosystems) means the level of aquatic ecosystem condition that the water quality objectives for that water are intended to achieve. The stated levels of aquatic ecosystem protection are:

- Level 1 - High ecological value (HEV)— effectively unmodified or highly valued aquatic ecosystems;
- Level 2 - Slightly to moderately disturbed (SMD) — aquatic ecosystems in which biological diversity has been adversely affected by human activity to a relatively small but measurable degree; and
- Level 3 - Highly disturbed (HD) — measurably degraded aquatic ecosystems of lower ecological value.

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

2.2 Receiving water quality information sources

Water quality information:

- informs strategic planning and development assessment - assessing current condition and trends in water quality;
- provides raw data to a range of client groups and the general public;
- informs the spatial and temporal variability that provides a basis for assessing compliance with the EPP Water and the Queensland Water Quality Guidelines;
- informs the development of reference values for Queensland waters; and
- informs regional environmental monitoring programs e.g. the SEQ Ecological Health Monitoring Program, and State of Environment reporting.

Water quality information sources include:

The Queensland waterways database contains current and historic water quality information from the EPA water quality monitoring program. The database includes monthly monitoring from more than 500 (mostly estuarine) sites across Queensland. View a map of the sites monitored in Queensland and click on the area or catchment of interest.

What indicators of water quality are monitored?

Brief indicator descriptions, sampling and determination methods can be viewed here. The range of water quality indicators include:

- physico-chemical indicators (temperature, pH, conductivity, dissolved oxygen, turbidity);
- chlorophyll-a , suspended solids, nutrient concentrations; and
- sediment metal concentrations, plankton samples and faecal coliform (bacteriological) counts.

How do I access water quality monitoring data and published information?

Download published water quality reports and brochures from the website publications page.

For access to the water quality monitoring data please contact the EPA Environmental Sciences Division, Freshwater and Marine Sciences, by emailing water.data@epa.qld.gov.au or telephone 3896 9250. Further information can be obtained at http://www.epa.qld.gov.au/environmental_management/water/water_quality_monitoring

Other sources of water quality information include State and Commonwealth agencies, Local Governments, Queensland Port Authorities, Regional NRM Bodies and industry. Additionally Universities (particularly the University of Queensland, Griffith University, Central Queensland University and James Cook University of North Queensland), the Australian Institute of Marine Science, the CSIRO Division of Land and Water and the SEQ Healthywaterways Partnership conduct research projects that may inform water quality assessment.

Specific information sources include:

- Department of Natural Resources and Water (NRW) which collects, manages and delivers data on the quantity and quality of fresh water in the State's rivers and aquifers. NRW operates and maintains networks across the State to monitor:
    - quantity and quality of surface water;

- groundwater quantity and groundwater quality; and
- sediment transport and aquatic ecology.

Data access is via NRW website the Stream Gauging Stations Index using stream name, or gauging station number. The water monitoring program operates under a certified quality management system at Water monitoring data collection standards. The validated field data is entered into easy access databases using formats specified in the Water monitoring data reporting standards.

- NRW State of Rivers projects provide 'snapshots' of the ecological and physical condition of Queensland riverine systems. Survey information for specific rivers is at *State of the Rivers* report. Condition ratings include riparian vegetation condition, aquatic vegetation and habitat condition, recreational and conservation value.
- Local Governments throughout Queensland which conduct water quality monitoring programs, including recreational (biological) monitoring.
- Great Barrier Reef Marine Park Authority which conducts lower estuarine and coastal water quality monitoring.
- Regional Environment Monitoring Programs (REMPs) that are supported collaboratively by State and local government and industry in parts of the State, including Trinity Inlet, SEQ/Moreton Bay, Cleveland Bay, the Great Barrier Reef and Port Curtis. In some cases development conditions related to receiving waters monitoring may be addressed by applicants by contributing to such REMPs.
- OzCoast website which includes an estuary database and information on coastal indicators that can be accessed at http://www.ozcoasts.org.au/.
- Water Quality Online website which includes products developed as part of the *National Action Plan for Salinity and Water Quality*. It includes water quality assessment tools that can be accessed at http://www.wqonline.info/.
- Ports Corporation Queensland undertakes water quality monitoring at each of its ports to assess trends in water quality parameters over time. The current program of water quality monitoring commenced in mid-2004 and the links below provide a summary of the results obtained to date. Each file contains a map of the sampling area and locations, as well as the sampling results from; Abbot Point/Bowen. Lucinda. Mourilyan. Thursday Island. Weipa.
- Other information sources include the Department of Primary Industries and Fisheries (declared fish habitat areas under the *Fisheries Act 1994,* mangroves and seagrass mapping), Sunwater, SEQ Water and other water authorities throughout the State.

For further information please search the respective websites or contact the organisations.

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786
Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

2.3 Assessing water quality – for DA and strategic planning

Comparison of ambient or receiving water quality data from site monitoring programs or test data should be made with the WQOs for the waters under the EPP Water, either listed under Schedule 1 or from the QWQGs/ANZECC.

Compliance with the WQOs for all indicators from the Schedule 1 documents for the specific waters (and water types) is assessed by comparing the annual median value for each indicator and site with the WQOs for the water - at the stated level of aquatic ecosystems protection.

In the second case compliance is assessed by comparison with the water quality objectives from the QWQGs/ANZECC for relevant regions/subregions/catchment level information. Compliance is assessed for all indicators by comparing the annual median value for each indicator, by site and water type against the QWQGs/ANZECC guideline values.

In both assessment cases the level of level of aquatic ecosystem condition that the water quality objectives for that water are intended to achieve should be determined from either the Schedule 1 document for the waters, or from the QWQGs in conjunction with planning designations for impacted or downstream waters (e.g. marine park/national park, fish habitat areas, significant wetlands (Ramsar/Directory of Important Wetlands etc.))

Assessment of sample or test data against the WQOs for the waters

Median, 20th and 80th percentile values for each indicator at each sample site, or test data from model predictions, are compared with the WQOs as follows:

- [redacted] (less than the WQOs for nutrients, suspended solids, turbidity or chlorophyll-a; greater than the WQO for Secchi depth; less than the maximum and greater than the minimum for pH and dissolved oxygen), [redacted]; or
- If the median value of the sample or test data is not within the water quality objectives, but the 20th or 80th percentile is within the water quality objectives (20th percentile less than the WQO for nutrients, suspended solids, turbidity or chlorophyll-a; 80th percentile greater than the guideline for Secchi depth; 20th percentile less than the maximum guideline or 80th percentile greater than the minimum guideline for pH and dissolved oxygen), the waters are slightly/moderately impacted (SMD waters) with some signs of poor ecological health; or
- [redacted] (20th percentile greater than the WQO for nutrients, suspended solids, turbidity or chlorophyll-a; 80th percentile less than the guideline for Secchi depth; 20th percentile greater than maximum or 80th percentile less than minimum for pH/dissolved oxygen), [redacted]

Compliance can be assessed by producing box plots of the sample or test data (using the median values, the 20th and 80th percentiles and the highest and lowest values (not outliers) for comparison with the WQOs for the waters. Refer to Figure 2 below.

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

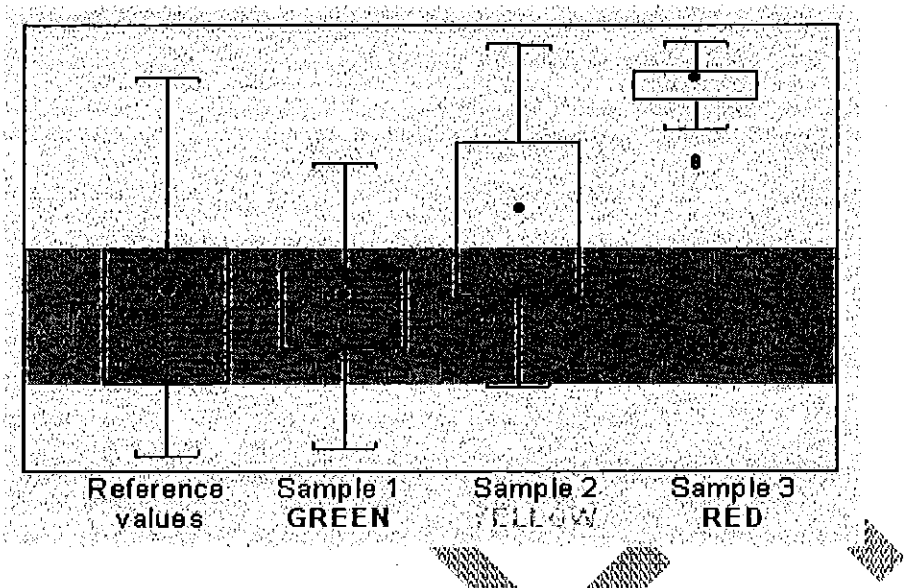


Figure 2. Box plot presentation of sample or test data against WQOs

Green: WQOs are met. Median value of sample or test data is within WQOs –.sample/test site is ecologically healthy/slightly impacted.

Yellow: Median exceeds WQOs, but 20th or 80th percentile is within the WQOs – sample/test site is sightly/moderately impacted with some signs of poor ecological health.

Red: WQOs not met. Median and 20th or 80th percentile exceeds WQOs – sample /test site is moderately/heavily impacted.

Integrated assessments of sample or test sites against the WQOs for the waters

Integrated assessment combines the results from the individual indicator/site assessments as follows:

Criteria			Result
	All sample or test sites green?	Yes	[illegible]
			Yellow
	More sample/test sites yellow than green?	Yes	Yellow
	Any sample/test sites red?	Yes	[illegible]
			[illegible]

Notes

1. The S-PLUS statistical software package, or equivalent, to produce box plots for water quality assessment is the preferred method for sample/test data presentation and comparison with WQOs. S-PLUS software is available for EPA staff - contact the EPA Water Policy and Partnerships Unit by email at EPA.EV@epa.qld.gov.au, or telephone 1800 177 291.

2. The above assessment, based on annual medians, is not relevant for assessing the likely impact of toxicants, short term releases or pulse events on aquatic ecosystem values - refer to the ANZECC guidelines (via e-Guides) for approaches to these issues.

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

2.4 Assessing the contribution of multiple discharges to receiving waters

In assessing receiving water quality, the current condition reflects discharges from the whole catchment - including point source emissions, urban diffuse source emissions and rural diffuse source emissions. The relative contributions from the various emission sources should be understood in the assessment of applications for further waste water discharge or in strategic planning; particularly for slightly to moderately disturbed (SMD) waters without assimilative capacity or highly disturbed (HD) waters (that have no assimilative capacity.)

Possible information sources on existing waste water discharges to waters within a given catchment include:

- the EPA point source database and licensing database that provide information on existing point source discharges (quality/quantity/location);
- the results of compliance inspections conducted in specific areas of the State that may provide additional information on point source emissions and particular waterways/catchment issues;
- Local Government may have catchment level information on urban diffuse emissions;
- Healthy waterways strategies (including water quality improvement plans) and Regional NRM Plans may provide whole of catchment information, including rural and urban diffuse emissions; and
- EPA internal reports (via ROBIN) and external research publications via the Internet; also refer to Section 2.2.

2.5 Waste water discharge to ephemeral streams – ecological and hydrological impacts

Discharge of waste water to temporary streams requires special consideration due to their unique hydrological and ecological characteristics. The importance of maintaining water quality in the small number of permanent pools in ephemeral streams during naturally dry stages includes the protection of these habitats as refugia for aquatic species during the dry season. Waste water emissions during naturally dry stages are likely to disrupt the natural ecology and impact the aquatic ecosystem, and continuous or semi-continuous discharges of waste water should be avoided. Wet weather discharges of waste water should occur when receiving water flows are sufficient, from a risk based assessment, to maintain the water quality objectives of the receiving waters. (Data from any adjacent upstream gauging station may assist in determining the release period.) Feasible disposal alternatives should be investigated, including minimising the production of waste water, reuse opportunities and retention for discharge during wet conditions. Specific mine water disposal issues of a 'one-off' nature would be considered on a case-by-case basis with the administering authority.

Receiving water quality objectives should be based on the most appropriate local reference data collected from same stream above the discharge, or in an adjacent stream not affected by waste water discharges. Monitoring data should ideally cover the wetting stage as well as recessional or pool stages. In the absence of suitable reference data, default values from the Queensland and ANZECC Water Quality Guidelines should be adopted.

Information on methods to assess ephemeral stream water quality is available from
http://www.acmer.uq.edu.au/research/attachments/FinalReport TempWatersSep20042.pdf

The discharge of waste water may also have adverse impacts on the hydrology of temporary and permanent surface receiving waters. The impacts relate to the volume and velocity of discharge relative to natural flows and may include bed and bank erosion and changes to the particle size distribution of sediments. Other effects may occur on biota where there is insufficient time to complete life cycles due to changed flow regimes. As a guide,

modelling of flow characteristics should be considered where the waste water flow exceeds 10% of the natural flow of the waterway.

2.6 EPA guidelines - sampling / experimental design / sample analysis / data analysis and pre-development water quality monitoring

The EPA Water Quality Sampling Manual, at http://www.epa.qld.gov.au/environmental_management/water/water_quality_monitoring/publications/, is to be used by relevant parties in deciding sampling, sample analysis and statistical analysis requirements under the EPP Water, including when:

- taking samples, or making tests and measurements; or
- preserving and storing samples, or performing analyses on samples; or
- performing statistical analyses on the results of sample analyses.

Manual methods or the S-PLUS statistical software package, or equivalent, should be used to produce box plots for water quality assessment of sample or test data against water quality objectives.

Where pre-development water quality monitoring is required:

- the QWQGs recommend the taking 18 samples to provide estimates of median, 20th and 80th percentiles at a reference site, refer to section 3.4.3.1 and Figure 3.4.1. As a minimum samples should be collected over a period of at least 12 months and cover seasonal variations, on the understanding that further samples would be collected to meet the recommended number of 18. Note the ANZECC Water Quality Guidelines recommend the taking of 24 samples to estimate the above percentiles at a reference site; and
- The Australian Guidelines for water quality monitoring and reporting 2000 informs baseline studies that measure change, including the *Multiple Before After Control Impact* (MBACI) experimental design. MBACI examples detecting environmental impacts of marine aquaculture are at http://www.bio.usyd.edu.au/SOBS/TEACHING/ecol_04/marine/CAS%202004%20marine%20ecology%20lecture%2011.pdf.

The above protocols also inform the baseline studies required under the EPA Operational Policy *Waste water discharge to Queensland waters* in demonstrating '*an equivalent outcome of no, or negligible, change to the physico-chemical, biological, habitat and flow attributes beyond natural variation of HEV waters, excepting, in limited circumstances, within a defined initial mixing zone measured near the waste water release outfall location. The intent is that beyond the mixing zone boundaries, current environmental quality is maintained and the aquatic ecosystem is conservatively protected over time, taking into account the precautionary principle.*" Appendix 6.4 of the Operational Policy, Application of MBACI design for HEV water assessment, provides further information.

Note

The method of assessing 'no change' to the physico-chemical, biological, habitat and flow ecosystem attributes of high ecological waters is given in the Queensland Water Quality Guidelines 2006 (Appendix D Compliance assessment protocols.)

2.7 Predicting the impacts of the proposed waste water discharge on the receiving waters

This Section informs Section 2.3 and Section 3 of the Operational Policy

When is predictive water quality modelling required to ascertain the impact from the proposed waste water discharge?

All development applications or environmental authority applications proposing waste water discharge to waters must quantitatively assess the impacts on the receiving waters.

- Where the assessed environmental risk of the proposed discharge is low (on the basis of toxicity assessment and contaminant load), the scale is small and spreadsheet calculations or simple box modelling indicates the increase in contaminant concentration does not exceed of the WQOs for the receiving waters, then more detailed predictive water quality modelling is not likely to be required. This circumstance may include a proposed discharge involving a small volume of waste water containing one or two well-studied contaminants at concentrations only several times greater than the well mixed mid/lower estuarine receiving waters. Refer to Attachment 2 to Section 2. Assimilative capacity must exist for the contaminant (that is the WQOs are not exceeded).
- Commensurate with increased scale and risk, and including where the receiving waters are of high ecological value, the use of more complex predictive water quality modelling will be required to evaluate receiving waters impacts. Predictive modelling outputs would include the assessments over a range of input conditions or scenarios. Test data output should be analysed and compared with the existing receiving water quality and the WQOs of the receiving waters using box plots, refer Section 2.3.

What models / techniques should be used?

- **Mixing zone models** are used to assess water quality impacts from point source discharges. The most commonly used mixing zone model is Cormix available through the USEPA website is a water quality modeling and decision support system designed for environmental impact assessment of mixing zones resulting from waste water discharge from point sources. Although US focused, the compilation of mixing zone documents provides good background information.

  Mixing zone guidance includes:

  - to protect EVs, outfall diffusers would normally be required to ensure a minimum initial dilution level under the stated tidal or flow conditions (i.e. release during stated parts of the tide or above stated freshwater flows);
  - the maximum lateral dimension of the mixing zone should be the lesser of 50m diameter or 30 percent of the waterway width for riverine and estuarine waters; and a radius not exceeding 100m from the diffuser port for coastal waters;
  - boundaries of adjacent mixing zones be at least 200m apart, cumulative impacts should be assessed;
  - compliance with receiving water quality objectives should be met within 3 stream widths or 300m from the diffuser port, whichever is the smaller; and
  - application is primarily to toxicants. Nutrients should be assessed in terms of equilibrium concentrations at a certain distance (for example 300m) from the discharge port.

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

- **Catchment models** typically simulate the flows and loads of suspended sediment, total phosphorus and total nitrogen from freshwater catchments with consideration of land use, rainfall, soil characteristics, vegetation cover etc. Flows and loads are routed through stream networks, typically to the tidal limits of estuaries. Catchment models are available from a number of sources including CSIRO Land and Water, eWATER CRC and Regional NRM Groups.
- **Receiving water quality models** for estuaries and embayments are specific and complex models that simulate the hydrodynamic and water quality variations in the water body subject to external inputs. Receiving water quality models enable scenario modelling of water quality to be undertaken to predict the likely impacts of contaminants. Receiving water quality models are available through major consultant organisations for specific parts of the State, and are required to be used for significant projects.
- **Box models for estuarine water quality modelling** provide a simple computational framework that may be used to determine contaminant load estimates (e.g. N and P). Box models are relatively straightforward, available through most consultant organisations or may be developed for the estuarine waters of interest. A simple box model of steady state increase of contaminant concentration is at Attachment 1 to Section 2.

2.8 Considering the results of water quality assessments in accordance with the Operational Policy

Development applications and environmental authority applications proposing to discharge waste water to receiving waters should provide information to characterise the receiving environment and predicted impacts of the proposed discharge of waste water in accordance with sections 2.1 to 2.7 above, and in summary as follows.

- Environmental values, water quality objectives, water types and levels of aquatic ecosystem protection for the receiving waters should be provided, preferably with spatial datasets including application details and relevant overlays (e.g. protected estate and constraints mapping).
- Waste water contaminant assessment, discharge and monitoring information – refer Attachment to Section 1.
- Existing receiving water quality and ecological health information should be sourced and collated to include riverine, estuarine and coastal waters and the broadest range of indicators and indicator values.
- Future planning intent for the catchment and associated waters should be determined.
- Conduct baseline water quality monitoring for HEV waters, and as required for SMD/HD waters. Use agreed experimental design to establish pre-development water quality at control sites and proposed impact sites:
    - The QWQGs provide guidance on the number of site samples and time period to establish baseline development water quality, refer also to Section 2.6; and
    - The EPA Sampling Manual informs sampling techniques and sample analysis requirements. Sample data statistical analysis should include the calculation of median values, 20th and 80th percentiles and data outliers, by indicators, by sample sites for a given water type. Box plot presentation is preferred.

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786
Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

- All applications must quantitatively assess the impact of the proposed waste water discharge on receiving water quality. Information on the proposed waste water discharge contaminants (indicators concentrations and loads) should be provided. Depending on the degree of risk, scale and initial estimates of contaminant concentration increases above background, predictive modelling may be required.
- Collate test data or site sample data on existing water quality. Use S-PLUS statistical analysis software or equivalent, comparing site sample data or site test data with the WQOs for the water type for key indicators.
- Use box plots to present data and develop integrated water quality assessments ([redacted], YELLOW and [redacted] ZONES) to provide an evidence base that informs the subsequent analysis in accordance with the EPP Water:
    - **Green:** Median of site sample data and test data is within WQOs – sample or test sites are ecologically healthy/slightly impacted, WQOs are met prior to, and post the proposed discharge of the waste water;
    - **Yellow:** Median values of site sample data or test data exceeds WQOs, but 20th or 80th percentile is within the WQOs – sample /test site is slightly/moderately impacted site; and
    - **Red:** Median of site sample data or test data and 20th or 80th percentile exceeds WQOs – sample or test site is moderately/heavily impacted. WQOs are not met by the existing water quality. Further decline in water quality would be expected with additional discharge.

Assessment and decision making guidance

In assessing and deciding applications for development approval and environmental authority, the administering authority must comply with any relevant EPP requirement, consider the standard criteria and other prescribed matters. **That is, the assessment and decision making processes are determined by consideration of multiple criteria – not single criterion.** Refer to Endnotes 1, 2 and 3 for further detail.

The current EPP Water includes statements of policy about assessment and decision making that resulted from consultation on the Regulatory Impact Statement for the *Environmental Protection (Water) Amendment Policy No 1 2006* (the EPP (Water) AP). These are described in the corresponding Explanatory notes and summarized in the EPA Operational Policy.

- For proposed waste water discharge to [redacted] there should be no impact beyond the mixing zone (minimized to the greatest extent) and where practicable environmental offsets used to provide a net environmental gain to the receiving waters (refer Section 3 Environmental Offsets). Some assimilative capacity is preserved for future ESD.

  Note that mixing zone considerations apply to all environmental management decisions involving waste water discharge to surface water in accordance with s18 of the EPP Water; considerations include the use of diffusers, limiting the size of the mixing zone and releasing waste water under stated tidal or flow conditions.
- For [redacted] assessment - proposed discharge of waste water to SMD waters with assimilative capacity (WQOs met prior to and post the discharge):

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786
Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

- seek to maintain current water quality, through innovative and proactive discussions working in close partnership with the applicant to investigate on feasible alternatives to waste water discharge - refer to the waste management hierarchy for guidance at the Attachment to Section 1);
- retain some assimilative capacity for future ESD; and
- limit non-compliance to the mixing zone, minimised to the greatest extent.

