Queensland Floods Commission of Inquiry

CROWN LAW–(DERM – Andrew Brier)
Response to Req #1720609 – Dawson Mine)
#1737334 File 540093/1
Volume 1 of 1 ORIGINAL

Statement of Andrew Stuart Brier (Dawson Mine)

September 2011

QFCI

Date: 8/11/11 JM

Exhibit Number: 937

QUEENSLAND FLOODS
COMMISSION OF INQUIRY

STATEMENT OF ANDREW STUART BRIER

WITH RESPECT TO THE DAWSON 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 13 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.

2. 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

Role

3. I am currently the General Manager Strategic Implementation, Coal and Coal Seam Gas Operations within the Regional Service Delivery Division in DERM 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.

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. Officers of DERM carried out a pre wet season compliance inspection of the Dawson Central and North and Dawson South Mines on 9 November 2010 (**ASB-D01-01** to **ASB-D01-05**). At this time the mine advised that they were prepared for the 2010-2011 wet season and did not expect to have any non-compliant discharges of mine affected water to the environment.

9. The mine also advised that water management remained an ongoing issue for the Dawson Central and North and Dawson South Mines given the size of the site and the configuration of the current water management infrastructure, which captures water that falls within the mine area.

10. DERM was informed that excess water would be pumped across the Central and North portions of the site via the "backbone" water distribution system to locations with available storage capacity including unused open cut and underground pits during the 2010 – 2011 wet season if required. Water management options at Dawson South appeared limited but they did not anticipate that they would exceed available storage capacity.

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. The Dawson mine was included in a list of mines to be inspected prior to the 2010-2011 wet season (**ASB-D01-01**). 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. The Dawson Mine was defined as a low-medium risk site.

12. DERM identified three issues at Dawson South and four issues at Dawson Central and North. However, the issues were not anticipated to prevent Dawson Mine from complying with the water management conditions (**ASB-D02-01** and **ASB-D02-02**) during the upcoming wet season. Dawson mine was provided an opportunity during a phone conversation with DERM in December 2010 to submit a voluntary Transitional Environmental Program (TEP) to reduce the risk of non-compliant discharges and to develop a detailed release strategy that would provide the best outcome for the environment and community downstream of the mine. Dawson Mine submitted a response to DERM's concerns in letters dated 28 January 2011 (**ASB-D02-03** and **ASB-D02-04**).

13. Neither Dawson Central and North or Dawson South Mines took the opportunity to submit a TEP at this time, but advised DERM they had adequate contingencies in place should they receive significant rainfall during the wet season.

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

14. Dawson Mine advised DERM on 28 December 2010 through verbal communications that it would not be able to comply with the water management conditions due to significant rainfall events during late December 2010. According to the mine, rainfall had resulted in uncontrolled release from authorised release locations, and exceeded the capacity of the on-site water management system to manage mine affected water through discharges to the environment.

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

15. Dawson Mines operate under the full suite of 'Model Water Conditions for Coal Mines in the Fitzroy Basin' (**ASB-D02-01** and **ASB-D02-02**) that were developed after the 2008 flooding in Central Queensland. These conditions were applied to the EA in late 2009.

16. There have not been any amendments to the Dawson Mine EA water conditions since this time.

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

17. To the best of my knowledge, I do not consider the water management conditions at Dawson Mines contains 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

18. There were a number of dealings related to mine releases authorised by a Transitional Environmental Program (TEP) at Dawson mines 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 specific 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.

19. Dawson Central and North Mine received verbal advice via phone conversation with Mark Evans, acting Regional Manager, Environmental Services, Central West Region, DERM to discharge from authorised and unauthorised locations on 27 December 2010. This was done in order to provide an expedited approval for what was considered to be a low risk release to avoid potential issues future non compliant releases, and water ponding to elevated levels around mine infrastructure and potentially impacting site safety for mine personnel.

20. Dawson South Mine submitted a draft TEP on 4 January 2011 (**ASB-D03-19**) the TEP was assessed and approved by the department on 13 January 2011 (**ASB-D03-07**) to discharge mine affected water with increased concentrations of salinity (EC) to the receiving environment if increased natural flow in the Dawson River was also present.

21. Dawson Central mine submitted a draft TEP to the department on 4 January 2011 (**ASB-D03-17**). Following the submission of this document there was significant consultation between Dawson Mine and the department, resulting in a combined draft TEP for the Dawson Central and North mine being submitted on 7 February 2011 (**ASB-D03-18**). The draft TEP was assessed and accepted with conditions on 18 February 2011 (**ASB-D03-08**) to discharge mine affected water from authorised discharge locations at elevated EC concentrations and regional receiving water flow rates.

22. Dawson Central and North mine received verbal approval via a phone conversation on 14 January 2011 to discharge non-mine affected water from an unauthorised discharge location to minimise impact to mining operations. It was determined that the release of non-mine affected water would not have an impact on the receiving environment.

23. Dawson Central and North mine submitted a draft TEP to DERM on 16 May 2011, the draft TEP was submitted to extend the TEP (MAN11600) approved on 18 February 2011. The draft was assessed by DERM and refused as it did not include demonstrated actions, or a discussion of impacts to local waterways (**ASB-D03-11**).

b) Any relevant dam safety issues

24. There were no dam safety issues identified.

c) Relevant correspondence with the mine operator and other stakeholders

25. Dawson mine provided information on 4 March 2011 regarding contact with downstream users of Kianga Creek (**ASB-D03-09**) after the TEP for Dawson Central and North was approved on 18 February 2011.

26. DERM conducted a phone conversation with a landowner who did not support on-going discharge of poor quality water from the Dawson Mine. The landholder

was informed of the TEP process and the requirements for the Dawson Mine to monitor water quality and flow rate in Kianga Creek and the Dawson River and that water would only be authorised to be released if it met specific water quality parameters. The landholder was satisfied with this proposed course of action and that the mine could release mine affected water.

27. 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, DERM 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

28. DERM consulted with the Fitzroy Water Quality Advisory Group (FWQAG) on three occasions during the dates specified. This consultation was not specific to Dawson and related to all mines that were discharging into the Fitzroy Basin at the time and formed part of the agenda at meetings of the FWQAG held in Rockhampton on 16 December 2010, 4 February 2011 and 7 April 2011.

29. 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.

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

31. The Director of Environmental Health from Qld Health was also placed on the distribution list for the weekly Fitzroy Basin water quality report compiled by DERM (**ASB-D03-22**) in an effort to keep Qld Health informed of the current situation across the Fitzroy Basin.

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

32. 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-D03-e00a**).

33. Draft TEPs may be submitted voluntarily by a mine operator, or DERM may require an operator to submit a draft TEP if it 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.

34. Section 338 of the EP Act (**ASB-D03-e00b**) 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.

35. 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-D03-e01**) and Part 2-Considering and making a decision about a draft TEP (**ASB-D03-e02**) is attached. Supplementing the guidelines are two correlating assessment report templates Part 1 Assessment Report (**ASB-D03-e03**) 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-D03-e04**) 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-D03-e04a**) and a Request for Statutory Approval template (**ASB-D03-e04b**) was utilised by regional officers to assist with the TEP assessment process.

36. The reasons for the decisions are contained within the assessment report and request for statutory approval (**ASB-D03-12**, **ASB-D03-13** and **ASB-D03-14**).

37. DERM assessed potential impacts from Dawson Mine to the Kianga Creek receiving environment and the Dawson River regional water body. Assessment included cumulative impacts such as maintaining a window of opportunity for Baralaba Coal Project downstream to discharge, whilst, maintain appropriate water quality for downstream irrigators and the town water supplies for Baralaba, Woorabinda and Duaringa.

38. 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.

39. 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.

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

41. 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.

42. DERM has produced guidance material to assist environmental officers in assessing draft TEPs (**ASB-D03-20** and **ASB-D03-21**).

43. In the case of Dawson Mines, DERM considered a number of issues including:
    - The distance of the release points at the mine to the nearest large watercourse;
    - Release of water with salinity (EC) up to 3000uS/cm in dry ephemeral streams such a Kianga Creek;
    - The background water quality parameters in the streams surrounding the mine;
    - Downstream water quality in the Dawson River, being mindful of the DRAFT environmental values and water quality objectives for the Dawson River and the Lower Mackenzie;
    - 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

44. 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.

45. When making any decision under the EP Act, including whether to approve a draft TEP, DERM must consider the "Standard Criteria" (**ASB-D03-f01**) 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 earlier exhibit **ASB-D03-e02**) 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.

46. Furthermore, part 2 and 3 of the *Environmental Protection Regulation 2008* (EP Reg) (**ASB-D03-f02**) 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.

47. 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 Dawson TEPs 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 related to the decision to grant a TEP, however in conditioning the TEP, managing unacceptable risks to the environment was the major consideration.

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

48. DERM assessed potential impacts of discharges to the Kianga Creek receiving environment and the Dawson River regional water body. Assessment included cumulative impacts such as maintaining a window of opportunity for Baralaba Coal Project downstream to discharge, whilst, maintain appropriate water quality for downstream irrigators and the town water supplies for Baralaba, Woorabinda and Duaringa.

49. DERM also took into account releases from the Baralaba Coal Mine into the system along with background water quality parameters to ensure cumulative impacts were minimised and downstream water users were adequately protected.

50. 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.

51. The Dawson Mines 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

52. Refer to (a) in Item 3 for terms of TEPs issued and verbal advice from DERM.

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

53. Due to the limited rate of release, eg. less than 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.

j) Reasons for the decision given to the mine operator

54. The reasons for the decisions are contained within the request for statutory approval (**ASB-D03-12**).

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

55. Breaches occurred in relation to TEP MAN11600 for Dawson Central and North and MAN11500 for Dawson South on several occasions. The breaches included discharge from an authorised location, monitoring at an unauthorised location, exceeding downstream release limits, and reporting issues of timeliness and detail. Warning letters were issued to Dawson Central and North and Dawson South on 1 July 2011 (**ASB-D03-15** and **ASB-D03-16**). These breaches were not considered serious enough to warrant further action as it was determined that environmental harm had not occurred as a result.

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.

56. 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 *Environmental Protection (Water) Policy 2009* (EPP Water) (**ASB-D04-01**). Applications must be able to demonstrate that the management intent for the receiving water will be met despite the discharge occurring.

57. 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-D04-02**) 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-D04-03**) and associated procedural information (**ASB-D04-04** and **ASB-D04-05**). 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-D04-06**) which informs assessments and resultant authority conditions

58. 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. .

59. 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.

60. 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.

61. 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.

62. 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.

63. 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.

64. 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.

65. 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.

66. 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.

67. 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.

68. 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.

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

70. 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 there is no evidence to suggest that unacceptable environmental harm has resulted from any non compliant release.

71. 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. The only town water supplies potentially impacted by discharges from Dawson Mine are Baralaba Duaringa, Woorabinda, and Rockhampton.

72. 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 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

73. I am informed that the new Fitzroy Model Conditions are likely to provide Dawson Central and North mine with the flexibility to increase discharge of mine affected water when natural regional receiving environment flows are elevated.

74. Dawson South has indicated they are not planning to amend the current EA with the new Fitzroy Model Conditions.

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.

75. With regard to the Dawson Central and 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.

76. Additional discharge of mine affected water may prove advantageous where the Dawson Central and 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 available storage capacity for mine affected water for the upcoming wet season.

77. 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 benefits to individual mines from adoption of the new model conditions needs to be determined by the mine through relevant analysis

Item 7: any briefing (written or oral) given to any Minister or Director-General regarding a TEP or ED related to water management or non-compliance with an environmental authority at the mine and the reason for that briefing

78. To the best of my knowledge there were no specific written briefings provided to any Minister or Director General in relation to this mine. A number of general briefings were provided in relation to mines and the 10/11 wet season and these are attached as items **ASB-D07-01** to **ASB-D07-06**. A weekly report on TEPs was provided via email to key departmental and ministerial staff during the time period requested and a copy of the latest report provided prior to 20 July 2011 is attached as item **ASB-D07-07**. It is possible that there were other written briefing material provided during this period but this is the best information DERM staff were able to gather within the timeframe permitted for submission of this statement.

79. There were a significant number of oral briefings provided to the Minister for Climate Change and Sustainability and the Director General of DERM in relation to TEPs during the wet season period of which there are no written records. In general, these were primarily in relation to the mining/CSG industry as a whole and the number of TEPs issued or currently being assessed. Individual mines were discussed at several of these briefings but I am unable to provide an accurate transcript or meeting notes from these briefings.

Item 8: DERM's opinion as to whether the mine operator should be managing water at the Mine other than by storing it in dams or ponds, including by using desalination plants, purification procedures or any other means

80. To the best of my knowledge I believe that the storage of mine affected water at the Dawson Mines in dams, pits, and ponds is an appropriate management strategy and is consistent with the strategies used across the coal mining industry in Central Queensland.

81. The Dawson Mines are required as a condition of the relevant EA (Dawson South) (**ASB-D02-D02**) and water management conditions (Dawson Central and North) (**ASB-D02-01**) to provide adequate storage on site for mine affected water.

Item 9: an explanation of that which is involved in managing water at the Mine other than by storing it in dams or ponds, including by using desalination plants, purification procedures or any other means

82. On-site water management practices should be integrated with mining activities and should provide for the collection, storage and disposal of water on a mine site.

83. A site water management strategy should be developed for the whole mine site based generally on the following principles:
    a. Limiting the extent of site disturbance and limit catchment areas that report to site water management infrastructure;
    b. Recycling water in the process circuit or for other uses, such as dust suppression, as much as possible;
    c. Optimising the volume of water discharged from the site (having regard to the mass and concentration of contaminants expected to reach the receiving waters);
    d. Segregating water by quality or source and reducing contaminant concentrations in water where possible;
    e. Reducing contamination concentration by suitable treatment methods;
    f. Avoiding the accumulation of large volumes of contaminated water on-site;
    g. Applying appropriate risk assessment methods in the sizing and design of works;
    h. Undertake a risk assessment that meets with DERMs requirements when sizing and designing storage dams;
    i. Protecting groundwater resources from contamination;
    j. Designing a system able to accommodate staged development of the mine;
    k. Protecting the mine workings and infrastructure from floodwater inundation.

84. Mine affected water is used at Dawson Central and North for dust suppression and in the coal-washing plant. Mine affected water at Dawson South is also used for dust suppression.

85. The Dawson Mine is required to develop a Water Management Plan that details how the site will achieve best practice water management as detailed above. This plan is required as a condition of its EA to be reviewed twice each year prior to and following the wet season. The water management plan is also required to be made available to DERM when requested.

86. As part of an upcoming compliance inspection of the Dawson Mine, DERM will request a copy of the Water Management Plan be provided prior to officers inspecting the site.

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 1712526

13 September 2011

[redacted]
Assistant Crown Solicitor
Crown Law
GPO Box 5221
BRISBANE QLD 4001

Dear [redacted]

Department of Environment and Resources – 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 Hail Creek Mine, Dawson Mine, Callide Power Station, Rolleston Coal Mine and Moranbah CSG Project.
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 Century Mine

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].

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 1712484

13 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 Hail Creek Mine, Dawson Mine, Callide Power Station, Rolleston Coal Mine and Moranbah CSG Project:

1. Department of Environment and Resource Management (DERM) 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 mines during the 2010/2011 wet season, including:
   a. any concerns held by him or 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 any of the mines 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 mines, the downstream environment and safety issues

7. any briefing (written or oral) given to any Minister or Director-General regarding a TEP or ED related to water management or non-compliance with an environmental authority at the mine and the reason for that briefing

8. DERM's opinion as to whether the mine operator should be managing water at the Mine other than by storing it in dams or ponds, including by using desalination plants, purification procedures or any other means

9. an explanation of that which is involved in managing water at the Mine other than by storing it in dams or ponds, including by using desalination plants, purification procedures or any other means

With respect to the Callide Power Station only:

10. to the knowledge of DERM, the effects on the environment, drinking water quality and public health downstream of each of the Power Station sites (as far as the Great Barrier Reef Marine Park) as a result of discharges from Ash Dam B between 1 October 2010 and 30 July 2011

11. a description of the concerns surrounding Ash Dam B during the period 1 October 2010 to 30 July 2011, including:
    a. water level

b. dam safety
c. uncontrolled discharge
d. contaminants and hazardous waste in the contents of the dam

With respect to the Moranbah CSG Project only:

12. a description of any concerns regarding the potential for pond overtopping at the site between 1 October 2010 and 30 July 2011

13. an explanation of how the risks to the environment, drinking water quality and public health posed by the discharge of water from coal seam gas operations are different to those risks posed by the discharge of water from coal, gold or copper mining

14. an explanation of how the process of DERM assessing and deciding whether to grant a TEP is different for coal seam gas projects as compared to mines

15. an explanation of how consideration taken into account by DERM in assessing and deciding whether to grant TEP or ED is different for coal seam gas projects as compared to mines

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 1712531

13 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 Century Mine:

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. any briefing (written or oral) given to any Minister or Director-General regarding a TEP or ED related to water management or non-compliance with the water management provisions of the environmental authority at the mine and the reason for that briefing

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

8. 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

9. 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

10. DERM's opinion as to whether the mine operator should be managing water at the Mine other than by storing it in dams or ponds, including by using desalination plants, purification procedures or any other means

11. An explanation of that which is involved in managing water at the Mine other than by storing it in dams or ponds, including by using desalination plants, purification procedures or any other means

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 mine

- 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 the mine operator, 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

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.

P. Holmes

Commissioner
Justice C E Holmes

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		Monitoring 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 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.	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		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		**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		**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		**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 managem ent 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	[redacted]	**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	[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 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		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		None – only conditions of EA	

Mine	authorised 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 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	
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		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	[redacted]	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-C35) 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	[redacted]	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		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	[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.						
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	[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.						
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							
Olive Downs, New Lenton			L	L	L	[redacted]		Not operational

Water Inspections – Program Plan
November 2010

Pre inspection
Review EA, Water Management Plan and Receiving Environment Management Plan to gain basic understanding water management arrangements on site.

Inspection Focus: Water management
ES Mining Staff

- Water storage monitoring locations – water storages associated with release points, as defined in the Environmental Authority, Table W5
- All release points on sites – water levels in associated dams (Regulated dams MRL's), discuss water quality and review available data,
- All water monitoring locations – accessible in wet weather, requirement for stream flow gauges, telemetry systems, automatic samplers
- All receiving waters (upstream and downstream) as defined in the Environmental Authority

Assistance Staff

- identify water storages that may have the potential for uncontrolled discharges through the failure to contain water and embankment failure.
- Identify spillway capacity for water storages and determine appropriateness of capacity.

Post Inspection
ES Mining Staff

- Develop brief inspection report
- Correspondence to Mines identify areas of concern/outcomes of inspection

Assistance Staff

- Provision of technical information to facilitate the drafting of a brief inspection report.

Inspections are scheduled for early for November, please see attached calendar, * indicates requirement for assistance staff.

November 2010

Mon	Tue	Wed	Thu	Fri	Sat	Sun
1 Millennium/RMIJV (LP, GH)	2	3	4 Goonyella Riverside (CM, RB) O/N	5 Norwich Park (CM,RB)	6	7
8 Carborough / Moorvale (GW, TR) O/N	9 Coppabella (GW, TR) O/N Callide (FC, MJ) O/N	10 Dawson Central (TF, MJ)	11 Blair Athol/ Clermont (GH, RB)	12	13	14
15	16 Hail Creek (TR,GB) O/N Blackwater (CM/DL)	17 Ensham (GW/DL) LR O/N EMD	18 Cook/ Kestrel (GH/MJ) South Walker (LP, LR) O/N	19 Burton (TR,GB) Minerva (GH/MJ) North Goonyella (LP, LR) LR O/N EMD	20	21
22	23Peak Downs (RB*) O/N	24Saraji (RB*)	25	26	27	28
29	30					

File/Ref

[Insert Date]

[Reply Name] [CC: Name]
[Reply Address]
[Suburb State Postcode]

Dear [Miss/Mrs/Ms/Mr Surname] / Attention: [use attention if the letter is for someone other than who it is addressed to]

Compliance Inspection to be conducted for <INSERT activity> at <INSERT premises>

Officers of the Department of Environment and Resource Management (the department) 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.

Officers of the department will be visiting your site on <insert date > to conduct a compliance inspection in regards to your Environmental Authority (EA) issued under the *Environmental Protection Act 1994*. This inspection will specifically address the on-site water management systems for <insert mine name> and conditions relating to Department Interest - Water in EA MIN<number>.

Please arrange to have the appropriate company personnel on site for this inspection, and have all environmental records and documents available for inspection. Officers of the department 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 <insert timeframe>.

Should you have any further enquiries, please do not hesitate to contact [Miss/Mrs/Ms/Mr Firstname Surname, Position] of the department on telephone [number, i.e. (07) 4980 6200].

Yours sincerely,

[Insert Signing Officer's name]
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

File/Ref

[Insert Date]

[Reply Name] [CC: Name]
[Reply Address]
[Suburb State Postcode]

Dear [Miss/Mrs/Ms/Mr Surname] / Attention: [use attention if the letter is for someone other than who it is addressed to]

Wet season preparation status

The Department of Environment and Resource Management (the department) is writing to you as a holder of a Level 1 Non-code Compliant Environmental Authority, MIN<insert number>, for <insert mine name>.

As you may be aware, and may have already experienced on site, the impending wet season is expected to occur in the Central West Region over the coming months. The department suggests that you review your water management system prior to the upcoming wet season to ensure that its operation will be in compliance with <insert number> and the *Environmental Protection Act 1994*. 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.

If it is anticipated that <insert mine name>may be unable to comply with the current conditions of MIN<insert number>, a representative from the site should immediately contact the department to discuss these issues.

Should you have any further enquiries, please do not hesitate to contact [Miss/Mrs/Ms/Mr Firstname Surname, Position] of the department on telephone [number, i.e. (07) 4980 6200].