- For [redacted] assessment - proposed discharge of waste water to SMD and HD waters that do not meet the WQOs (prior to or post the waste water discharge – i.e. the waters have no assimilative capacity for the discharge):
  - in constructive partnership with the applicant, seek innovative and proactive alternatives to waste water discharge (refer to the waste management hierarchy); and
  - consider the use of environmental offsets if there are no feasible alternatives to discharge.
  - Analyse key contributors discharging to catchment waters to understand the existing major emission sources. (Unrelated to the application being assessed, discussion with the Regional Manager may consider initiating a *strategic compliance management plan* involving area and industry sector inspection programs towards longer term improvements in receiving water quality).
- For YELLOW ZONE assessment - Median values of site sample data or test data exceeds WQOs, but 20th or 80th percentile is within the WQOs
  - **Assess as above** - recognising there is no assimilative capacity in respect of the non-compliant water quality indicators and considering the use of environmental offsets where there is no feasible alternative to discharge. If the discharge will not affect a non-compliant indicator e.g. discharge of sediment where water clarity and any relevant biological indicators are met, assess as per green zone.

Endnotes

1. The *Environmental Protection Act 1994* (EP Act) s73A, AA, B and C informs the assessment of development applications for chapter 4 activities (other than for mining or petroleum activities), wherein the administering authority must comply with any relevant Environmental Protection Policy requirement and must consider the standard criteria of schedule 3 of the EP Act and additional information given in relation to the application. (This section does not limit the Integrated Planning Act (IPA), section 3.3.15 or chapter 3, part 5 (Decision stage) or division 2 (Assessment process) of that Act).

Section 73B of the EP Act specifies the conditions of any development approval that may and must be imposed; including s73B (1) subject to the Integrated Planning Act s3.5.30 (conditions must be relevant or reasonable), the administering authority may impose the conditions on the development approval it considers are necessary or desirable and (2) the conditions must include any condition the authority is required to impose under an EPP requirement.

2. In assessing and deciding applications for environmental authority (mining activity) for level 1 mining projects, under s 193 the administering authority may in granting the application impose the conditions on the draft environmental authority it considers necessary or desirable.

In deciding whether to grant or refuse the application or to impose a condition the authority must:

(a) comply with any relevant Environmental Protection Policy requirement; and

(b) subject to paragraph (a), consider the application documents for the application, the standard criteria, the wild river declaration for the area—to the extent the application relates to mining activities in a wild river area, any suitability report obtained for the application and the status of any application under the Mineral Resources Act for each relevant mining tenement.

3. The standard criteria under Schedule 3 Environmental Protection Act 1994 means:

(a) the principles of ecologically sustainable development as set out in the 'National Strategy for Ecologically Sustainable Development'; and

(b) any applicable environmental protection policy; and

(c) any applicable Commonwealth, State or local government plans, standards, agreements or requirements; and

(d) any applicable environmental impact study, assessment or report; and

(e) the character, resilience and values of the receiving environment; and

(f) all submissions made by the applicant and submitters; and

(g) the best practice environmental management for activities under any relevant instrument, or proposed instrument, as follows—

(i) an environmental authority;

(ii) an environmental management program;

(iii) an environmental protection order;

(iv) a disposal permit;

(v) a development approval; and

(h) the financial implications of the requirements under an instrument, or proposed instrument, mentioned in paragraph (g) as they would relate to the type of activity or industry carried out, or proposed to be carried out, under the instrument; and

(i) the public interest; and

(j) any applicable site management plan; and

(k) any relevant integrated environmental management system or proposed integrated environmental management system; and

(l) any other matter prescribed under a regulation.

Attachment 1 to Section 2

Box Model estimation of steady state increase in total nitrogen concentration

Question – What is the steady state increase in total nitrogen concentration in a "box" of water given a constant daily load and a first order decay due to denitrification?

Conservative assumptions include:

- No advection
- No dispersion
- Tidal prism based on neap tidal range

Other assumptions include

- Losses due to denitrification – first order decay with a rate constant K_T of 0.05 day^{-1} (derived by John Bennett from modelling work on Southeast Queensland estuaries.)

The basic relationship is

$$\frac{d\ Total\ N}{dt} = Load\ TN - K_T\ Total\ N$$

i.e. the change in total nitrogen (TN) (kg) wrt. time is the load of TN (kg/day) minus losses of TN due to denitrification

Calculating tidal prism in ML

Determine areal extent (m^2) of waters upstream from discharge point.

Obtain data from site inspection/map/field visit. Distance upstream is limit of tidal influence for small streams. For large streams, use mean tidal velocity for an average tide (m/s) multiplied by time of tidal cycle e.g. 6hrs X 60min X 60secs for 2 tides/day.

Calculate the tidal range under neap tides (m) from local tide data.

Tidal prism ML = areal extent (m^2) X depth (m) /1000

In this case, 40m wide X 3000 m long X 1.0m mean neap tide difference/1000

➔ **Tidal prism = 120 ML**

Calculating aquaculture daily load of total nitrogen (TN)

Daily Discharge in m^3 = 5% of growout pond volume
= 0.05 X 6 X 5000m^2 X 1m
= 1500 m^3

Daily Discharge in ML = discharge in m^3 /1000
= 1.5 ML

Max Daily Load TN (kg/day) = daily discharge (ML/day) x concentration TN (mg/L)
= 1.5 X 0.6
= 0.9 kg/day (Scenario 1)

Calculating the change in total N (ΔTN)

The Basic Relationship again is

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

$\frac{d\ \text{Total N}}{dt} = \text{Load} - K_T\ \text{Total N}$

Under steady state, change in Total N wrt. time is zero, therefore:

$\frac{d\ \text{Total N}}{dt} = \text{Load} - K_T\ \text{Total N} = 0$

transforming the equation gives:

Total N (kg) $= \frac{\text{Load (kg day}^{-1})}{K_T\ (\text{day}^{-1})}$ (Note from above, $K_T\ (\text{day}^{-1})$ value is a given factor)

= 0.9/0.05
= 18 kg

This is the steady state additional mass of TN in the tidal prism (i.e. the box) caused by the discharge

Calculating the change in total N concentration (ΔTN)

ΔTN mg/l = mass TN (kg) /volume (ML) of the tidal prism
= 18/120
= 0.15 mg/L

Assessing Impact

Add predicted increase in TN mg/L (i.e. 0.15mg/L) to ambient median TN

Scenario A: ambient median TN = 0.36mg/L
Scenario B: ambient median TN = 0.205 mg/L

Compare result to water quality objective for TN: 0.300mg/L

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

Alternate Scenario

Let's say that the discharge is instead to larger estuary with the following characteristics.

- Average width: 70 m for at least 12 km upstream
- Neap tidal range: same, 1.2 m
- Distance to extremity of tidal influence upstream from farm 20 km
- Average tidal current velocity during neap tides 0.5 metres per second.
- 2 tidal cycles per day i.e. approx. a 6 hour tidal cycle

To recalculate tidal prism:

1. Distance of tidal flow upstream = 0.5 m/sec X 6 hours
= 0.5 m/sec X 60 X 60 X 6 sec
= 10800 metres

2. Tidal prism

Tidal prism ML = areal extent (m^2) X depth (m) /1000

In this case, 70m wide X 10800 m long X 1.2 mean neap tide difference/1000
= 907.2 ML

Calculating the change in total N concentration (ΔTN)

ΔTN mg/l = mass TN (kg) /volume (ML) of the tidal prism
= 18/907.2
= 0.02 mg/L

Assessing Impact

Add predicted increase in TN mg/L (i.e. 0.03mg/L) to ambient median TN

Scenario A: ambient median TN = 0.36mg/L
Scenario B: ambient median TN = 0.205mg/L

Compare result to water quality objective for TN: 0.300mg/L

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

Attachment 2 to Section 2

Steady state calculations – estimation of activity impact

A. Dilution Ratio in Creek Method
Assumptions:

- Constant flow in creek
- Constant flow of discharge
- Calculates ratio of flow in creek to flow in discharge
- Gives a guide to potential dilution available.

[Note: This does not take account of mixing zone impacts]

Assumed flows

- Turtle Creek North – 12.77 cumecs = 12.77 cubic metres per second
- Turtle Creek South – 25.3 cumecs = 25.3 cubic metres per second

Maximum waste water discharge
= 5 ML/day
= 5000 cubic metres per day
= 0.058 cubic metres per sec

Dilution Ratios

Turtle Creek North – 12.77/0.058 = 220:1

Turtle Creek South – 25.30.058 = 436:1

B. Estimated concentration in creek method

To calculate the resultant water concentration the following formula can be used:

$$Cres = \frac{(Qcreek * Ccreek) + (Qdis * Cdis)}{(Qcreek + Qdis)}$$

With:
Cres = *Resultant concentration in the creek in µg/L*
Q creek = *Flow in the creek in (m^3/s) upstream of discharge*
Ccreek = *Concentration in Creek upstream of discharge (µg/L)*
Q dis = *Discharge volume of activity (m^3/s)*
Cdis = *Concentration in discharge (µg/L)*

Assumptions:

- Constant flow in creek in one direction
- Constant flow of discharge into the creek
- Assumes all mix together
- Note this ignores a mixing zone effect and hence any mixing zone impacts.

Example

Data

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

Q creek - 12.77 cumecs =12.77 cubic meters per second
Ccreek from data = 0.4 µg/L maximum dissolved copper
Q dis = 0.058 m^3/s
Cdis = 30 µg/L maximum (assume all dissolved copper)

$$Cresulting = \frac{(12.77 * 0.4) + (0.058 * 30)}{(12.77 + 0.058)} = 0.5 \text{ µg/L}$$

C. Estimated minimum dilution in creek method

Question: What if we want to know what minimum dilution is necessary to meet ANZECC trigger values?

Data

Cresulting = 1.4 (ANZECC criteria for copper)
Q creek - x cumecs = x cubic meters per second
Ccreek from data = 0.4 µg/L maximum dissolved copper
Q dis = 0.058 m^3/s
Cdis = 30 µg/L maximum (assume all dissolved copper)

Substituting from equation above gives:

$$Cresulting = \frac{(x * Ccreek) + (Qdis * Cdis)}{(x + Qdis)}$$

$$\rightarrow \quad 1.4 = \frac{(x * 0.4) + (0.058 * 30)}{(x + 0.058)}$$

→ Qcreek = 1.6588

Flow in the creek (Q creek) must equal at least 1.6588 cumecs i.e. 1.6588 cubic meters per second if the resultant concentration is not to exceed 1.4 micrograms Cu per litre.

Minimum dilution ratio therefore is:

1.6588 cubic meters per second flow in creek to achieve criteria
Maximum daily discharge = 0.058 cubic meters per second

= 28.6 (rounded off say 29-30 times)

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

3. Environmental offsets

This Section informs Section 2.4 of the Operational Policy

3.1 What is an environmental offset in the context of waste water discharge?

Environmental offsets (offsets) means the measures taken to counterbalance the negative environmental impacts resulting from a residual waste water discharge that must first be avoided, then minimised before considering the use of offsets for any residual impacts. An offset is to be of a like-kind (i.e. the same contaminant and chemical form) and seeking to deliver a net environmental gain to the receiving waters. Offsets may be located within or outside a development site and should be legally secured.

Offsets will not replace or diminish existing environmental standards or regulatory requirements that must still be met; e.g. a discharge of poorly treated waste water or an activity that failed to incorporate best practice measures could not implement an offset to avoid adopting best practice environmental management. Offsets will not be used to allow development in areas where they could not otherwise occur or be used for purposes not otherwise allowed. They are simply intended be provide another tool that can be used during project design, environmental assessment and implementation to achieve the principles of ecologically sustainable development—the object of the EP Act.

Offsets counterbalance those impacts that still exist despite reduction through best practice waste avoidance, recycling and re-treatment, and adoption of environmentally sound discharge location and release circumstances in accordance with the EPP Water. Offsets should be distinguished from 'abatement measures' which refer to the range of actions that can be undertaken to reduce the level of impacts of a discharge (typically undertaken on-site and by adopting discharge strategies sensitive to environmental conditions).

3.2 When may an environmental offset be required?

The administering authority may require an offset or may approve an offset incorporated in a development proposal in making a decision about an application under the EP Act for a development approval for an environmentally relevant activity or environmental authority for a level 1 mining or petroleum activity. Refer to section 2.0 and 2.1 of the EPA Operational Policy. The policy intent is that for:

- HEV waters, where practicable the application includes a like kind environmental offset proposal - counterbalancing the discharge of residual waste water (the discharge) from the proposed ERA; and
- SMD and HD waters with no assimilative capacity, environmental offsets (offsets) may be considered by the administering authority where there are no feasible alternatives to residual waste water discharge.

For the purposes of the EPA Operational Policy, environmental offsets will not apply to SMD waters where assimilative capacity exists. Refer to the Operational Policy Section 2.3.4 Assimilative capacity and sustainable load. By definition HD waters have no assimilative capacity.

In all cases an environmental offset condition must only be imposed where it is considered to be either necessary or desirable in the context of the activity (see EP Act s 73B, 114 and 210). This means there must be a nexus between the offset and environmental protection of the subject waters, and the offset is either a necessary or desirable additional measure that assists in achieving the object of the EP Act.

Note
The Australian Government Department of Environment and Water Resources is addressing the use of environmental offsets in approval conditions under the EPBC Act, when a proposed development impacts on a matter of national environmental significance that is protected by that Act. When finalised, EPBC Act requirements should be considered in conjunction with this Operational Policy.

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786
Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

3.3 Queensland Government Environmental Offsets Discussion Paper

The consideration of environmental offsets is in accordance with the principles in the discussion paper on a proposed Queensland Government Environmental Offsets Policy, that are listed below.

- *Environmental impacts must first be avoided, then minimised before considering the use of offsets for any residual impacts.*
- *Offsets will not be used to allow development in areas where they could not otherwise occur, or for purposes not otherwise allowed.*
- *Offsets must achieve an equivalent or better environmental outcome.*
- *Offsets must provide environmental values as similar as possible to those being lost.*
- *Offsets must be provided with a minimal time-lag between the impact and delivery of the offset.*
- *Offsets must provide additional protection to values at risk or additional management actions to improve environmental values.*

3.4 Information on the development of an acceptable offsets proposal

In developing an offsets proposal under the EPA Operational Policy, offsets must be:

Enduring—they must offset the impact of the development for the period that the impact occurs. Where there is an approved increase in residual waste water discharge over time, a commensurate increase in offset quantity is required. Where the onset time is delayed, the offset will need to generate a larger amount of contaminant reduction in later years to balance any shortfall in the early establishment period. Development conditions or environmental authority conditions will specify the maintenance and monitoring requirements for the offset to ensure the achievement of the net environmental gain to the receiving waters over the life of the project.

Quantifiable and Monitored—the proposed environmentally relevant activity (ERA) discharge load increase and the counterbalancing offset load reduction must both be able to be measured or estimated with a reasonable level of confidence. Where the offset involves land-use change impacting on diffuse source contaminants, it is likely to be difficult to determine precisely the actual amount of pollution abated. In this case, measurement using a protocol agreed beforehand with the administering authority would be required. Measurement of baseline loads before implementation of the offset in accordance with the protocol would typically be included. Sound estimation tools should be based on the best available science and an acceptable level of understanding of how the offset measures work.

To measure the success of environmental offsets in delivering the desired environmental outcome, it is necessary that offset performance is monitored and audited, and the results included in reporting to the administering authority.

Targeted and located appropriately—they must offset the impacts on a 'like-for-like' basis (like kind offsets) of the same chemical type and form and be located appropriately. Offsets must impact on the same (receiving) waters and use offset ratios to achieve environmental equivalence between the proposed ERA discharge and offset sources. The administering authority will advise priority catchment locations for rural diffuse offsets.

Potential offset sources should discharge the same type and chemical form of contaminant and to the same waters as the proposed ERA discharge. In some cases a contaminant will be present in more than one form. For example, phosphorus is comprised of both soluble and non-soluble forms and most sources discharge a

combination of these forms. As offset opportunities are considered, the form of the contaminant being discharged should be identified to ensure that offsets represent an equivalent impact on water quality.

The fate of a contaminant is also an important consideration in evaluating impacts. For example although an activity may discharge non-soluble phosphorus, if the environmental conditions result in indirect impacts these must also be considered (e.g. discharge to stratified receiving waters that solubilise phosphorus.) The applicant should establish:

- the type and form of the major contaminant proposed in the residual waste water discharge;
- catchment offset sources that discharge the same type and form of the contaminant;
- the impacts of concern for the contaminant and any variation based on different chemical forms; and
- the potential for differential impacts from the various forms of the contaminant.

Suitable—discharge contaminants that may be suitable for management by offsets include nutrients (nitrogen and phosphorus), sediment (TSS and TDS), organic carbon or other contaminants where the scientific basis can be demonstrated and the contaminants do not have human health impacts, irreversible environmental impacts or unacceptable biota impacts.

Criteria to determine if a particular contaminant is suitable for management by offsets include:

- the contaminant contributes to a chronic, cumulative environmental impact (load effect), not an acute, localized impact (concentration effect)—toxicants are not appropriate;
- practical off-site pollution abatement measures are available to remove the contaminant elsewhere in the catchment; and
- practical tools are available to measure or estimate diffuse and point source loads of the offset contaminant, including existing baseline loads before ERA discharge and the offset measures commence.

Contaminants such as pathogens, most heavy metals and other contaminants that are toxic, at very low levels, to humans and the environment cannot be addressed using offsets.

The Attachment to Section 3 informs phosphorus, nitrogen and sediment suitability for management by offsets.

Enforceable—the applicant is responsible for ensuring that the offset is implemented diligently and maintained in a proper and effective manner. The applicant must identify how offsite elements will be implemented. Where the applicant is not the owner of the land subject to the offset, evidence of owner consent should be included in the application and ongoing use of the land for offset activities. The location of the offset (lot and plan numbers) must be included in the Offset Agreement.

Supplementary—offsets must have been specifically proposed for the offset purpose and be beyond current regulatory requirements.

The offsets proposal must also consider financial assurance—the administering authority has discretion under Chapter 7 Part 6 of the EP Act, and applicants should discuss the possible requirement during pre-design conferencing with the administering authority. It is reasonable that any financial assurance be drawn down as offsets are progressively implemented.

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786
Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

3.5 Determining environmental equivalence of offsets at different discharge points - offset ratios

The application of an equivalence (or offset) ratio seeks to account for contaminant reductions (offsets) made at different points within a catchment and to ensure that the impact of the offsets from designated locations or areas are equivalent to the proposed ERA residual waste water discharge.

Offset ratios must be greater than 1:1

An offset ratio determines the quantity of contaminant that a proposed offset must reduce for each kilogram of contaminant emitted in the residual waste water discharge. The offset ratio 3:1 means that 3 kilograms of contaminant are offset for every 1 kilogram of contaminant discharged. Offset ratios account for:

- the policy intent for the management of HEV, SMD and HD waters (refer section 2.0 of the EPA Operational Policy);
- the scientific uncertainty in estimating the loads of contaminant emitted by the ERA proposal (the load being offset) and the load reduced by the offset actions; and
- the spatial, temporal, chemical and bioavailability differences between the contaminants released and offset.

Table 1 provides default offset ratios that may be used to provide a reasonable level of confidence that the contaminant discharge is offset. The default ratios are consistent with offset / trading ratios used nationally and internationally for a range of contaminants, refer http://www.environment.nsw.gov.au/resources/framework05260.pdf and http://www.epa.gov/owow/watershed/trading/tfaenvrn.pdf. Different default ratios may be needed to address the project contaminants and locality issues, and should be discussed at pre-design conferencing.

Table 1: Default offset ratios

Emission source of ERA contaminant	Emission source of offset contaminant	Ratio (offset : impact)	Basis of ratio (Offsets are in the same waters or different water types *upstream* of the ERA contaminant discharge.)
Point	Point	1.5:1	A 1:1 ratio is the minimum needed to achieve a nil net discharge. The ratio also reflects the risk and uncertainties of achieving the offset measure and to achieve a net environmental gain to HEV waters or SMD/HD waters not meeting WQOs.
Point	Diffuse (rural)	3:1	As above. In addition, the ratio has been increased to account for the greater uncertainty in achieving and quantifying rural diffuse offsets, in-stream processing effects and spatial, time and bioavailablity differences.
Point	Diffuse (urban)	3:1	As above.

Notes to Table 1

1. Table 1 provides **minimum default offset ratios** that may be used for point and diffuse offsets to waters in the same catchment. The ratios assume knowledge of the proposed ERA residual waste water discharge, over time, and the conduct of monitoring programs to inform offset compliance.

2. Applicants may choose to develop project specific offset ratios, based on catchment and offset modelling, for consideration by the administering authority. Where offsets are proposed to be implemented in waters of **adjacent catchments with common receiving waters**, this must be agreed with the administering authority at pre-design conferencing and the offset ratios determined from catchment and offset modelling.

3. Proposals to include **rural diffuse offsets** assumes the restoration or re-establishment of degraded riparian or wetland habitats, or other land management actions, according to priorities advised by the administering authority at pre-design conferencing.

4. Proposals to include **urban diffuse offsets** from either new or existing urban development should also be according to the priorities advised by the administering authority. (The use of modelling techniques to demonstrate treatment train effectiveness in reducing contaminant emissions from both existing and new urban development will be required by the administering authority. Note that with respect to new urban development, offset proposals would be required to address contaminants remaining after the application of best practice environmental management for urban stormwater.)

5. **Downstream offsets.** SMD and HD waters that have no assimilative capacity for the proposed ERA residual waste water discharge contaminants will show further deterioration in current condition and for HEV waters the natural values of HEV waters will not be maintained. Localized contaminant impacts post the ERA discharge may be exacerbated in riverine waters with low flows and/or a high capacity for contaminant retentiveness or in extended estuaries with limited tidal flushing. The adoption of downstream offsets in different water types (i.e. the offset is located in a different water type that is downstream of the proposed ERA discharge) has limited ability to address the policy intent of preventing further degradation and reversing the declining trend in water quality or maintaining natural values. Accordingly, the adoption of downstream offsets in different water types does not contribute to achieving the policy intent and is not considered suitable.

Offsets for proposed ERA residual discharge in riverine waters should be in the same water type, using the minimum default offset ratios as in Table 1.

3.6 Determining riparian and wetland buffer widths

The Department of Natural Resources and Water's *Regional Vegetation Management Codes* under the *Vegetation Management Act 1999* for the relevant Queensland bioregions (available through the website at www.nrm.qld.gov.au) should be used as **default buffer widths** to **re-establish degraded watercourse riparian or wetland function** — providing the offsetting contaminant load reduction to receiving waters by preventing bank erosion and filtering sediments, nutrients and other contaminants from stormwater run-off.

In the context of this Operational Policy the codes are used to provide default buffer widths — equivalent to the buffer widths under the codes to be retained in the clearing of vegetation to prevent loss of riparian function. Extracts in Table 2 below are for information only and reference must be made to the appropriate Queensland bioregion code for case-by-case assessment. Examples of degraded and functioning riparian buffers are at Figure 3.

Table 2 Default riparian and wetland buffer widths

Performance requirement To re-establish degraded watercourse riparian or wetland function.	**Buffer width** Guideline buffer widths to re-establish degraded watercourse riparian and wetlands function — shown below as ***bold/italics/underlined text***.
Watercourses To regulate the clearing of vegetation in a way that prevents the loss of biodiversity and maintains ecological processes — remnant vegetation associated with any **watercourse** is protected to maintain — a) **bank stability by protecting against bank erosion**; b) **water quality by filtering sediments, nutrients and other pollutants**; c) **aquatic habitat; and** d) **wildlife habitat**; **Wetlands** To regulate the clearing of vegetation in a way that prevents the loss of biodiversity and maintains ecological processes — remnant vegetation associated with any **significant wetland** and/or **wetland** is protected to maintain — a) **water quality by filtering sediments, nutrients and other pollutants**; b) **aquatic habitat; and** c) **wildlife habitat.**	***Buffer width*** Clearing does not occur — a) in any watercourse; b) within ***200 metres from each high bank of each watercourse with a stream order 5 or greater***; c) within ***100 metres from each high bank of each watercourse with a stream order 3 or 4***; and d) within ***50 metres from each high bank of each watercourse with a stream order 1 or 2***. ***Buffer Width*** Clearing does not occur — a) in any wetland; b) in any significant wetland; c) within ***100 metres from any wetland***; and d) within ***200 metres from any significant wetland***.

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

Alternatively, applicants may conduct site based modelling studies acceptable to the administering authority to determine **riparian and wetland buffer widths** for Queensland bio-regions; e.g. the CSIRO Land and Water at http://www.clw.csiro.au/publications/technical99/tr32-99.pdf. In either case (i.e. default or site specific study) the riparian vegetation structure design must restore full ecological function; e.g. according to CSIRO Land and Water management objectives at http://downloads.lwa2.com/downloads/publications_pdf/PN061234_34-36.pdf.

Best practice environmental management includes fencing to exclude stock at least 5m upslope from the top of the bank, ensuring the bank is fully vegetated, incorporating a grass strip filter of the design width (but at least 15m) between the stream and the land use, adding an additional width equal to the height of the bank where this is greater than 15m, and including 30m or three widths of native trees/scrubs along the top of the bank.

Note that determining the **buffer length** to satisfy offset load requirements will require case by case land use and locality assessment, as prioritised by the administering authority. Site based modelling will be required.

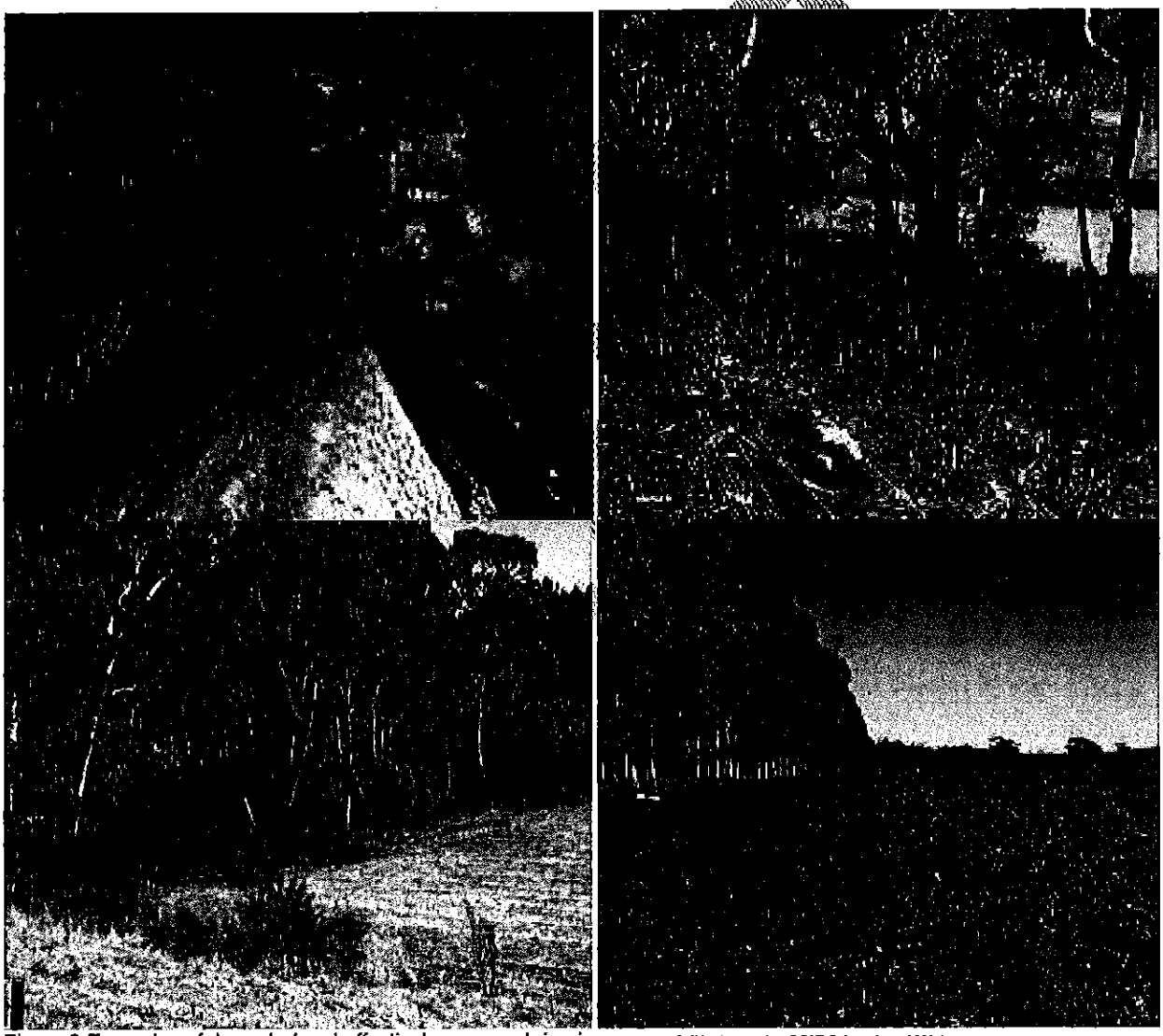


Figure 3 Examples of degraded and effectively managed riparian zones © Photographs CSIRO Land and Water

Attachment to Section 3

A. Offset suitability for phosphorus

Sources of phosphorus include point sources such as waste water sewage treatment plants and diffuse sources such as agricultural activities. Phosphorus discharges and in-stream concentrations can be readily measured and the contaminant is relatively stable as it travels through waterways. As a result, water quality equivalence can be established between offset load reductions and ERA load increases.

Contaminant forms. Phosphorus forms include:

- Soluble phosphorus, as dissolved ortho-phosphates, that is more bioavailable than nonsoluble forms.
- Non-soluble sediment-bound or particulate-bound phosphorus, that is not as likely to promote rapid algal growth but has the potential to become biologically available over time.

The concentration of total phosphorus is based on the sum of the soluble and non-soluble phosphorus. Due to phosphorus cycling in a waterbody (conversion between forms), offsets should consider total phosphorus expressed in terms of annual loads as a common metric with ERA discharge loads.

Actual forms of phosphorus being discharged should be identified to establish an equivalent impact on water quality. E.g., if offset reductions have substantially divergent chemical form to ERA discharges (e.g., one primarily discharges soluble phosphorus while another primarily discharges non-soluble phosphorus) then the two may not be environmentally equivalent. Most diffuse phosphorus from grazing/rural lands is sediment-bound, non-soluble phosphorus and from irrigation/horticulture in soluble form.

Impact. Excessive phosphorus concentrations have both direct and indirect effects on water quality. Direct effects include nuisance algae growth. Indirect effects include low dissolved oxygen, elevated pH, cyanotoxins from blue-green algae production and trihalomethane in drinking water systems.

Phosphorus **fate and transport** in waterways are well understood. The phosphorus "retentiveness" of a waterway describes the rates that nutrients are used relative to their rate of downstream transport. Areas of high retentiveness are usually associated with low flows, impoundments, dense aquatic plant beds and heavy sedimentation. Offsets that involve phosphorus discharges through these areas will likely require higher offsets to achieve water quality equivalence. In areas with swift flowing water and low biological activity, phosphorus is transported downstream faster than it is used by the biota, resulting in low levels of retentiveness and minimal aquatic growth. In reaches where phosphorus is transported rapidly through the system, lower offsets may be required.

Timing. The key consideration for phosphorus offsets is the seasonal load variability amongst emission sources. Agricultural diffuse source loadings will vary seasonally, with greater loadings likely during the growing season and during storm events associated with soil runoff. Point sources generally discharge continuously.

Refer *Water Quality Trading Assessment Handbook, US EPA, November 2004* available at http://www.epa.gov/owow/watershed/trading/handbook/docs/NationalWQTHandbook_FINAL.pdf.

B. Offset suitability for nitrogen

Anthropogenic sources of nitrogen discharging to receiving waters include point sources, such as waste water treatment plants and industrial discharge, and diffuse sources from agricultural activities and rural lands. Human activity has had an important influence on nitrogen cycles causing an increase of mobilized nitrogen. In particular nitrogenous fertilizer use has increased nitrogen input to receiving waters since widespread use began in the 1950's. In addition, both natural and human disturbances of natural ecosystems (e.g., forest fires, forest clearing) can contribute significant quantities of biologically available nitrogen to receiving waters.

Nitrogen discharges can be measured or calculated and tracked along a waterway.

Contaminant forms. Nitrogen forms include:

- Organic nitrogen that refers to nitrogen contained in organic matter and organic compounds, and may include both dissolved and particulate forms. Sources of organic nitrogen include decomposition of biological material, animal manure, soil erosion, waste water treatment plants and some industries. Organic nitrogen is not available for aquatic plant uptake, but over time organic forms may convert to inorganic, bioavailable forms.
- Inorganic nitrogen that includes nitrate (NO_3^-), nitrite (NO_2^-), ammonia (NH_3) and ammonium (NH_4^+). The primary sources of inorganic nitrogen are mineralized organic matter, nitrogenous fertilizers, point source discharges and atmospheric deposition. Inorganic nitrogen is bioavailable.

Total nitrogen is typically calculated based on the total load - it is assumed that all of the organic nitrogen will become bioavailable within a relevant time period. Offsets are based on total nitrogen load.

Impact. The effects of excessive nitrogen include those related to eutrophication—such as habitat degradation, algal blooms, hypoxia, anoxia and direct toxicity effects. While nutrient and eutrophication impacts associated with excess phosphorus may be more commonly of concern in freshwater systems, nitrogen is generally the limiting nutrient in marine environments and thus has a greater impact in estuarine systems. Some forms of nitrogen may pose particular problems; including ammonia that can cause localized toxicity problems and high concentrations of nitrate in drinking water may raise human health concerns.

A key consideration in determining offset requirements is to understand the nitrogen loss from the waterway. In addition to nitrogen exiting the waterway via irrigation diversions is nitrogen attenuation in the waterway, e.g. vegetation can draw dissolved inorganic nitrogen (NO_3^- and NH_4^+) from the system. Another form of attenuation involves the process of "denitrification" whereby nitrate is reduced to gaseous nitrogen mainly by microbiological activity. Waterway reaches associated with high denitrification are usually associated with low, shallow flows. If offset nitrogen is mainly in the form of nitrate a (potentially large) portion of nitrogen may not reach the receiving waters and hence higher offset requirements. Conversely, nitrogen loads discharged to swiftly flowing, deep waters will have less opportunity for denitrification and have lower offset requirements.

Another factor important to water quality impacts in estuarine environments is the degree of flushing activity, particularly from tides. For example some estuarine waters may have a low level of tidal activity, mixing, and flushing. It is likely that these zones will retain the nitrogen for long periods of time and may have significant water quality concerns from discharge to such waters.

Timing. Nitrogen offsets are expressed in terms of annual loads as a common metric to ERA discharge loads. While point sources such as WWTPs are likely to have relatively consistent discharge timing, rural diffuse sources will have variable loadings that change seasonally based on land management activities and increased nitrogen levels during periods of high rainfall.

C. Offset Suitability for sediments

Sediment from erosion or unconsolidated deposits is transported by, suspended in, or deposited by water. The erosion, transport and deposition of sediment become a problem when increases in sediment supply exceed the water body assimilation capacity. Sediment problems involve the presence of excess fine sediment such as silt and clay particles that increase turbidity when suspended, and form muddy bottom deposits when they settle. Excessive fine suspended and bedload sediments cause aquatic ecosystem impairments.

Sources. Major sources include soil erosion carried by surface runoff and within-channel erosion of banks and bedload sediments.

In catchments where human activity has markedly increased overland flow and run-off, and in-channel erosion and sediment load, excess sediment may be a common event with resulting impairment. Diffuse sediment sources include streambank destabilization due to riparian vegetation removal, agricultural activities without adequate buffer zones, urban sources during stormwater runoff from construction and permanent land development activities, sand and gravel extraction and road construction and maintenance.

Impacts. Excessive amounts of sediment can directly impact aquatic life and fisheries. Deposition can choke spawning gravels, impair fish food sources and reduce habitat complexity in stream channels. Stream scour can lead to destruction of habitat structure. Sediments can cause taste and odour problems for drinking water, block water supply intakes, foul treatment systems, and fill reservoirs. High levels of sediment can impair swimming and boating by altering channel form, creating hazards due to reduced water clarity, and adversely affecting aesthetics.

Indirect effects include low dissolved oxygen levels due to the decomposition of organic sediment materials and water column enrichment of attached nutrients loads. Elevated stream bank erosion rates also lead to wider channels that can contribute to increased water temperatures.

Contaminant forms. Sediment sources discharge a range of particle sizes and loads based on:

- Suspended or "water column" sediments are particles that are small and light enough to remain suspended in the water column, generally less than 1 mm. Sources discharge two types of these suspended sediments: geological particles, which are derived from rock and soil, and biological particles such as planktons and other microscopic organisms.
- Bedload sediments are generally larger particles that are too heavy to be suspended in the water column. They are discharged by diffuse sources and are transported along the bed of the stream and range in size from fine clay particles to coarse material.

Timing. Sediment delivery to streams from diffuse sources is episodic and rainfall related. Metrics for sediment offsets are expressed as average load per year.

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

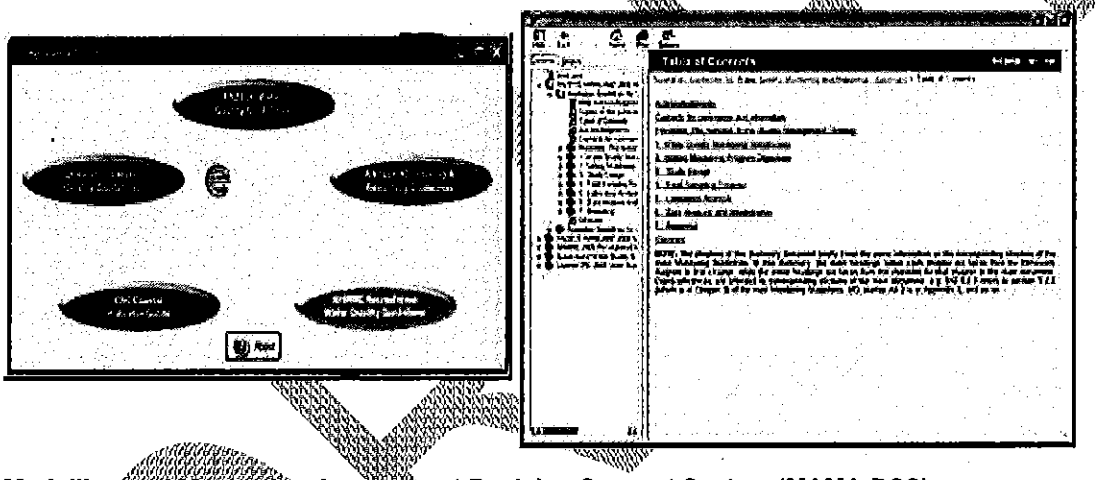
4. Science & Capacity Building

4.1 Decision Support Software

eGuides
eGuide is an electronic document which consists of a number of commonly referred to water quality guideline documents. The current version of eGuides contains the following documents.

- ANZECC/ARMCANZ 2000 Monitoring & Reporting Guidelines
- ANZECC/ARMCANZ 2000 Water Quality Guidelines
- NHMRC 2005 Recreational Guidelines
- Queensland Water Quality Guidelines
- Coastal CRC Users' Guide to Indicators for Monitoring

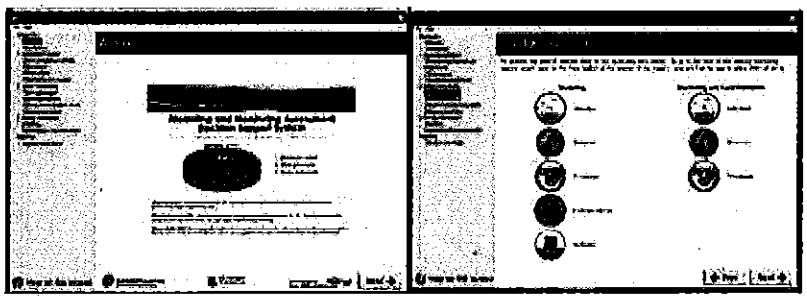
These documents have been compiled into a standard "HTML" version of Windows help systems (shown below) and can be installed in any personal computer for easy and quick access to information. Users can select the document that they would like to manually browse, or select the 'search' tab to search all the guides for some key words. The searched items can be viewed, copied to another document or printed out for later references. The beta version of this tool has been released and available on request from water.tools@epa.qld.gov.au.



Modelling and Monitoring Assessment Decision Support System (MAMA DSS)
The Modelling and Monitoring Assessment Decision Support System (MAMA DSS) is a decision support tool to help choose and review modelling and monitoring undertaken as part of Environmental Impact Assessments (EIAs). Decision-making about activities in the coastal zone is generally underpinned by information from monitoring and modelling. The DSS is designed to provide a process for choosing and reviewing assessment techniques considering the management objective, the potential pollutants from point or diffuse sources, the features of the environment and the relevant indicators, stressors, and processes.

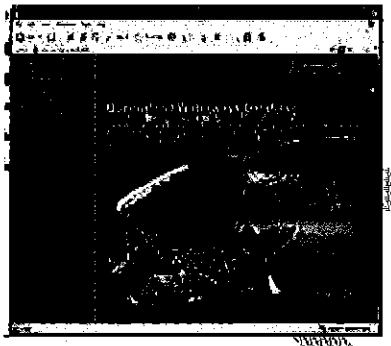
The DSS is supported by a help system containing information about water quality modelling approaches such as: biogeochemical modelling (also called process modelling), statistical modelling (also called non-process modelling), and monitoring and experimentation methods such as in-field monitoring, autosampling, remote sensing, and experimentation.

The MAMA DSS can be requested from water.tools@epa.qld.gov. Further information on the tool can be obtained from http://www.coastal.crc.org.au/3m/.



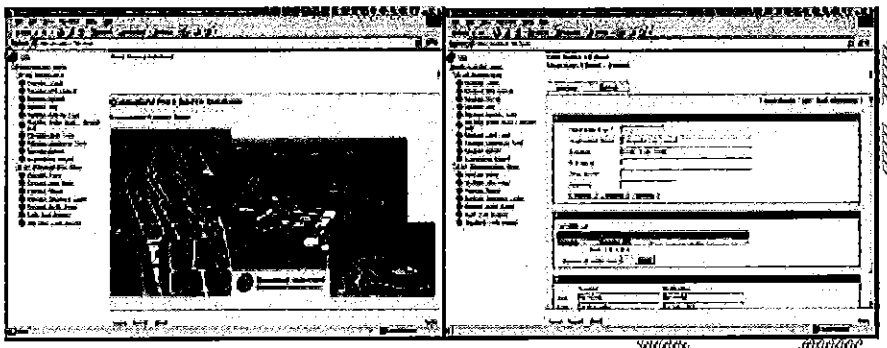
Queensland Waterways Database
The Queensland Waterways Database is a repository for all current and historical water quality monitoring data for Queensland waterways collected by the EPA. Approximately 350 sites across Queensland are monitored every month for a range of water quality indicators. Government agencies, research organisations and community groups use this information to assess the health of Queensland's waterways. Within the agency, water quality data is used in the production of reports, maps and models and to assist in compliance investigations, decision-making and planning.

Further information can be obtained by emailing water.data@epa.qld.gov.au or from http://www.epa.qld.gov.au/environmental_management/water/water_quality_monitoring



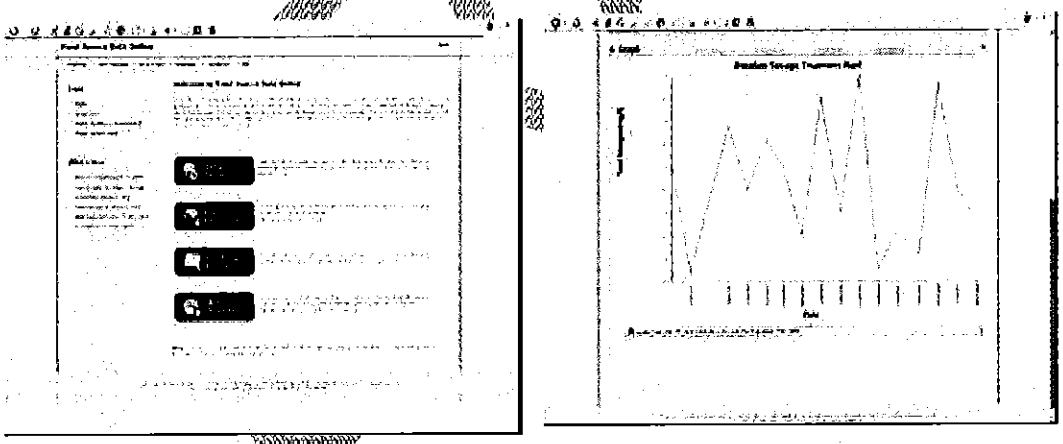
Point Source Database

Information on licensed discharges to water is monitored as part of licensees' permits issues by the EPA. The EPA's Point Source Database has been developed since 2003 and allows electronic submission, automated checking and storage of data. It is aimed to assist compliance and allow improved access to discharge information for a range of other uses. The database currently contains information on major sewage treatment plants in Queensland but will be extended in the future to all industries with licensed discharges. Further information on the database is provided in Appendix 1.