Yours sincerely,

[Insert Signing Officer's name]
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

ANGLO COAL

DAWSON

Anglo Coal (Dawson) Pty Ltd

[redacted]
Safety and People Manager

Direct Fax: [redacted]
Direct Line:
e-mail: [redacted]

30th November 2009

[redacted]
Senior Environmental Officer
Department of Environment and Natural Resources (DERM)
Central West Region (Gladstone)
PO Box 5065
GLADSTONE QLD 4680

[redacted]

RE: **Final Model Water Conditions for Plan of Operations Attachment 2 - Dawson Central and North.**

Following receipt of the Department of Environment and Natural Resources (DERM) correspondence on the 27th November 2009 regarding the request to finalise the draft Model Water Conditions in the amendment to the Dawson North and Central Plan of Operations, please find attached the Model Water Conditions prepared for signing on 3rd December 2010.

I trust this helps in assisting your department with the amendment of our Dawson South environmental authority by December 2009. Should you wish to discuss or seek additional information, please feel free to get in contact wit[redacted]

Yours sincerely,

[redacted]
Safety and People Manager
Dawson Mine

Encl.: Final Water Model Conditions

Departmental Interest: Water

Contaminant Release

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 W1: Contaminant Release Points, Sources and Receiving Waters* and depicted on *Attachment 2: Authorised Discharge Points – Anglo Coal (Dawson South) Pty Ltd* attached to this environmental authority.

Table W1: Contaminant Release Points, Sources and Receiving Waters

Release Point (RP)	Latitude (GDA94)	Longitude (GDA94)	Contaminant Source and Location	Monitoring Point	Receiving waters description
RP DS01T	-244947.2	1495950.2	Industrial Dam (WA-DS01T) located west of Dawson South mining operations.	End-of-pipe	Defined ephemeral stream channel draining to the Dawson River

W3 The release of contaminants to waters must not exceed the release limits stated in *Table W2: Contaminant Release Limits* when measured at the monitoring points specified in *Table W1: Contaminant Release Points, Sources and Receiving Waters* for each quality characteristic.

W4 The release of contaminants to waters from the release points must be monitored at the locations specified in *Table W1: Contaminant Release Points, Sources and Receiving Waters* for each quality characteristic and at the frequency specified in *Table W2: Contaminant Release Limits* and *Table W3: Release Contaminant Trigger Investigation Levels*.

Table W2: Contaminant Release Limits

Quality Characteristic	Interim Release Limits for all mines (limits to apply from the date of issue)	Future Release Limits from 31 December 2009 Note: These future limits will apply from a yet to be negotiated date using alternative numbers that will be derived from the information gathered by any combination of the following: (1) the results of near field monitoring; (2) any studies or investigations carried out in accordance with recommendations 2 & 3 of the Cumulative Impact Study on water quality in the Fitzroy River Basin; (3) any review of the QLD Water Quality Guidelines; (4) other relevant information. *Note: This information should be available by the end of 2011 if not before and when it becomes available limits will be determined for each mine site based on the environmental values to be protected and in accordance with criteria below.*	Monitoring frequency	Comments
Electrical conductivity (uS/cm)	1500	Future limit to be determined to achieve aquatic ecosystem protection (no drinking water value): An end-of-pipe limit to achieve in the range 0 to 1000 EC in the receiving waters - for mines in the upper catchments must have natural flow i.e. the 20th percentile flow trigger.	Daily during release	
pH (pH Unit)	6.5 (minimum) 9.0 (maximum)	6.5 (minimum) 9.0 (maximum)	Daily during release	
Turbidity (NTU)	660	660	Daily during release*	Turbidity is required to assess ecosystems impacts and can provide instantaneous results
Suspended Solids (mg/L)	400	Limit to be determined based on receiving water reference data and achievable best practice sedimentation control and treatment	Daily during release*	Suspended solids are required to measure the performance of sediment and erosion control measures.
Sulphate (SO_4^{2-}) (mg/L)	400	Limit to be determined	Daily during release*	Drinking water environmental values from NHMRC 2006 guidelines OR ANZECC & ARMCANZ 2000 stock water quality guidelines.

** local trigger values need to be developed*

Table W3: Release Contaminant Trigger Investigation Levels

Quality Characteristic	Trigger Levels (ug/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 the 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 (Inorganic)	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	1000	*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 W3: Release Contaminant Trigger Investigation Levels will be reviewed once the results of the monitoring data is gathered for the interim period until 31 December 2011 or on earlier date if the data is, or becomes, available and if its is determined that there is no need to monitor for certain individual quality characteristics these can be removed from Table W3: Release Contaminant Trigger Investigation 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.

OA

W5 If quality characteristics of the release exceed any of the trigger levels specified in *Table W3: 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 W3: 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 W3: 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 exceedance 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 exceedance 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 W4: Contaminant Release during Flow 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 W4: Contaminant Release during Flow Events* for the contaminant release point(s) specified in *Table W1: Contaminant Release Points, Sources and Receiving Waters.*

Table 4: Contaminant Release during Flow 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
Dawson River	RP-DS01T	AQ-DS01T	-244947.2	1495950.2	> or = 2m³/sec	Continuous (minimum daily)

W9 Contaminant release flow rate must not exceed twenty percent (20%) 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 W1: Contaminant Release Points, Sources and Receiving Waters.*

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 point/s;
d) release volume (estimated);
e) receiving water/s 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 Exceedance

W14 If the release limits defined in *Table W2: 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.

AA

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 W5: Water Storage Monitoring* which are associated with the release points must be monitored for the water quality characteristics specified in *Table W6: Onsite Water Storage Contaminant Limits* at the monitoring locations and at the monitoring frequency specified in *Table W5: Water Storage Monitoring.*

Table W5: Water Storage Monitoring

Water Storage Description	Latitude (GDA94)	Longitude (GDA94)	Monitoring Location	Frequency of Monitoring
WA-DS01T	-244918.92	1500142.3	Industrial Dam located west of Dawson South mining operations	Quarterly

W17 In the event that water storages defined in *Table W5: Water Storage Monitoring* exceed the contaminant limits defined in *Table W6: Onsite Water Storage Contaminant Limits*, the holder of the environmental authority must implement measures, where practicable, to prevent access to waters by all livestock.

Table W6: Onsite Water Storage Contaminant Limits

Quality Characteristic	Test Value	Contaminant Limit
pH (pH unit)	Range	Greater than 4, less than 9[2]
EC (µS/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 W8: Receiving Water Upstream Background Sites and Downstream Monitoring Points* for each quality characteristic and at the monitoring frequency stated in *Table W7: Receiving Waters Contaminant Trigger Levels*.

CAA

Table W7: 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)	400		
Sulphate (SO_4^{2-}) (mg/L)	400		

Table W8: Receiving Water Upstream Background Sites and Downstream Monitoring Points

Monitoring Points	Receiving Waters Location Description	Latitude (GDA94)	Longitude (GDA94)
Upstream Background Monitoring Points			
AQ-DS01R	Dawson River main channel 1.4 kilometres upstream of confluence with release water channel (i.e. channel initially receiving water from RPDS01T) – at Theodore Nth	-240539.21	1500020.9
Downstream Monitoring Points			
AQ-DS01T	Dawson River main channel 4.5 kilometres downstream of confluence with release water channel (i.e. channel initially receiving water from RPDS01T) – at Woodleigh guage	-244955.7	1495830.52

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 W7: 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:

   a) details of the investigations carried out; and

   b) actions taken to prevent environmental harm.

Note: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with W19(2)b) 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 3 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 waters of the Dawson River and connected major tributaries within 50km 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 W3: 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 W2: 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 W8: 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 two (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.

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 for those contaminants monitored and the suitability of current discharge limits to protect downstream environment values.

Water General

W23 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 **twenty-four (24) 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 **W23** 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.*

W24 The release of contaminants directly or indirectly to waters:

a) must not produce any visible discolouration of receiving waters; nor
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

W25 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 exceedances 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

W26 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 Environment and Resource Management *Guideline - Activities in a Watercourse, Lake or Spring associated with Mining Activities.*

Water Management Plan

W27 A Water Management Plan must be developed and implemented by **3 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.

W28 The Water Management Plan must be developed in accordance with DERM *Guideline for Preparing a Water Management Plan 2009* (to be developed by 1 October) 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.

W29 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.

W30 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

W31 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

W32 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

W33 An Erosion and Sediment Control Plan must be developed by an appropriately qualified person and implemented for all stages of the mining activities on the site to minimise erosion and the release of sediment to receiving waters and contamination of stormwater.

W34 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 receiving waters.

W35 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 receiving waters.

All Dams

W36 The hazard category of each dam must be determined by a suitably qualified and experienced person at least once in each two year period.

W37 Dams having a hazard category determined to be significant or high, must be specifically authorised by an environmental authority.

CM

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

Queensland Government

W38 The holder of this environmental authority must ensure that dams are designed, constructed, operated and maintained in accordance with accepted engineering standards.

W39 The condition of dams must be monitored for early signs of loss of structural or hydraulic integrity based on the advice of a suitably qualified and experienced person.

W40 In the event of early signs of loss of structural or hydraulic integrity, the holder of this environmental authority must take action to prevent or minimize any actual or potential environmental harm; and report any findings and actions taken to the administering authority.

W41 The holder of this environmental authority must not abandon any dam, but must decommission each dam to a situation where ongoing environmental harm is prevented.

W42 As a minimum, dams must be decommissioned such that they:

a) no longer contain flowable substances;
b) become stable landforms; and
c) comply with the rehabilitation requirements of this environmental authority.

W43 The holder of this environmental authority must ensure that activities conducted in accordance with this environmental authority do not compromise the integrity of a dam, whether or not that dam is under the control of the holder.

W44 The spillway for industrial dams, environmental dams and sediment dams constructed or operated within the operational land must be sized for a spillway critical design storm with a 100 year ARI and the capacity of industrial dams must be sized for a 100 year ARI 24 hour rainfall event.

Erosion control

W45 All reasonable and practicable erosion protection measures and sediment control measures must be implemented and maintained to minimise erosion and the release of sediment.

Groundwater

W46 Groundwater, affected by the mining activities must be monitored at the frequencies defined in *Table W9: Ground water monitoring locations, frequency and parameters* and at the locations generally in accordance with –*Attachment 3: Water monitoring locations*.

Table W9: Groundwater monitoring locations, frequency and parameters

Monitoring point	Monitoring frequency (once every)	Parameters
GW1	3 months	Depth to water; TDS (mg/L); EC (µS/cm); and Sulphate (mg/L).
GW2		
GW3		
GW4		

Note: The locations of the groundwater monitoring bores will be generally as indicated in Attachment 3: Water monitoring locations. The Plan of Operations will indicate groundwater monitoring bore locations more precisely.

W47 Subject to requirements of condition **W46**, groundwater levels must be monitored and groundwater draw down fluctuations in excess of 2 m per year, not resulting from the pumping of licensed bores, must be notified within 14 days to the administering authority following completion of monitoring.

W48 Complete an investigation into groundwater on the surface area of ML6667 and submit a report to the administering authority proposing revised monitoring program to identify the impact of mining and spoil management on the groundwater quality by **30 June 2012**. The investigation is to include an assessment of the hydraulic characteristics of the alluvium in the near the Dawson River and determine potential for seepage between the alluvium and the final void.

W49 The method of sampling of groundwater must comply with that set out in the latest edition of the administering authority's Water Quality Sampling Manual.

Fitzroy River Basin Study

W50 The administering authority and the holder of this environmental authority both acknowledge that the conditions for release of contaminants to the Dawson 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) QLD 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.

FOLIO GLT958
GLT20 11 / 883.

GLT 958

AngloAmerican

METALLURGICAL COAL

Anglo American Metallurgical Coal Pty Ltd

201 Charlotte Street
Brisbane 4000 Australia
GPO Box 1410
Brisbane 4001 Australia

Christopher Loveday
Manager (Environmental Services – Mining)
Central West Region
Department of Environment and Resource Management
Ground Floor 136 Goondoon Street
PO Box 5065
Gladstone Qld 4680

28th January 2011

Dear Mr Loveday

Please accept the following as a response to your letter regarding the compliance inspection conducted for water management systems at Dawson South Mine, your reference GLT1041. In this letter it was requested that Dawson Mine respond with the details of actions that Dawson Mine is taking to address the risks identified. Each identified risk is listed below with details of the associated actions being undertaken to mitigate them.

'Industrial Dam South was close to full capacity with EC of 3790uS/cm'

- During the inspection it was noted that the Industrial Dam South did appear to be quite full, however it should be noted that this is a large storage facility with a relatively small catchment.
- The water level in this dam (and the other three licenced release dams) is monitored on a fortnightly basis at the site water meeting to ensure that enough freeboard is maintained in the dam to contain a 1 in 20 year ARI 24hr duration rainfall event. The DERM inspector conducting the compliance inspection was shown the "Water Board" at the time of the inspection which contained graphs and associated documentation resulting from the fortnightly meetings.
- Dawson Environmental Personnel at the conclusion of the inspection as per request from DERM inspector reviewed RL levels for the four release dams to ensure that the data was accurate. This review indicated that the data was accurate and it was found that at the time of inspection there was enough freeboard in Industrial Dam South to contain the 1 in 20 year event.
- Pumping from this dam back to an onsite storage facility has continued, and recently been augmented with the installation of additional pumping infrastructure.
- Following the significant rain that was received in December 2010, a successful compliant release was conducted. The combined result of pumping back to site and the compliant release of water from this dam, has resulted in the water level and perceived risk of non-compliant water release, now being further reduced.

AngloAmerican

'Roads to the release point and monitoring points for Industrial Dam South were inaccessible during significant rainfall events'

- Dawson Mines acknowledges that during significant rainfall events access to not only monitoring sites may become inaccessible but to the site itself. This is as a result of roads being closed by council and the condition of the tracks accessing the monitoring points.
- Dawson Mines has installed automatic water quality monitoring stations at a number of locations across the operations. Those stations providing data relating to Dawson South are:
    - AQ-DS01R (Dawson River upstream of release);
    - WA-DS01T Dawson South Industrial Dam; and
    - AQ-DS01T (Dawson River downstream of release).
- These stations communicate in-situ water quality results back to the Dawson Mines main office via radio telemetry.
- Following the significant rain that was received in December 2010 Dawson Mines successfully obtained a TEP for the discharge of water from Industrial Dam South to the Dawson River. Part of the TEP conditions was that an alternative monitoring site was allocated and has been documented as AQ-DS01A. This alternate monitoring site will now be sampled when access to monitoring station AQ-DS01R becomes impassable during a rain event.

'It was discussed during the inspection that telemetry systems are in place to monitor residual water storage capacity'

- WA-DS01T Dawson South Industrial Dam is fitted with a level sensor that reports back to the office via radio telemetry.

Please do not hesitate to contact either myself or [redacted] Environmental Officer on [redacted] if there are any questions or concerns regarding this responses.

Thank you to yourself and your staff for conducting this inspection and assisting Dawson Mine with it's commitment to continual improvement of the water management system.

Yours sincerely

[redacted]
Environmental Superintendent
Anglo American Metallurgical Coal
Dawson Mine
T: [redacted]
E: [redacted]
www.angloamerican.com.au

GLT ~~952~~ / 958

AngloAmerican

METALLURGICAL COAL

Anglo American Metallurgical Coal Pty Ltd

201 Charlotte Street
Brisbane 4000 Australia
GPO Box 1410
Brisbane 4001 Australia

Christopher Loveday
Manager (Environmental Services – Mining)
Central West Region
Department of Environment and Resource Management
Ground Floor 136 Goondoon Street
PO Box 5065
Gladstone Qld 4680

28th January 2011

Dear Mr Loveday

Please accept the following as a response to your letter regarding the compliance inspection conducted for water management systems at Dawson North and Central Mine, your reference GLT952. In this letter it was requested that Dawson Mine respond with the details of actions that Dawson Mine is taking to address the risks identified. Each identified risk is listed below with details of the associated actions being undertaken to mitigate them.

'14 Dam appeared to be at full capacity with EC of 3536uS/cm'

- During the inspection it was noted that the Industrial Dam South did appear to be quite full due to water level at the spillway.
- The water level in this dam (and the other three licenced release dams) is monitored on a fortnightly basis at the site water meeting to ensure that enough freeboard is maintained. The DERM inspector conducting the compliance inspection was shown the "Water Board" at the time of the inspection which contained graphs and associated documentation resulting from the fortnightly meetings.
- Dawson Environmental Personnel at the conclusion of the inspection as per request from DERM inspector reviewed RL levels for the four release dams to ensure that the data was accurate. This review indicated that the data for the RL of 14 Dam spillway was in fact incorrect. This amended RL was then used to recalculate the freeboard level within 14 Dam.
- As a result an action to install an open diversion drain into a non operational pit was put in place to effectively eliminate the potential risk of a non-compliant release due to passive discharge from this dam. This diversion drain has now been completed.

'Industrial Dam North contained EC levels of 1900uS/cm'

- The water level in this dam (and the other three licenced release dams) is monitored on a fortnightly basis at the site water meeting to ensure that enough

AngloAmerican

freeboard is maintained. The DERM inspector conducting the compliance inspection was shown the "Water Board" at the time of the inspection which contained graphs and associated documentation resulting from the fortnightly meetings.

- By maintaining sufficient freeboard in Industrial Dam North enables adequate dilution during a large rainfall event thus the risk of a non-compliant release is effectively reduced to within licence discharge limits.

'Roads to some monitoring points for Industrial Dam North were inaccessible during significant rainfall events'

- Dawson Mines acknowledges that during significant rainfall events access to not only monitoring sites may become inaccessible but to the site itself. This is as a result of roads being closed by council and the condition of the tracks accessing the monitoring points.
- Dawson Mines has installed automatic water quality monitoring stations at a number of locations across the operations. Those stations providing data relating to Dawson North are:
    - AQ-DN01T;
- These stations communicate in-situ water quality results back to the Dawson Mines main office via radio telemetry.
- Following the significant rain that was received in December 2010 Dawson Mines has applied for a TEP to discharge water from the Dawson North Pit via the Industrial Dam North into Kianga Creek. As part of this application an alternative monitoring site was allocated and has been documented as AQ-DN01A. This alternate monitoring site will now be sampled when access to monitoring station points become impassable during a rain event.

'It was discussed during the inspection that telemetry systems are in place to monitor residual water storage capacity'

- There are several storages that have telemetry systems that report water level and quality. These sites were installed selectively on the licensed discharge dams that have the greatest risk of discharge. The telemetry systems at these sites enables more frequent monitoring of the higher risk sites, effectively reducing the level of risk of a non-compliant discharge.

Please do not hesitate to contact either myself or Brian Barry, Environmental Officer on [redacted] if there are any questions or concerns regarding this response.

Thank you to yourself and your staff for conducting this inspection and assisting Dawson Mine with it's commitment to continual improvement of the water management system.

AngloAmerican

Yours sincerely

[redacted]

Environmental Superintendent
Anglo American Metallurgical Coal
Dawson Mine
T: [redacted]
E: [redacted]
www.angloamerican.com.au

ecoaccess
environmental licences and permits

Environmental Services - Mining

Transitional environmental program certificate of approval number MAN11500

This certificate of approval is issued by the administering authority pursuant to section 333 of the Environmental Protection Act 1994. *A 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:

Anglo Metalurgical Coal (Dawson South) Pty Ltd
Dawson Mine
Dawson Highway
PO Box 225
Moura Qld 4718

approving the voluntary Transitional Environmental Program (TEP); titled *Draft Transitional Environmental Program under Section 333 of the Environmental Protection Act 1994,*for potential non-compliance with conditions of Environmental Authority (EA) MIN100510607. The TEP is to be undertaken for management of mine affected water at the Dawson South Coal Mine, Mining Leases (ML) 5657, ML80160, and ML80161.

The application for a voluntary TEP titled *Draft Transitional Environmental Program under Section 333 of the Environmental Protection Act 1994* was received electronically by the department on 4 January 2011.

The voluntary Transitional Environmental Program is approved, subject to 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 under the *Environmental Protection Act 1994.*

2 The release of contaminants to waters must only occur from the release point specified in *Table 1: Dawson South Discharge Location* and depicted below on Figure 1.

3 The release of contaminants to waters must not exceed the release limits stated in Table 2 at the monitoring point specified in *Table 1: Dawson South Discharge Location and Table 2: Contaminant Release Limits* of this Transitional Environmental Program – Certificate of Approval.

4 The release of contaminants to waters from the release point must be monitored at the location specified in Tables 1 and 3 of this TEP – Certificate of Approval.

5 If quality characteristics of the release exceed any trigger levels specified in *Table 5: Receiving water trigger investigation levels* during a release event, the Certificate of Approval holder must compare the downstream results in the receiving waters identified in *Table 6: Flow Measurement Locations during*

Queensland Government

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

discharge events to the trigger values specified in *Table 5: Receiving water trigger investigation levels* 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: Receiving water trigger investigation levels* 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 certificate holder of the TEP must notify the administering authority within 24 hours of receiving the result. The notification must include written verification of the exc[redacted]uthority either via facsimile [redacted] or email to [redacted]

Table 1: Dawson South Discharge Location.

Release Point (RP)	East. GDA94	North. GDA94	Contaminant Source	Monitor Point	Receiving Waters
RP DSO1T	-244947.2	1495950.2	Industrial Dam	End of pipe	Dawson River

Table 2: Contaminant Release Limits.

Quality characteristic	Release Limit	Monitoring Frequency	Sample Type	Monitoring Point
Electrical conductivity (uS/cm)	4500 (Dawson River)	Daily during release (the first sample must be taken within 2 hours of commencement of release)	*In situ*[1]	During release from the discharge location listed in Table 1; *when background flow is >=10m³/sec.*
			Samples require laboratory analysis[2]	
	510 (AQ-DS01A)	Daily during release (the first sample must be taken within 12 hours of commencement of release)	*In situ*[1]	During release from the discharge location listed in Table 3
			Samples require laboratory analysis[2]	
pH (pH Unit)	6.5 (minimum) 9.5 (maximum)	Daily during release (the first sample must be taken within 2 hours of commencement of release)	*In situ*[1]	During release from discharge location listed in Table 1.
			Samples require laboratory analysis[2]	

Turbidity (NTU)	1000	Daily during release (the first sample must be taken within 2 hours of commencement of release)	*In situ*[1]	During release from discharge location listed in Table 1.
[3]*Total Suspended Solids (mg/l)*	500	Daily during release (the first sample must be taken within 2 hours of commencement of release)	Samples require laboratory analysis[2]	During release from discharge location listed in Table 1.
Sulphate (SO_4^{2-}) (mg/l)	1000	Daily during release (the first sample must be taken within 2 hours of commencement of release)	Samples require laboratory analysis[2]	During release from discharge location listed in Table 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 Transitional Environmental Program.*
[3] *Only required in the event Turbidity measurements are not available.*

Table 3: Receiving Water Upstream Background Sites and Downstream Monitoring Points.

Monitoring Points	Receiving Waters Location Description	Northing (GDA94)	Easting (GDA94)	Monitoring frequency
Upstream Background Monitoring Points				
AQ-DS01R	Dawson River Main Channel 1.4 km upstream of confluence with release water channel	-240539.21	1500020.9	Daily during discharge
Downstream Monitoring Points				
AQ-DS01T	Dawson River Main Channel 4.5 km downstream of confluence with release water channel	-244955.7	1495830.52	Daily during discharge
AQ-DS01A	Dawson River Main Channel 12 km downstream of AQ-DS01T	-244755.0	1495819.6	Daily during discharge

Table 4: Receiving Water Contaminant Limit.

Quality characteristic	Release Limit	Monitoring Frequency	Sample Type	Monitoring Point
Electrical conductivity (*u*S/cm)	1500 (maximum)	Commencement of release (within 12 hours of release event) and thereafter daily during release	*In situ*[1]	AQ-DS01T
			Samples require laboratory analysis[2]	
	510 (maximum)	Commencement of release (with 12 hours of release event) and thereafter daily during release	*In situ*[1]	AQ-DS01A.
			Samples require laboratory analysis[2]	

pH (pH Unit)	6.5 (minimum) 9.5 (maximum)	Commencement of release (within 12 hours of release event) and thereafter at the monitoring frequency listed in Table 3	*In situ*[1] Samples require laboratory analysis[2]	From Receiving Waters sites listed in Table 3.
Suspended solids (mg/L)	400	Commencement of release (within 12 hours of release event) and thereafter at the monitoring frequency listed in Table 3	Samples require laboratory analysis[2]	From Receiving Waters sites listed in Table 3.
Sulphate (SO_4^{2-}) (mg/L)	400	Commencement of release (within 12 hours of release event) and thereafter at the monitoring frequency listed in Table 3	Samples require laboratory analysis[2]	From Receiving Waters sites listed in Table 3.

[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.*

Table 5: Receiving water trigger investigation levels.

Quality characteristic[1]	Trigger levels (µg/L)	Monitoring frequency	Monitoring Point
Aluminium	100	Commencement of release (within 12 hours of release event) and thereafter weekly during release	During release from discharge locations listed in Table 1.
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	1000		
Nitrate	1100		
Petroleum hydrocarbons (C6-C9)	20		
Petroleum hydrocarbons (C10-C36)	100		
Fluoride (total)	2000		

[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.*

Table 6: Flow Measurement Location during discharge events.

Receiving waters	Release point (TEP RP)	Gauging station description	Northing (GDA94)	Easting (GDA94)	Minimum flow in receiving water required for a release event	Flow recording frequency
Dawson River	RP-DS01T	AQ-DS01T (Downstream Water Quality)	-244955.7	1495830.52	= > $10m^3$/sec	Continuous (minimum daily)

Contaminant Release Events

7 Notwithstanding any other condition of this TEP – Certificate of Approval, the release of contaminants to waters must only take place during periods of natural flow events specified as minimum flow in *Table 6: Flow Measurement Location during discharge events* for the contaminant release point(s) specified in *Table 1: Dawson South Discharge Location.*

8 The TEP certificate holder must operate and maintain a stream flow gauging station to determine and record stream flows at the locations specified in *Table 6: Flow Measurement Location during discharge events* for any receiving waters into which a release occurs.

9 Notwithstanding any other condition of this TEP, the release of contaminants to waters must only take place from the discharge locations identified in Table 1 at a maximum rate of 100ML per day.

10 The daily quantity of contaminants released from each release point must be measured and recorded at the release points identified in *Table 1: Dawson South Discharge Location.*

Notification of Release Events

11 The TEP certificate holder must notify the administering authority as soon as practicable (within no later than 6 hours of having commenced deliberately releasing mine affected water to the receiving environment from an authorised discharge point, and no later than 12 hours after any uncontrolled release from an authorised discharge point). Notification must include the submission of written advice 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) the 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).

12 The TEP certificate holder must provide the administering authority, daily during the release of mine affected water, information on the release of contaminants to waters. The information must be provided in writing (either via facsimile [redacted] or email to [redacted] and include the following:

a) all in situ monitoring data for that day
b) the receiving water flow rate
c) the release flow rate
d) the volume of water released from the release point.

13 The TEP certificate holder must provide the administering authority, weekly during the release of mine affected water, information on the release of contaminants to waters. The information must be provided in writing (either via facsimile [redacted] or email to [redacted] and include the following:

a) all in situ monitoring data for that week
b) the range of receiving water flow rate
c) the range of release flow rate
d) the total volume of water released from the release point.

14 The TEP certificate 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 11 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 TEP (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

15 If the release limits defined in Table 2 are exceeded, the certificate holder of the TEP must notify the administering authority within 24 hours of receiving the results.

16 The TEP certificate holder must, within 28 days of a release that exceeds the conditions of this TEP – Certificate of Approval, 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.

Erosion and Sediment Control

17 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.

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

19 The certificate holder of this TEP 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 TEP. 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.

Requirements to cease the release of mine affected water

20 The release of mine affected waters must cease immediately if any water quality limit as specified in *Table 4: Receiving Water Contaminant Limit* is exceeded.

21 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.

22 The release of mine affected waters must cease immediately if the certificate holder of this TEP is directed to do so by the administering authority.

23 The release of mine affected waters authorised under this TEP must cease by **13 May 2011**. If above average wet conditions continue beyond that date, the TEP may be extended for an additional length of time agreed to by Anglo Coal Dawson South and the department.

Monitoring Requirements

24 Where monitoring is a requirement of this TEP, ensure that a competent person(s) conducts all monitoring.

25 All monitoring undertaken as a requirement of this TEP must be undertaken in accordance with the administering authority's Water Sampling Manual.

Notification of emergencies, incidents and exceptions

26 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 TEP, the administering authority must be notified of the release by telephone, facsimile or email.

27 The notification of emergencies or incidents must include but not be limited to the following:
- a) the holder of the TEP
- b) the location of the emergency or incident
- c) the number of the TEP
- d) the name and telephone number of the designated contact person
- e) the time of the release
- f) the time the holder of the TEP 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.

28 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.

Reporting

29 The certificate holder of this TEP must submit a report to the administering authority on the fifth business day of each month detailing:
- a) all activities undertaken under the TEP,
- b) b) how the TEP certificate holder has met the objectives of the TEP, 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 TEP certificate holder has complied with all conditions contained within the TEP – Certificate of Approval.

30 The certificate holder of this TEP must submit a report to the administering authority by **14 June 2011** including:
- a) details of the completion of the TEP,
- b) details on all activities undertaken under the TEP,
- c) identification of how the TEP certificate holder has met the objectives of the TEP, 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 TEP certificate holder has complied with all conditions contained within the TEP – Certificate of Approval, and
- e) confirmation that at closure of the TEP, the certificate holder will be able to comply with the conditions of the current Environmental Authority MIN100510607 issued for the Dawson South Coal Mine, located at ML5657, ML80161, and ML80162 and the *Environmental Protection Act 1994*.

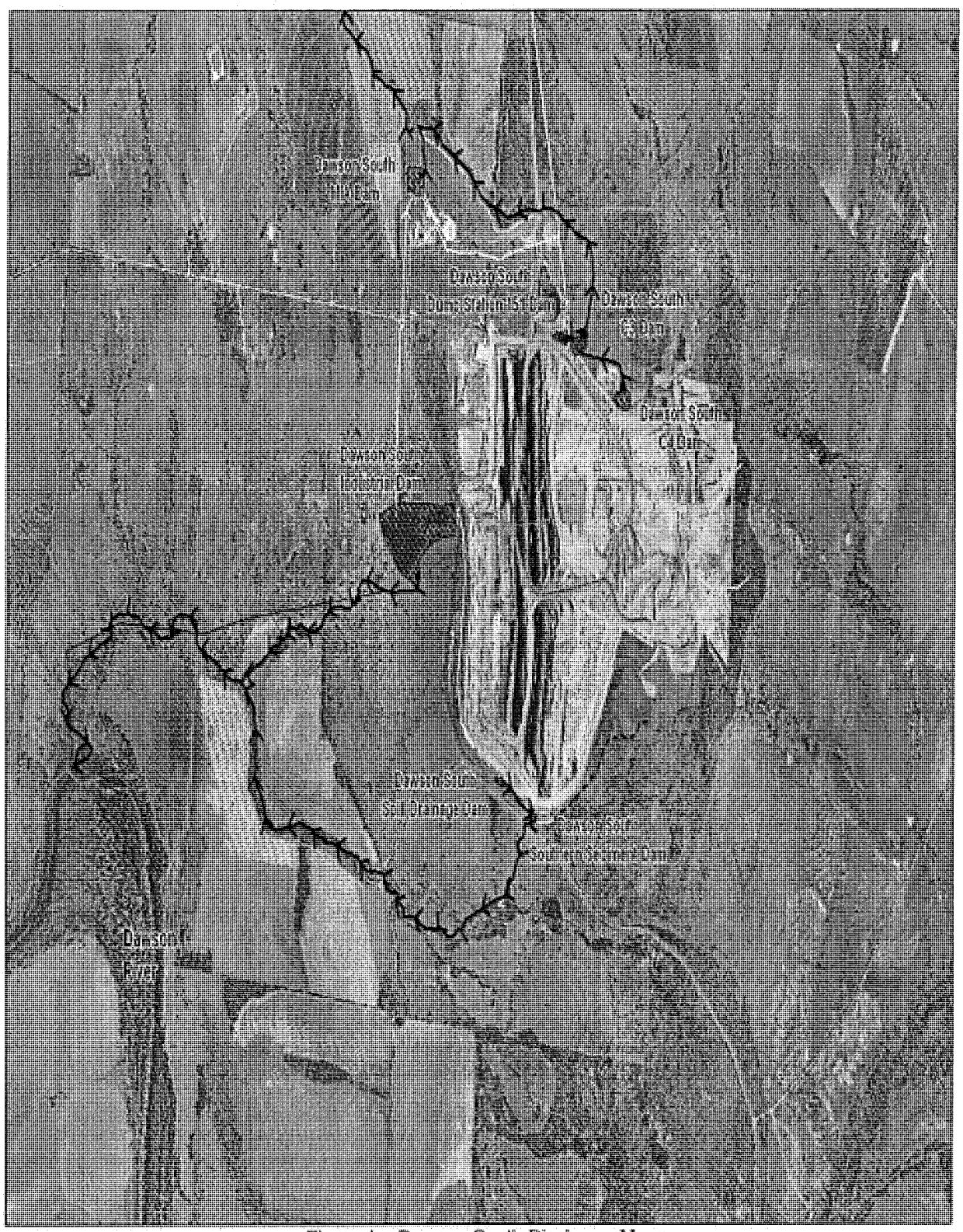


Figure 1 – Dawson South Discharge Map

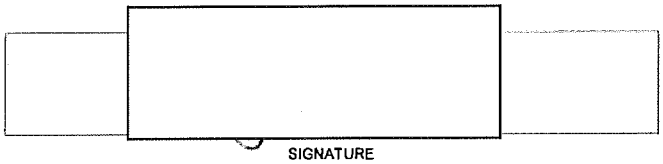
Notice

Transitional environmental program certificate of approval

This transitional environmental program remains in force until **30 June 2011**.

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, Christopher Loveday of the department on telephone number [redacted] would be happy to assist you.



SIGNATURE

13 January 2010

DATE

Christopher Loveday
Delegate of the Administering Authority
Regional Manager (Environmental Services - Mining)
Central West Region

Enquiries:
Department of Environment and Resource Management
PO Box 19
EMERALD QLD 4720
Phone: 4980 6200
Fax: 4982 2568

ecoaccess
environmental licences and permits

Notice

Environmental Services - Mining

Decision to grant an approval for a draft transitional environmental program

This statutory notice is issued by the administering authority pursuant to section 340 of the Environmental Protection Act 1994, *to advise you of a decision or action.*

Anglo Coal (Dawson) Pty Ltd
Attention [redacted]
Dawson Mine
Dawson Highway
Moura Qld 4718

Your reference: Voluntary Transitional Environmental Program (TEP) Dawson South Coal Mine Water Discharge MAN11500

Our reference: MAN11500 File: GLT958

Attention: [redacted]

Re: Application for an approval for a voluntary transitional environmental program for Dawson South Coal Mine – Transitional Environmental Program (TEP) – Dawson South Coal Mine Water Discharge

Thank you for your application for an approval for a voluntary transitional environmental program. This application has been issued with the Certificate Approval number: MAN11500 (attached to this notice)

Your application, which was received by this office on 4 January 2011, has been approved with additional conditions as described in the attached Certificate of Approval.

Fees apply for the assessment of a draft transitional environmental program (TEP). The fees are outlined in the attached operational policy *Transitional Environmental Program (TEP) fees.*

A fee of **$2896.40** is payable.

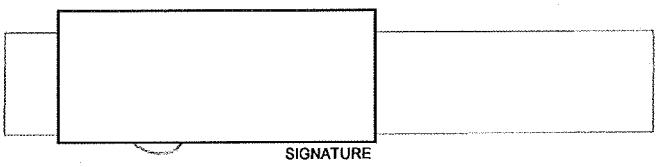
You may apply to the Department of Environment and Resource Management for a review of this decision within 10 business days of receiving this Notice. You may also appeal against this decision to the Planning and Environment Court.

Information outlining the review and appeal processes under the *Environmental Protection Act 1994* is included

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

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, Christopher Loveday of the department on telephone [redacted] would be happy to assist you.



SIGNATURE

13 January 2011

DATE

Christopher Loveday
Manager (Environmental Services - Mining)
Central West Region
Delegate of the Administering Authority
Environmental Protection Act 1994

Enquiries:
Department of Environment and Resource Management
PO Box 19
EMERALD QLD 4720
Phone [redacted]
Fax: [redacted]

Department of Environment and Resource Management

GLT 95Z 1912.

EMD2011/499

DEPARTMENT OF ENVIRONMENT & RESOURCE MANAGEMENT
RECEIVED
2 MAR 2011
GLADSTONE

Environmental Protection Act

Transitional environmental program certificate of approval number MAN11600

This certificate of approval is issued by the administering authority pursuant to section 339 of the Environmental Protection Act 1994. *A 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:

[redacted]
General Manager
Dawson Mine
Dawson Highway
PO Box 225
Moura Qld 4718

REGISTERED POST – SENDER TO KEEP
533678369013

C/C [redacted] Dawson Mine

Dawson Highway

REGISTERED POST – SENDER TO KEEP
533678368016

approving the draft transitional environmental program; titled Draft Transitional Environmental Program Under s333 of the Environmental Protection Act 1994 for management of water releases at Dawson Central and North Coal Mine.

The draft transitional environmental program, dated 7 February 2011 , was received by this office on 4 February 2011.

The draft transitional environmental program is approved subject to the conditions identified in Section 5.0 of the *Draft Transitional Environmental Program Under s333 of the Environmental Protection Act 1994*:

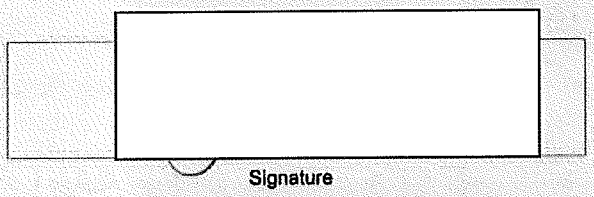
The transitional environmental program remains in force until 30 June 2011.

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 Department of Environment and Resource Management on telephone [redacted] would be happy to assist you.

Transitional environmental program certificate of approval



Signature

18 February 2011

Date

Christopher Loveday
Manager – Environmental Services - Mining
Department of Environment and Resource Management

Enquiries:
Department of Environment and Resource Management
Ph. [redacted]
Fax

ecoaccess
environmental licences and permits

EMD2011/500

Notice

Environmental Services - Mining

Decision to grant an approval for a draft transitional environmental program

This statutory notice is issued by the administering authority pursuant to section 340 of the Environmental Protection Act 1994, *to advise you of a decision or action.*

Anglo Metallurgical Coal (Dawson Central and North)Pty Ltd
Dawson Mine
Dawson Highway
PO Box 225
Moura Qld 4718

CC: [redacted]
Environmental Superintendent
Dawson Mine
Dawson Highway
PO Box 225
Moura Qld 4718

Your reference: Transitional Environmental Program (TEP) Anglo Metallurgical Coal (Dawson Central and North) Pty Ltd Water Discharge MAN11600

Our reference: MAN11600 File:

Attention: [redacted]

Re: Application for an approval for a transitional environmental program for Anglo Metallurgical Coal (Dawson Central and North) Pty Ltd – Transitional Environmental Program (TEP) – Dawson Central and North Dewatering Program

Thank you for your application for an approval for a voluntary transitional environmental program. This application has been issued with the Certificate Approval number: MAN11600 (attached to this notice)

Your application, which was received by this office on 4 February 2011, has been approved with additional conditions as described in the *Draft Transitional Environmental Program Under s333 of the Environmental Protection Act 1994.*

Discharge from the site at the locations identified in the TEP may continue until 13 May 2011 unless conditions are revised.

Fees apply for the assessment of a draft transitional environmental program (TEP). The fees are outlined in the attached operational policy *Transitional Environmental Program (TEP) fees.*

A fee of **$10317.40** is payable.

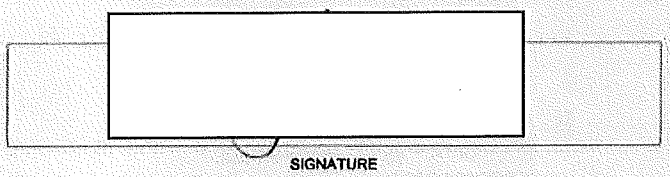
Department of Environment and Resource Management
www.derm.qld.gov.au ABN 46 640 294 485

Notice

Decision notice regarding a transitional environmental program

You may apply to the Department of Environment and Resource Management for a review of this decision within 10 business days of receiving this Notice. You may also appeal against this decision to the Planning and Environment Court.
Information outlining the review and appeal processes 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 department on telephone [redacted] would be happy to assist you.



SIGNATURE

18 February 2011

DATE

Christopher Loveday
Manager (Environmental Services - Mining)
Central West Region
Delegate of the Administering Authority
Environmental Protection Act 1994

Enquiries:
Department of Environment and Resource Management
PO Box 19
EMERALD QLD 4720
Phone: [redacted]
Fax: [redacted]

Farley Terry

From: [redacted]
Sent: Friday, 4 March 2011 3:58 PM
To: [redacted] Manager MiningCWR
Subject: Dawson North Consultation with
Attachments: 20110304 Stakeholder communication record.xls
H[redacted]

In accordance with condition 31 of TEP MAN11600 Dawson North and Central TEP, please find attached the record of consultation with Kianga Creek downstream landholders.

Several meetings have been held with the landholders between the release point and Kianga creek and work is continuing on their properties to mitigate the impact of the release (e.g. culverts for critical roads).

At this stage, if we get the rain that is forecast over the weekend and it improves the salinity in the river, we are expecting to be in a position to commence a release from Dawson North next week at a flow rate of approximately 120L/sec from the pit.

Thanks [redacted]

[redacted]
Environmental Officer

Anglo American

E [redacted]
D
F

METALLURGICAL COAL

Dawson Mine
Dawson Highway
PO Box 225
Moura
4718
Australia

www.angloamerican.com.au

A member of Anglo American plc group

Stakeholder	Address
QNP	Three Chain Rd, Moura 4718
Molopo Energy Ltd	Level 14, 31 Queens Street, Melbourne Vic 3000

Communication Date	Time	Outcome
40606	0.471528	OK. Letter sent to [redacted]
40606	0.618056	OK. Letter sent to [redacted]
40606	0.611111	OK. Letter given to
40606	0.463194	Request creek crossing. Letter sent to
40606	0.468056	Left message with Lynette. Letter sent to
40606	0.511111	OK. Letter sent to
40606	0.492361	Left message. Letter sent to
40606	0.529861	OK. Happy to have monitoring point on property if required. Letter sent to
40606	0.5625	No answer. Letter sent
40606	0.484028	OK. Letter sent by mail and email
40606	0.486111	OK. Letter sent
40606	0.488194	Left message. Letter sent.
40607	0.490278	OK. Letter sent

[redacted]

From: Evans Mark
Sent: Friday, 14 January 2011 4:20 PM
To: [redacted]
Cc: Loveday Chris; [redacted]
Subject: Discharge from 9-12 Dam of Non-Mine affected water

[redacted]

I refer to our phone calls this afternoon.

You indicated in these phone calls that Dawson Mine wishes to discharge non-mine affected water, of 170uS Electrical Conductivity, that was collected in 9-12 Dam during the recent heavy rains. You also indicated that you wished to discharge this into Kianga Creek via a pipeline of approximately 1km through mining lease at a rate of 150L/sec. You stated that Kianga Creek then flows into the Dawson River approximately 2km from where you will be discharging into it.

Until Monday, when this discharge will be considered along with the other discharges included in a recent application submitted by you for a Transitional Environmental Program, I do not consider that this proposed discharge needs a formal authorisation by DERM.

It must be noted though that this position by DERM does not authorise any environmental harm from this release, outside that authorised in your Environmental Authority (EA), or detrimental impacts on landholders and waterway users downstream of your discharge.

You also stated during our telephone call that you would undertake monitoring as per the monitoring requirements for releases in your EA, and that you would notify downstream landholders.

Should you have any queries in relation to this, please feel free to give me a call on the mobile below.