In addition to monitoring data, licence limits and discharge locations have been collated and are available to EPA staff via Ecomaps (http://mudlark.env.qld.gov.au/website/index.htm). Further information on how to access this layer of Ecomaps is provided in Attachment 2.

A further initiative is Point Source Data (PSD) Online which will provides access to up-to-date information on licensed discharges to waters in Queensland. The current application is a prototype and a beta version should be available EPA in mid 2008. PSD Online will provides access to raw data and graphed data contained in the EPA database. Other features include load estimation and links to discharge locations and licence limits in Ecomap. Instructions on how to use PSD Online will be provided.



Point source data is available to EPA staff, other organisations and the community on request from water.data@epa.qld.gov.au. Information on the database is available to the public from http://www.epa.qld.gov.au/environmental_management/water/water_quality_monitoring/reporting_of_licensed_discharges_to_waterways/.
For further information, email psd.help@epa.qld.gov.au or contact the Freshwater & Marine Sciences Group of the EPA.

Licensing Sewage Discharges Decision Support System (LSD DSS)

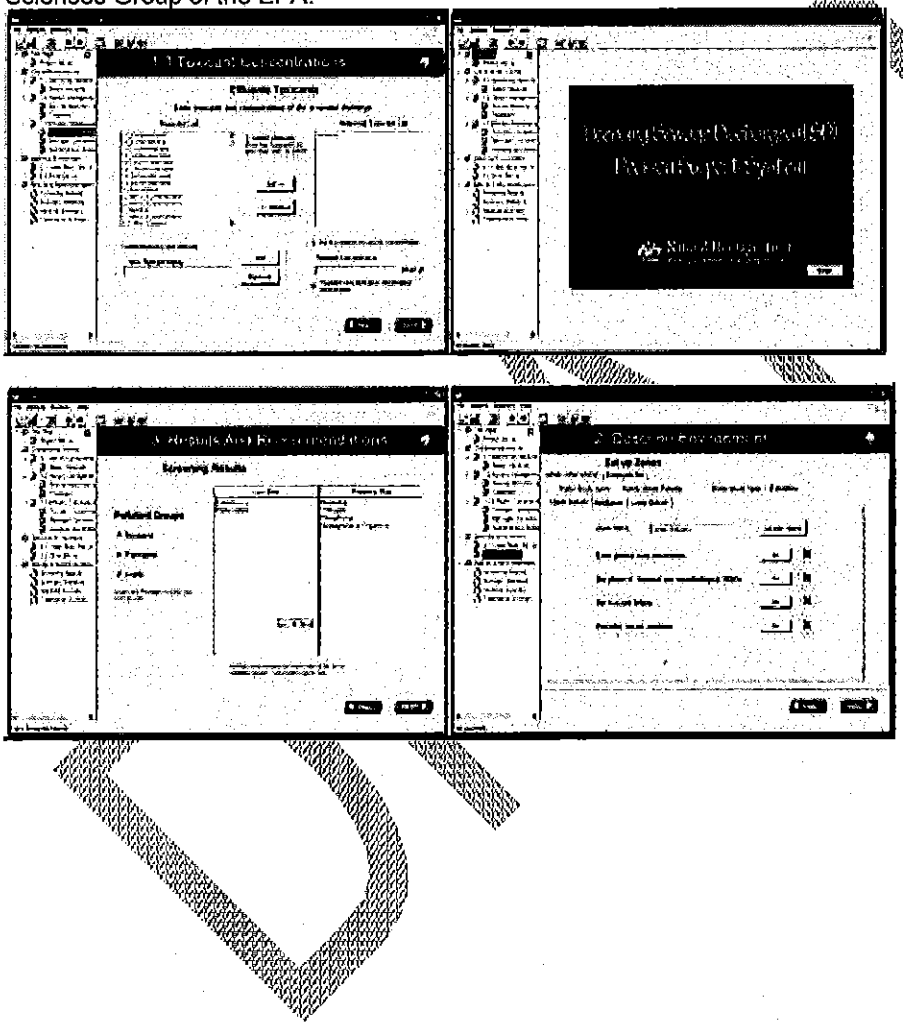
Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

The Licensing Sewage Discharges Decision Support System (LSD DSS) is a support tool for the assessment of the aquatic aspects of proposed discharges from sewage treatment plants. It has been designed to be used by licensing officers in the early stages of screening a licensed application. There is an associated help system that is fully searchable. It includes screen explanations and the knowledge bases on typical sewer pollutants, waste water treatment, risk assessment protocols and relevant water quality guidelines.

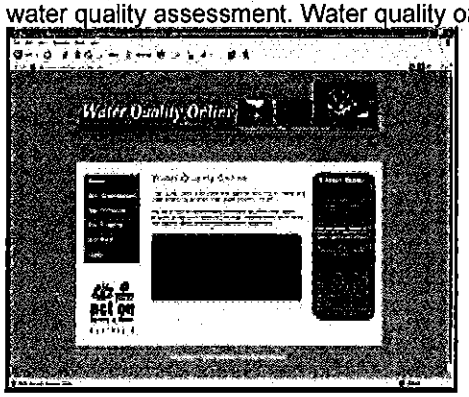
The DSS was originally developed by the Queensland Environmental Protection Agency in collaboration with the Environment Protection Authority Victoria and the NSW Department of Environment and Conservation. The latest beta version was produced in collaboration with the e-Water Cooperative Research Centre.

For further information about the DSS please contact water.tools@epa.qld.gov.au or the Freshwater & Marine Sciences Group of the EPA.



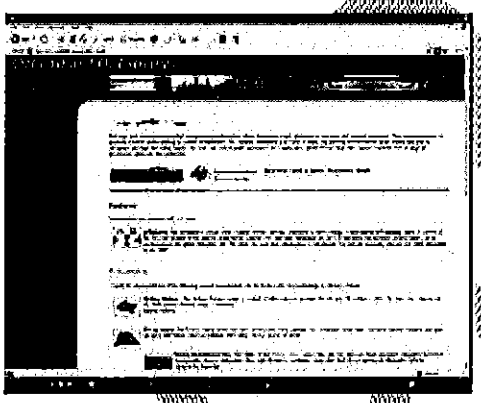
Water Quality Online Website

Water Quality Online is a website that contains information on water quality information and products developed as part of the National Action Plan for Salinity and Water Quality for regional managers in Queensland. It includes some of the tools discussed above in addition to a range of other tools that could assist water quality assessment. Water quality online is located at http://www.wqonline.info

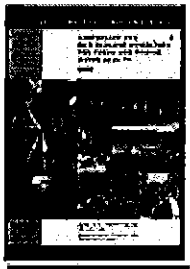


OzCoasts/OzEstuaries Website

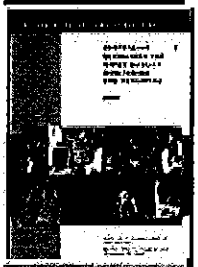
The OzCoast and OzEstuaries provides comprehensive information about Australia's coast, including its estuaries and coastal waterways. This information helps to generate a better understanding of coastal environments, the complex processes that occur in them, the potential environmental health issues and how to recognise and deal with these issues. It includes a database on estuaries, information on coastal indicators, geomorphology and geology, conceptual models, the simple estuary response model (SERM) plus more. It can be accessed at http://www.ozcoasts.org.au/.



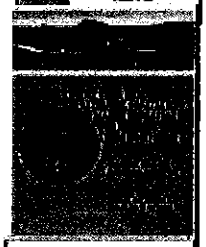
4.2 Relevant Water Quality Guidelines



ANZECC & ARMCANZ - Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000. These guidelines provide substantial information on the nationally agreed approaches and trigger values for the protection of fresh and marine water. The guidelines are available with eGuides described above or can be downloaded from http://www.environment.gov.au/water/publications/quality/ index.html#nwqmsguidelines

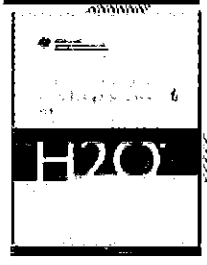


ANZECC & ARMCANZ - Australian Guidelines for Water Quality Monitoring and Reporting 2000. These national guidelines present useful information on water quality monitoring covering planning, designing, fieldsampling, laboratory analysis and reporting. The guidelines are available with eGuides described above or can be downloaded from http://www.environment.gov.au/water/publications/ quality/index.html#nwqmsguidelines



The Coastal CRC's User's Guide to Estuarine, Coastal and Marine Indicators for Regional NRM Monitoring, Coastal Zone CRC. These guidelines were designed to assist regional natural resource managers choose indicators when dealing with estuarine and marine environment. It provides substantial information on the stressors and indicators that could be applicable to these environments. The guidelines are available with eGuides described above or can be downloaded from http://www.coastal.crc.org.au/Publications/indicators.html

NHMRC Guidelines for Managing Risks in Recreational Waters, endorsed June 2005. These guidelines are the most recently published in Australia for the management of recreational waters. It covers of range of hazards including microbial contamination. It includes a new risk assessment approach including sanatory surveys and new indicators/classifications to assess risks from pathogens. The guidelines are available with eGuides described above or can be downloaded from http://www.nhmrc.gov.au/publications/synopses/eh38.htm.

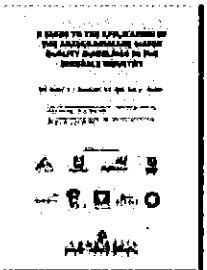


NHMRC Australian Drinking Water Guidelines 2006. The Australian Drinking Water Guidelines (the ADWG) are intended to provide a framework for good management of drinking water supplies. They are concerned with safety from a health point of view and with aesthetic quality. The guidelines are available from http://www.nhmrc.gov.au/publications/ synopses/eh19syn.htm.

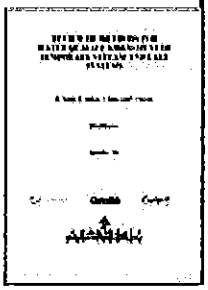
Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

Queensland Water Quality Guidelines, Queensland EPA, March 2006. These guidelines were developed to complement the ANZECC/ARMCANZ Freshwater and Marine Guidelines. It includes site specific trigger values for regions of Queensland based on monitoring data from relevant reference sites. The guidelines are available with eGuides described above or can be downloaded from http://www.epa.qld.gov.au/environmental_management/water/queensland_water_quality_guidelines/#gen0

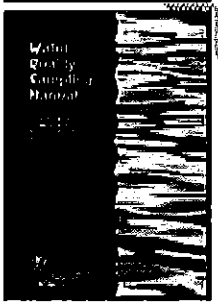


A guide to the application of the ANZECC/ARMCANZ Guidelines in the minerals industry, Australian Centre for Environmental Research (ACMER), September 2003. These guidelines provide advice on the application of the national guidelines to mining industry and includes relevant case studies. More information on obtaining this document is available at http://www.acmer.uq.edu.au/ publications/handbooks.html



Review of Methods for Water Quality Assessment for Temporary Stream and Lakes Systems, Australian Centre for Environmental Research (ACMER), September 2004. This document provides information on methods used to assess ephemeral streams. The document is available from http://www.acmer.uq.edu.au/research/attachments/FinalReportTempWatersSep20042.pdf

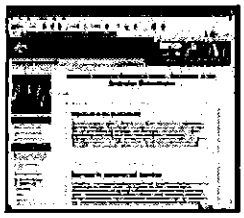
Licensing Discharges from Sewage Treatment Plants, Case Study No.2, EPA. This document provides an example of how EPA licensing officers may apply the agency's Procedural Guide for Licensing Discharges to Aquatic Environments. It involves a large sewage treatment plant which discharges to an estuary. It is available from the EPA's Ecostep system.



Water Quality Sampling Manual, EPA, 1999. This document is the third edition of the Queensland EPA's Water Quality Sampling Manual. It is for used in deciding 'protocols' under section 10 of the Queensland Environmental Protection (Water) Policy 1997 (subordinate legislation 1997 No. 136). It can be obtained from http://www.epa.qld.gov.au/environmental_management/water/water_quality_monitoring/publications/

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service



National Chemical Reference Guide - Standards in the Australian Environment. This is an Australian Government website that provides you with standards for chemicals such as in foods. It is found at http:// hermes.erin.gov.au/pls/crg_public/!CRG_OWNER.CRGPPUBLIC.pStart

4.3 Water Quality Advice & Technical Services

The Freshwater & Marine Sciences Group of the EPA provides services to internal EPA clients on request (see electronic form on requesting services). These services include general advice, review of documents, modelling, field investigations and monitoring services and will typically cover only water quality aspects of a project. In requesting services, you need to clearly state the objective of the project or the problem to be solved staff. Additional documents should be sent via email or post.

The general turn-around time for reviews of EIS/IAS or similar major documents is 10 working days. However, the time required to complete any particular project will depend on the scope of the work and the available staff resources within the group at the time of the request. In general, the Freshwater & Marine Sciences Group will provide staff time on an in-kind basis, subject to director's approval. The requestor should cover any additional project costs, such as analysis costs and airfares.

Contacts for the Freshwater & Marine Sciences Group
Email: [redacted]
Phone
Postal: Indooroopilly Sciences Centre
EPA (Botany Building)
80 Meiers Road, Indooroopilly
Brisbane, QLD, 4068

Attachment1 to Section 4

The Point Source Database Information Guide for EPA Staff
October 2007
Version 3.0

Overview

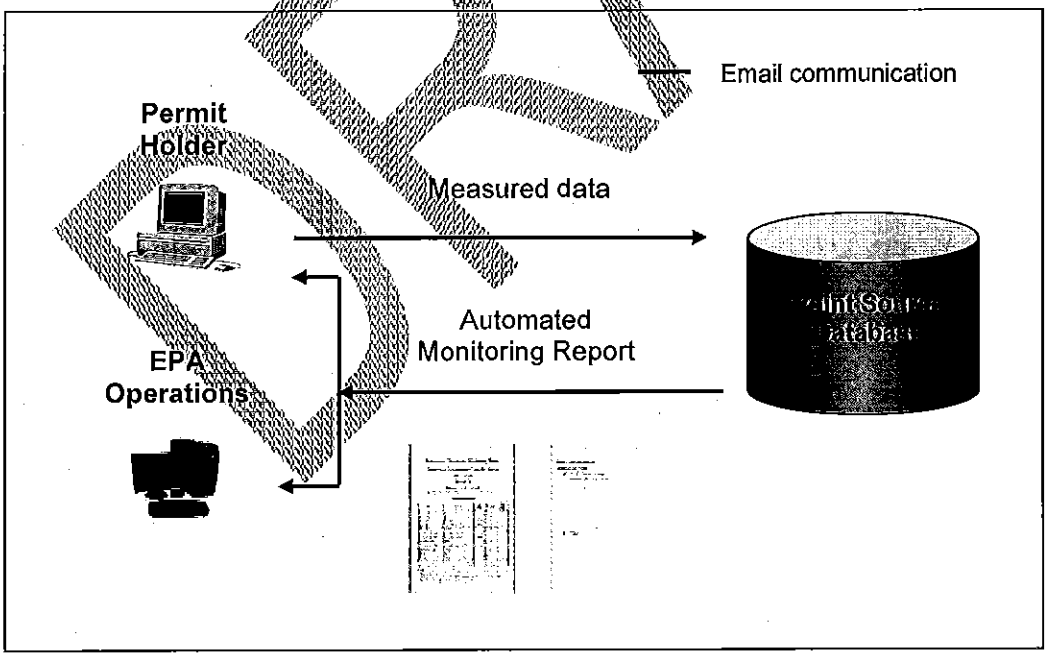
The Point Source Database (PSD) was designed and developed by the EPA to hold monitoring data for discharges to water required under EPA development permits for environmentally relevant activities (ERA's). It allows electronic submission of data and undertakes automated checks of the data against compliance limits. The submitted data can be viewed graphically by EPA staff while discharge locations and limits can be viewed using Ecomaps.

Benefits

The purpose of the PSD is to support compliance although it is not designed to replace notification requirements for non-compliance and incidents as prescribed in development permits. The database will also reduce the time taken by both EPA staff and registered operators in dealing with data requests and improve EPA decisions and projects through providing more complete and up-to-date information. Reporting of point source releases through mechanisms such as State of Environment Reporting, National Pollution Inventory and the Southeast Queensland's Ecosystem Health Report Card will be improved.

For registered operators submitting electronic data to the EPA, the requirement for this data and the related analysis to be submitted with the permit holder's annual return will be waived.

Electronic Submission and Reporting

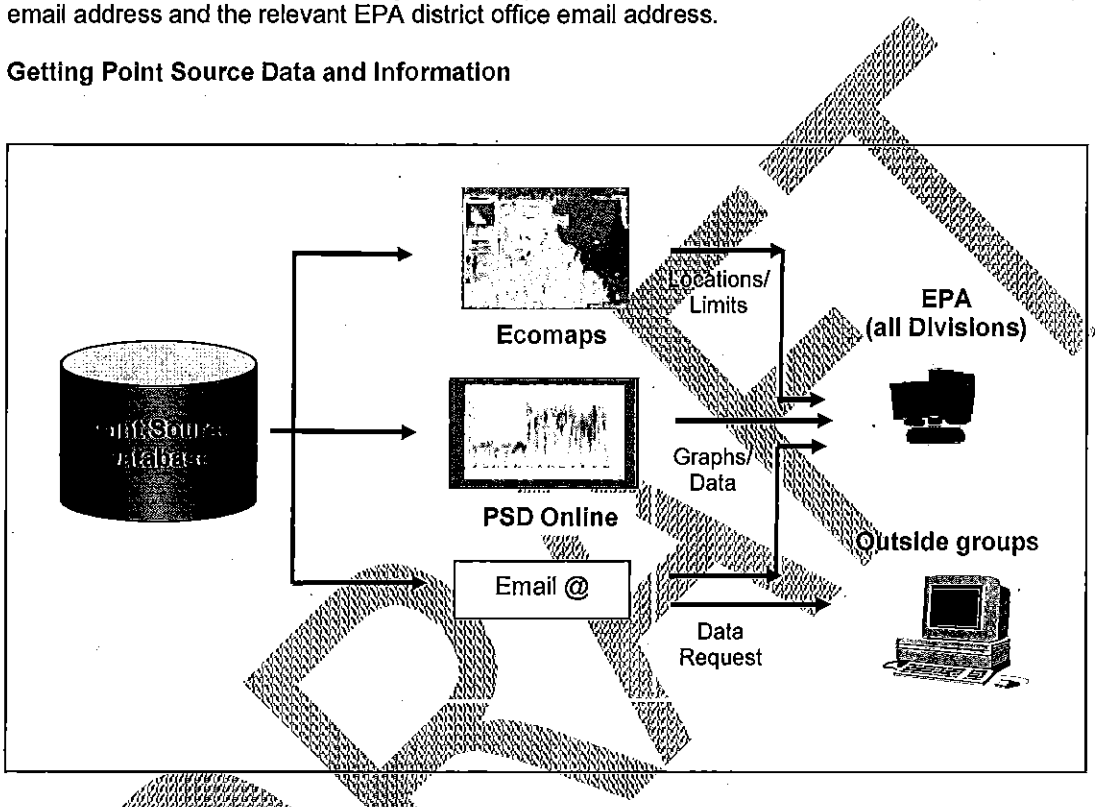


Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

The PSD requires registered operators to prepare a text file of measured data using a specific Excel template and attached this file to an email which is sent to the database. For registered operators of sewage treatment plants, this is currently at least every three months. The email is then received by the database and the file is firstly checked, and if in a correct format, imported into the database. The database then compares the submitted measured data to permits limits that are stored in the database and an automated monitoring report is produced. This provides a summary of results for each permit limit of the release as well as more detailed information on any exceedences – see Automated Monitoring Report for more information. The automated monitoring report is then sent, along with a copy of the submitted data, via email to the specified permit holder's email address and the relevant EPA district office email address.

Getting Point Source Data and Information



Information will be available to EPA staff via Ecomaps, an internal website called Point Source Data Online or on request. The Ecomaps layers contain information on each the facilities, discharge locations and discharge limits. Point Source Data Online will provide direct access to most recent and historical data received by the database either as raw data or through viewing measured data via graphs. The data can be compared directly to permit limits and saved as an Excel file. Point Source Data Online also provides a facility to estimate pollutant loads for each facility based on submitted data. Guidance on accessing the ecomaps layer is provided in Appendix 2 (coming soon for Point Source Data Online). Requests for data or limits/locations can also be made to the Environmental Sciences Division – see contact details below.

External organisations do not have direct access to measured data, graphs, permit limits or discharge locations. However, the Environmental Sciences Division will respond to all reasonable data requests received in writing by an organisation or individual from government, universities, private industry or the general public. Data will generally be provided to partner organisations (those contributing to EPA monitoring programs) free of charge. The EPA will reserve the right to charge a nominal fee for services for any other data request.

Requests for data can also be made from Freshwater & Marine Sciences Group via email [redacted]. The GIS layer of locations and limits can be requested from the Environmental Information Systems Unit via email [redacted].

Implementation Overview

The PSD has currently been implemented for all sewage treatment plants greater than 10,000 equivalent persons (ERA 15 (e), (f) and (g) under Schedule 1 of the *Environmental Protection Regulation 1998*) that involve a direct discharge to waters. Historical data for these discharges has been collected, in most cases back to the year 2000. Electronic submission of quarterly data commenced for these discharges in 2007.

The PSD has been initially set up to collect information on direct releases to water. However, flow measurements of "recycled water" leaving the registered operators premises are also being collected for sewage treatment plants. At this stage, flows or quality of waters release to land covered under the permits are not collected or checked against permit limits, although this may be implemented in the future.

The next phase of the implementation will target major industry and the remaining sewage treatment plants, firstly in South East Queensland (SEQ) and then the remainder of Queensland. Some historical data for major industry in SEQ has already been collected.