Regards

mark

Mark Evans
Regional Manager, Environmental Services – Mining
Central West Region

Department of Environment and Resource Management

Mobile: [redacted]

[redacted]

From: [redacted]
Sent: Tuesday, 17 May 2011 8:58 PM
To: [redacted]
Cc: Loveday Chris
Subject: ERS (Water Sciences) Response - Dawson North Central TEP

H[redacted] not sure if the notice board email is working at present (you may get emails later). Anyway, here is the response..

Officer
ramsayi
Created Date
17/05/2011 8:49 PM
Title
ERS (Water Sciences) Response - Dawson North Central TEP
Summary
Request Task: TEP Review
Client Company: AngloCoal
Facility Name: Dawson Central and North Coal Mine
Facility Location: PO Box 225, Moura Qld 4718
Project File Details: -
Date of Request: 17/05/2011 12:00:00 AM
Due Date of Request: 24/05/2011 12:00:00 AM
Urgency: Normal

Dea[redacted]

Further to your work request of the 17 May, I have quickly reviewed the information provided as part of the latest Dawson Central/North Coal Mine TEP "REQUESTED VOLUNTRY TRANSITIONAL, 13th MAY 2011".

The TEP proposal is similar to the existing TEP except for changes to flow rates and an alternative release point.

The major concern we have is that this and the previous TEP does not ensure protection of local waterways. The risk to local waterways increases if the TEP continues through the dry season and no flushing of the local waterway occurs (and water wholes may evaporate and become more salty). Greater consideration of the local waterways is warranted in such a case. Release of the lower EC water is less likely to be of concern.

The approach to manage the release to maximise release opportunity but maintain a set incremental increase in EC in the regional waterway is generally supported. However, there is some potential risk about the magnitude of change to regional water quality in the Dawson - the incremental increase up to about 130uS/cm may be too large. If there are other mines releasing at the same time then this will contribute to a cumulative increase in the EC in the Dawson.

In general, we support the change to allow release water of "good' quality with low EC, particularly if the release is not for extended durations.

From the TEP proposal information, we can see that there have been discussions between the client and DERM officers and that the TEP may be required to overcome some operational constraints.

Please let us know if you require further information.

Cheers

[redacted]
Chief Scientist

Aquatic Ecosystem Risk & Decision Support

Water Quality & Aquatic Ecosystem Health

Environment and Resources Sciences (ERS)

Department of Environment and Resource Management (DERM)

Phone [redacted] Mobile [redacted] Fax: [redacted]

Postal Address: GPO Box 2454, Brisbane Q 4001

Physical Address: 41 Boggo Road, Block B East Level 1, Dutton Park Q 4102

[redacted]
Email: [redacted]

From: [redacted]
Sent: Tuesday, 17 May 2011 9:04 AM
To: [redacted]
Subject: RE: Dawson Central North TEP

[redacted]

Attached is the correct form. Do I need to request a username and password to submit documents through the website?

Thank you for the response, I thought you had new form, but this was fairly recent submittal. I agree this is a very poor TEP, however, [redacted] thinks they should be allowed to continue to discharge as long as the Dawson River is flowing.

I understand that you have a lot on your plate, provide a time that you may get to the review.

Please feel free to contact me with any questions.

Regards,

From [redacted]
Sent: Monday, 16 May 2011 9:45 PM
To: [redacted]
Cc: Loveday Chris
Subject: RE: Dawson Central North TEP

Hi [redacted]

Thanks for the email. We have a new work request form and system now – see attached. You can either send this form to me or submit it yourself via the link.

[redacted]and I are in the throws of reviewing the model conditions currently with some tight deadlines. I don't think we are committing to any tight turn around times presently given this and the fact that we assume the potential for rain has decreased significantly (and it is not the best time of the year to discharge, risks are likely to be greater). Also, the appropriateness for a "discharge" TEP without a commitment to transition to improved management and environmental outcome should be determined prior to approving this TEP. This was a big discussion point of the workshop we had last week looking at the review.

Given this, please advise as to the potential deadline and if you would like us to proceed. Happy to chat on the phone if needed – I'll be on the mobile tomorrow.

Cheers,

[redacted]
Chief Scientist

Aquatic Ecosystem Risk & Decision Support
Water Quality & Aquatic Ecosystem Health
Environment and Resources Sciences (ERS)
Department of Environment and Resource Management (DERM)

Phone: [redacted] Mobile [redacted] Fax: [redacted]

Postal Address: GPO Box 2454, Brisbane Q 4001

Physical Address: 41 Boggo Road, Block B East Level 1, Dutton Park Q 4102

From: [redacted]
Sent: Monday, 16 May 2011 2:02 PM
To: Water WorkRequests @ EPA
Cc: Loveday Chris
Subject: Dawson Central North TEP

[redacted]

Attached is a request for review of application of a TEP for Dawson to continue discharge from the central and north operations.

Please feel free to contact me with questions.

Thank you for the time and assistance

[redacted]
Principal Environmental Officer, Mining Services
Telephone: [redacted] **Facsimile:** [redacted]
Email: [redacted]
Department of Environment and Resource Management
Ground floor, 136 Goondoon Street
Gladstone QLD 4680

Request for Statutory Approval

CONSIDERATION OF A TRANSITIONAL ENVIRONMENTAL PROGRAM (TEP)
SECTION 337 OF THE *ENVIRONMENTAL PROTECTION ACT 1994*

CLIENT:	Anglo Coal (Dawson South) Pty Ltd
REGISTERED OFFICE ADDRESS:	Dawson Mine
	Dawson Highway
	Moura Qld 4718
TENEMENT:	ML5657, ML80160, and ML80161
ENV AUTHORITY NO.:	MIN100510607
FILE NO.:	GLT958
REASON FOR TEP:	Water Management
DATE SUBMITTED:	4 January 2011
DECISION DUE DATE:	4 February 2011
(if approval required)	
TIME SPENT:	16 Hours

1.0 SUMMARY

Anglo Coal (Dawson South) Pty Ltd submitted a voluntary DRAFT Transitional Environmental Program (TEP) on 4 January 2011, in relation to the Dawson South Coal Mine.

The TEP was submitted following above average rainfall during 2010 that has decreased water storage capacity that may cause an uncontrolled release of mine affected water at Dawson South. As of 4 January 2011, Dawson South Industrial Dam has limited capacity to maintain water storage. This TEP proposes to discharge waters from the site which exceed the environmental authority limits.

The water proposed for discharge is of varying quality (with electric conductivity concentration ranging up to 6910). Dawson South proposes to discharge from the authorised discharge location and minimum receiving water flow rate (>= 2 cubic metres/sec).

The TEP will authorise Dawson South to release mine affected water that exceeds water quality parameters from the authorised discharge location. The Dawson river is the receiving water from the discharge location. The receiving water becomes Fitzroy River.

The department has proposed an additional downstream monitoring point to confirm a decreasing trend in EC concentrations from the mine affected waters discharged from Dawson South Coal Mine.

Flows in all receiving waters currently are significantly higher than normal and are predicted to remain high for an extended period.

Environmental harm of the receiving waters is not anticipated from discharge of mine affected water.

The voluntary TEP has been approved with additional conditions. Rainfall continues in the area, with localised heavy rain events occurring. The TEP as approved will provide Dawson South an opportunity to discharge mine affected water in excess of the environmental authority water quality limits during periods of increased natural flow in the receiving waters to minimise the potential for uncontrolled discharge.

Has the TEP been entered in EcoTrack:	Yes
EcoTrack Compliance Reference (if applicable): -	CA22013
EcoTrack TEP Reference Number: -	MAN11500
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.

Discharge proposed only during continued above normal flows to minimize potential environmental harm. Upon completion of discharge, site will improve water management to maintain water quality for future discharge events.

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.

Administering authority will decide whether to approve the voluntary draft transitional environmental program within 20 business days of the application date.

The assessment and decision process was completed in 6 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.

No public notice was required.

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

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
Yes

s52 Conditions to be considered for environmental management decisions
Yes

s53 Matters to be considered for decisions imposing monitoring conditions
Yes

Part 3 Additional regulatory requirements for particular environmental management decisions

s55 Release of water or waste to land
No
s56 Release of water, other than stormwater, to surface water
Yes

s57 Release of stormwater
Yes

s58 Release of water or waste to particular wetlands for treatment
No

s59 Activity involving berthing, docking or mooring a boat
No

s60 Activity involving storing or moving bulk material
No

s61 Activity involving acid sulphate soil
No

s62 Activity involving acid-producing rock
No

s63 Activity involving direct release of waste to groundwater
No

s64 Activity involving indirect release of contaminants to groundwater
No

(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'.*
  Yes

- *Any applicable environmental protection policy.*
  Yes

- *Any applicable Commonwealth, State or local government plans, standards, agreements or requirements.*
  Yes

- *Any applicable environmental impact study, assessment or report.*
  Yes

- *The character, resilience and values of the receiving environment.*
  Yes

- *All submissions made by the applicant and submitters.*
  Yes

- *The best practice environmental management for activities under any relevant instrument, or proposed instrument, as follows – a transitional environmental program.*
  Yes

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.*
  Yes

- *The public interest.*
  Yes

- *Any applicable site management plan.*
  NA

- *Any relevant integrated environmental management system or proposed integrated environmental management system.*
  NA

- *Any other matter prescribed under a regulation.*
  NA

(ii) additional information given in relation to the draft program;
Maps and background information was submitted and assessed.

(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.
NA

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
Discharge of mine affected water with potential elevated EC concentrations to establish freeboard during periods of above average rainfall

(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
Discharge will continue to comply with all other environmental authority conditions

(ii) the risks of environmental harm being caused by the activity; and
Low due to potential elevated concentrations of EC may impact receiving waters and downstream users if the dilution within the receiving water is not met

(c) state appropriate performance indicators at intervals of not more than 6 months; and
Daily monitoring of discharge, daily, weekly, and monthly reporting to the administering authority

(d) make provision for monitoring and reporting compliance with the program.
Daily, weekly, and monthly required reporting to administering authority

343 Failure to approve draft program taken to be refusal
NA

4.0 RECOMMENDATION

The TEP be approved with the conditions proposed by the administering authority

Forward a copy of the certificate of approval and decision notice to the applicant

[redacted]
Principal Environmental Officer

Signed –

Date -

Reviewed & Endorsed By	
	Chris Loveday Manager – Mining Central West Region 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	
Ecotrack number	MAN11500
Permit number	ML5657, ML80160, and ML80161
File number	
Applicant name	Dawson South
Registered office or place of business	Anglo Metallurgical Coal (Dawson South) Pty Ltd Dawson Mine Dawson Highway PO Box 225 Moura Qld 4718
Date draft TEP received.	*24 March 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.

On the 24th March 2011, Dawson South submitted amendment to the current Transitional Environmental Program (TEP) in relation to its operations at the Southern portion of the mine.

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

Queensland Government

Discharge of mine affected water from the authorised discharge location at the south has been under a TEP since early January 2011.

Electric conductivity (EC) concentrations in the receiving water (Dawson River) at the TEP required far downstream monitoring location has been above (720) the TEP limit (510).

Dawson has requested to revise the TEP to allow discharge into the Dawson River as long as the discharge does not increase the far downstream monitoring EC concentration by more than 10%.

The proposed amendment revises the far downstream monitoring location EC concentration of the current TEP.

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 amendment will continue to increase far downstream EC concentrations with no dilution within the receiving water.

Does the draft TEP clearly set out the objectives that will be achieved and maintained under the program?

☒ Yes.

☐ No.

The proposed amened TEP requires the mine to meet varying concentration limits, report water quality parmeters on a daily, weekly, and monthly basis, provides for dewatering activities to cease if conditions require, and a timeframe for activities to be completed.

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.

Yes, monitoring and reporting along with assessment are required to continue TEP activities.

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.

Review of the proposed amended TEP does not identify that best practice environmental management is being implemented.

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.

Potential risk of environmental harm to downstream users was not sufficiently assessed within the proposed amendments.

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.

Discharge will cease on 13 May 2011 unless conditions provide for continued discharge.

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.

The proposed amended TEP is not acceptable in terms of relavent regulatory requirements regarding preventing environmental harm

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	NA
Environmental protection polices (EPPs)	EPP water was not followed to limit environmental risk to receiving waters
Plans, standards or agreements	NA
Environmental impact study, assessment or report	NA
Receiving environment	Current elevated EC concentrations would likely continue to increase if the amended TEP was accepted
Submissions made by the applicant and submitters	The applicant has provided an application to amend the TEP and limited supporting documentation
Best practice environmental	NA

management	
Financial implications	NA
Public interest	NA
Site management plan	NA
Environmental management systems (IEMS)	NA

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.

Meeting, phone conversations, assessment of provided documentation.

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.

NA

Are the decision maker and recommending officer free from bias or the perception of bias?

- ☒ Yes.
- ☐ No.

6. Recommendation.

The recommending officer is required to make a recommendation in relation to the draft TEP.

Recommendation:.

"I recommend that the application to amend TEP MAN11500 be refused on 25 March 2011".

7. Endorsement

Recommending officer	Supervisory review
Print name: [redacted]	**Print name:**
Date: 28 March 2011	**Date: 28 March 2011**

Delegated decision maker	Approve / Reject recommendation (circle one)
Reasons for decision.	
Print name: Christopher Loveday	
Date: 28 March 2011	

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	CA22049
Ecotrack number	MAN11600
Permit number	Numerous EAs for each mining lease
File number	GLT952
Applicant name	Dawson Central and North
Registered office or place of business	Anglo Metallurgical Coal (Dawson Central and North) Pty Ltd Dawson Mine Dawson Highway PO Box 225 Moura Qld 4718
Date draft TEP received.	*4 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.

On the 4th February 2011, Dawson Central and North submitted a revised draft voluntary Transitional Environmental Program (TEP) in relation to its operations at the Central and North portions of the mine.

Discharge of mine affected water from the authorised discharge location at the south has been under a TEP since early January 2011.

Separtate TEPs for the Central and North operations were originally submitted on 4 January 2011 and 18 January 2011. Due to above average rainfall during late 2010 and early 2011 compliant water management has been impacted.

Discussions with Dawson regarding relevant issues and approaches resulted in the submittal of the current revised voluntary TEP on 4 February 2011. The TEP proposes to dewater the Dawson North Pit utilising "clean water" from other locations within the mine to achieve concentrations that may be discharged into Kianga Creek under no flow conditions. The TEP also proposes to continue to discharge into the Dawson River at low flow to no flow conditions and add two additional . EC is the only parameter requested for revision, with all other contaminant parameters remaining consistent with the EA conditons.

Coal mining activities have not occurred at the Dawson North Pit since 2008; however, according to Anglocoal, the location is critical to operations and dewatering is required. The dewatering activity is proposed with the availability of an onsite alternate storage.

Discharge from the North pit via Dawson North Industrial Dam to flow along an unnamed gully into Kianga Creek, based on the EC concentration of the discharge, additional water may be discharged from additional locations to dilute the discharge from the pit. Kianga Creek travels approximately 48 km from the mine to the Dawson River. Samples will be collected in the mixing zone and at "Bindaree" weir to confirm receiving water levles are met.

The proposed discharge will exceed the environmental authority limits regarding EC concentrations, receiving waters flow rate, and creating additional authorised discharge locations.

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 TEP will transition to the environmental standard by providing the mine the ability to dewater the Dawson North pit and return to environmental conditions identified within the final model water condiitons included in the Plan of Operations for Dawson Central and North.

Does the draft TEP clearly set out the objectives that will be achieved and maintained under the program?

☒ Yes.

☐ No.

The TEP requires the mine to meet concentration limits, report water quality parmeters on a daily, weekly, and monthly basis, provides for dewatering activities to cease if conditions require, and a timeframe for activities to be completed.

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.

Yes, monitoring and reporting along with assessment are required to continue TEP activities.

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.

Review of the proposed dewatering plan by ERS identifies best practice environmental management is implemented.

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.

Potential risk will be addressed through regular monitoring and analysis of results to assess required amendments prior to environmental harm occurring.

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.

Upon completion of discharge activities, the site will return to operation under the final model water conditons with the current Plan of Operations (2011) for Dawson Central and North.

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.

Discharge will cease on 13 May 2011 unless conditions provide for continued discharge.

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.

The TEP is acceptable in terms of relavent regulatory requirements

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	NA

development	
Environmental protection polices (EPPs)	EPP water is followed to limit environmental risk to receiving waters, ERS reviewed all of the submitted TEPs and revisions and provided comments
Plans, standards or agreements	NA
Environmental impact study, assessment or report	NA
Receiving environment	Discharge allowed during no flow conditions in the receiving waters,
Submissions made by the applicant and submitters	The applicant has provided a draft TEP and additional information as requested by the department
Best practice environmental management	NA
Financial implications	Mining activities within Dawson North may not be rreinstated without dewatering of the pit
Public interest	Prior to acceptance of the TEP by the department, Dawson is required to contact landholders along Kiananga Creek regarding discharge
Site management plan	NA
Environmental management systems (IEMS)	NA

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.

Meeting, phone conversations, review of provided documentation, information requests, and review by ERS has been completed.

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.

NA

Are the decision maker and recommending officer free from bias or the perception of bias?

☒ Yes.

☐ No.

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 with the conditions identified and agreed to by Dawson mine on 18 February 2011".

7. Endorsement

Recommending officer	Supervisory review
[redacted]	Review and comments [redacted]
Print name: [redacted]	**Print name:**
Date: 18 February 2011	**Date: 18 February 2011**

Delegated decision maker	Approve / Reject recommendation (circle one)
Reasons for decision.	
Print name: Christopher Loveday	
Date: 18 February 2011	

[redacted]
REGISTERED POST – SENDER TO KEEP
482063831010
[redacted]

Queensland Government

EMD2011/1424

GLT952

Department of
Environment and Resource Management

4 July 2011

The Directors
Anglo American Metallurgical Coal
Dawson Mine (Central & North)
PO Box 225
Moura Qld 4718

c/c [redacted]
General Manager
Anglo Coal (Dawson Central & North) Pty Ltd

[redacted]
Environmental Superintendent
Anglo Coal (Dawson Central & North) Pty Ltd
PO Box 225
Moura Qld 4718

Attention [redacted]

Re: Warning Letter for non-compliance with the Final Water Model Conditions

The Department of Environment and Resource Management (DERM) has investigated the discharge of mine affected water from mine sites in the Central Queensland region during the heavy rains experienced since November 2010.

Information supplied to DERM by Dawson identified it was in breach of conditions of the final water model conditions, detailed within the Dawson Mine (Central and North) Plan of Operations dated 1 January 2011 to 31 December 2011 for the following event: 8 February 2011 release of Mine affected water from the 1B rejects storage. The Plan of Operations states that the Dawson Mine (Central and North) will undertake the release of contaminants to the receiving environment in accordance with the final water model conditions. The final model water conditions state that:

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 and depicted on Figure 1 attached to this environmental authority.

Department of Environment and Resource Management
Ground Level, 136 Goondoon Street
PO Box 5065
Gladstone 4680 Australia
Telephone + 61 7 4971 6500
Facsimile + 61 74972 1993
Website www.derm.qld.gov.au
ABN 46 640 294 485

The 1B rejects storage is not an authorised release point.

You will be aware that it is an offence under section 233 of the *Environmental Protection Act 1994* to carry out an activity that is not consistent with the Plan of Operations.

DERM has a responsibility to respond to any non-compliance with legislative requirements. In the event of non-compliance with the legislation and the environmental performance standards, DERM has the ability to use a number of enforcement measures in accordance with its Enforcement Guidelines (copy enclosed).

In this instance DERM has exercised its discretion to provide a formal warning letter for the offences.

You should be aware that any future breaches relating to non-compliant discharge of mine affected water will be viewed seriously and an escalated enforcement response may be adopted. Further warning notices for similar events may not be considered an appropriate enforcement response.

DERM is focussed on achieving environmental outcomes and takes this opportunity to remind Dawson Central and North Coal Mine of its obligation to assess, manage and mitigate the risk associated with the mining activity.

Should you have any further enquiries, please do not hesitate to contact [redacted] on telephone number [redacted].

Yours sincerely

[redacted]

Christopher Loveday
Manager
Environmental Services – Mining
Delegate
Environmental Protection Act 1994

EMD2011/1407

Queensland Government

REGISTERED POST – SENDER TO KEEP
482063820014

GLT952

Department of
Environment and Resource Management

4 July 2011

The Directors
Anglo American Metallurgical Coal
Dawson Mine (Central & North)
PO Box 225
Moura Qld 4718

c/c [redacted]
General Manager
Anglo Coal (Dawson Central & North) Pty Ltd

[redacted]
Environmental Superintendent
Anglo Coal (Dawson Central & North) Pty Ltd
PO Box 225
Moura Qld 4718

Attention: [redacted]

Re: Warning Letter for non-compliance with the Transitional Environmental Program

The Department of Environment and Resource Management (DERM) has investigated the discharge of mine affected water from mine sites in the Central Queensland region during the heavy rains experienced since November 2010.

Information supplied to DERM by Dawson identified it was in breach of the following conditions of the Transitional Environmental Program (TEP) MAN11600:

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, unless otherwise authorised under the *Environmental Protection Act 1994*.

3 The release of contaminants to waters must not exceed the release limits stated in Table 2 at the monitoring points specified in Table 1 of this voluntary Transitional Environmental Program (TEP).

4 The release of contaminants to waters from the release point must be monitored at the locations specified in Tables 1 and 3 of this TEP.

DEPARTMENT OF ENVIRONMENT & RESOURCE MANAGEMENT
RECEIVED
8 JUL 2011
GLADSTONE

Department of Environment and Resource Management
Ground Level, 136 Goondoon Street
PO Box 5065
Gladstone 4680 Australia
Telephone + 61 7 4971 6500
Facsimile + 61 74972 1993
Website www.derm.qld.gov.au
ABN 46 640 294 485

29 The TEP certificate holder must provide the administering authority, weekly during the release of mine affected water, information on the release of contaminants to waters. The information must be provided in writing (either via facsimile [redacted] or email to [redacted] and include the following:

a) all in situ monitoring data for that week

b) the range of receiving water flow rate

c) the range of release flow rate

d) the total volume of water released from the release point.