Guidance to Registered operators

Registered operators participating in electronic submission of data will generally have received a Point Source Database Implementation Manual and attended an information session run by the EPA. The following information is generally provided to the registered operator prior to submission.

The EPA will request participation from a registered operator in writing to submit their data electronically. The registered operator should notify the EPA in writing if they wish to participate. The EPA should also be notified in writing if the registered operator no longer wishes to submit electronic data to the EPA. In this case, reporting and data analysis is required as part of the licensees' annual return and data will need to be provided to the EPA on request. All correspondence with registered operators should be available on the relevant EPA files.

In preparing for electronic submission, the EPA will request the permit holder to provide historical data (preferably back to the year 2000) in an electronic format to the EPA. The data does not need to be in any specific format and existing Excel spreadsheets will suffice as long as they can be easily interpreted. The EPA will then import this data manually into the database. Automated checking of this data against permit limits is not usually undertaken. The data can then be used for data requests and to provide a previous history for assessment of long term limits that are usually up to 12 months when the first automatic submission is received.

Submission of electronic data to the EPA should be done using the templates provided by the EPA for the permit holder's specific plant or based on the EPA's electronic submission guide (available from [redacted]. The [redacted] should be attached to an email as a .CSV file (comma delimited text file) and sent to [redacted]. For large point source emitters, data should be submitted to the EPA on no less than a quarterly basis and coincide with the end of the financial and calendar years. Data should be submitted for whole calendar months. Data submission will become due one calendar month after the end of the yearly quarter. The EPA will provide an email reminder to each licensee at this time. Data is to be submitted within thirty days of becoming due.

The provision of correct and accurate data is the sole responsibility of the permit holder and should be undertaken as set out in the development permit/s. The EPA will not be held responsible for submission of incorrect data. If incorrect data has been submitted, please contact the database manager on [redacted]

The licensee should provide the EPA with a single generic email address so that all electronic correspondence in relation to the Point Source Database can be emailed to this address. It is the responsibility of the licensee to manage this email address and notify the EPA of any changes.

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

Registered operators who submit monitoring data required under their development permit/s for the release to water are not required to submit this data or any related analysis with their annual return. However, submission of data to the Point Source Database does not remove an organization's obligation to report non-compliances and incidents as prescribed by their development permit/s.

New Permits or Change to Permit Limits

The PSD contains permit limits for every licensed discharge to water contained in the database. It is essential that these permits limits are kept up-to-date as they are used for automated checking against submitted data. The permit limits are also displayed in Ecomaps, which is currently updated periodically.

Project Managers in the Environmental Operations Division are responsible for notifying the PSD administrators of any new development permits involving a discharge to waters and of any amendments to existing discharge quality limits on a development permit. This is required to be completed prior to submission to the Delegate and the process is included in the standard template "Assessment Report – Environmentally Relevant Activities". If a new permit involving a discharge to waters has been approved and is not currently in the PSD, please contact the Freshwater & Marine Science (email [redacted]. If you become aware that the permit limits in the database, either from automated monitoring reports or from the layer in Ecomaps, also please contact Freshwater & Marine Sciences.

The PSD current holds information for all permits or amended permits but does not include details of Environmental Management Programs (EMPs). Please notify Freshwater & Marine Sciences if an EMP exists for a permit involved in electronic submission.

Automated Monitoring Report

The EPA will produce an automated monitoring report (see attached sample) when new monitoring data is received from registered operators. A copy of the automated monitoring report and the data submitted will be sent to the relevant EPA Environmental Operations office and to the registered operator. Limit exceeded events are highlighted in the report and correspond to when the monitoring data provided exceeds permit limits. These are provided as a guide but should not be used as the primary basis for non-compliance.

The automated monitoring report is produced for each discharge plant/monitoring point. The report shows the date of submission, a unique return ID allocated by the database, the date period for which the new data have been submitted and the plant/discharge point name. A summary of results is provided in a tabular form with each line corresponding to a different indicator and limit type set out in the relevant permit. The indicators column shows the indicator name and units. The limit type column shows a range of limit types including maximum, range (maximum and minimum), loads, medians and a combination of short-term and long-term percentiles. For medians and percentiles, the limit period over which the limit is applied is shown in the next column and can include numbers of days, weeks or months. The frequency of sampling is not specifically tested by the database. However, the number of data points submitted to the database are counted and presented in the summary report. This allows the reader to scan the column and for those indicators taken at the sample frequency, the number of data points should be the same. Note there are typically more flow data points (typically measured daily) than water quality concentrations.

More detailed information on limit exceedences is provided in the automated monitoring report after the summary table. For each indicator/limit type combination, information is presented on the limit values and the date and values of any exceedences. The time period and samples required for the limit are also shown for medians and percentile limit types.

If the automated monitoring report contains exceedences, it is important to note that this may not be because of non-compliance. The limits in the monitoring report should be checked against current known limits. The limits may not be up-to-date or there may be an Environmental Management Program (EMP) in place allowing higher discharge levels. The data should also be checked. The raw data is provided with the automated monitoring report. Alternatively, data can be obtained or visualised using Point Source Data Online which allows direct

comparison against limits. It should be noted incorrect data can be submitted to the database and that the database and online tool may not correctly represent the limit calculations as set out in development permits. Therefore, even if the limits and exceedence appear correct, it is strongly recommended that the registered operator are contacted and provided an opportunity to confirm that the data and the limit exceeded events are correct. The limit exceeded events can also be checked against the non-compliances already notified to the EPA. If the limit exceeded events have not been reported, the registered operators should again be contacted. Based on the response from the registered operators, further actions may be required by the EPA.

Further Information

The Point Source Database is a joint initiative Environmental Sciences and Environmental Operations Divisions. For further information please contact Freshwater & Marine Sciences or [redacted] or [redacted]

Sample Automated Monitoring Report

Automated Discharge Monitoring Report

Queensland Environmental Protection Agency

Date: 06/08/2007

Return Id: 845

Data Period: 01/04/2007 - 29/06/2007

Discharge Point: Coombabah / GCCCRP2

[redacted]

Summary Results

Indicator	Limit Type	Limit Period	Data Points in Period	Limit Exceeded Events
BOD 5 (mg/l)	80th percentile (short-term)	5 Weeks	13	0
BOD 5 (mg/l)	90th percentile (long-term)	12 Months	13	0
BOD 5 (mg/l)	maximum		13	0
D.O. (mg/l)	minimum		13	0
Suspended Solids (mg/l)	maximum		13	0
Suspended Solids (mg/l)	80th percentile (short-term)	5 Weeks	13	0
Suspended Solids (mg/l)	90th percentile (long-term)	12 Months	13	0
Faecal Coliforms (CFU/100ml)	80th percentile (1 day)	1 Days	13	0
Faecal Coliforms (CFU/100ml)	median (1 day)	1 Days	13	0
Free Residual Chlorine (mg/L)	maximum		13	0
pH (Unit)	range		13	0
Total Phosphorus (mg/l)	maximum		13	2
Total Nitrogen (mg/l)	maximum		13	0
Total Nitrogen (mg/l)	50th percentile (long-term)	12 Months	13	0
N-NH3 (mg/l)	no limit		N/A	N/A
Total Nitrogen (mg/l)	Annual Load		13	0

Disclaimer

- It is the responsibility of the licensee to ensure samples are taken in accordance with their permit. Refer to permit for more information on limits.
- Although all care has been taken in the development of this report, the results may be incorrect and do not necessarily constitute compliance or non-compliance.
- This report does not constitute notification to EPA of any non-compliance.

Indicator	Limit Type	Limit Period	Data Points in Period	Limit Exceeded Events
Total Phosphorus (mg/l)	Annual Load		13	0
Flow (L)	maximum (dry day)		51	0
Flow (L)	maximum (wet day)		39	0

Details of Limit Exceedence

BOD 5 (mg/l), 80th percentile (short-term)
Lower/upper limit: < 15
Time period for limit application: 5 Weeks
Samples required in time period: 5
Date of exceedence (result):
Nil.

BOD 5 (mg/l), 90th percentile (long-term)
Lower/upper limit: < 10
Time period for limit application: 12 Months
Samples required in time period: 52
Date of exceedence (result):
Nil.

BOD 5 (mg/l), maximum
Lower/upper limit: < 30
Date of exceedence (result):
Nil.

D.O. (mg/l), minimum
Lower/upper limit: > 4
Date of exceedence (result):
Nil.

Suspended Solids (mg/l), maximum
Lower/upper limit: < 45
Date of exceedence (result):
Nil.

Attachment 2 to Section 4

Point Source Database – New Ecomaps Layers
Version 1.0

Introduction

Two new layers relating to point source discharges have been added to Ecomaps. The two layers are (i) Point source discharge plants and (ii) Point source discharges. They currently contain similar metadata information but have been included as the locations of the plants and the discharges are usually different. The layers shows the location of point source discharges/plants and a description of each including the plant name, ecotrack number, permit reference, Environmentally Relevant Activity (ERA) type, licensee, location details. There is also a link to permit limit details that are the indicators and numerical limits placed on each of those limits in the relevant permit.

This document provides instruction on how to access these layers on Ecomaps that is located at: http://mudlark.env.qld.gov.au/website/index.htm

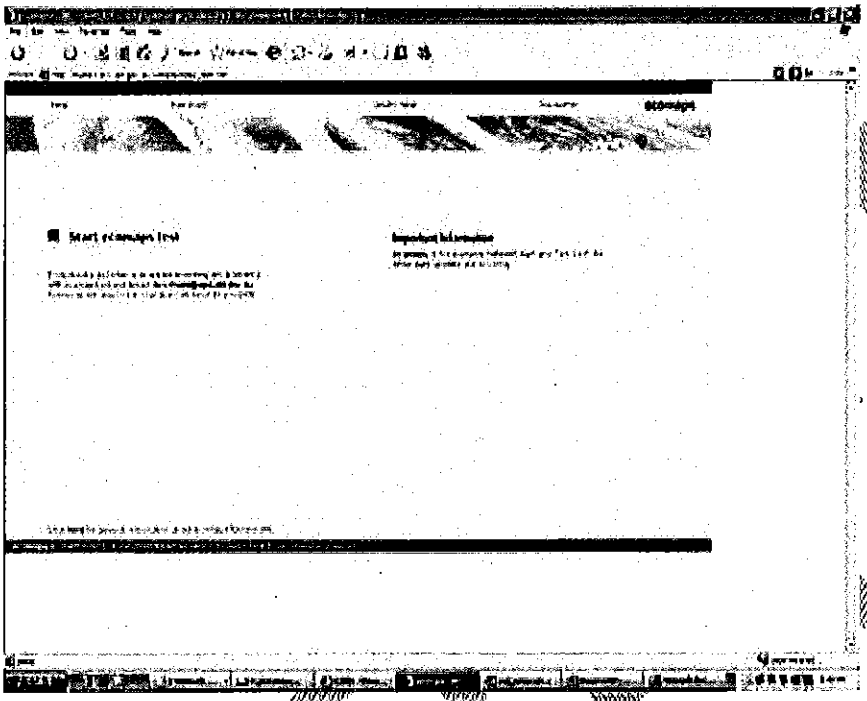
Although all care has been taken with the compilation of the data, please note that the information presented in this layer may contain errors or not be up-to-date. In terms of permit limits, Environmental Management Plans or other statutory mechanisms may be in place that are not recorded on these layers. Please contact the relevant Environmental Operations Office for the most recent information.

The Point Source Database is a joint initiative Environmental Sciences and Environmental Operations Divisions. For further information or feedback, please contact Freshwater & Marine Sciences on [redacted] or [redacted]

Instructions

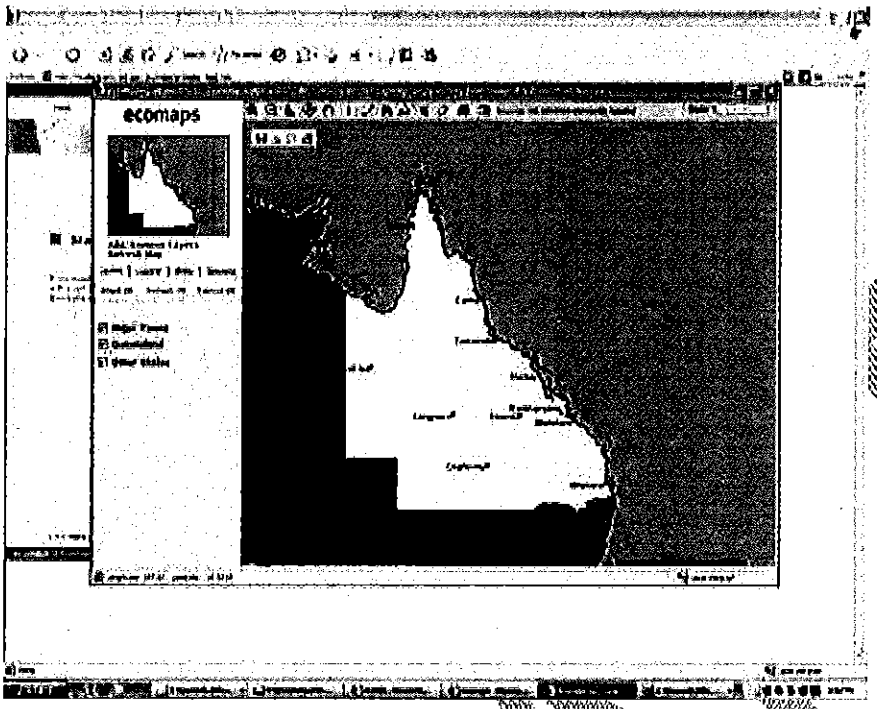
Step 1 – Start Ecomaps using the link and click on Start "ecomaps test"

http://mudlark.env.qld.gov.au/website/index.htm

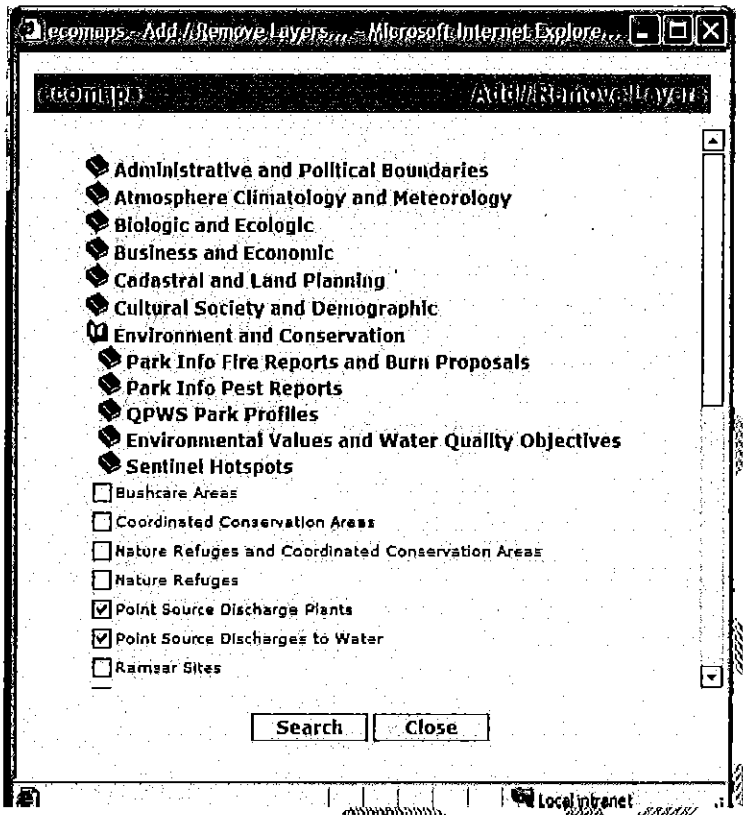


Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

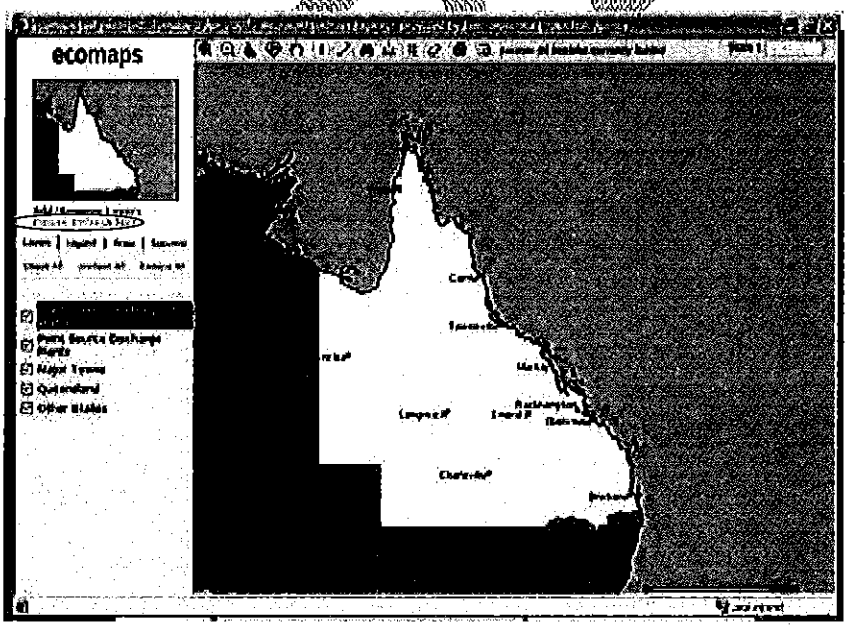
Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service



Step 2 – Click on Add/Remove Layers and choose Environment and Conservation. You can click the two boxes related to Point Sources and then Close



Step 3 – Check both boxes on the main screen and then Refresh Map



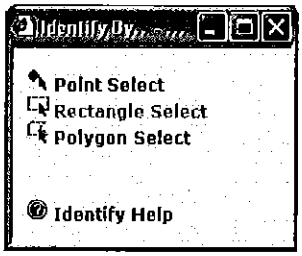
Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

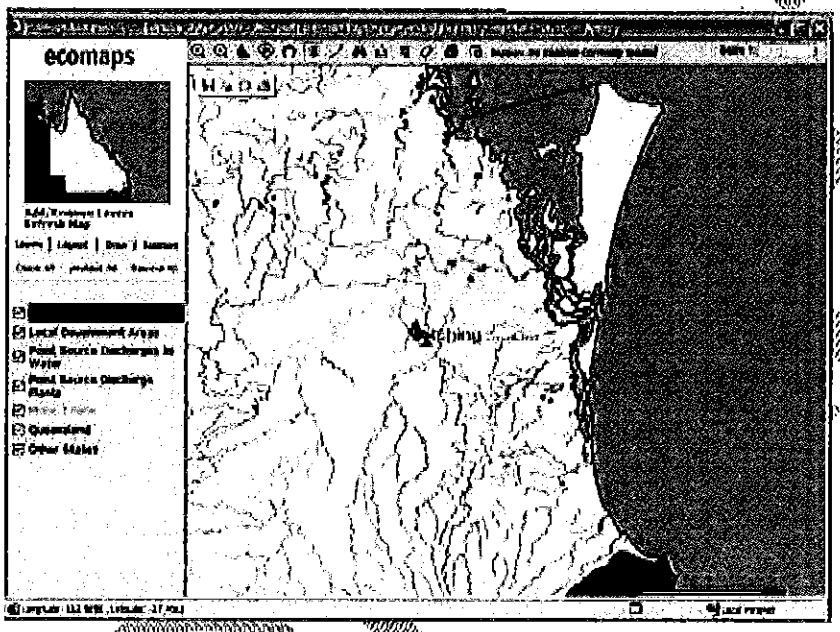
Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

Step 4 – Add any other layers you want such as local government boundaries, rivers etc. and then Refresh Map

Step 5 – Zoom into some area of choice using the magnifying glass symbol

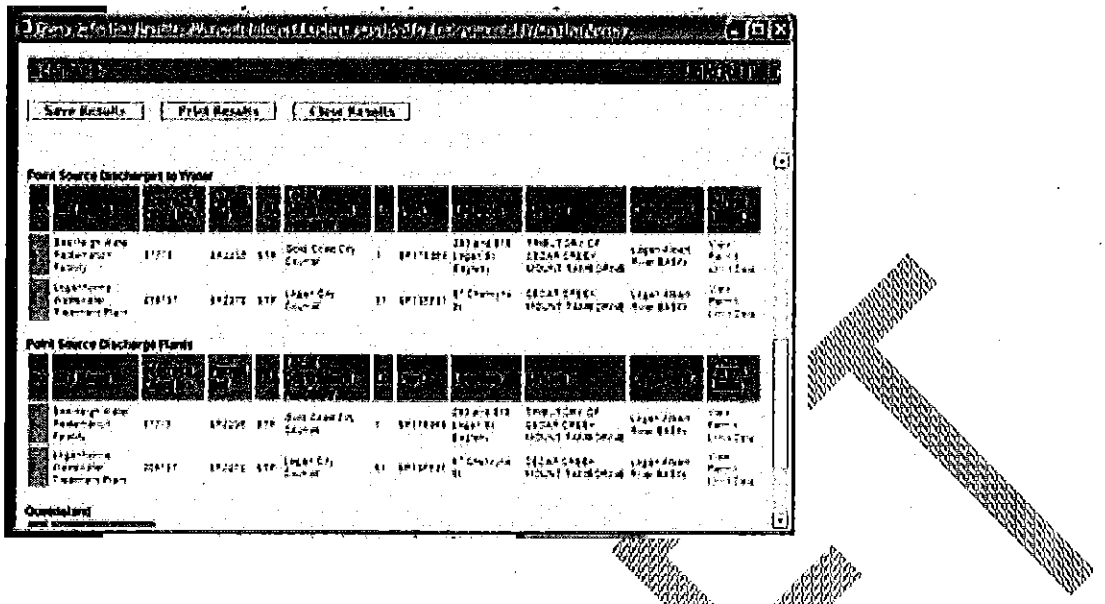
Step 6 – Click on i symbol and then choose Rectangle Select and select an area



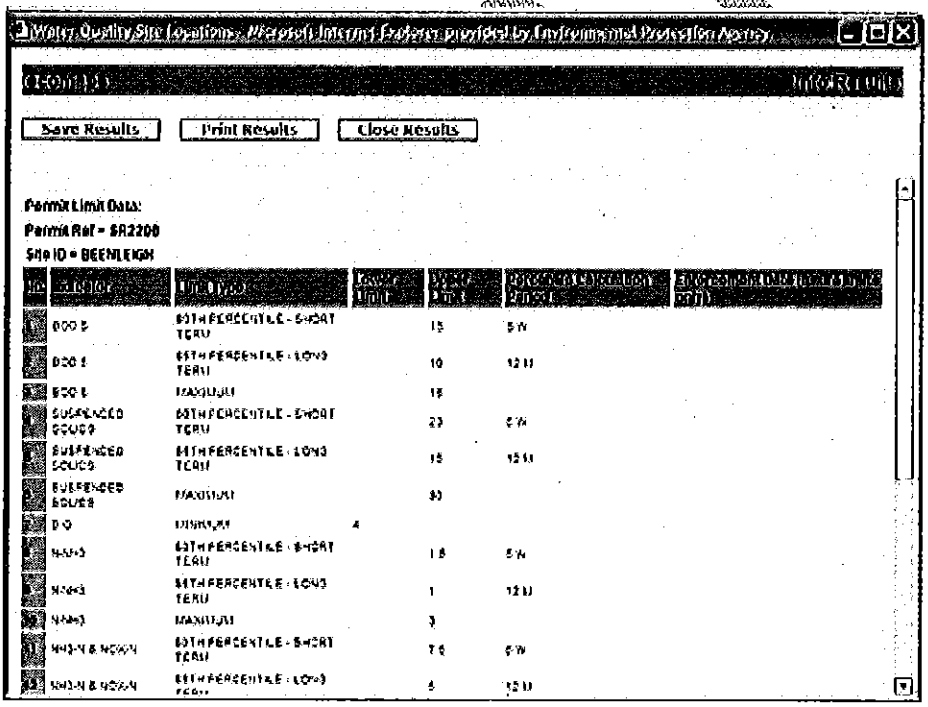


Scroll down till you see the point source information:

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786



Step 7 – Click on View Permit Limit Data for your Plant/Discharge of choice:



5. Direct Toxicity Assessment

This Section provides 'stand alone' information in considering a requirement for direct toxicity assessment. It also informs Section 2.3 of the Operational Policy.

5.1 Introduction

This section of the *Procedural Guide* has been prepared by the Freshwater & Marine Sciences Unit (Environmental Sciences Division) for staff of the Environmental Protection Agency involved with regulating wastewater discharges to aquatic receiving environments.

The following subsections outline what assistance this document can provide for EPA staff contemplating the need to request or impose Direct Toxicity Assessment of an existing or proposed effluent discharge and what information would be required to make an informed decision. The following sections in the *Procedural Guide* will detail the specific effluent quality data required to determine whether or not there is a significant risk of toxic effects and therefore whether one-off, event-based or routine assessment for the toxic potential of the effluent is required. This assessment is referred to as a Direct Toxicity Assessment.

It should be noted that a Direct Toxicity Assessment (DTA) is also widely known as Whole Effluent Toxicity (WET) tests and both refer to an experimental procedure aimed at quantifying the potential toxicity of a sample of effluent through exposing a range of test specimens to that effluent. To remain consistent with the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC & ARMCANZ 2000), only the term DTA will be used hereafter.

This Document (the Procedural Guide/Policy)

This *Procedural Guide* will assist EPA officers who have reason to believe (or suspect) that:

- an effluent may have the potential of exhibiting toxic effects in aquatic biota, and consequently
- need to decide whether or not a DTA of the effluent is warranted.

A new Development Application (DA) or Amendment to an existing DA should contain detailed information that characterises the effluent and the receiving aquatic environment.

Information Submitted by the Proponent

The information provided in an Environmental Impact Assessment (EIA), Environmental Impact Statement (EIS), or other equivalent document, will form the basis of the assessment to determine whether or not there is a significant risk of toxic effects being caused by the effluent. If the required effluent quality data has not been presented in EIA/EIS then the priority would be to obtain it via a Request for Further Information (RFI).

In most cases however, the EIA/EIS should already contain detailed information that:

- identifies and quantifies the actual (or expected) effluent water quality characteristics;
- discusses whether or not the contaminants in the effluent comply with local Water Quality Objectives (WQOs) and preserve the Environmental Values (EVs) attributed to the specific receiving waters, and
- describes the effluent quality criteria in comparison to *Toxicity Trigger Values* (TTVs) presented in (ANZECC & ARMCANZ 2000) or alternate equivalent guideline.

5.2 Warranting Direct Toxicity Assessment

Performing a DTA usually involves initiating a series of laboratory-based toxicological bioassays that are designed to determine whether or not the effluent is toxic to any of a range of aquatic biota. The DTA of an effluent is both a time-consuming undertaking (at least several weeks) and expensive; hence for a DTA to be warranted there needs to be one or more issues of concern regarding some aspect of the:

- toxicant concentrations;
- discharge characteristics, and

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

- aquatic receiving environment.

Each of these aspects of an effluent is addressed below individually, however it must be pointed out that these are by no means separate issues; they are interrelated. An obvious example would be that a salinity concentration of 20 parts per thousand (ppt) would not be considered a toxicant in an estuarine or marine environment, but would be in a freshwater environment.

Toxicant Concentrations

The primary reason for warranting a DTA of an effluent relates directly to the expected or observed concentrations of potential toxicants. There is a need for a DTA of the effluent to be performed when:

- one or more toxicant concentrations in the effluent are shown to exceed the TTVs at the appropriate *Percentage Level of Species Protection* (refer to Section 3.4).

Additionally, a requirement to have a DTA conducted should also be considered when there is a notable lack of measured effluent quality data, such as when the effluent quality data are:

- incomplete;
- based only on:
  - medians, means or 50th percentiles;
  - non-validated modelling outputs, or
  - best available estimations;
- relevant only for a short monitoring period and the quality of the effluent is:
  - likely to experience significant process-based fluctuations, or is
  - seasonally variable and the toxicant data is not representative of seasonality.

Characterising the effluent

In order to determine whether the effluent poses a significant toxicological risk in the receiving environment, the first step is to review the quality characteristics of the effluent. Toxicity or environmental harm could be caused by one or more of the following characteristics:

- physicochemical variables;
- known toxicants; and
- unknown toxicants.

Each of these aspects of an effluent is addressed individually below.

Physicochemical Variables

Although physicochemical variables are not toxicants per se, they may still cause harm to aquatic biota when they occur outside of a certain range or beyond certain limits. The main physicochemical variables that need to be considered when determining if a DTA is warranted are:

- pH (note that ammonia toxicity varies with pH; refer to ANZECC & ARMCANZ 2000);
- temperature;
- dissolved oxygen (DO) concentration/saturation, and
- conductivity/salinity/total dissolved salts
- hardness/total dissolved solids (TDS).

The acceptable ranges or limits for these water quality characteristics can be available for specific water bodies, climatic regions, aquatic environment types, or catchments, and can be available in either State or National publications, or by the private sector (i.e. generated by environmental consultants). Physicochemical variables are generally part of the WQOs and for Queensland, those can be found in the *Queensland Water Quality Guidelines* (QLD EPA 2006).

Known Toxicants

Known toxicants are toxicants that are known to be have the potential to harm the health of aquatic receiving environments and are therefore frequently analyses via chemical analysis. The following categories contain the

names of known toxicants that should be considered when characterising an effluent and where appropriate, example ANZECC & ARMCANZ (2000) TTVs are presented.

Metals & Metalloids

A more complete list of metals and metalloids with the potential to cause toxic effects in aquatic biota is presented in Table 3.4.1 of the ANZECC & ARMCANZ (2000). The most commonly encountered metals and metalloids of concern have been reproduced below (Table 1) for the reader's convenience.

Table 1. **Excerpt from Table 3.4.1 in ANZECC 2000 – Toxicity Trigger Values for most Metals & Metalloids at alternative levels of protection.**

Values in grey shading are the trigger values applying to typical *slightly-to-moderately* disturbed systems.

Chemical	Toxicity Trigger Values for Freshwater (µg/L)				Toxicity Trigger Values for Marine Water (µg/L)			
	Level of Protection (% species)				Level of Protection (% species)			
	99%	95%	90%	80%	99%	95%	90%	80%
Metals & Metalloids								
Aluminium pH >6.5	27	55	80	150	ID	ID	ID	ID
Aluminium pH <6.5	ID	ID	ID	ID	ID	ID	ID	ID
Arsenic (As III)	1	24	94[C]	360[C]	ID	ID	ID	ID
Arsenic (As V)	0.8	13	42	140[C]	ID	ID	ID	ID
Boron	90	370[C]	680[C]	1300[C]	ID	ID	ID	ID
Cadmium	0.06	0.2	0.4	0.8[C]	0.7[B]	5.5[B,C]	14[B,C]	36[B,A]
Chromium (Cr III)	ID	ID	ID	ID	8*	27*	50*	90*
Chromium (Cr VI)	0.01	1.0[C]	6[A]	40[A]	0.14	4.4	20[C]	85[C]
Cobalt	ID	ID	ID	ID	0.005	1	14	150[C]
Copper	1.0	1.4	1.8[C]	2.5[C]	0.3	1.3	3[C]	8[A]
Lead	1.0	3.4	5.6	9.4[C]	2.2	4.4	6.6[C]	12[C]
Mercury (inorganic)	0.06	0.6	1.9[C]	5.4[A]	0.1	0.4[C]	0.7[C]	1.4[C]
Mercury (methyl)	ID	ID	ID	ID	ID	ID	ID	ID
Nickel	8	11	13	17[C]	7	70[C]	200[A]	560[A]
Selenium (Total)	5	11	18	34	ID	ID	ID	ID
Silver	0.02	0.05	0.1	0.2[C]	0.8	1.4	1.8	2.6[C]
Zinc	2.4	8.0[C]	15[C]	31[C]	7	15[C]	23[C]	43[C]

* These figures are provided in the errata for the ANZECC & ARMCANZ (2000) Guidelines (http://www.mincos.gov.au/pdf/anz_water_quality/qfmwq-guidelines-vol1-errata.pdf)

A Figure may not protect key test species from acute (and chronic) toxicity – see Table 3.4.1 in ANZECC & ARMCANZ (2000) for more information.

B Chemicals for which possible bioaccumulation and secondary poisoning effects should be considered – see Table 3.4.1 in ANZECC & ARMCANZ (2000) for more information.

C Figure may not protect key test species from chronic toxicity – see Table 3.4.1 in ANZECC & ARMCANZ (2000) for more information.

H The figure has been calculated for a Hardness of 30 mg/L $CaCO_3$ and should be adjusted for site specific hardness – see Table 3.4.1 in ANZECC & ARMCANZ (2000) for more information.

ID Insufficient data to derive a trigger value – see Table 3.4.1 in ANZECC & ARMCANZ (2000) for more information.

Non-metallic Inorganics

Table 2 is a complete listing of non-metallic inorganic toxicants as per Table 3.4.1 of the ANZECC & ARMCANZ (2000).

Table 2. **Excerpt from Table 3.4.1 in ANZECC 2000 – Toxicity Trigger Values for Non-metallic Inorganics at alternative levels of protection.**

Values in grey shading are the trigger values applying to typical *slightly-to-moderately* disturbed systems.

Chemical	Toxicity Trigger Values for Freshwater (µg/L)				Toxicity Trigger Values for Marine Water (µg/L)			
	Level of Protection (% species)				Level of Protection (% species)			
	99%	95%	90%	80%	99%	95%	90%	80%
Non-metallic Inorganics								
Ammonia	320	900[C]	1430[C]	2300[A]	500	910	1200	1700
Chlorine	0.4	3	6[A]	13[A]	ID	ID	ID	ID
Cyanide	4	7	11	18	2	4	7	14
Nitrate*	4900	7200	8700[C]	12000[A]	ID	ID	ID	ID
Hydrogen Sulfide	0.5	1.0	1.5	2.6	ID	ID	ID	ID

* The TTVs for nitrate are officially under review (refer to ANZECC & ARMCANZ (2000) errata), however the values provided here have been recalculated by prominent Australian toxicologists involved in the writing of the Guideline and are therefore likely to be adopted.
A, B, C, H, ID – Refer to the footnotes to Table 1.
D Ammonia as total ammonia [NH_3-H] at pH 8 – see Table 3.4.1 in ANZECC & ARMCANZ (2000) for more information.
E Chlorine as total chlorine, as [Cl] – see Table 3.4.1 in ANZECC & ARMCANZ (2000) for more information.
F Cyanide as un-ionised HCN, measured as [CN] – see Table 3.4.1 in ANZECC & ARMCANZ (2000) for more information.
G Sulfide as un-ionised H_2S, measured as [S] – see Table 3.4.1 in ANZECC & ARMCANZ (2000) for more information.
J Figures protect against toxicity and do not relate to eutrophication issues – see Table 3.4.1 in ANZECC & ARMCANZ (2000) for more information.
* Note that these figures differ from those in ANZECC & ARMCANZ (2000) due to a subsequent review of the values {{XXXXXXXXX}}

Aromatic Hydrocarbons, Phenols & Xylenols, Organic Sulfur Compounds

If an effluent is shown to contain significant concentrations (i.e. as low as 1-10 µg/L or greater) of aromatic hydrocarbons, phenols, xylenols, organic sulphurous compounds or phthalates, then it may cause harm to an aquatic receiving environment. Table 3 provides some examples.

Table 3. Excerpt from Table 3.4.1 in ANZECC 2000 – Toxicity Trigger Values for some Aromatic Hydrocarbons, Phenols & Xylenols, Organic Sulfurous Compounds and Phthalates.

Values in grey shading are the trigger values applying to typical *slightly-to-moderately* disturbed systems.

Chemical		Toxicity Trigger Values for Freshwater (µg/L)				Toxicity Trigger Values for Marine Water (µg/L)			
		Level of Protection (% species)				Level of Protection (% species)			
		99%	95%	90%	80%	99%	95%	90%	80%
AROMATIC HYDROCARBONS									
Benzene		600[C]	950	1300	2000	500	700	900	1300
o-xylene		200	350	470	640	ID	ID	ID	ID
p-xylene		140	200	250	340	ID	ID	ID	ID
Naphthalene		2.5	16	37	85	50[C]	70[C]	90[C]	120[C]
Nitrobenzene		230	550	820	1300	ID	ID	ID	ID
Polychlorinated Biphenyls (PCBs) & Dioxins									
Aroclor 1242	B	0.3	0.6	1.0	1.7	ID	ID	ID	ID
Aroclor 1254	B	0.01	0.03	0.07	0.2	ID	ID	ID	ID
PHENOLS & XYLENOLS									
Phenol		85	320	600	1200[C]	270	400	520	720
2,4,6-tetrachlorophenol	T,B	3	20	40	95	ID	ID	ID	ID
2,3,4,6-tetrachlorophenol	T,B	10	20	25	30	ID	ID	ID	ID
Pentachlorophenol	T,B	3.6	10	17	27[A]	11	22	33	55[A]
ORGANIC SULFUROUS COMPOUNDS									
Carbon Disulfide		ID	ID	ID	ID	ID	ID	ID	ID

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

PHTHALATES									
Dimethylphthalate		3000	3700	4300	5100	ID	ID	ID	ID
Dibutylphthalate	B	9.9	26	40.2	64.6	ID	ID	ID	ID

A,B,C,ID – Refer to the footnotes to Table 1.
T Tainting or flavour impairment of fish flesh may occur at lower concentrations – see Table 3.4.1 in (ANZECC & ARMCANZ 2000) for more information.

Pesticides (Insecticides, herbicides, fungicides) and other synthetic organic compounds

If an effluent is shown to contain significant concentrations (i.e. as low as 1-10 µg/L or greater) of aromatic hydrocarbons, phenols, xylenols or sulphurous compounds, then it may cause harm to an aquatic receiving environment. Table 4 provides some examples.

Table 4. Excerpt from Table 3.4.1 in ANZECC 2000 – Toxicity Trigger Values for some Pesticides, Herbicides and Fungicides.

Values in grey shading are the trigger values applying to typical *slightly-to-moderately* disturbed systems.

Chemical		Toxicity Trigger Values for Freshwater (µg/L)				Toxicity Trigger Values for Marine Water (µg/L)			
		Level of Protection (% species)				Level of Protection (% species)			
		99%	95%	90%	80%	99%	95%	90%	80%
ORGANOCHLORINE PESTICIDES									
Chlordane		0.03	0.08	0.14	0.27	ID	ID	ID	ID
Heptachlor		0.01	0.09	0.25	0.7[A]	ID	ID	ID	ID
Lindane		0.07	0.2	0.4	1.0[A]	ID	ID	ID	ID
ORGANOPHOSPHATE PESTICIDES									
Chlorpyrifos	B	0.00004	0.01	0.11[A]	1.2[A]	0.0005	0.009	0.04[A]	0.3[A]
Diazinon		0.00003	0.01	0.2[A]	2[A]	ID	ID	ID	ID
Dimethoate		0.1	0.15	0.2	0.3	ID	ID	ID	ID
Parathion		0.0007	0.004[C]	0.01[C]	0.04[A]	ID	ID	ID	ID
HERBICIDES & FUNGICIDES									
Atrazine		0.7	13	45	150[C]	ID	ID	ID	ID
Diquat		0.01	1.4	10	80[A]	ID	ID	ID	ID
2,4-D		140	280	450	830	ID	ID	ID	ID
2,4,5-T		3	36	100	290	ID	ID	ID	ID
Glyphosate		370	1200	2000	3600[A]	ID	ID	ID	ID
Simazine		0.2	3.2	11	35	ID	ID	ID	ID

A,B,C,ID – Refer to the footnotes to Table 1.

Endocrine Disrupting Chemicals

Endocrine Disrupting Chemicals (EDCs) are comprised of many elements and different groups of compounds from a variety of sources, including industrial reagents, and domestic, health and personal care products. Although many are also be toxicants capable of causing lethal effects when they occur at sufficient concentration, at much lower concentrations they are referred to as *micropollutants*. EDCs are believed to cause detrimental effects in biota through disrupting the proper function of glands of the endocrine system. The glands and the hormones they release influence almost every cell, organ, and function in an organism. The endocrine system is instrumental in regulating mood (in humans), growth and development, tissue function, and metabolism, as well as sexual function and reproductive processes. For more information refer to CRC-WQT (2007).

A list of common known EDCs is provided in 0

Pharmaceuticals

Pharmaceuticals, including veterinary chemicals should be screened for in effluents derived from wastes where hospitals and large-scale livestock operations occur. Some of these compounds have been shown to pass through secondary treatment trains more readily than others. Some of these substances act as EDCs. Please refer to CRC-WQT (2007).

A list of common known pharmaceutical EDCs is provided in 0.

Unknown Toxicants

Unknown toxicants can be of two types; *Known-Unknowns* and *Unknown-Unknowns*. These are explained below.

Known-Unknown Toxicants

Known-Unknown Toxicants are chemicals that are known to be in use and form a component of the effluent, but are unstable and degrade quickly to levels outside the detection capabilities of today's instruments, or there are no chemical analysis procedures or instruments capable of reliably detecting or quantifying them to-date.

Examples of Known-Unknown Toxicants would include undescribed disinfection by-products (making them undetectable in chemical analyses aimed at detecting specific compounds) and anti-scaling agents. Anti-scaling agents (such as orthanophosphates) are routinely used in Reverse Osmosis (RO) treatment of treated sewage effluent and sea water. At the present time there is no reliable method of detecting this group of compounds and their potential for toxicological effect have not yet been fully described; therefore, they are a potential Known-Unknown toxicant.

When Known-Unknown Toxicants are used in treatment processes and suspected to persist at significant concentrations in an effluent, and no readily available scientific literature exists that could be used to estimate the potential risk they pose to the aquatic receiving environment in question, then a DTA would be warranted.

Unknown-Unknown Toxicants

Unknown-Unknown Toxicants are chemicals suspected of being present in some effluent streams but cannot be quantified or detected. Unknown-Unknown Toxicants could be present due to:

- illegal or undeclared substances that either directly or indirectly enter the effluent stream;
- complex mixtures of organic compounds reacting with strong oxidising agents (e.g. chlorine) forming undescribed toxicants, and
- undescribed degradation products of pesticides and other complex substances.

When the effluent is likely to incorporate industrial and/or trade wastes that include chemicals of concern, and when the characteristics of the discharge are likely to match the scenarios presented under Section 0, it may be prudent to recommend that a DTA be performed.

Discharge Characteristics

There may be good reason to order that a DTA of the effluent be performed whenever the proposed effluent is:

- being discharged to an aquatic environment attributed with High Ecological Value (HEV);
- voluminous, and being discharged into a relatively small receiving environment; or
- being discharged without a diffuser into:
    - a moderately to poorly-mixed (medium to low kinetic energy) environment, or
    - a receiving environment with a significantly different density.

Some general information on mixing zones is presented below that will be helpful in determining whether or not adequate mixing is taking place to manage acutely toxic concentrations of contaminants.

Mixing Zone characteristics

The mixing zone of an effluent discharge is typically defined as the area or zone at which the concentrations of contaminants may be above water quality objectives. This means that the mixing zone could be a different size for different contaminants, depending on the:

- Concentration of the contaminant in the effluent;
- Ambient or baseline concentration of the contaminant; and the
- Water quality objectives for the contaminant.

For instance, if Contaminant A

- is typically present in the effluent at 10 mg/L and
- the water quality objective for that contaminant is 1 mg/L, and background concentrations will be very low, then;
- 10 times dilution would be required for Contaminant A to meet water quality objectives, and that level of dilution would be achieved within;
- Distance X of the discharge point, based on dilution modelling;

For Contaminant B, it:

- is typically present in the effluent at 30 mg/L and;
- the water quality objective for that contaminant is 1 mg/L, and background concentrations will be very low, then;
- 60 times dilution would be required for Contaminant B to meet water quality objectives, and that level of dilution would be achieved within;
- Distance Y of the discharge point, based on dilution modelling.

Note that Distances X and Y should typically be determined using the average dilution scenario (e.g. mean current velocity and tide). A worst-case dilution scenario with low velocity (e.g. 0.05m/s) at low tide should also be determined to check no overlap with other mixing zones or contact with the shore line.

Therefore, Contaminant A and B will mostly likely possess mixing zones of differing dimension. This applies to all contaminants. There are a multitude of factors that will influence the size and extent of a mixing zone and the dilution rate of an effluent, and these should be presented as the input variables and assumptions used in the modelling for the discharge. The validity and applicability of those input variables should be assessed.