30 The certificate holder of this TEP must submit a report to the administering authority on the fifth business day of each month detailing:

a) all activities undertaken under the TEP,
b) how the TEP certificate holder has met the objectives of the TEP, 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 TEP certificate holder has complied with all conditions contained within the TEP

Water released from the authorised discharge locations from Dawson Central and North Coal Mine from 29 March to 6 April 2011 was not monitored at the location specified in Table 3 as required by TEP condition 4 or reported on a weekly basis as required by TEP condition 29.

You will be aware that it is an offence under section 432 of the *Environmental Protection Act 1994* to contravene a condition of an environmental authority.

DERM has a responsibility to respond to any non-compliance with legislative requirements. In the event of non-compliance with the legislation and the environmental performance standards, DERM has the ability to use a number of enforcement measures in accordance with its Enforcement Guidelines (copy enclosed).

In this instance DERM has exercised its discretion to provide a formal warning letter for the offences.

You should be aware that any future breaches relating to non-compliant discharge of mine affected water will be viewed seriously and an escalated enforcement response may be adopted. Further warning notices for similar events may not be considered an appropriate enforcement response.

DERM is focussed on achieving environmental outcomes and takes this opportunity to remind Dawson Central and North Coal Mine of its obligation to assess, manage and mitigate the risk associated with the mining activity.

Should you have any further enquiries, please do not hesitate to contact [redacted] on telephone number [redacted]

Yours sincerely

Christopher Loveday
Manager
Environmental Services – Mining
Delegate
Environmental Protection Act 1994

DRAFT TRANSITIONAL ENVIRONMENTAL PROGRAM UNDER s333 OF THE *ENVIRONMENTAL PROTECTION ACT 1994*

Principal Holder:	Anglo Coal Australia Pty Ltd
EA Number:	No EA - Refer to Current Plan of Operations and Fitzroy Model Water Conditions
Title:	Dawson Mine Transitional Environmental Program: Release from Hillview Dam and 9-12 Dam
Date:	1st January 2011
Finish Date:	1st July 2011

1.0 BACKGROUND

1.1 Purpose of TEP

Dawson Mine, one of Queensland's leading export coal operations, is owned by the Moura Joint Venture, comprising Anglo Coal Australia Pty Ltd (51%) and Mitsui Coal Holdings Pty Ltd (49%). The mine is operated by Anglo Coal Australia and is located in the southern part of the Bowen Basin, approximately 180km west of Gladstone.

A recent weather system has caused excessive rainfall across most of Central Queensland resulting in the flooding of tributaries across a large portion of the region. The weather station located in the town of Moura recorded a total monthly rainfall in December of 290.4mm (refer to Figure 1). Due to this recent weather event the Dawson Mine water inventory has risen significantly and many onsite water storages are nearing or have reached full capacity. The mine has implemented its Water Management Plan to appropriately manage or contain water across the operation. This includes the diversion of clean water around the site, controlled releases of water where possible and the pumping of water to water storages across site. There are currently three (3) dams at Dawson Mine which are releasing or have recently released; Hillview Dam, 14 Dam and 35ML Dam. These releases have been both controlled (within licence conditions) and uncontrolled and have been reported to Department of Environment and Resource Management (DERM).

Due to the uncontrollable climatic conditions detailed, Dawson Mine requests the consideration of this Draft Transitional Environmental Program (TEP) in accordance with s333 of the *Environmental Protection Act 1994,* to allow for the management of increased water flows at the Dawson Mines. Specifically, this TEP proposes to allow for the controlled release of water from the 9-12 Clean Water Dam and Hillview Dam into Kianga Creek with the potential for water quality parameters and receiving water flow rates to be outside prescribed limits. Details of how environmental aspects shall be managed under this TEP are detailed in the following sections of this application.

Daily Rainfall (millimetres)

MOURA POST OFFICE

Station Number: 039071 · State: QLD · Opened: 1941 · Status: Open · Latitude: 24.57°S · Longitude: 149.97°E · Elevation: 148 m

2010	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	0	38.4	5.2	1.0	0	0	0	0	0	0	0	4.4
2nd	0	7.6	14.8	0	0	0	0	0	0	0	0.6	
3rd	0	0.6	10.4	0	0	0	1.0	0	0	0	0	27.6
4th	6.2	4.8	0	0	0	0	0	0	0	0	1.8	9.0
5th	22.4	0	13.2	0	0	0	0	0	10.2	0	2.6	1.0
6th	2.4	0	2.0	0	1.8	0	0	0	141.0	0	0	
7th	8.0	4.8	33.2	0	0	0	0	0	0	0	0	7.6
8th	0	0	0	0	0	0	3.6	0	0	0.8	0	
9th	0	35.2	0	0	0	0	1.2	0	0	0	3.6	
10th	0	0	0	12.6	0	0	0	0	0	0	0	
11th	0	0	0	0	0	0	0	69.8	1.0	0	0	
12th	0	4.8	0	34.6	0	0	0	0	0	9.2	0	2.2
13th	0	0	0	4.0	0	0	0	0	0	0	0	3.8
14th	0	0	0	0	0	0	0	0	0	0	0	
15th	0	0	0	0	0	8.0	0	0	0	0	0	
16th	0	50.8	0	0	0	0	0	0	0	34.0	2.0	
17th	0	12.2	0	0	0	0	0	0	0	0	3.2	
18th	0	6.4	0	0	0	0	0	0	1.0	0	10.8	3.6
19th	0	44.6	0	9.6	0	2.0	0	0	3.0	6	27.6	32.6
20th	0	0	0	0.4	0	2.8	5.0	0	22.6	6	4.6	21.4
21st	0	0	0	0	0	0	0	4.6	0.6	6	4.6	
22nd	0	0	25.6	0	1.6	0	0	0	7.0	0	7.0	
23rd	0	0	2.4	0	0	0	0	0	16.6	0	0	53.0
24th	0	0	0	0	0	0	0	6.0	0	0	9.8	0.8
25th	0	3.0	0	0	4.8	1.2	0	0	6.4	3.4	0	2.0
26th	0	6.4	0	0	3.0	0	3.4	10.6	1.0	0	0	29.8
27th	0	0	0	0	0	0	0	0	1.8	0	0	28.8
28th	0	0	0	0	0	0	0	0	0.8	0	0	55.0
29th	0		5.8	0	2.6	0	0	0	15.6	0	0	4.8
30th	0		0	0	0	0	0	0	0.8	0	2.6	
31st	2.0		0		0		0	0		0		
Highest daily	22.4	50.8	33.2	34.6	4.8	8.0	5.0	69.8	141.0	34.0	27.6	55.0
Monthly Total	41.0	232.6	112.6	53.2	13.8	14.0	13.2	91.0	229.4	47.4	80.8	290.4

Annual total for 2010 = 1209.4mm

↓ This day is part of an accumulated total
Quality control: 12.3 Done & acceptable, *12.3* Not completed or unknown

Product code: IDCJAC0009 reference: 03624368

Australian Government Bureau of Meteorology

Figure 1: Table of Rainfall Data for Moura Weather Station 039071.
Source: Australian Government Bureau of Meteorology, 31st December 2010.

1.2 Current Status and Water Management Options for Dams

1.2.1 Hillview Dam

Hillview Dam is located on the western side of the Dawson Central mining operations and is a nominated release point for Dawson Central (Refer to Figure 2). Water is pumped to Hillview Dam from various locations across site including clean water dams, sediment dams and pits. There is an automatic monitoring station at Hillview which monitors volume, level, EC, pH and temperature. Manual sampling is also conducted at Hillview Dam for further parameters.

Over the last ten (10) days Hillview Dam has, at intervals of two (2) and three (3) days, been subject to both controlled and uncontrolled releases. DERM officers have been notified of these releases and have been provided with all requested information. The water released from Hillview Dam to date has remained under water quality trigger levels. Three (3) days of controlled and uncontrolled discharging occurred while the flow rate in Kianga Creek was under the nominated $2m^3/s$. This controlled discharge was undertaken after verbal permission was received from DERM Officers [redacted].

There is potential that further controlled discharges from Hillview Dam will need to be undertaken with a flow rate in Kianga Creek of less than 2m3/s, to ensure water levels are appropriately managed on site. Where this potential arises, it is proposed under this TEP that Hillview Dam be permitted to discharge in a controlled manner, as necessary for flood mitigation and water management during and after extreme high rainfall conditions. If this situation is to arise, DERM officers will be contacted to discuss the action plan for discharges from Hillview Dam moving forward.

1.2.2 9-12 Clean Water Dam

The 9-12 Clean Water Dam (9-12 Dam) is located east of the Dawson Central mining operations. This dam contains runoff from catchments on the eastern side of the mining lease which mostly consist of grazing land. The dam does not contain any water from pits or sediment dams across the mining lease. Please refer to Figure 3 which outlines the location of the 9-12 Dam. This Dam has reached capacity following the recent rainfall events.

Infrastructure is currently available to pump water from the 9-12 Dam into Kianga Creek upstream from the Hillview Dam release point to increase the storage capacity of this Dam should further rainfall be received. In addition to improving water storage on site, the controlled release of water from this dam has the potential to increase the flow in Kianga Creek prior to further discharges from Hillview Dam.

Water quality samples are to be collected from the 9-12 Dam by Bureau Veritas International Trade (BVIT) on 4th January 2011. A pH/EC meter was used by BVIT to monitor levels in 9-12 Dam on 3rd January 2011. The pH results indicated a pH of 7.8 and an EC of 160µS/cm.

1.2.3 Bottom Dam East

Bottom Dam East is a clean water dam located on the eastern side of the mining operations in the vicinity of the Coal Handling Preparation Plant (CHPP) (Refer to Figure 4). This Dam contains runoff from catchments on the eastern side of the mining lease. This dam has received a high influx of rainwater during the recent weather events and is close to capacity. Infrastructure is available to pump water from Bottom Dam East to Borehole Creek which flows directly to Hillview Dam. This water has the potential to increase the dilution factor at Hillview Dam prior to discharge from Hillview Dam.

Water Quality samples are to be collected at Bottom Dam East by Dawson Mine Contractor BVIT on 4th January 2011. A pH/EC meter was used by BVIT to monitor levels in Bottom Dam East on 3rd January 2011. The results indicated a pH of 7.5 and an EC of 390µS/cm.

1.2.4 Days Dam

Days Dam is a clean water Dam which is located on the eastern side of the Dawson Central mining operations (Refer to Figure 5). This dam contains runoff from catchments on the eastern side of the mining lease which mostly consist of grazing land. This dam has similarly

received a high volume of rainfall in recent weeks. Infrastructure is currently available to pump water from Days Dam into Hillview Dam thereby potentially increasing the dilution factor in Hillview Dam. Water Quality samples are to be collected at Days Dam by Dawson Mine Contractor BVIT on 4th January 2011.

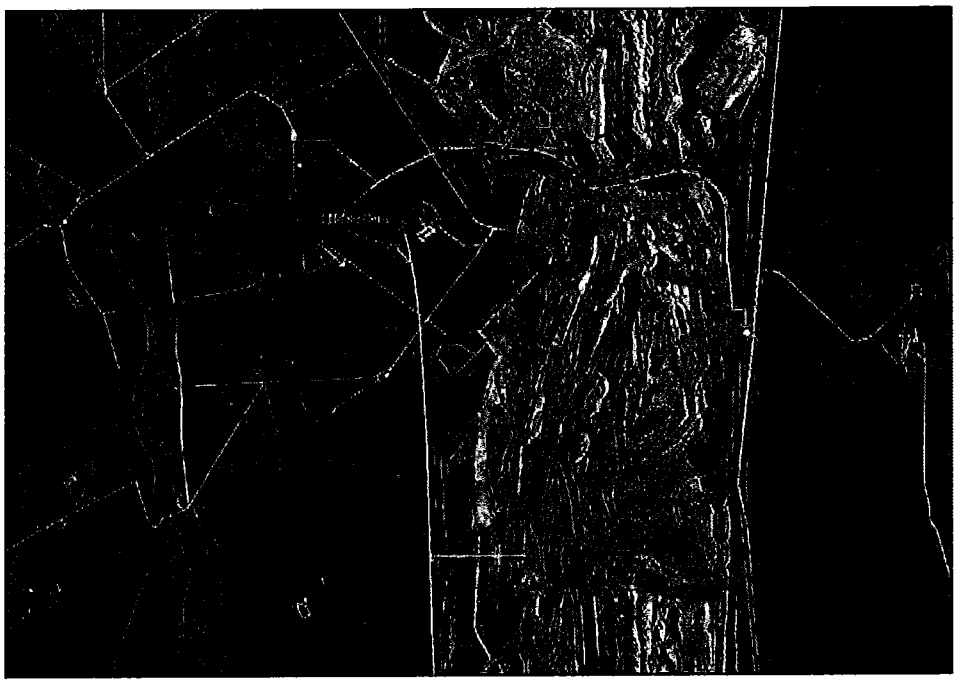


Figure 2: Map of Hillview Dam and Drainage System
Source: Dawson Mine GIS Software

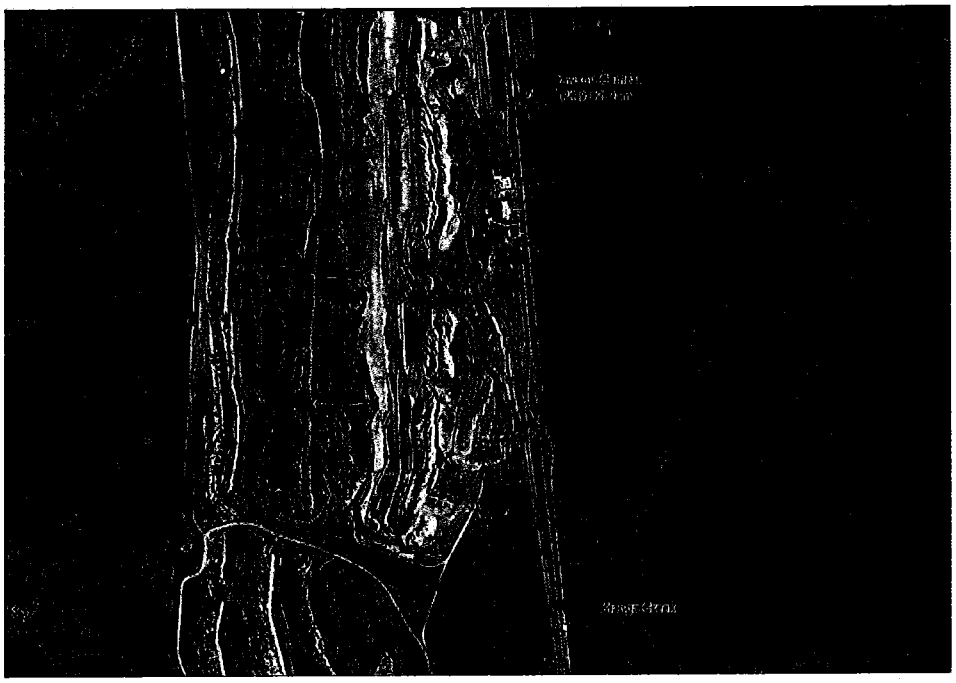


Figure 3: Map of 9-12 Dam and Drainage System
Source: Dawson Mine GIS Software

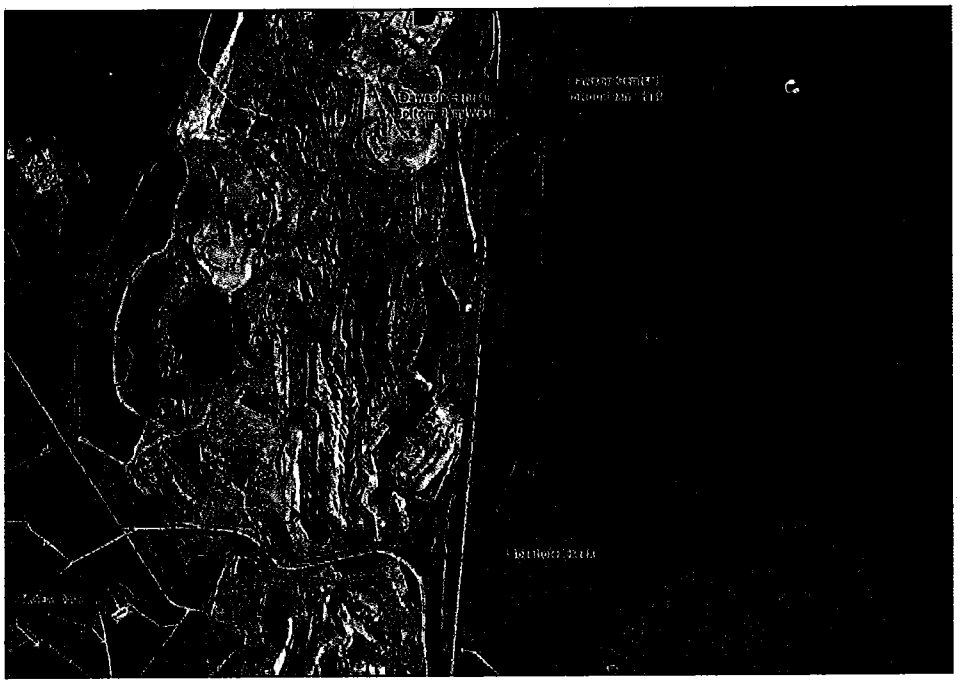


Figure 4: Map of Bottom Dam East and Drainage System
Source: Dawson Mine GIS Software

Figure 5: Map of Days Dam and Drainage System
Source: Dawson Mine GIS Software

2.0 SUPPORTING INFORMATION

The Dawson Central operation currently operates under a Plan of Operations (PoOps). Under this PoOps Hillview Dam is a nominated release point provided discharges comply with both the PoOps and The Final Model Water Conditions for Coal Mines in the Fitzroy Basin (Fiztroy Model Water Conditions). The water quality in Hillview Dam is manually monitored on a monthly basis during normal operations. Historical monthly water quality monitoring results from January – November 2010 are provided in Appendix 1. Where a controlled release from the dam is undertaken, monitoring is completed as per the PoOps and Fitzroy Model Water Conditions.

Discharges from Hillview Dam are directed into Kianga Creek which then flows into the Dawson River. The proposed discharge from 9-12 Dam will also be directed to Kianga Creek with flow through to the Dawson River. The Dawson River is currently in flood with a flow rate of 3796 m^3/s recorded at Woodleigh monitoring station (AQDS01T) on 3rd January 2011. Communities both upstream and down stream of the discharge point along the river are also experiencing flood conditions. As Such, the environmental impact of water discharged from Hillview Dam and 9-12 Dam is expected to be minimised through the dilution of dam water from high quantities of rainfall and the current flood status of the receiving waters.

3.0 OBJECTIVES

The purpose of this Transitional Environmental Program (TEP) is to adequately manage water at the Dawson Central operation. To achieve this, it is proposed that Dawson Mine conduct controlled release events from Hillview Dam and 9-12 Dam into Kianga Creek while

co-currently pumping Days Dam and Bottom Dam east into Hillview Dam, with the potential for water quality parameters and flow rates of receiving water to be outside prescribed limits. By allowing these controlled and monitored discharges, this will reduce the likelihood of an uncontrolled release of water from the Dawson Central operation therefore reducing the risk of environmental harm.

The objectives of this TEP are as follows:

- Reduce the volume of water stored onsite at Dawson Central and maintain freeboard so as to prevent an uncontrolled release event;
- Outline how the release is to be conducted;
- Indicate performance indicators for the release;
- Outline monitoring requirements prior, during and after the release;
- Outline the appropriate resources to be allocated to the TEP; and
- Provide a timeframe for the commencement, duration and completion of the TEP.

Allowance for discharging water under this TEP will provide for greater management of water at Dawson Mine should further extreme rainfall events occur. The Dawson Mine is continuing flood immunity works that will progressively improve the capability for water storage across the operation.

4.0 HOW OBJECTIVES ARE TO BE ACHIEVED

Details of how the objectives of this TEP will be achieved are summarised in Table 1 with further detail provided below where necessary.

Table 1: Action Plan for Achieving TEP Objectives

Objective	Action	Responsibility	Time Frame	Performance Indicator	Completion Details
Undertake a controlled release from 9-12 Dam to reduce water volume with the potential to increase the flow rate in Kianga Creek upstream of Hillview Dam.	Install two (2) diesel pumps and piping infrastructure to pump water from 9-12 Dam into Kianga Creek upstream of the Hillview Dam release point	Dawson Mine pump crew will install and maintain the pumping infrastructure in consultation with Dawson environmental personnel	4th January 2011	Successful installation of pumping infrastructure.	
	Water to be pumped at a maximum rate of 300L/s into Kianga Creek where it will flow 13.8km before reaching the Hillview Dam release point.	Dawson Mine pump crew will operate and maintain the pumping infrastructure in consultation with Dawson environmental personnel	As required over the 6 month period commencing 4th January 2011	• Flow rate of Kianga Creek and Dawson River • Volume Discharged • Water Quality	
	Undertake water quality monitoring	Dawson Environmental personnel and BVIT personnel	As per TEP requirements over the 6 month term of the TEP	• Flow rate of Kianga Creek and Dawson River • Volume Discharged • Water Quality	
	Submit monitoring results and TEP reports to DERM as detailed by TEP	Dawson Environmental personnel	As per TEP requirements over the 6 month term of the TEP	Timely submission of monitoring data and reports to DERM	

Undertake a controlled release from Hillview Dam to maintain freeboard and manage excess water in the Dawson Central Operation.	Switch on two (2) siphons to release water from Hillview Dam into Kianga creek	Dawson Mine pump crew will operate and maintain the pumping infrastructure in consultation with Dawson environmental personnel	4th January 2011	Successful operation of pumping infrastructure.	
	Water to be pumped at a maximum rate of 1000L/s through the siphons into Kianga Creek. The water will travel approx 30km in Kianga Creek to reach the Dawson River	Dawson Mine pump crew will operate and maintain the pumping infrastructure in consultation with Dawson environmental personnel	As required over the 6 month period commencing 4th January 2011	• Flow rate of Kianga Creek and Dawson River • Volume Discharged • Water Quality	
	Undertake water quality monitoring	Dawson Environmental personnel and BVIT personnel	As per PoOps and TEP requirements over the 6 month term of the TEP	• Flow rate of Kianga Creek and Dawson River • Volume Discharged • Water Quality	
	Submit monitoring results and TEP reports to DERM as detailed by TEP	Dawson Environmental personnel	As per PoOps and TEP requirements over the 6 month term of the TEP	Timely submission of monitoring data and reports to DERM	
Pump water from Bottom Dam East into Hillview Dam to manage water across the Dawson central operation.	Install diesel pump at Bottom Dam East to pump water into Hillview Dam.	Dawson Mine pump crew will install and maintain the pumping infrastructure in consultation with Dawson environmental personnel	As required over 6 month period	Successful installation of pumping infrastructure.	
	Pump water from	Dawson Mine pump crew	As required	• Volume of Hillview	

	Bottom Dam East to Hillview Dam at a maximum flow rate of 300L/s	will operate and maintain the pumping infrastructure in consultation with Dawson environmental personnel	over 6 month period	Dam • Volume discharged	
Pump from Days Dam into Hillview Dam to manage water across the Dawson central operation.	Install an electric pump at Days Dam to pump water into Hillview Dam	Dawson Mine pump crew will install and maintain the pumping infrastructure in consultation with Dawson environmental personnel	As required over 6 month period	Successful installation of pumping infrastructure	
	Pump water from Days Dam into Hillview Dam at a maximum flow rate of 250L/s	Dawson Mine pump crew will operate and maintain the pumping infrastructure in consultation with Dawson environmental personnel	As required over 6 month period	• Volume of Hillview Dam • Volume discharged	

4.1 Responsibility and Resources

Dawson environmental personnel will be primarily responsible for coordinating the release of water from the specified dams, including ensuring monitoring and reporting requirements as per PoOps and TEP conditions are met.

The following resources will be available during the release event:

- Dawson Mine Environmental personnel;
- Dawson Mine Pump and infrastructure crew;
- BVIT personnel
- Monitoring equipment (incl sample bottles, gloves, etc);
- Dedicated pumps and piping for transportation of water across site;
- Citect program for analysis of automatic water monitoring results; and
- DERM personnel.

4.2 Time Frame

Dawson Mine request that this TEP be implemented for a period of up to six (6) months. This does not suggest, however, that the release event will continue for the full six (6) month period. The focus for the immediate future is to discharge a sufficient water volume that will allow for the management of water levels on site following recent rainfall events. The release event will cease when the dams reach a capacity whereby sufficient freeboard is maintained to adequately manage the risk of subsequent rain events.

Should another weather system similar to or more severe than the recent event lead to similar water volumes being received within the Dawson region, the timeframe of this TEP will allow for further discharge of water for flood mitigation if necessary. The Dawson Mine will notify DERM of the necessity for further releases as per the requirements of this TEP.

4.3 Performance Indicators

4.3.1 Flow Rate

According to the current Dawson Central and North Plan of Operations the flow rate in the Kianga Creek must be greater than or equal to 2 m^3/s in order to release from Hillview Dam (RP-DC01T) (See Figure 6).

Receiving water description	Release Point	Gauging station description	Latitude or northing (GDA94)	Longitude or easting (GDA94)	Minimum Flow in Receiving Water Required for a Release Event	Flow recording Frequency
Kianga Creek	RP-DN01T	AQ-DC02T	-242915.62	150353.46	> or = 0.5 m^3/s	Continuous (minimum daily)
Kianga Creek	RP-DC01T	AQ-DC02T	-243358.95	150039.09	> or = 2 m^3/s	Continuous (minimum daily)
Kianga Creek	RP-DC02T	AQ-DC02T	-243949.98	150336.97	> or = 4 m^3/s	Continuous (minimum daily)

Figure 6: Table of Flow Conditions required to conduct controlled release at RP-DC01T

Source: Current Dawson Central and North Plan of Operations

The flow rate obtained from the Dawson Mine automatic monitoring station at Kianga Weir (AQ-DC02T) is used to monitor flow in Kianga Creek to ensure it remains at greater than $2m^3/s$ during releases from Hillview Dam. Where the potential arises for the Kianga Creek flow rate to fall below $2m^3/s$, it is proposed under this TEP that Hillview Dam be permitted to

discharge in a controlled manner, as necessary for flood mitigation and water management during and after extreme high rainfall conditions. If this situation is to arise, DERM officers will be contacted to discuss the action plan for discharges from Hillview Dam moving forward.

4.3.2 Water Quality

Water contaminant limits for releases from Hillview Dam are detailed in the Final Model Water Conditions for Coal Mines in the Fitzroy Basin as contained in the current Dawson Central and North Plan of Operations. For the purpose of this TEP, these conditions will also form the basis for assessing the quality of water released from 9-12 Dam.

There is the potential that water of a quality outside these limits may be released under this TEP. For Hillview Dam, current physical water quality parameters are within prescribed limits for release. In addition, it is expected that the significant inflow of freshwater from clean water dams and from the catchment area, will allow for sufficient dilution of any contaminants therefore reducing the risk of environmental harm. The release of water from 9-12 Dam is not expected to exceed these limits due to it being a clean water dam.

If the level of any parameter as per the Fitzroy Model Water Conditions is recorded to be outside of the given limits at the downstream monitoring point for both Hillview Dam and 9-12 Dam, this will be communicated to DERM through daily reporting of in situ parameters and weekly recordings of metals, ammonia and nitrate.

Appendix A contains water quality results for Hillview Dam over a period starting 1st January 2010 to 30th November 2010.

5.0 MONITORING

Water samples will be collected at the release point from Hillview Dam (RP-DC01T) as well as the upstream (AQ-DC02R) and downstream (AQ-DC03T) monitoring point. Water samples will be collected from 9-12 Dam release point as well as the upstream (AQ-DC03R) and downstream (AQ-DC02R).

Physical parameters will be monitored on a daily basis during the release event and metals, ammonia and nitrate will be monitored on a weekly basis.

Water samples will be collected either by Dawson Mine personnel or Dawson Mine contractors BVIT. All samples will be analysed in the BVIT laboratory by trained and competent lab technicians.

6.0 REPORTING

Results of insitu water quality parameters will be reported to DERM on a daily basis. Monthly progress reports outlining the activities and issues associated with the TEP will be issued to DERM along with proposed activities for the upcoming month. A final report defining how the objectives of the TEP have been achieved will be submitted upon completion of all actions.

7.0 APPENDIX A: Hillview DamWater Quality Results 1st Jan – 30th Nov 2010

January:

Environmental, Health & Safety Services
Bureau Veritas - International Trade Australia
ABN: 64 001 285 927
46 RAEDON ST
BILOELA QLD 4715
PH: 07 49925600 FAX: 07 49925115
[redacted]

ORIGIN: Dawson Mine **JOB NO:** Bi1498502

DESCRIPTION: Water Quality - Monthly Sampling **REC'D:** Jan-10

REPORTED TO: [redacted]

DATE REPORTED: 16/02/10

Sample ID		Area 14 Dam	Evaporation Ponds	Hillview Dam	Area 19 Dam	Pit 138L	Narweena Dam	Dawson River	100 Meg Dam
Date Sampled		14/01/10	13/01/10	13/01/10	14/01/10	-	14/01/10	13/01/10	13/01/10
Sample No.		M7766	M7750	M7749	M7763	-	M7764	M7740	M7747
pH		9.0	8.8	8.9	9.2	-	9.7	7.1	8.5
Conductivity	µS/cm	8360		9600	6570	-		160	5940
Temperature	°C	30.7	33.3	32.3	33.0	-	33.0	33.7	29.1
Dissolved Oxygen	mg/L	9.3	6.9	9.8	9.3	-	7.4	7.7	9.1
Turbidity	NTU	-	-	-	-	-	-	-	-
RL	m	-	-	-	-	-	-	-	-
Total Solids	mg/L	-	-	-	-	-	-	-	-
Total Dissolved Solids	mg/L	-	-	-	-	-	-	-	-
Total Suspended Solids	mg/L	-	-	-	-	-	-	-	-
Sulphate	mg/L	-	-	-	-	-	-	-	-
DISSOLVED METALS									
Aluminium	ug/L	13	NR	<5	NR	-	NR	NR	NR
Arsenic	ug/L	11	NR	13	NR	-	NR	NR	NR
Boron	ug/L	NR	NR	NR	NR	-	NR	NR	NR
Cadmium	ug/L	<5	NR	<5	NR	-	NR	NR	NR
Chromium	ug/L	NR	NR	NR	NR	-	NR	NR	NR
Cobalt	ug/L	<5	NR	<5	NR	-	NR	NR	NR
Copper	ug/L	<5	NR	<5	NR	-	NR	NR	NR
Iron	ug/L	NR	NR	NR	NR	-	NR	NR	NR
Lead	ug/L	<5	NR	<5	NR	-	NR	NR	NR
Manganese	ug/L	NR	NR	NR	NR	-	NR	NR	NR
Mercury	ug/L	NR	NR	NR	NR	-	NR	NR	NR
Nickel	ug/L	<5	NR	<5	NR	-	NR	NR	NR
Selenium	ug/L	NR	NR	NR	NR	-	NR	NR	NR
Silver	ug/L	NR	NR	NR	NR	-	NR	NR	NR
Uranium	ug/L	NR	NR	NR	NR	-	NR	NR	NR
Vanadium	ug/L	NR	NR	NR	NR	-	NR	NR	NR
Zinc	ug/L	32	NR	15	NR	-	NR	NR	NR
TOTAL METALS									
Aluminium	ug/L	210	130	510	1300	-	520	10000	270
Arsenic	ug/L	12	<5	14	14	-	<5	<5	7
Boron	ug/L	NR	NR	NR	NR	-	NR	NR	NR
Cadmium	ug/L	<5	NR	<5	NR	-	NR	NR	NR
Chromium	ug/L	NR	<5	NR	<5	-	<5	<5	<5
Cobalt	ug/L	<5	NR	<5	NR	-	NR	NR	NR
Copper	ug/L	<5	29	<5	12	-	23	9	<5
Iron	ug/L	NR	<100	NR	1100	-	470	6500	140
Lead	ug/L	<5	NR	<5	NR	-	NR	NR	NR
Manganese	ug/L	NR	140	NR	42	-	32	220	29
Mercury	ug/L	NR	NR	NR	NR	-	NR	NR	NR
Nickel	ug/L	<5	16	<5	<5	-	9	6	<5
Selenium	ug/L	NR	170		17	-	140	<5	14
Silver	ug/L	NR	NR	NR	NR	-	NR	NR	NR
Uranium	ug/L	NR	NR	NR	NR	-	NR	NR	NR
Vanadium	ug/L	NR	NR	NR	NR	-	NR	NR	NR
Zinc	ug/L	34	31	16	28	-	27	41	14
TPH FRACTIONS									
C6 - C9	ug/L	NR	NR	NR	NR	-	NR	NR	NR
C10 - C14	ug/L	NR	NR	NR	NR	-	NR	NR	NR
C15 - C28	ug/L	NR	NR	NR	NR	-	NR	NR	NR
C29 -C36	ug/L	NR	NR	NR	NR	-	NR	NR	NR
Fluoride	mg/L	0.5	<0.5	0.9	0.900	-	<0.5	<0.5	0.600
Ammonia as N	mg/L	NR	NR	NR	NR	-	NR	NR	NR
Total Fluoride	mg/L	0.500	NR	0.900	NR	-	NR	NR	NR
Nitrate as N	mg/L	1.900	<0.5	2.000	<0.5	-	<0.5	1.500	5.000
Chloride	mg/L	1800	18000	2400	1200	-	15000	7	1300
Orthophosphate as P	mg/L	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5
TRH	mg/L	NR	NR	NR	NR	-	NR	NR	NR

ND - Nil Detected
NR - Not Required
^ Sample lost in transit.

* - Guidelines apply only to Kianga Weir. Remaining samples are dirty water and guidelines do not apply.

This is preliminary report number 1

February:

Bureau Veritas - International Trade Australia
ABN: 64 001 285 927
46 RAEDON ST
BILOELA QLD 4715
PH: 07 49925600 FAX: 07 49925115
[redacted]

ORIGIN: Dawson Mine
JOB NO: Bi1498502
DESCRIPTION: Water Quality - Monthly Sampling
REC'D: Feb-10
REPORTED TO: [redacted]
PAGE: 7 of 55
DATE REPORTED: 10/03/10

Sample ID		Area 14 Dam	Evaporation Ponds	Hillview Dam	Area 19 Dam	Pit 13BL	Narweena Dam	Dawson River	100 Meg Dam
Date Sampled		05/02/10	05/02/10	05/02/10	04/02/10	DRY	04/02/10	10/02/10	05/02/10
Sample No.		M7838	M7843	M7844	M7834	-	M7835	M7852	M7846
pH		8.7	9.1	9.1	9.3	-	9.2	7.2	8.4
Conductivity	µS/cm	7.07	92.10	9.54	7.29	-	77.3	0.14	5.99
Temperature	°C	28.7	30.4	30.7	35.5	-	29.5	26.9	28.9
Dissolved Oxygen	mg/L	7.6	10.1	10.9	13.8	-	19.2	4.6	9.7
Turbidity	NTU				-	-			
RL	m				-	-			
Total Solids	mg/L				-	-			
Total Dissolved Solids	mg/L				-	-			
Total Suspended Solids	mg/L				-	-			
Sulphate	mg/L				-	-	-	-	-
DISSOLVED METALS									
Aluminium	ug/L		-		-	-	-	-	-
Arsenic	ug/L		-		-	-	-	-	-
Boron	ug/L	NR	-	NR	-	-	-	-	-
Cadmium	ug/L		-		-	-	-	-	-
Chromium	ug/L	NR	-	NR	-	-	-	-	-
Cobalt	ug/L		-		-	-	-	-	-
Copper	ug/L		-		-	-	-	-	-
Iron	ug/L	NR	-	NR	-	-	-	-	-
Lead	ug/L		-		-	-	-	-	-
Manganese	ug/L	NR	-	NR	-	-	-	-	-
Mercury	ug/L	NR	-	NR	-	-	-	-	-
Nickel	ug/L		-		-	-	-	-	-
Selenium	ug/L	NR	-	NR	-	-	-	-	-
Silver	ug/L	NR	-	NR	-	-	-	-	-
Uranium	ug/L	NR	-	NR	-	-	-	-	-
Vanadium	ug/L	NR	-	NR	-	-	-	-	-
Zinc	ug/L		-		-	-	-	-	-
TOTAL METALS									
Aluminium	ug/L		-		-	-	-	-	-
Arsenic	ug/L		-		-	-	-	-	-
Boron	ug/L	NR	-	NR	-	-	-	-	-
Cadmium	ug/L		-		-	-	-	-	-
Chromium	ug/L	NR	-	NR	-	-	-	-	-
Cobalt	ug/L		-		-	-	-	-	-
Copper	ug/L		-		-	-	-	-	-
Iron	ug/L	NR	-	NR	-	-	-	-	-
Lead	ug/L		-		-	-	-	-	-
Manganese	ug/L	NR	-	NR	-	-	-	-	-
Mercury	ug/L	NR	-	NR	-	-	-	-	-
Nickel	ug/L		-		-	-	-	-	-
Selenium	ug/L	NR	-	NR	-	-	-	-	-
Silver	ug/L	NR	-	NR	-	-	-	-	-
Uranium	ug/L	NR	-	NR	-	-	-	-	-
Vanadium	ug/L	NR	-	NR	-	-	-	-	-
Zinc	ug/L		-		-	-	-	-	-
TPH FRACTIONS									
C6 - C9	ug/L	NR	-	NR	-	-	-	-	-
C10 - C14	ug/L	NR	-	NR	-	-	-	-	-
C15 - C28	ug/L	NR	-	NR	-	-	-	-	-
C29 -C36	ug/L	NR	-	NR	-	-	-	-	-
Fluoride	mg/L		-		-	-	-	-	-
Ammonia as N	mg/L		-		-	-	-	-	-
Total Fluoride	mg/L		-		-	-	-	-	-
Nitrate as N	mg/L		-		-	-	-	-	-
Chloride	mg/L		-		-	-	-	-	-
Orthophosphate as P	mg/L		-		-	-	-	-	-
TRH	mg/L	-	-	-	-	-	-	-	-

ND - Nil Detected
NR - Not Required
^ Sample lost in transit.

* - Guidelines apply only to Kianga Weir. Remaining samples are dirty water and guidelines do not apply.

This is preliminary report number 1

March:

Bureau Veritas - International Trade Australia
ABN: 64 001 285 927
46 RAEDON ST
BILOELA QLD 4715
PH: 07 49925600 FAX: 07 49925115
[redacted]

ORIGIN: Dawson Mine

JOB NO: Bi1498502

DESCRIPTION: Water Quality - Monthly Sampling

REC'D: Feb-10

REPORTED TO: [redacted]

DATE REPORTED: 30/03/10

Sample ID		Area 14 Dam	Evaporation Ponds	Hillview Dam	Area 19 Dam	Pit 13BL	Narweena Dam	Dawson River	100 Meg Dam
Date Sampled		23/03/10	24/03/10	24/03/10	23/03/10	DRY	23/03/10	25/03/10	24/03/10
Sample No.		M8030	M8042	M8041	M8028	-	M8029	M8052	M8044
pH		8.8	8.6	8.9	8.5	-	7.4	7.4	7.8
Conductivity	µS/cm	2330.00	8.72	1110.00	1630.00	-	1420.0	160.00	3870.00
Temperature	°C	26.6	28.9	28.3	28.5	-	30.0	26.5	29.1
Dissolved Oxygen	mg/L	13.5	10.2	6.6	10.6	-	5.6	2.8	9.8
Turbidity	NTU				-	-			
RL	m				-	-			
Total Solids	mg/L				-	-			
Total Dissolved Solids	mg/L				-	-			
Total Suspended Solids	mg/L				-	-			
Sulphate	mg/L				-	-	-	-	-
DISSOLVED METALS									
Aluminium	ug/L	8	-	9	-	-	-	-	-
Arsenic	ug/L	7	-	6	-	-	-	-	-
Boron	ug/L	NR	-	NR	-	-	-	-	-
Cadmium	ug/L	<5	-	<5	-	-	-	-	-
Chromium	ug/L	NR	-	NR	-	-	-	-	-
Cobalt	ug/L	<5	-	<5	-	-	-	-	-
Copper	ug/L	<5	-	<5	-	-	-	-	-
Iron	ug/L	NR	-	NR	-	-	-	-	-
Lead	ug/L	<5	-	<5	-	-	-	-	-
Manganese	ug/L	NR	-	NR	-	-	-	-	-
Mercury	ug/L	NR	-	NR	-	-	-	-	-
Nickel	ug/L	<5	-	<5	-	-	-	-	-
Selenium	ug/L	NR	-	NR	-	-	-	-	-
Silver	ug/L	NR	-	NR	-	-	-	-	-
Uranium	ug/L	NR	-	NR	-	-	-	-	-
Vanadium	ug/L	NR	-	NR	-	-	-	-	-
Zinc	ug/L	26	-	23	-	-	-	-	-
TOTAL METALS									
Aluminium	ug/L	110	-	380	-	-	-	-	-
Arsenic	ug/L	7	-	6	-	-	-	-	-
Boron	ug/L	NR	-	NR	-	-	-	-	-
Cadmium	ug/L	<5	-	<5	-	-	-	-	-
Chromium	ug/L	NR	-	NR	-	-	-	-	-
Cobalt	ug/L	<5	-	<5	-	-	-	-	-
Copper	ug/L	<5	-	<5	-	-	-	-	-
Iron	ug/L	NR	-	NR	-	-	-	-	-
Lead	ug/L	<5	-	<5	-	-	-	-	-
Manganese	ug/L	NR	-	NR	-	-	-	-	-
Mercury	ug/L	NR	-	NR	-	-	-	-	-
Nickel	ug/L	<5	-	<5	-	-	-	-	-
Selenium	ug/L	NR	-	NR	-	-	-	-	-
Silver	ug/L	NR	-	NR	-	-	-	-	-
Uranium	ug/L	NR	-	NR	-	-	-	-	-
Vanadium	ug/L	NR	-	NR	-	-	-	-	-
Zinc	ug/L	26	-	23	-	-	-	-	-
TPH FRACTIONS									
C6 - C9	ug/L	NR	-	NR	-	-	-	-	-
C10 - C14	ug/L	NR	-	NR	-	-	-	-	-
C15 - C28	ug/L	NR	-	NR	-	-	-	-	-
C29 - C36	ug/L	NR	-	NR	-	-	-	-	-
Fluoride	mg/L		-		-	-	-	-	-
Ammonia as N	mg/L		-		-	-	-	-	-
Total Fluoride	mg/L		-		-	-	-	-	-
Nitrate as N	mg/L		-		-	-	-	-	-
Chloride	mg/L		-		-	-	-	-	-
Orthophosphate as P	mg/L		-		-	-	-	-	-
TRH	mg/L	-	-	-	-	-	-	-	-

ND - Nil Detected
NR - Not Required
^ Sample lost in transit.

* - Guidelines apply only to Kianga Weir. Remaining samples are dirty water and guidelines do not apply.