(i) *Near-field Mixing Zone and Far-field Diffusion*

Near-field Mixing Zone occurs in the area within the mixing zone where the most rapid dilution takes place. This area is situated from the point of discharge to a certain distance away from that point, and the mixing is generally driven by the exit velocity of the effluent. Thereafter, where the effluent has lost its exit inertia and has become assimilated with the hydrodynamics of the aquatic receiving environment, a slower dilution-rate (a diffusion-based dilution rate) presides. The **Far-field Diffusion Zone** occurs from the extent of the near-field mixing to a distance where an elevation in the concentration of *any* contaminant from the effluent is no longer detectable from that in the ambient environment.

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

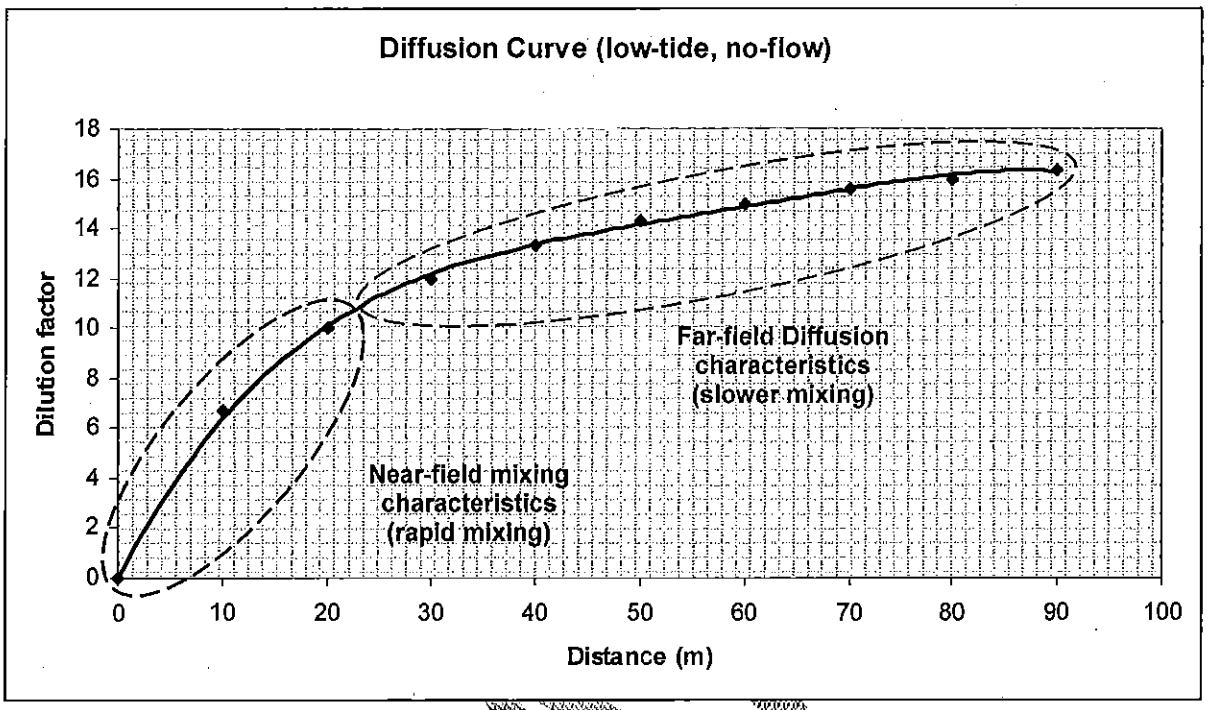
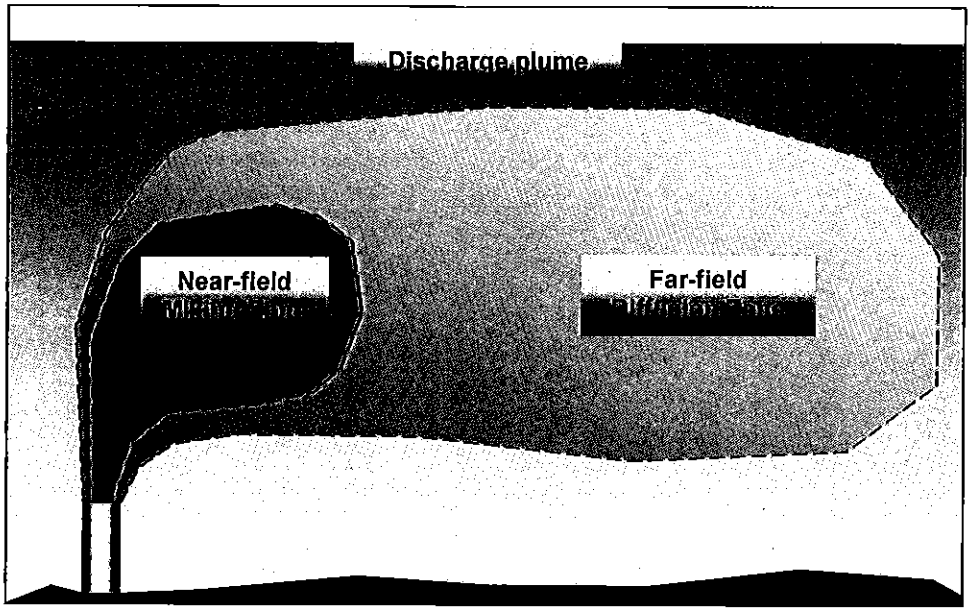


Figure 1. Example Diffusion Curve and related mixing characteristics

Hydrodynamic mixing models can provide estimates of the extent of these areas under differing conditions in the receiving environment, such as no-flow (worst-case), low-flow, and high-flow (best-case) conditions, and dilution curves (see Figure 1) can be produced for each scenario.

The dilution curves coupled with computer modelling of lateral diffusion dynamics are capable of producing a visual representation of the area likely to be affected by the discharge. This area is often described as the *plume* (see Figure 2). Both the near-field mixing zone and far-field diffusion occur within the boundary of the plume.


Discharge plume
Near-field
Far-field

The EPA should always ensure, or negotiate toward, a no Acute Toxicity Zone scenario (see Figure 3 A.). It can be assumed that an acute toxicity zone is absent when all toxicant concentrations are below the acute toxicity criteria (i.e. ANZECC & ARMCANZ (2000) TTVs) at the end-of-pipe. In such a case, only a chronic toxicity zone may be present, and only long-term continuous exposure to these levels of toxicants would be likely to result in any observable adverse effects to the exposed biota.

Unfortunately however, having the effluent meet the (ANZECC & ARMCANZ 2000) TTVs at the end-of-pipe is not always achievable by the proponent. In such cases, the EPA needs to assess the risk posed to the receiving environment by the toxicants in the effluent.

Aquatic Receiving Environment

Effluents are generally discharged to surface waters that can be classified into four categories:

- Freshwaters;
- Brackish waters;
- Estuarine waters, and
- Marine waters.

Considerations that relate to a discharge to each of these environments are discussed below.

Discharges to Freshwaters

Freshwaters are by definition very soft (i.e. water hardness is very low; salinity 0.05-1.0 ppt (ANZECC & ARMCANZ 2000)) and this condition promotes the solubility and consequently the bioavailability of toxicants, especially heavy metals and metalloids. Therefore the same 'total' metal concentrations in freshwater will tend toward being more toxic in freshwater than the same concentration in marine waters (refer to Table 1).

Discharges to Brackish or Estuarine waters

Brackish waters are slightly-to-moderately saline waters (salinity between 0.5 and 30 ppt (ANZECC & ARMCANZ 2000)), often resulting from saline ocean waters mixing with, and being diluted by, freshwater sources, as in estuaries. This variability in salinity normally excludes freshwater species being used as the test specimens in toxicity bioassays, although some freshwater biota can tolerate a certain degree of brackishness.

It is common however that marine species are selected for assessing effluent being discharged into brackish or estuarine waters. This is possible by simply elevating the effluents' salinity to a concentration preferred by the test specimen through the addition of pure salt. Naturally, this approach is not appropriate if it is the toxicity of the salinity itself what is being assessed.

Discharges to Marine waters

Marine waters are saline waters (salinity between 30-40 ppt ANZECC & ARMCANZ (2000)) and the presence of salt generally suppresses the bioavailability of metal and metalloid toxicants. This does not always translate to less toxic effects being observed in marine environments because some marine species can be more susceptible to toxic reactions to specific toxicants than freshwater species (e.g. copper; refer to Table 1).

Only marine species should be selected for DTA of discharges to marine environments.

5.3 Essential Components of the DTA Design

Test-effluent Management

As mentioned in Section 0, the effluent needs to be characterised so that an appropriate DTA can be designed with applicable test specimens that can be used to determine the existence and magnitude of toxicological effects. Other important considerations that may affect the results of a DTA, such as the way the effluent is collected, stored and transported as well as the natural water used for dilutions are discussed in the following subsections.

Effluent Dilution Series

In order to determine the level of dilution required for an effluent to no longer exhibit observable toxic effect in the test biota, the DTA incorporates a dilution series into the design. The dilution series typically takes the form of serial 1:1 dilutions that result in the following concentrations of effluent:

Table 5. Effluent dilution series

Dilution ratio (parts effluent: parts dilution water)	Resultant Percentage of the original effluent concentration
(undiluted)	100%
1:1	50%
1:3	25%
1:7	12.5%
1:15	6.25%
1:31	3.125%

The most appropriate water that can be utilised for the dilutions would be collected from the actual receiving environment for the proposed discharge (refer to Section 0); otherwise tap water, deionised or demineralised water, artificially manufactured sea water, or some other uncontaminated dilution water would be required.

Normalising for Salinity

When the salinity of the effluent varies significant from the salinity of the receiving waters then there is the potential for an adverse impact on the environment to occur. This can be true for effluents more saline and for effluents less saline than receiving waters; however, the former is by far the more common case and of greater concern due to the potential of the denser brine solution sinking to engulf benthic biota.

In cases such as this, marine or estuarine test specimens should be selected (even for effluents proposed for a freshwater discharge) and the salinity of the effluent artificially increased to match that preferred by the test specimen (refer to {{58 Krasson, R. 1995}}). In this way, any observable effects due to salinity are negated and the only effects from toxicants remain observable. Even though the test specimen is not representative of the receiving environment, the effects of elevated salinity are taken out of the toxicity equation.

Collection and Use of Effluent and Bulk Natural Water

Certain complications can arise with the bulk collection of natural water for purpose of diluting effluent for DTA. These complications arise due to fluctuations in water quality variables that may occur between the times of collection to the commencement of the bioassays. Critical water quality parameters should be measured in the field (at the time of collection) wherever possible using portable probes and spectrometers; then again prior to the commencement of the bioassay so that any deviation from the field values is documented:

- pH
- Temperature
- Dissolved Oxygen (DO) concentration
- Conductivity (Salinity)
- Ammonia
- Suspended Solids

Where suspended solids (SS) are in high concentration in the receiving environment, it can interfere with observing the test specimens and can be a cause for toxic effects in some test specimens and therefore the bulk water should be allowed to settle or should be filtered. Bulk natural water should also be refrigerated to slow the activity of microbes consuming carbonaceous compounds and dissolved oxygen, and transport times should be kept to a minimum (i.e. use of local laboratories are preferable to interstate arrangements). In all other aspects, bulk natural water should be collected as per the *Water Quality Sampling Manual* (QLD EPA 2008) or the latest issue.

Appropriate End Points

Ideally, a well designed DTA program that is in accordance with the guidelines stipulated in ANZECC & ARMCANZ (2000) must firstly incorporate five test specimens selected from four major taxonomical groups, but

should also aim to examine multiple toxicological end point types (i.e. acute, sub-lethal and chronic effects) over the varying selected periods of exposure. These concepts are discussed in more detail below.

Acute Effects

Acute effects are observed when the substance(s) being tested causes death or severely incapacitates the organisms to the point where they are unable to maintain normal functions that will lead to certain death in the very near future (e.g. organisms become moribund through their inability to feed themselves, their nervous system has been irreparably damaged, etc.).

These are the most unlikely effects observable in the receiving environment, predominantly because the EPA will regulate the toxicant concentration levels in the discharge as to avoid acute toxicological effects from occurring, but also because biota are unlikely to remain in an unhospitable environment long enough for acute effect to manifest. On the contrary however, some biota are incapable of avoiding or vacating such inhospitable environments before permanent and lethal damage has occurred (e.g. slow-moving or sessile organisms).

Sub-lethal Effects

Sub-lethal effects are observed when a substance being tested causes detrimental effects that will certainly compromise the individual organisms' ability to survive (e.g. through retarding growth and/or development) or the species' ability to persist (i.e. affecting fecundity, gestation or other reproductive success rates).

These effects can be exhibited in an organism later on in life after a larval or early development life stage was exposed to a short-term or pulse exposure to a toxicant, or can be the effect of long-term chronic exposure. This type of effect is more likely to occur in the receiving environment than are acute effects however they are rarely observed due to lack of in-depth monitoring.

Chronic Effects

Chronic effects are observed when the substance causes the organism to be unable to maintain normal biological functions that will lead to certain death in the long-term (e.g. it compromises the organisms' ability to resist disease, causes biochemical changes that affect absorption rate of nutrient through the gut wall, etc.).

These effects are most likely to occur in the receiving environment but due to the lack of routine monitoring associated with effluent discharges, they are rarely observed. Even when the effects of chronic toxicity are observed, it is difficult to identify the specific effluent(s) or source(s) responsible for the observed effect because long-term chronic exposures are difficult to link back to specific point-source discharge(s).

Exposure Times

Toxicological effects are dependant on the concentration of the toxicant versus the time of exposure. To examine the potential short-term and long-term effects that a substance may exhibit on test specimens, short-term exposures (1 hour) and medium-term exposures (96 hours) should be incorporated into the DTA design. Although longer-term exposures (e.g. weeks, months or even years) may exhibit adverse effects on biota in the receiving environment, it is unfeasible to explore these effects within the scope of most DTAs. It may be necessary that a long-term monitoring program be implemented if the circumstances of the discharge warrant continued vigilance (refer to Section 0).

Appropriate Test Specimens

The best DTAs utilise test specimens that are directly relevant to the receiving environment for the discharge, however this may not always be possible for several reasons, including:

- Unavailability of the organism in sufficient numbers to perform the bioassays
- Inability to maintain the organism in the laboratory in a healthy state
- The organisms' relative sensitivity to a toxicant is unknown making its selection dubious
- State laws prohibited its use upon grounds of animal ethics (e.g. vertebrates)

In all other cases the best compromise should be sought. The most important considerations are:

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

- the test specimens should:
  - be sensitive to the main toxicant(s) of concern; this may be the case according to:
    - taxa versus toxicant type (e.g. use insect or crustacean macroinvertebrates for organophosphate pesticides),
    - life stage of the test organism (e.g. juveniles may be more sensitive than adults);
  - reasonably or closely relevant to the receiving environment, or
  - a standard test organism (see Section 0)

Acclimatised Species

It may be appropriate to capture and rear local specimens that have acclimatised to local background toxicant concentrations. This may be particularly applicable where background toxicants exceed the ANZECC 2000 TTVs but locally captured organisms don't seem adversely affected.

This approach is more in the realms of scientific research and therefore normally out of the scope of a general DA however if the proponent is willing to wait for the research to be performed and invest the money required then this should be considered by EPA officers.

Some Standard Test Specimens used in Australia

Table 6. Some generic Direct Toxicity Assessment toxicity bioassays

Organism	Test Type	Test Duration & Effect	Test Endpoint	Substance Tested	Receiving Environment	Sources
Plant						
Selanastrum capricornutum Freshwater micro alga	Laboratory	96 hours chronic	Growth inhibition	WE, chemicals, sediment, leachates, groundwater	Freshwater	USEPA Method 1003.0 OECD Method 201 Stauber 1994b Bailey et al 2000
Lemna gibba *Lemna minor* Duckweed	Laboratory	4-7 days chronic	Plant growth	WE, chemicals, sediment, leachates, groundwater	Freshwater (incl. turbid waters)	USEPA OPPTS 850.4300 ASTM (1998) OECD Guideline 221
Iscochrysis aff. galbana Marine microalga	Laboratory	72-96 hours chronic	Growth inhibition	WE, chemicals, sediment, leachates, groundwater	Marine	USEPA Method 1003.0 APHA Method 8111 Stauber et al. (1996)
Chlorella protothecoides	Laboratory	72 hours chronic	Cell division rate			
Fish (vertebrate)						
Insect (invertebrate)						
Mollusc (invertebrate)						
Saccostrea commercialis Rock oyster *Mimachlamys asperrima* Doughboy scallop	Laboratory	48 hours chronic	Larval abnormality	WE	Estuarine, marine	Krassoi et al. (1996)
Crustacean (invertebrate)						
Ceriodaphnia dubia *Ceriodaphnia cf. dubia* *Daphnia carinata* Freshwater water fleas	Laboratory	24-96 hours acute 7 days chronic	Juvenile survival 3rd brood of neonates	WE, chemicals, sediment, leachates, groundwater	Freshwater	USEPA Method 1003.0 Stauber et al. (1996)

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

Daphnia magna Freshwater water flea	Laboratory				Freshwater	
Amphipod (invertebrate)						
Corophium cf. volutator Aquatic amphipod	Laboratory	10 days acute	Juvenile survival, emergence and reburial	Sediment	Freshwater, estuarine, marine	USEPA OPPTS 850.1020
Echinoderm (invertebrate)						
Heliocidaris tuberculata Sea urchin	Laboratory	1 hour acute	Fertilisation success	WE, chemicals, sediment, leachates, groundwater	Estuarine, marine	APHA Method 8810C Simon and Laginestra (1997)
		72 hours chronic	Larval development			APHA Method 8810D Simon and Laginestra (1997)

Region- and Habitat-specific Test Specimens

(ii) *Queensland Freshwaters*

Table 7. Some Direct Toxicity Assessment toxicity bioassays appropriate for Queensland Freshwaters

Organism	Test Type	Test Duration & Effect	Test Endpoint	Substance Tested	Receiving Environment	Sources
Plant						
Chlorella sp. Green alga	Laboratory	72 hours chronic	Population growth	Cu, herbicides, WE	Lowland streams, floodplains	{{56 Riethmuller, N. 2003;}}
Chlorella sp. (2 tropical species)	Laboratory	48 or 72 hrs chronic	Cell division rate	WE		Franklin et al 1998 Franklin et al (in press)
Ceratophyllum dermersum Hornwort	Laboratory	96 hours chronic	Growth inhibition	Cu, herbicides, WE	Lowland streams, floodplains	{{56 Riethmuller, N. 2003;}}
Lemna aequinoctialis sp. Duckweed	Laboratory	4-7 days chronic	Plant growth	Cu, herbicides	Lowland streams, floodplains	{{56 Riethmuller, N. 2003;}}
Monoraphidium arcuatum Tropical green alga	Laboratory	72 hours chronic	Cell division rate	Cu		{{69 Levy, J.L. 2007;}}
Fish (vertebrate)						
Melanotaenia nigrans Black-banded rainbowfish	*In-situ*/ Laboratory	96 hours acute	Larval survival	U, Cu, WE	Escarpment streams, floodplains	eriss notes
Magurnda magurnda Purple-spotted gudgeon	Laboratory	96 hours acute	Larval survival	U, Cu, WE	Upland streams, floodplains	{{56 Riethmuller, N. 2003;}}
Insect (invertebrate)						

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

Chironomus crassiforceps Chironomid	Laboratory	5 days chronic	Larval growth	U, Cu	Permanent billabongs, floodplains	eriss notes
Mollusc (invertebrate)						
Amerianna cumingii Freshwater gastropod	*In-situ*	96 hours chronic	Reproduction, juvenile survival	U, Cu, WE	Permanent billabongs, floodplains	eriss notes
Crustacean (invertebrate)						
Moinodaphnia macleayi Freshwater cladoceran	Laboratory	6 day sub-lethal	Reproduction (3 brood)	U, Cu, HCN, Mn, NO_3, Cd, WE	Permanent billabongs	{{56 Riethmuller, N. 2003;}}
		24 hours chronic	Feeding inhibition			
		6 day acute	Survival			
Cnidarian (invertebrate)						
Hydra viridissima Green hydra	Laboratory	96 hours chronic	Population growth	U, Cu, Mg, Na, WE	Permanent billabongs, floodplains	{{56 Riethmuller, N. 2003;}}

Cd – Cadmium
Cu – Copper
HCN – Cyanide
Mg – Magnesium
Mn – Manganese
Na – Sodium
NO_3 – Nitrite
U – Uranium
WE – whole-effluent
WS – whole-sediment

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

Queensland Brackish Waters

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

Queensland Marine Waters

Table 8. Some Direct Toxicity Assessment toxicity bioassays appropriate for Queensland Marine Waters

Organism	Test Type	Test Duration & Effect	Test Endpoint	Substance Tested	Receiving Environment	Sources
Plant						
Nitzschia closterium Marine microalga (diatom)	Laboratory	72-96 hours chronic	Growth inhibition	WE, chemicals, sediment, leachates, groundwater	Marine	USEPA Method 1003.0, APHA Method 8111, Stauber et al. (1996)
Nitzschia closterium (tropical) Marine microalga (diatom)	Laboratory	72 hours chronic	Cell division rate	WE	Marine	{{62 Johnson, H.L. 2007;}}
Phaeodactylum tricornutum Marine microalga (diatom)	Laboratory	72 hours chronic	Cell division rate	WE	Marine	{{63 Franklin, N.M. 2001;}}
Entomoneis cf *punctulata* microalga (diatom)	Laboratory	72 hours chronic	Cell division rate	WS	Marine	{{64 Adams, M.S. 2004;}}
		24 hour acute	Esterase inhibition			
Dunaliella tertiolecta Green alga	Laboratory	1 hour acute	Enzyme inhibition	WE	Marine	Peterson & Stauber
		72 hour chronic	Cell division rate			{{59 Stauber, J.L. 1994;}}
Fish (vertebrate)						
Insect (invertebrate)						
Mollusc (invertebrate)						
Tellina deltoidalis bivalve	Laboratory	10 days acute	Survival	WS	Estuarine, marine	{{68 Simpson, S.L. 2005;}}
	Laboratory	4 week chronic	Growth			Strom/simpson
Spiculla trigonella Bivalve	Laboratory	10 days acute	Survival	WS	Estuarine, marine	Strom spadaro simpson
Crustacean (invertebrate)						

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

Penaeus monodon Tiger prawn	Laboratory	96 hours acute	Juvenile survival	WE	Estuarine, marine	USEPA OPPTS 850.1045
Amphipod (invertebrate)						
Allorchestes compressa Marine amphipod *Hyale crassicornis* *Melita spp.*	Laboratory	96 hours acute	Juvenile survival	WE, chemicals, sediment, leachates, groundwater	Marine	USEPA OPPTS 850.1020
Melita plumulosa Epibenthic deposit feeder	Laboratory	10 days acute	Survival, growth	WS	Estuarine, marine	{{66 King, C.K. 2006;}}
		6 week chronic	Reproduction			{{67 Gale, S.A. 2006;}}
		13 day chronic	Reproductive index			Hyne et al
Copepod (invertebrate)						
Acartia sinijiensis (tropical) Copepod	Laboratory	48 hours acute	Immobilisation	WE	Marine	{{65 Rose, A. 2006;}}
Nitocra ap. Copepod	Laboratory	7 day chronic	Life cycle (split) 7 day reproduction 7 day development	WE	Marine	?
Cnidarian (invertebrate)						

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

Toxicity Identification Evaluation

Once the toxicological bioassays of a DTA are complete and toxic effects have been observed, there may be a need to determine which constituents in the effluent were responsible for those observed effects. The process for this determination is described by a series of procedures published by the USEPA but basically takes the following approach; the following Phase I TIE manipulations of the effluent are performed and then a repeat of. the initial DTA is initiated, with subsequent Phase II and Phase III manipulations if required:

- Phase I TIE manipulations:
  - EDTA chelation – removes divalent metal ions (e.g. Cu, Zn, Ag, Hg) to reduce toxicity of the effluent;
  - pH adjustment – ammonia and aluminium toxicity can be reduced significantly by adjusting the effluent of pH;
  - Aeration – oxidisable or volatile toxicants are stripped or converted in the effluent to reduce overall effluent toxicity
  - Sodium thiosulphate – binds oxidative chemicals (such as Cl and Br) and some metals (e.g. Cu) making them unavailable as toxicants;
  - Solid Phase Extraction (SPE) – columns with C18 or C8 resin absorb non- or moderately polar organic chemicals from the effluent;
  - Filtration and centrifugation – removes particulate-bound toxicants;
  - Sublimation and Foam fractionation – removes sublimatable compounds such as surfactants;
  - Piperonyl Butoxide (PBO) addition – affects the action of some metabolically activated pesticides for that their toxicity is reduced or eliminated but may enhance the toxicity of pyrethroids.
- Phase II TIE manipulations:
  - SPE elution pattern – an enhanced version of Phase I SPE extraction;
  - HPLC elution pattern – similar to SPE elution pattern but with higher resolution;
- Phase III TIE manipulations:
  - Confirmation (spiking) study – suspect toxicants are spiked into the sample at double the concentration they exist at in the sample to observe enhanced toxic effect.