This is preliminary report number 2

April:

Bureau Veritas - International Trade Australia
ABN: 64 001 285 927
46 RAEDON ST
BILOELA QLD 4715
PH: 07 49925600 FAX: 07 49925115
[redacted]

ORIGIN: Dawson Mine

JOB NO: Bi1498502

DESCRIPTION: Water Quality - Monthly Sampling

REC'D: Apr-10

REPORTED TO: [redacted]

DATE REPORTED: 0/01/00

Sample ID		Area 14 Dam	Evaporation Ponds	Hillview Dam	Area 19 Dam	Pit 138L	Narweena Dam	Dawson River	100 Meg Dam
Date Sampled		20/04/10	20/04/10	20/04/10	20/04/10	DRY	20/04/10	20/04/10	20/04/10
Sample No.		M8103	M8108	M8109	M8100	-	M8101	M8113	M8111
pH		8.3	8.9	9.2	8.7	-	8.9	7.6	8.6
Conductivity	µS/cm	2670.00	11940.00	2200.00	2210.00	-	4.6	250.00	2310.00
Temperature	°C	24.7	24.4	24.6	24.3	-	26.5	24.9	24.8
Dissolved Oxygen	mg/L	7.2	8.9	10.8	6.4	-	10.8	4.7	8.5
Turbidity	NTU					-			
RL	m					-			
Total Solids	mg/L					-			
Total Dissolved Solids	mg/L					-			
Total Suspended Solids	mg/L					-			
Sulphate	mg/L					-	-	-	-
DISSOLVED METALS									
Aluminium	ug/L					-	-	-	-
Arsenic	ug/L					-	-	-	-
Boron	ug/L					-	-	-	-
Cadmium	ug/L					-	-	-	-
Chromium	ug/L					-	-	-	-
Cobalt	ug/L					-	-	-	-
Copper	ug/L					-	-	-	-
Iron	ug/L					-	-	-	-
Lead	ug/L					-	-	-	-
Manganese	ug/L					-	-	-	-
Mercury	ug/L					-	-	-	-
Nickel	ug/L					-	-	-	-
Selenium	ug/L					-	-	-	-
Silver	ug/L					-	-	-	-
Uranium	ug/L					-	-	-	-
Vanadium	ug/L					-	-	-	-
Zinc	ug/L					-	-	-	-
TOTAL METALS									
Aluminium	ug/L					-	-	-	-
Arsenic	ug/L					-	-	-	-
Boron	ug/L					-	-	-	-
Cadmium	ug/L					-	-	-	-
Chromium	ug/L					-	-	-	-
Cobalt	ug/L					-	-	-	-
Copper	ug/L					-	-	-	-
Iron	ug/L					-	-	-	-
Lead	ug/L					-	-	-	-
Manganese	ug/L					-	-	-	-
Mercury	ug/L					-	-	-	-
Nickel	ug/L					-	-	-	-
Selenium	ug/L					-	-	-	-
Silver	ug/L					-	-	-	-
Uranium	ug/L					-	-	-	-
Vanadium	ug/L					-	-	-	-
Zinc	ug/L					-	-	-	-
TPH FRACTIONS									
C6 - C9	ug/L					-	-	-	-
C10 - C14	ug/L					-	-	-	-
C15 - C28	ug/L					-	-	-	-
C29 -C36	ug/L					-	-	-	-
Fluoride	mg/L					-	-	-	-
Ammonia as N	mg/L					-	-	-	-
Total Fluoride	mg/L					-	-	-	-
Nitrate as N	mg/L					-	-	-	-
Chloride	mg/L					-	-	-	-
Orthophosphate as P	mg/L					-	-	-	-
TRH	mg/L					-	-	-	-

ND - Nil Detected
NR - Not Required
^ Sample lost in transit.

* - Guidelines apply only to Kianga Weir. Remaining samples are dirty water and guidelines do not apply.

This is preliminary report number 1

May:

Bureau Veritas - International Trade Australia
ABN: 64 001 285 927
46 RAEDON ST
BILOELA QLD 4715
PH: 07 49925600 FAX: 07 49925115
[redacted]

ORIGIN: Dawson Mine

JOB NO: Bi1498502

DESCRIPTION: Water Quality - Monthly Sampling

REC'D: May-10

REPORTED TO: [redacted]

DATE REPORTED: 22/06/10

Sample ID		Area 14 Dam	Evaporation Ponds	Hillview Dam	Area 19 Dam	Pit 13BL	Narweena Dam	Dawson River	100 Meg Dam
Date Sampled						DRY			
Sample No.						-			
pH						-			
Conductivity	µS/cm					-			
Temperature	°C					-			
Dissolved Oxygen	mg/L					-			
Turbidity	NTU					-			
RL	m					-			
Total Solids	mg/L					-			
Total Dissolved Solids	mg/L					-			
Total Suspended Solids	mg/L					-			
Sulphate	mg/L					-	-	-	-
DISSOLVED METALS									
Aluminium	ug/L					-	-	-	-
Arsenic	ug/L					-	-	-	-
Boron	ug/L					-	-	-	-
Cadmium	ug/L					-	-	-	-
Chromium	ug/L					-	-	-	-
Cobalt	ug/L					-	-	-	-
Copper	ug/L					-	-	-	-
Iron	ug/L					-	-	-	-
Lead	ug/L					-	-	-	-
Manganese	ug/L					-	-	-	-
Mercury	ug/L					-	-	-	-
Nickel	ug/L					-	-	-	-
Selenium	ug/L					-	-	-	-
Silver	ug/L					-	-	-	-
Uranium	ug/L					-	-	-	-
Vanadium	ug/L					-	-	-	-
Zinc	ug/L					-	-	-	-
TOTAL METALS									
Aluminium	ug/L					-	-	-	-
Arsenic	ug/L					-	-	-	-
Boron	ug/L					-	-	-	-
Cadmium	ug/L					-	-	-	-
Chromium	ug/L					-	-	-	-
Cobalt	ug/L					-	-	-	-
Copper	ug/L					-	-	-	-
Iron	ug/L					-	-	-	-
Lead	ug/L					-	-	-	-
Manganese	ug/L					-	-	-	-
Mercury	ug/L					-	-	-	-
Nickel	ug/L					-	-	-	-
Selenium	ug/L					-	-	-	-
Silver	ug/L					-	-	-	-
Uranium	ug/L					-	-	-	-
Vanadium	ug/L					-	-	-	-
Zinc	ug/L					-	-	-	-
TPH FRACTIONS									
C6 - C9	ug/L					-	-	-	-
C10 - C14	ug/L					-	-	-	-
C15 - C28	ug/L					-	-	-	-
C29 -C36	ug/L					-	-	-	-
Fluoride	mg/L					-	-	-	-
Ammonia as N	mg/L					-	-	-	-
Total Fluoride	mg/L					-	-	-	-
Nitrate as N	mg/L					-	-	-	-
Chloride	mg/L					-	-	-	-
Orthophosphate as P	mg/L					-	-	-	-
TRH	mg/L					-	-	-	-

ND - Nil Detected
NR - Not Required
^ Sample lost in transit.

* - Guidelines apply only to Kianga Weir. Remaining samples are dirty water and guidelines do not apply.

This is preliminary report number 1

June:

Bureau Veritas - International Trade Australia
ABN: 64 001 285 927
46 RAEDON ST
BILOELA QLD 4715
PH: 07 49925600 FAX: 07 49925115
[redacted]

ORIGIN: Dawson Mine

JOB NO: Bi1498502

DESCRIPTION: Water Quality - Monthly Sampling

REC'D: Jun-10

REPORTED TO: [redacted]

DATE REPORTED: 0/01/00

Sample ID		Area 14 Dam	Evaporation Ponds	Hillview Dam	Area 19 Dam	Pit 13BL	Narweena Dam	Dawson River	100 Meg Dam
Date Sampled		21/06/10	21/06/10	21/06/10	21/06/10	DRY	21/06/10	23/06/10	25/06/10
Sample No.		M8255	M8261	M8260	M8252	-	M8253	M8268	M8303
pH		8.1	9.0	9.2	10.2	-	8.9	7.9	8.3
Conductivity	µS/cm	3550.00	18620.00	4230.00	2900.00	-	7220.0	290	3080.00
Temperature	°C	17.3	18.6	18.0	15.1	-	19.4	18.2	18.3
Dissolved Oxygen	mg/L	9.0	10.7	13.9	12.3	-	11.2	7.1	9.5
Turbidity	NTU	5.00	-	10.00	-	-	-	-	-
RL	m	-	-	-	-	-	-	-	-
Total Solids	mg/L	-	-	-	-	-	-	-	-
Total Dissolved Solids	mg/L	2000	13858	2500	1728	-	4362.0	-	-
Total Suspended Solids	mg/L	<20	18	22	24	-	62.0	-	-
Sulphate	mg/L	480	-	380	-	-	-	-	-
DISSOLVED METALS									
Aluminium	ug/L	<5	-	<5	-	-	-	-	-
Arsenic	ug/L	6	-	34	-	-	-	-	-
Boron	ug/L		-		-	-	-	-	-
Cadmium	ug/L	<0.2	-	<0.2	-	-	-	-	-
Chromium	ug/L	-	-	-	-	-	-	-	-
Cobalt	ug/L	<5	-	<5	-	-	-	-	-
Copper	ug/L	<5	-	<5	-	-	-	-	-
Iron	ug/L	<100	-	<100	-	-	-	-	-
Lead	ug/L	<5	-	<5	-	-	-	-	-
Manganese	ug/L	-	-	-	-	-	-	-	-
Mercury	ug/L	-	-	-	-	-	-	-	-
Nickel	ug/L	<5	-	<5	-	-	-	-	-
Selenium	ug/L	-	-	-	-	-	-	-	-
Silver	ug/L	-	-	-	-	-	-	-	-
Uranium	ug/L	-	-	-	-	-	-	-	-
Vanadium	ug/L	-	-	-	-	-	-	-	-
Zinc	ug/L	43	-	26	-	-	-	-	-
TOTAL METALS									
Aluminium	ug/L	100	-	280	-	-	-	-	-
Arsenic	ug/L	5	-	33	-	-	-	-	-
Boron	ug/L	-	-	-	-	-	-	-	-
Cadmium	ug/L	<0.2	-	<0.2	-	-	-	-	-
Chromium	ug/L	-	-	-	-	-	-	-	-
Cobalt	ug/L	<5	-	<5	-	-	-	-	-
Copper	ug/L	<5	-	<5	-	-	-	-	-
Iron	ug/L	<100	-	100	-	-	-	-	-
Lead	ug/L	<5	-	<5	-	-	-	-	-
Manganese	ug/L	-	-	-	-	-	-	-	-
Mercury	ug/L	-	-	-	-	-	-	-	-
Nickel	ug/L	<5	-	<5	-	-	-	-	-
Selenium	ug/L	-	-	-	-	-	-	-	-
Silver	ug/L	-	-	-	-	-	-	-	-
Uranium	ug/L	-	-	-	-	-	-	-	-
Vanadium	ug/L	-	-	-	-	-	-	-	-
Zinc	ug/L	11	-	13	-	-	-	-	-
TPH FRACTIONS									
C6 - C9	ug/L	-	-	-	-	-	-	-	-
C10 - C14	ug/L	-	-	-	-	-	-	-	-
C15 - C28	ug/L	-	-	-	-	-	-	-	-
C29 -C36	ug/L	-	-	-	-	-	-	-	-
Fluoride	mg/L	-	-	-	-	-	-	-	-
Ammonia as N	mg/L	-	-	-	-	-	-	-	-
Total Fluoride	mg/L	-	-	-	-	-	-	-	-
Nitrate as N	mg/L	-	-	-	-	-	-	-	-
Chloride	mg/L	-	-	-	-	-	-	-	-
Orthophosphate as P	mg/L	-	-	-	-	-	-	-	-
TRH	mg/L	-	-	-	-	-	-	-	-

ND - Nil Detected
NR - Not Required
^ Sample lost in transit.

* - Guidelines apply only to Kianga Weir. Remaining samples are dirty water and guidelines do not apply.

This is preliminary report number 1

July:

Bureau Veritas - International Trade Australia
ABN: 64 001 285 927
46 RAEDON ST
BILOELA QLD 4715
PH: 07 49925600 FAX: 07 49925115
[redacted]

ORIGIN: Dawson Mine
JOB NO: BI1498502
DESCRIPTION: Water Quality - Monthly Sampling
REC'D: Jul-10
REPORTED TO: [redacted]
DATE REPORTED: 1/09/10

Sample ID		Area 14 Dam	Evaporation Ponds	Hillview Dam	Area 19 Dam	Pit 13BL	100 Meg Dam	Dawson River	Narweena Dam
Date Sampled		16/07/10	16/07/10	16/07/10	16/07/10	DRY	20/07/10	09/07/10	16/07/10
Sample No.		M8374	M8378	M8377	M8371	-	M8386	M8367	M8372
pH		8.9	9.1	9.1	10.4	-	8.4	7.8	8.9
Conductivity	µS/cm	3840.00	22170.00	5120.00	3240.00	-	3890.0	250	8270.00
Temperature	°C	19.1	18.9	18.5	20.4	-	17.7	17.6	21.1
Dissolved Oxygen	mg/L	12.2	10.6	12.3	13.9	-	8.3	6.8	9.9
Turbidity	NTU	8.00	10	13.00	29.00	-	4.0	13	12
RL	m		-	-		-	-	-	-
Total Solids	mg/L	2400.0	17000.0	3500.0	2100.0	-	-	200	5600
Total Dissolved Solids	mg/L	2400	17000	3000	2100	-	3700.0	200	5100
Total Suspended Solids	mg/L	<20	44	22	44	-	<20	<20	27/01/00
Sulphate	mg/L	460	4400	360	380	-	660	3	880
DISSOLVED METALS									
Aluminium	ug/L	<5	360	140	1400	-	-	770	350
Arsenic	ug/L	<5	8	35	38	-	-	<5	8
Boron	ug/L	-	-	-	-	-	-	-	-
Cadmium	ug/L	<0.2	-	<0.2	-	-	-	-	
Calcium	ug/L	-	130	-	10			21	48
Chromium	ug/L	-	<5	-	<5	-	-	<5	<5
Cobalt	ug/L	<5	-	<5	-	-	-	-	-
Copper	ug/L	<5	7	<5	6	-	-	<5	<5
Iron	ug/L	<100	200	<100	500	-	-	500	300
Lead	ug/L	<5	-	<5	-	-	-	-	-
Magnesium	ug/L	-	570	-	11			7	47
Manganese	ug/L	-	14	-	28	-	-	10	55
Mercury	ug/L	-	-	-	-	-	-	-	-
Nickel	ug/L	<5	<5	<5	<5	-	-	<5	<5
Postassium	ug/L	-	33	-	2			8	19
Selenium	ug/L	-	56	-	<5	-	-	<5	20
Silver	ug/L	-	-	-	-	-	-	-	-
Sodium	ug/L	-	5000	-	660			26	1700
Uranium	ug/L	-	-	-	-	-	-	-	-
Vanadium	ug/L	-	-	-	-	-	-	-	-
Zinc	ug/L	<5	17	<5	14	-	-	14	13
TOTAL METALS									
Aluminium	ug/L	120	-	400	-	-	170	-	-
Arsenic	ug/L	<5	-	30	-	-	6	-	-
Boron	ug/L	-	-	-	-	-	-	-	-
Cadmium	ug/L	<0.2	-	<0.2	-	-	-	-	-
Calcium	ug/L	-		-			73		
Chromium	ug/L	-		-	-	-	<5	-	-
Cobalt	ug/L	<5	-	<5	-	-	-	-	-
Copper	ug/L	<5	-	<5	-	-	<5	-	-
Iron	ug/L	100	-	200	-	-	100	-	-
Lead	ug/L	<5	-	<5	-	-	-	-	-
Magnesium	ug/L	-		-			62		
Manganese	ug/L	-	-	-	-	-	18	-	-
Mercury	ug/L	-	-	-	-	-	-	-	-
Nickel	ug/L	<5	-	<5	-	-	8	-	-
Postassium	ug/L	-		-			14		
Selenium	ug/L	-	-	-	-	-	13	-	-
Silver	ug/L	-	-	-	-	-	-	-	-
Sodium	ug/L	-		-			790		
Uranium	ug/L	-	-	-	-	-	-	-	-
Vanadium	ug/L	-	-	-	-	-	-	-	-
Zinc	ug/L	15	-	14	-	-	18	-	-
TPH FRACTIONS									
C6 - C9	ug/L	-	-	-	-	-	-	-	-
C10 - C14	ug/L	-	-	-	-	-	-	-	-
C15 - C28	ug/L	-	-	-	-	-	-	-	-
C29 - C36	ug/L	-	-	-	-	-	-	-	-
Fluoride	mg/L	<0.5	-	0.800	0.600	-	0.700	<0.5	<0.5
Ammonia as N	mg/L	-	-	-	-	-	-	-	-
Total Fluoride	mg/L	-	-	-	-	-	-	-	-
Nitrate as N	mg/L	0.900	-	<0.1	<0.1	-	9.100	0.400	<0.1
Chloride	mg/L	710	-	1000	480	-	720	30.000	1600
Orthophosphate as P	mg/L	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5
TRH	mg/L	-	-	-	-	-	-	-	-

ND - Nil Detected
NR - Not Required
^ Sample lost in transit.

* - Guidelines apply only to Kianga Weir. Remaining samples are dirty water and guidelines do not apply.

This is preliminary report number 2

August:

Bureau Veritas - International Trade Australia
ABN: 64 001 285 927
46 RAEDON ST
BILOELA QLD 4715
PH: 07 49925600 FAX: 07 49925115
[redacted]

ORIGIN: Dawson Mine

JOB NO: Bi1498502

DESCRIPTION: Water Quality - Monthly Sampling

REC'D: Aug-10

REPORTED TO: [redacted]

DATE REPORTED: 22/09/10

Sample ID		Area 14 Dam	Evaporation Ponds	Hillview Dam	Area 19 Dam	Pit 13BL	100 Meg Dam	Dawson River	Narweena Dam
Date Sampled		12/08/10	10/08/10	12/08/10	12/08/10	-	10/08/10	10/08/10	13/08/10
Sample No.		M8505	M8489	M8507	M8503	-	M8491	M8494	M8510
pH		9.0	9.6	8.9	10.3	-	7.7	8.4	8.8
Conductivity	µS/cm	3530.00	22090.00	5460.00	2950.00	-	5090.0	410	8300.00
Temperature	°C	18.5	18.7	19.0	19.0	-	20.2	19	21.5
Dissolved Oxygen	mg/L	11.2	9.6	10.3	11.8	-	7.3	8.6	11.7
Turbidity	NTU	12.00	9	29.00	32.00	-	17.0	13	54
RL	m	-	-	-	-	-	-	-	-
Total Solids	mg/L	-	-	-	-	-	-	-	-
Total Dissolved Solids	mg/L	2300	22000	3400	1800	-	3600.0	200	16000
Total Suspended Solids	mg/L	33	66	45	34	-	35.0	<20	87
Sulphate	mg/L	-	-	-	-	-	-	-	-
DISSOLVED METALS									
Aluminium	ug/L	<5	-	8	-	-	-	-	-
Arsenic	ug/L	<5	-	29	-	-	-	-	-
Boron	ug/L	-	-	-	-	-	-	-	-
Cadmium	ug/L	<0.2	-	<0.2	-	-	-	-	-
Calcium	ug/L	-	-	-	-	-	-	-	-
Chromium	ug/L	-	-	-	-	-	-	-	-
Cobalt	ug/L	<5	-	<5	-	-	-	-	-
Copper	ug/L	<5	-	<5	-	-	-	-	-
Iron	ug/L	<100	-	<100	-	-	-	-	-
Lead	ug/L	<5	-	<5	-	-	-	-	-
Magnesium	ug/L	-	-	-	-	-	-	-	-
Manganese	ug/L	-	-	-	-	-	-	-	-
Mercury	ug/L	-	-	-	-	-	-	-	-
Nickel	ug/L	<5	-	<5	-	-	-	-	-
Postassium	ug/L	-	-	-	-	-	-	-	-
Selenium	ug/L	-	-	-	-	-	-	-	-
Silver	ug/L	-	-	-	-	-	-	-	-
Sodium	ug/L	-	-	-	-	-	-	-	-
Uranium	ug/L	-	-	-	-	-	-	-	-
Vanadium	ug/L	-	-	-	-	-	-	-	-
Zinc	ug/L	<5	-	<5	-	-	-	-	-
TOTAL METALS									
Aluminium	ug/L	210	-	580	-	-	-	-	-
Arsenic	ug/L	<5	-	27	-	-	-	-	-
Boron	ug/L	-	-	-	-	-	-	-	-
Cadmium	ug/L	<0.2	-	<0.2	-	-	-	-	-
Calcium	ug/L	-	-	-	-	-	-	-	-
Chromium	ug/L	-	-	-	-	-	-	-	-
Cobalt	ug/L	<5	-	<5	-	-	-	-	-
Copper	ug/L	<5	-	<5	-	-	-	-	-
Iron	ug/L	300	-	600	-	-	-	-	-
Lead	ug/L	<5	-	<5	-	-	-	-	-
Magnesium	ug/L	-	-	-	-	-	-	-	-
Manganese	ug/L	-	-	-	-	-	-	-	-
Mercury	ug/L	-	-	-	-	-	-	-	-
Nickel	ug/L	<5	-	<5	-	-	-	-	-
Postassium	ug/L	-	-	-	-	-	-	-	-
Selenium	ug/L	-	-	-	-	-	-	-	-
Silver	ug/L	-	-	-	-	-	-	-	-
Sodium	ug/L	-	-	-	-	-	-	-	-
Uranium	ug/L	-	-	-	-	-	-	-	-
Vanadium	ug/L	-	-	-	-	-	-	-	-
Zinc	ug/L	8	-	7	-	-	-	-	-
TPH FRACTIONS									
C6 - C9	ug/L	-	-	-	-	-	-	-	-
C10 - C14	ug/L	-	-	-	-	-	-	-	-
C15 - C28	ug/L	-	-	-	-	-	-	-	-
C29 -C36	ug/L	-	-	-	-	-	-	-	-
Fluoride	mg/L	-	-	-	-	-	-	-	-
Ammonia as N	mg/L	-	-	-	-	-	-	-	-
Total Fluoride	mg/L	-	-	-	-	-	-	-	-
Nitrate as N	mg/L	-	-	-	-	-	-	-	-
Chloride	mg/L	-	-	-	-	-	-	-	-
Orthophosphate as P	mg/L	-	-	-	-	-	-	-	-
TRH	mg/L	-	-	-	-	-	-	-	-

ND - Nil Detected
NR - Not Required
^ Sample lost in transit.

* - Guidelines apply only to Kianga Weir. Remaining samples are dirty water and guidelines do not apply.