Identification of the compound(s) responsible for the observed toxicological effects on DTA test specimens may assist in developing strategies to reduce or remove the toxicants in question from the effluent (through the addition or modification of a treatment step) or be used to support or negate other management options.

5.4 Related Matters

This section deals with when, why and how DTAs should be conditioned into Discharge Licenses and what needs to be considered in Receiving Environment Monitoring Programs (REMPs) so that the repercussions of the observations made in DTAs are adequately covered in the monitoring.

Routine DTAs

Where it is considered that there is continuing potential risk for an effluent to cause environmental harm then routine DTAs of the effluent may be required. Routine DTAs can be required:

- On an annual or bi-annual basis, or required at some other regular interval;
- whenever a treatment process change is implemented that is likely to significantly alter the effluent quality;
- whenever the influent quality into a sewage Treatment Plant (STP) for example, or Advanced Water Treatment Plant (AWTP), changes significantly, or
- when new information becomes available that puts into doubt the quality of the effluent so that the EPA can no longer confidently consider the effluent as being non-acutely toxic at the point of release.

An example of such a situation is where a ROC from a STP effluent that is being collected from a sewer catchment with a significant proportion of industrial effluents contributing to the bulk influent. Because of the

many parties involved with contributing to the STP influent and the high potential for unreported process changes and/or reagent changes to occur, it would be appropriate that there be a requirement that DTA be conducted on the effluent on a regular (routine) basis.

Requirement for Regular DTA

NEGATIONS REGARDING THIS ISSUE ARE IN PROGRESS

Requirement for Irregular or Event-based DTA

NEGATIONS REGARDING THIS ISSUE ARE IN PROGRESS

No Requirement for DTA

NEGATIONS REGARDING THIS ISSUE ARE IN PROGRESS

Receiving Environment Monitoring Programs

Where an existing or proposed discharge is considered to present unknown risk of acute, sub-lethal or chronic toxicological effects for reasons beyond the results of the DTA, then it may be appropriate to condition a biota monitoring component into a Receiving Environment Monitoring Program (REMP). Such reasons would include:

- Effluent diffusion is poor (poor mixing) during certain tidal or other variables (see Section 0);
- Receiving environment is of special significance (e.g. Ramsar wetlands, Wetlands of State Significance, HEV areas, etc.; see Section 0);
- The DTA test specimens:
  - were not directly relevant to the receiving environment (see Section 0), or
  - did not include the taxa that are most sensitive to the toxicant(s) in the effluent, or
- The effluent tested was not truly representative of the long-term discharge.

Biota monitoring can be for an interim period, or indefinite. Generally, an interim period would be a minimum of 2-3 years in duration so that seasonal changes and patterns of subsequent years can be analysed.

5.5 References

ANZECC & ARMCANZ (2000). Australian and New Zealand Guidelines for Fresh and Marine Water Quality. National Water Quality Management Strategy; Paper No. 4, .

CRC-WQT. (2007). *Chemicals of Concern in Wastewater Treatment Plant Effluent: State of the Science in Australia.* The Cooperative Research Centre for Water Quality and Treatment, Occasional Paper No. 8.

QLD EPA (2006). *Queensland Water Quality Guidelines*, Environmental Sciences Division, Queensland Environmental Protection Agency.

QLD EPA (1999). Water Quality Sampling Manual. 3rd Edition.

5.6 Acronyms and Abbreviations

ANZECC	Australian and New Zealand Environment and Conservation Council
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
AWTP	Advanced Water Treatment Plant
CRC-WQT	Co-operative Research Centre for Water Quality and Treatment
DA	Development Application
DO	Dissolved Oxygen
DTA	Direct Toxicity Assessment
EC_{50}	median Effective Concentration for 50% of exposed specimens
EDC	Endocrine Disrupting Chemical
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
eriss	Environmental Research Institute of the Supervising Scientist
EV	Environmental Value
HEV	High Ecological Value
LC_{50}	median Lethal Concentration for 50% of exposed specimens
mg/L	milligrams per litre
NATA	National Association of Testing Authorities of Australia
OPPTS	Office of Prevention, Pesticides and Toxic Substances
PCB	Poly-Chlorinated Biphenyl
pH	potential (of) Hydrogen
ppt	parts per thousand
QLD EPA	Queensland Environmental Protection Agency
RFI	Request for Further Information
RO	reverse osmosis
ROC	reverse osmosis concentrate
SPE	Solid-phase extraction
SS	Suspended Solids
STP	Sewage Treatment Plant
TDS	Total Dissolved Salts or Total Dissolved Solids
TIE	Toxicity Identification and Evaluation
TTV	Toxicity Trigger Value
µg/L	micrograms per litre
USEPA	United States Environment Protection Agency
WE	Whole effluent
WET(T)	Whole Effluent Toxicity (Testing)
WEMW	Whole effluent mine wastewater
WQO	Water Quality Objective

5.7 Glossary

Acute Toxicity	Acute toxicity is the ability of a substance or mixture of substances to cause lethal effects over a relatively short period of time, usually upon single or pulse exposures.
Aquatic Ecosystem	Any watery environment from small to large, from pond to ocean, in which plants and animals interact with the chemical and physical features of the environment.
Biota	The sum total of the living organisms in any designated area.
Chronic	Lingering or continuing for a long time; often for periods from several weeks to years. Can be used to define either the exposure of an aquatic species or its response to an exposure (effect). Chronic exposure typically includes a biological response of relatively slow progress and long continuance, often affecting a life stage.
Chronic Toxicity	Chronic toxicity is the ability of a substance or mixture of substances to cause harmful effects over an extended period, usually upon repeated or continuous exposure sometimes lasting for a significant proportion of the life of the exposed organism.
Cladoceran	Water flea; zooplankton belonging to the fourth Order of the Branchiopoda, the Cladocera.

Contaminant	Biological (e.g. bacterial and viral pathogens) and chemical (see **Toxicants**) introductions capable of producing and adverse response (effect) in a biological system, seriously injuring structure or function or producing death.
Direct Toxicity Assessment	The use of toxicity tests to determine the acute and/or chronic toxicity of waste water discharges or total pollutant loads in receiving waters. (Assesses the toxicity of mixtures of chemicals rather than individual chemicals).
EC_{50}	The concentration of material in water that is estimated to be effective in producing some response in 50% of the test organisms. The EC_{50} is usually expressed as a time dependant value (e.g. 24 hour or 96 hour EC_{50}).
Near-field mixing zone	The Near-field Mixing Zone (or the **Initial Mixing Zone**) is the area within the mixing zone where the most rapid dilution takes place. This area is situated from the point of discharge to a certain distance away from that point, and the mixing is generally driven by the exit velocity of the effluent.
Far-field Mixing Zone	The Far-field Mixing Zone (or the **Absolute Mixing Zone**) extends from the end of the **Near-field mixing zone** to a distance where an elevation in the concentration of *any* contaminant from the effluent is no longer detectable from that in the ambient environment. It may also be described as where the effluent has lost its exit inertia and has become assimilated with the hydrodynamics of the aquatic receiving environment; therefore a slower dilution-rate (i.e. a diffusion-based dilution rate) presides.
LC_{50}	The concentration of material in water that is estimated to be effective in producing some lethal response in 50% of the test organisms. The LC_{50} is usually expressed as a time dependant value (e.g. 24 hour or 96 hour LC_{50}).
TIE	Toxicity characterisation procedures involving use of selective chemical manipulations or separations and analyses coupled with toxicity testing to identify specific classes of chemicals and ultimately individual chemicals that are responsible for the toxicity observed in a particular sample.
Total Dissolved Salts	A measure of the inorganic salts dissolved in water. The organic component of the water has been removed via some laboratory technique.
Total Dissolved Solids	A measure of the inorganic salts (and organic compounds) dissolved in water.
Total Metal	The concentration of a metal in an unfiltered sample that is digested in strong nitric acid.
Toxicant	A chemical capable of producing an adverse response (effect) in a biological system at concentrations that might be encountered in the environment, seriously injuring structure and function or producing death. Examples include pesticides, heavy metals and biotoxins (i.e. domoic acid, ciguatoxin and saxitoxins).
Toxicity	The inherent potential or capacity of a material to cause adverse effects in a living organism.
Trigger Values	These are the concentrations (or loads) of the key performance indicators measured for the ecosystem, below which there exists a low risk that adverse biological 9ecological) effects will occur. They indicate the risk of impact if exceeded and should 'trigger' some action, either further ecosystem specific investigations or implementation of management/remedial actions.
Water Quality Criteria	Scientific data evaluated to derive the recommended quality of water for various uses.
Whole Effluent Toxicity Testing	The use of toxicity tests to determine the acute and/or chronic toxicity of effluents.

Source: ANZECC & ARMCANZ (2000)

5.8 Appendices

Endocrine Disrupting Chemicals (Pesticides)

Table 9 lists some commonly used pesticides and industrial chemicals that are known or believed to possess endocrine disrupting qualities. Use this list as a guide to help ascertain which compounds should be included in chemical analyses of wastewater effluents from systems with these activities taking place within the sewage catchment.

Table 9. Examples of known and suspected Agricultural and Industrial Endocrine Disrupting Chemicals

Chemical	Common Uses
Amitrol	Defoliant, a herbicide, photography, plant growth regulation, non-selective weed control
Atrazine	herbicide for weed control in agriculture
Arsenite	Sodium arsenite: Dyes, soap, treating scale diseases, insecticide (termites); antiseptic, topical acaricide, hide preservative, herbicide. Copper Acetoarsenite: Insecticide, wood preservative, larvicide, pigment (particularly for ships and submarines), fungicide, bactericide and molluscicide.
Benzophenone	Fixative for heavy perfumes, manufacture of antihistamines, hypnotics; insecticides.
Benzo(a)pyrene	Petrochemicals combustion by-product
Bisphenol A	Basic building block of polycarbonate plastic, an intermediate in the manufacture of polymers, epoxy resins, , fungicides, antioxidants, dyes, phenoxy, polysulfone and certain polyester resins, flame retardants and rubber chemicals.
Butylated hydroxyanisole (BHA)	Preservative and antioxidant in fat-containing foods, in edible fats and oils; and in cosmetic formulations.
Cadmium	Heavy metal with widespread use: electroplating, photoelectric cells, soft solder and solder for aluminium, deoxidizer in Ni plating, Ni-Cd storage batteries; process engraving, electrodes for cadmium vapour lamps, photometry of ultraviolet sun-rays. The powder is also used as an amalgam (1 Cd: 4 Hg) in dentistry. Cadmium chloride: photography, paints, pigments, glass, glazes, electronic components, herbicide, pesticide and a fungicide, dyeing and calico printing, in the manufacture of cadmium yellow, galvanoplasty, manufacture of special mirrors, ice-nucleating agent, lubricant, in analysis of sulfides to absorb hydrogen sulfide, polymerization catalyst. Cadmium oxide: electroplating, storage battery electrodes, catalyst, semi-conductors, silver alloys, ceramic glazes, nematocide, anthelminic, phosphors, glass, cadmium electroplating, and an aracaricide in pigs.
Dithiocarbamate	Sodium Diethyldithiocarbamate: pesticide, fungicide, chelating agent. It is used in the evaluation of T-cell deficient diseases, in the inhibition of superoxide dismutase in mice and of cisplatin nephrotoxicity in rats, in AIDS-related complex, in immunopharmacology and in cancer immunotherapy. It has clinical use in acute nickel carbonyl, cadmium and thallium poisoning. It is used in colorimetric determination of small quantities of copper and for its separation from other metals. It is also used as a latex accelerator in rubber processing and as a chemical intermediate in the production of other diethyldithiocarbamate metal salts, such as zinc selenium and tellurium salts. Sodium Dimethyldothiocarbamate: fungicide; corrosion inhibitor; rubber accelerator; intermediate; polymerization shortstop; nematocide and herbicide with a fumigant action. Lead Dimethyldothiocarbamate: vulcanization accelerator.

DDT	One of the 12 POPS listed by the Stockholm Convention on Persistent Organic Pollutants, DDT's allowed use is now restricted to disease vector control, specifically to kill mosquitoes spreading malaria in the developing world.
p, p'-DDE	One of the principal metabolites (breakdown products) of DDT
Dieldrin	Usage banned by the Stockholm Convention on Persistent Organic Pollutants. A non-systemic, persistent organic insecticide with contact and stomach action.
Endosulfan	Insecticide; pesticide. Very widespread modern use.
Ethylene thiourea	Polymer vulcanizing and curing agent, accelerator in curing polychloroprene (neoprene) and other elastomers. It is also used in electroplating baths, as an intermediate for anti-oxidants, in insecticides, dyes, pharmaceuticals and synthetic resins.
Furans	Usage banned by the Stockholm Convention on Persistent Organic Pollutants. Combustion by-products of combustion of organochlorine chemicals, furans have also been used as intermediates in the preparation of pharmaceuticals, insecticides, resins and in the formation of lacquers.
Heptachlor	Usage banned by the Stockholm Convention on Persistent Organic Pollutants. Heptachlor was used for control of the cotton boll weevil, termites, ants, grasshoppers, cutworms, maggots, thrips, wireworms, flies, mosquitoes, soil insects, household insects and field insects. It has some fumigant action, and was applied as a soil treatment, a seed treatment or directly to foliage.
Kepone	Used as an insecticide, fungicide, pesticide for control of the banana root borer and tobacco wireworm and bait for control of ants and cockroaches.
Lindane	Banned in many (but not all) countries, a pesticide to control lice and other ectoparasites; a foliar spray and soil application for insecticidal control of a broad spectrum of phytophagous and soil dwelling insects, animal ectoparasites and public health pests. It is used on ornamentals, fruit trees, nut trees, vegetables, tobacco and timber. This chemical is found in baits and seed treatments for rodent control. In pet shampoo it kill ticks, lice and sarcoptic mange mites.
Malathion	Insecticide on fruits, vegetables, ornamentals, household and livestock use, an acaracide, control of flies and other insect pests in animal and poultry houses, adult mosquitoes in public health programs, human body and head lice and in flea and tick dips. It is used in veterinary medicine as an ectoparasiticide.
Methoxychlor	Insecticide for a wide range of insect pests (particularly chewing insects) in field crops, forage crops, fruit, vines, flowers, vegetables, and in forestry, in animal houses and dairies, in household and industrial premises and in veterinary medicine as an ectoparasiticide.
Mirex	Usage banned by the Stockholm Convention on Persistent Organic Pollutants. Insecticide, pesticide, flame retardant for plastics, rubber, paint, paper and electrical goods; in antifouling paints, rodenticides and additives for antioxidant and flame retardant mixtures for stabilized polymer compositions, ablative compositions, anthelmintic compositions and lubricant compositions. Applied in paper, paint, rubber, electrical, adhesive and textile applications; also used in thermoplastic, thermosetting and elastomeric resin systems.
Nitrofen	Herbicide used on many vegetables, broad-leafed and grass weeds, cereals, rice, sugar beet, some ornamentals, broccoli, cauliflower, cabbage, brussel sprouts, onions, garlic, celery, roses and chrysanthemums.
Pentachlorophenol	Insecticide for termite control, pre-harvest defoliant, general herbicide, wood preservative, synthesis of pentachlorophenyl esters, molluscide, fungicide, bactericide, anti-mildew agent, slimicide and algaecide. The technical material finds extensive use in cooling towers of electric plants, as additives to adhesives based on starch and vegetable and animal protein, in shingles, roof tiles, brick walls, concrete blocks, insulation, pipe sealant compounds, photographic solutions, and textiles and in drilling mud in the petroleum industry.
Pentachloronitrobenzene	Fungicide for seed and soil treatment, herbicide, in slime prevention in industrial waters and to control damping off and other fungal infections.
Phenol, 4-tert-Butyl	Intermediate in the manufacture of varnish and lacquer resins, soap antioxidant;

	ingredient in de-emulsifiers for oil field use and motor oil.
Phthalates	Butyl benzyl phthalate (BBP) resins: solvent and a fixative in perfume. Di-n-butyl phthalate (DBP): plasticisers, cosmetics, safety glass, insecticides, printing inks, paper coatings, adhesives, elastomers and explosives; as a solvent in polysulfide dental impression materials, solvent for perfume oils, perfume fixative, textile lubricating agent and solid rocket propellant. Di-ethylhexylphthalate (DEHP): vacuum pumps; as a plasticizer for polyvinyl chloride (PVC) for medical devices, resins and elastomers. Solvent in erasable ink and dielectric fluid. Acaricide in orchards, an inert ingredient in pesticides, a detector for leaks in respirators, testing of air filtration systems and component in cosmetic products. Di-n-pentyl phthalate (DPP): plasticizer for nitrocellulose and resin lacquers; anti-foaming agent in the manufacture of glue; in rubber cements.
Thiram	Fungicide, bacteriostat, pesticide, rubber vulcanization accelerator, scarabicide, seed disinfectant, animal repellent, insecticide, lube oil additive, and wood preservative. Anti-septic sprays, lubricant oils. It is used against Botrytis, rusts and downy mildews and as a seed dressing against "damping off" and verticillium wilt. It is also used as an ethanol antagonist and deterrent in mixtures of the methyl, ethyl, propyl and butyl derivatives. Antioxidant in polyolefin plastics and a peptizing agent in polysulphide elastomers. Soaps and rodent repellents and as a nut, fruit and mushroom disinfectant.
Toxaphene	Usage banned by the Stockholm Convention on Persistent Organic Pollutants. Insecticide and pesticide. It was used on cotton crops, cattle, swine, soybeans, corn, wheat, peanuts, lettuce, tomatoes, grains, vegetables, fruit and other food crops; for control of animal ectoparasites, grasshoppers, army-worms, cutworms and all major cotton pests. It controls livestock pests such as flies, lice, ticks, scab mites and mange. It also controls mosquito larvae, leaf miners, bagworms, church bugs, yellow jackets and caterpillars.
Trifluralin	Pre-emergence herbicide, especially for cotton plants.
Zineb	Agricultural fungicide; insecticide.
Ziram	Fungicide and repellent to birds and rodents. Rubber vulcanization accelerator. Adhesives including those used in food packaging, paper coats for non-food contact, industrial cooling water, latex-coated articles, neoprene, paper and paperboard, plastics (polyethylene and polystyrene) and textiles.

Source: http://www.ourstolenfuture.org/Basics/chemuses.htm

Endocrine Disrupting Chemicals (Pharmaceuticals)

Table 10. Example known and suspected Pharmaceutical Endocrine Disrupting Chemicals

Aspirin	Analgesic
Bacitracin	Antibiotic
Carbamazepine	Antiepileptic
Chlorampenicol	Antibiotic
Ciprofloxacin[1]	Antibiotic
Clofibrate	Lipid regulator
Clofibric Acid	Lipid regulator
Enroflaxin[2]	Antibiotic
Eryrthromycin	Antibiotic
Fluvoxetine HCl	Antidepressant
Fluvoxamine	Antidepressant
Ibuprofen	Analgesic/Anti-inflammatory
Lincomycin[1,2]	Antibiotic
Naladixic acid[2]	Antibiotic
Naproxen sodium	Analgesic/Anti-inflammatory
Norfloxacin[2]	Antibiotic
Oleandomycin[2]	Antibiotic
Oxytetracycline	Antibiotic
Paracetamol	Analgesic
Paroxetine HCl	Antidepressant
Roxithromycin[2]	Antibiotic
Salicyclic Acid	Topical keratolytic
Sulfamethoxazole[1]	Antibiotic
Sulfamethazine	Antibiotic
Tetracycline	Antibiotic
Triclosan	Antibacterial
Trimethoprim[1,2]	Antibiotic
Tylosin[2]	Antibiotic

Source: GRC-WQT (2007)

1 Detected in STP and AWTP effluent {{67 Watkinson, A.J. 2007;}}

2 Detected in AWTP product water {{57 Watkinson, A.J. 2007;}}