This is preliminary report number 1

September:

Bureau Veritas - International Trade Australia
ABN: 64 001 285 927
46 RAEDON ST
BILOELA QLD 4715
PH: 07 49925600 FAX: 07 49925115
[redacted]

ORIGIN: Dawson Mine

JOB NO: Bi1498502

DESCRIPTION: Water Quality - Monthly Sampling

REC'D: Sep-10

REPORTED TO: [redacted]

DATE REPORTED: 0/01/00

Sample ID		Area 14 Dam	Evaporation Ponds	Hillview Dam	Area 19 Dam	Pit 13BL	100 Meg Dam	Dawson River	Narweena Dam
Date Sampled		18/09/10	INACCESSIBLE	14/09/10	18/09/10		18/09/10	14/09/10	18/09/10
Sample No.		M8617		M8610	M8614		M8622	M8609	M8615
pH		7.9		8.7	7.9		8.1	7.4	7.5
Conductivity	µS/cm	1420.00		1100.00	1270.00		1790.0	170	1660.00
Temperature	°C	26.0		28.9	25.4		24.1	22.5	25.7
Dissolved Oxygen	mg/L	7.5		9.4	5.1		7.0	7	6.8
Turbidity	NTU	26.00		100.00	46.00		99.0	370	31
RL	m	-		-	-		-	-	-
Total Solids	mg/L	-		-	-		-	-	-
Total Dissolved Solids	mg/L	430		470	820		1100.0	1800	1100
Total Suspended Solids	mg/L	<20		77	<20		65.0	240	24
Sulphate	mg/L	-		-	120		220	2	180
DISSOLVED METALS									
Aluminium	ug/L	220		230	-		-	-	-
Arsenic	ug/L	<5		9	-		-	-	-
Boron	ug/L	-		-	-		-	-	-
Cadmium	ug/L	<0.2		<0.2	-		-	-	-
Chromium	ug/L	-		-	-		-	-	-
Cobalt	ug/L	<5		<5	-		-	-	-
Copper	ug/L	<5		<5	-		-	-	-
Iron	ug/L	100		200	-		-	-	-
Lead	ug/L	<5		<5	-		-	-	-
Manganese	ug/L	-		-	-		-	-	-
Mercury	ug/L	-		-	-		-	-	-
Nickel	ug/L	<5		<5	-		-	-	-
Selenium	ug/L	-		-	-		-	-	-
Silver	ug/L	-		-	-		-	-	-
Uranium	ug/L	-		-	-		-	-	-
Vanadium	ug/L	-		-	-		-	-	-
Zinc	ug/L	8		8	-		-	-	-
TOTAL METALS									
Aluminium	ug/L	470		880	-		-	-	-
Arsenic	ug/L	<5		9	-		-	-	-
Boron	ug/L	-		-	-		-	-	-
Cadmium	ug/L	<0.2		<0.2	-		-	-	-
Chromium	ug/L	-		-	-		-	-	-
Cobalt	ug/L	<5		<5	-		-	-	-
Copper	ug/L	<5		<5	-		-	-	-
Iron	ug/L	400		800	-		-	-	-
Lead	ug/L	<5		<5	-		-	-	-
Manganese	ug/L	-		-	-		-	-	-
Mercury	ug/L	-		-	-		-	-	-
Nickel	ug/L	<5		<5	-		-	-	-
Selenium	ug/L	-		-	-		-	-	-
Silver	ug/L	-		-	-		-	-	-
Uranium	ug/L	-		-	-		-	-	-
Vanadium	ug/L	-		-	-		-	-	-
Zinc	ug/L	27		33	-		-	-	-
TPH FRACTIONS									
C6 - C9	ug/L	-		-	-		-	-	-
C10 - C14	ug/L	-		-	-		-	-	-
C15 - C28	ug/L	-		-	-		-	-	-
C29 -C36	ug/L	-		-	-		-	-	-
Fluoride	mg/L	-		-	-		-	-	-
Ammonia as N	mg/L	-		-	-		-	-	-
Total Fluoride	mg/L	-		-	-		-	-	-
Nitrate as N	mg/L	-		-	-		-	-	-
Chloride	mg/L	-		-	-		-	-	-
Orthophosphate as P	mg/L	-		-	-		-	-	-
TRH	mg/L	-		-	-		-	-	-

ND - Nil Detected
NR - Not Required
^ Sample lost in transit.

* - Guidelines apply only to Kianga Weir. Remaining samples are dirty water and guidelines do not apply.

This is preliminary report number 1

October:

Bureau Veritas - International Trade Australia
ABN: 64 001 285 927
46 RAEDON ST
BILOELA QLD 4715
PH: 07 49925600 FAX: 07 49925115

ORIGIN: Dawson Mine

JOB NO: Bi1498502

DESCRIPTION: Water Quality - Monthly Sampling

REC'D: Oct-10

REPORTED TO:

DATE REPORTED: 0/01/00

Sample ID		Area 14 Dam	Evaporation Ponds	Hillview Dam	Area 19 Dam	Pit 13BL	100 Meg Dam	Dawson River	Narweena Dam
Date Sampled		12/10/10	INACCESSIBLE	12/10/10	12/10/10		12/10/10	12/10/10	12/10/10
Sample No.		M8718		M8722	M8715		M8725	M8727	M8716
pH		8.3		9.4	7.5		8.3	7.7	6.4
Conductivity	µS/cm	1710.00		1320.00	1050.00		2020.0	190	2700.00
Temperature	°C	23.9		24.0	23.6		24.2	23.8	25.0
Dissolved Oxygen	mg/L	8.3		10.3	5.4		6.8	6	11.9
Turbidity	NTU	6.00		31.00	13.00		5.0	280	24
RL	m	-		-	-		-	-	-
Total Solids	mg/L	-		-	-		-	-	-
Total Dissolved Solids	mg/L	1000		740	650		1300.0	290	1500
Total Suspended Solids	mg/L	<20		28	<20		20.0	48	<20
Sulphate	mg/L	210		81	100		280	3	140
DISSOLVED METALS									
Aluminium	ug/L	130		67	-		-	-	-
Arsenic	ug/L	<5		12	-		-	-	-
Boron	ug/L	-		-	-		-	-	-
Cadmium	ug/L	<0.2		<0.2	-		-	-	-
Chromium	ug/L	-		-	-		-	-	-
Cobalt	ug/L	<5		<5	-		-	-	-
Copper	ug/L	<5		<5	-		-	-	-
Iron	ug/L	<100		<100	-		-	-	-
Lead	ug/L	<5		<5	-		-	-	-
Manganese	ug/L	-		-	-		-	-	-
Mercury	ug/L	-		-	-		-	-	-
Nickel	ug/L	<5		<5	-		-	-	-
Selenium	ug/L	-		-	-		-	-	-
Silver	ug/L	-		-	-		-	-	-
Uranium	ug/L	-		-	-		-	-	-
Vanadium	ug/L	-		-	-		-	-	-
Zinc	ug/L	9		14	-		-	-	-
TOTAL METALS									
Aluminium	ug/L	460		560	-		-	-	-
Arsenic	ug/L	<5		12	-		-	-	-
Boron	ug/L	-		-	-		-	-	-
Cadmium	ug/L	<0.2		<0.2	-		-	-	-
Chromium	ug/L	-		-	-		-	-	-
Cobalt	ug/L	<5		<5	-		-	-	-
Copper	ug/L	<5		<5	-		-	-	-
Iron	ug/L	300		500	-		-	-	-
Lead	ug/L	<5		<5	-		-	-	-
Manganese	ug/L	-		-	-		-	-	-
Mercury	ug/L	-		-	-		-	-	-
Nickel	ug/L	<5		<5	-		-	-	-
Selenium	ug/L	-		-	-		-	-	-
Silver	ug/L	-		-	-		-	-	-
Uranium	ug/L	-		-	-		-	-	-
Vanadium	ug/L	-		-	-		-	-	-
Zinc	ug/L	13		18	-		-	-	-
TPH FRACTIONS									
C6 - C9	ug/L	-		-	-		-	-	-
C10 - C14	ug/L	-		-	-		-	-	-
C15 - C28	ug/L	-		-	-		-	-	-
C29 -C36	ug/L	-		-	-		-	-	-
Fluoride	mg/L	-		-	-		-	-	-
Ammonia as N	mg/L	-		-	-		-	-	-
Total Fluoride	mg/L	-		-	-		-	-	-
Nitrate as N	mg/L	-		-	-		-	-	-
Chloride	mg/L	-		-	-		-	-	-
Orthophosphate as P	mg/L	-		-	-		-	-	-
TRH	mg/L	-		-	-		-	-	-

ND - Nil Detected
NR - Not Required
^ Sample lost in transit

* - Guidelines apply only to Kianga Weir. Remaining samples are dirty water and guidelines do not apply.

This is preliminary report number 1

November:

Bureau Veritas - International Trade Australia
ABN: 64 001 285 927
46 RAEDON ST
BILOELA QLD 4715
PH: 07 49925600 FAX: 07 49925115
[redacted]

ORIGIN: Dawson Mine **JOB NO:** BI1498502

DESCRIPTION: Water Quality - Monthly Sampling **REC'D:** Nov-10

REPORTED TO: [redacted]

DATE REPORTED: 2/12/10

Sample ID		Area 14 Dam	Evaporation Ponds	Hillview Dam	Area 19 Dam	Pit 13BL	100 Meg Dam	Dawson River	Narweena Dam
Date Sampled		09/11/10	09/11/10	09/11/10	09/11/10		09/11/10	09/11/10	09/11/10
Sample No.		M8797	M8802	M8803	M8794		M8805	M8807	M8795
pH		8.5	9.0	9.1	9.2		8.5	7.7	8.3
Conductivity	µS/cm	1960.00	16860.00	1600.00	1200.00		1530.0	200	4010.00
Temperature	°C	26.2	25.2	25.5	24.4		25.0	24.9	25.3
Dissolved Oxygen	mg/L	8.2	9.8	10.8	10.4		7.8	6.1	8.7
Turbidity	NTU	9.10	5	55.00	19.00		41.0	180	18
RL	m	-		-	-		-	-	-
Total Solids	mg/L	-		-	-		-	-	-
Total Dissolved Solids	mg/L	1100	12000	760	680		920.0	250	2300
Total Suspended Solids	mg/L	2	20	16	16		10.0	24	66
Sulphate	mg/L		3700		120		220	<15	470
DISSOLVED METALS									
Aluminium	ug/L	<50		<50	-		-	-	-
Arsenic	ug/L	4		10	-		-	-	-
Boron	ug/L	-		-	-		-	-	-
Cadmium	ug/L	<0.2		<0.2	-		-	-	-
Chromium	ug/L	-		-	-		-	-	-
Cobalt	ug/L	<1		<1	-		-	-	-
Copper	ug/L	<1		2	-		-	-	-
Iron	ug/L	<50		<50	-		-	-	-
Lead	ug/L	<1		<1	-		-	-	-
Manganese	ug/L	-		-	-		-	-	-
Mercury	ug/L	-		-	-		-	-	-
Nickel	ug/L	<1		<1	-		-	-	-
Selenium	ug/L	-		-	-		-	-	-
Silver	ug/L	-		-	-		-	-	-
Uranium	ug/L	-		-	-		-	-	-
Vanadium	ug/L	-		-	-		-	-	-
Zinc	ug/L	21		3	-		-	-	-
TOTAL METALS									
Aluminium	ug/L	210		1900	-		-	-	-
Arsenic	ug/L	4		11	-		-	-	-
Boron	ug/L	-		-	-		-	-	-
Cadmium	ug/L	<0.2		<0.2	-		-	-	-
Chromium	ug/L	-		-	-		-	-	-
Cobalt	ug/L	<1		1	-		-	-	-
Copper	ug/L	<1		4	-		-	-	-
Iron	ug/L	230		1200	-		-	-	-
Lead	ug/L	<1		<1	-		-	-	-
Manganese	ug/L	-		-	-		-	-	-
Mercury	ug/L	-		-	-		-	-	-
Nickel	ug/L	<1		2	-		-	-	-
Selenium	ug/L	-		-	-		-	-	-
Silver	ug/L	-		-	-		-	-	-
Uranium	ug/L	-		-	-		-	-	-
Vanadium	ug/L	-		-	-		-	-	-
Zinc	ug/L	5		<1	-		-	-	-
TPH FRACTIONS									
C6 - C9	ug/L	-		-	-		-	-	-
C10 - C14	ug/L	-		-	-		-	-	-
C15 - C28	ug/L	-		-	-		-	-	-
C29 -C36	ug/L	-		-	-		-	-	-
Fluoride	mg/L	-		-	-		-	-	-
Ammonia as N	mg/L	-		-	-		-	-	-
Total Fluoride	mg/L	-		-	-		-	-	-
Nitrate as N	mg/L	-		-	-		-	-	-
Chloride	mg/L	-		-	-		-	-	-
Orthophosphate as P	mg/L	-		-	-		-	-	-
TRH	mg/L	-		-	-		-	-	-

ND - Nil Detected
NR - Not Required
^ Sample lost in transit.

* - Guidelines apply only to Kianga Weir. Remaining samples are dirty water and guidelines do not apply.

This is preliminary report number 1

DRAFT TRANSITIONAL ENVIRONMENTAL PROGRAM UNDER s333 OF THE *ENVIRONMENTAL PROTECTION ACT 1994*

Principal Holder:	Anglo Coal Australia Pty Ltd
EA Number:	No EA - Refer to Current Plan of Operations and Fitzroy Model Water Conditions
Title:	Dawson North and Central Transitional Environmental Program:
Date:	7th February 2011
Finish Date:	1st July 2011 (inclusion of time required for reporting after discharge)

1.0 BACKGROUND

1.1 Purpose of TEP

Dawson Mine, one of Queensland's leading export coal operations, is owned by the Moura Joint Venture, comprising Anglo Coal Australia Pty Ltd (51%) and Mitsui Coal Holdings Pty Ltd (49%). The mine is operated by Anglo Coal Australia and is located in the southern part of the Bowen Basin, approximately 180km west of Gladstone.

A recent weather system has caused excessive rainfall across most of Central Queensland resulting in the flooding of tributaries across a large portion of the region. The weather station located in the town of Moura recorded a total monthly rainfall in December of 290.4mm (refer to Figure 1). Due to this recent weather event the Dawson Mine water inventory has risen significantly and many onsite water storages are nearing or have reached full capacity. The mine has implemented its Water Management Plan to appropriately manage or contain water across the operation. This includes the diversion of clean water around the site, controlled releases of water where possible and the pumping of water to water storages across site. There are currently three (3) dams at Dawson Mine which are releasing or have recently released; Hillview Dam, 14 Dam and 35ML Dam. These releases have been both controlled (within licence conditions) and uncontrolled and have been reported to Department of Environment and Resource Management (DERM).

The Dawson North Pit's construction included the diversion of an unnamed creek, which became know as Dawson North Lease Boundary Creek (a tributary of Kianga Creek). The diversion channel was designed to contain the peak 1:100 year flow and still maintain a 500mm freeboard. However during the recent heavy rainfall event, the bank of the diversion channel was compromised causing an inflow of fresh water into the pit. The calculated volume of water stored in the pit is 3,750 ML.

Due to the uncontrollable climatic conditions detailed, Dawson Mine requests the consideration of this Draft Transitional Environmental Program (TEP) in accordance with s333 of the *Environmental Protection Act 1994,* to allow for the management of increased water flows at the Dawson Mines.

Specifically, this TEP proposes:

- Release rate and period of release,
- EC level,
- Minimum flow in the Dawson River required for release,
- Flushing of Kianga Creek with Dawson Central clean water,
- Discharging from Hillview Dam in association with Dawson North Pit, and
- Proposed monitoring.

1.2 Current Status and Water Management Options for Dams

1.2.1 Hillview Dam

Hillview Dam is located on the western side of the Dawson Central mining operations and is a nominated release point for Dawson Central (Refer to Figure 2**Error! Reference source not found.**). Water is pumped to Hillview Dam from various locations across site including clean water dams, sediment dams and pits. There

is an automatic monitoring station at Hillview which monitors volume, level, EC, pH and temperature. Manual sampling is also conducted at Hillview Dam for further parameters.
Over the last ten (10) days Hillview Dam has, at intervals of two (2) and three (3) days, been subject to both controlled and uncontrolled releases. DERM officers have been notified of these releases and have been provided with all requested information. The water released from Hillview Dam to date has remained under water quality trigger levels. Three (3) days of controlled and uncontrolled discharging occurred while the flow rate in Kianga Creek was under the nominated 2m^3/s. This controlled discharge was undertaken after verbal permission was received from DERM Officers [redacted].

There is potential that further controlled discharges from Hillview Dam will need to be undertaken with a flow rate in Kianga Creek of less than 2m3/s, to ensure water levels are appropriately managed on site. Where this potential arises, it is proposed under this TEP that Hillview Dam be permitted to discharge in a controlled manner, as necessary for flood mitigation and water management during and after extreme high rainfall conditions. If this situation is to arise, DERM officers will be contacted to discuss the action plan for discharges from Hillview Dam moving forward.

1.2.2 9-12 Clean Water Dam

The 9-12 Clean Water Dam (9-12 Dam) is located east of the Dawson Central mining operations. This dam contains runoff from catchments on the eastern side of the mining lease which mostly consist of grazing land. The dam does not contain any water from pits or sediment dams across the mining lease. Please refer to **Error! Reference source not found.**Figure 3 which outlines the location of the 9-12 Dam. This Dam has reached capacity following the recent rainfall events.

Infrastructure is currently available to pump water from the 9-12 Dam into Kianga Creek upstream from the Hillview Dam release point to increase the storage capacity of this Dam should further rainfall be received. In addition to improving water storage on site, the controlled release of water from this dam has the potential to increase the flow in Kianga Creek prior to further discharges from Hillview Dam.

Water quality samples are to be collected from the 9-12 Dam by Bureau Veritas International Trade (BVIT) on 4th January 2011. A pH/EC meter was used by BVIT to monitor levels in 9-12 Dam on 3rd January 2011. The pH results indicated a pH of 7.8 and an EC of 160µS/cm.

1.2.3 Bottom Dam East

Bottom Dam East is a clean water dam located on the eastern side of the mining operations in the vicinity of the Coal Handling Preparation Plant (CHPP) (Refer to Figure 3). This Dam contains runoff from catchments on the eastern side of the mining lease. This dam has received a high influx of rainwater during the recent weather events and is close to capacity. Infrastructure is available to pump water from Bottom Dam East to Dawson North Discharge Channel. This water has the potential to increase the dilution factor at the Dawson North Industrial Dam spillway prior to discharge from the drainage channel.

Water Quality samples are to be collected at Bottom Dam East by Dawson Mine Contractor BVIT on 4th January 2011. A pH/EC meter was used by BVIT to monitor levels in Bottom Dam East on 3rd January 2011. The results indicated a pH of 7.5 and an EC of 390µS/cm.

1.2.4 Days Dam

Days Dam is a clean water Dam which is located on the eastern side of the Dawson Central mining operations (Refer to Figure 4). This dam contains runoff from catchments on the eastern side of the mining lease which mostly consist of grazing land. This dam has similarly received a high volume of rainfall in recent weeks. Infrastructure is currently available to pump water from Days Dam into Hillview Dam thereby potentially increasing the dilution factor in Hillview Dam. Water Quality samples are to be collected at Days Dam by Dawson Mine Contractor BVIT on 4th January 2011.

Figure 1: Map of Hillview Dam and Drainage System
Source: Dawson Mine GIS Software

Figure 2: Map of 9-12 Dam and Drainage System
Source: Dawson Mine GIS Software

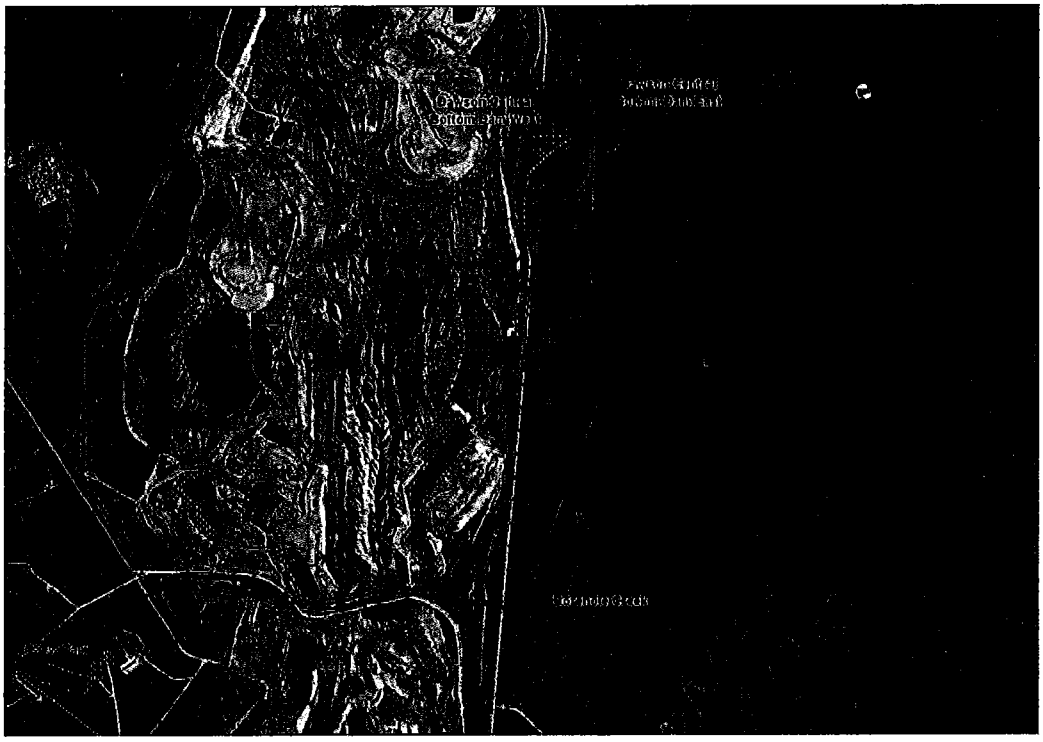
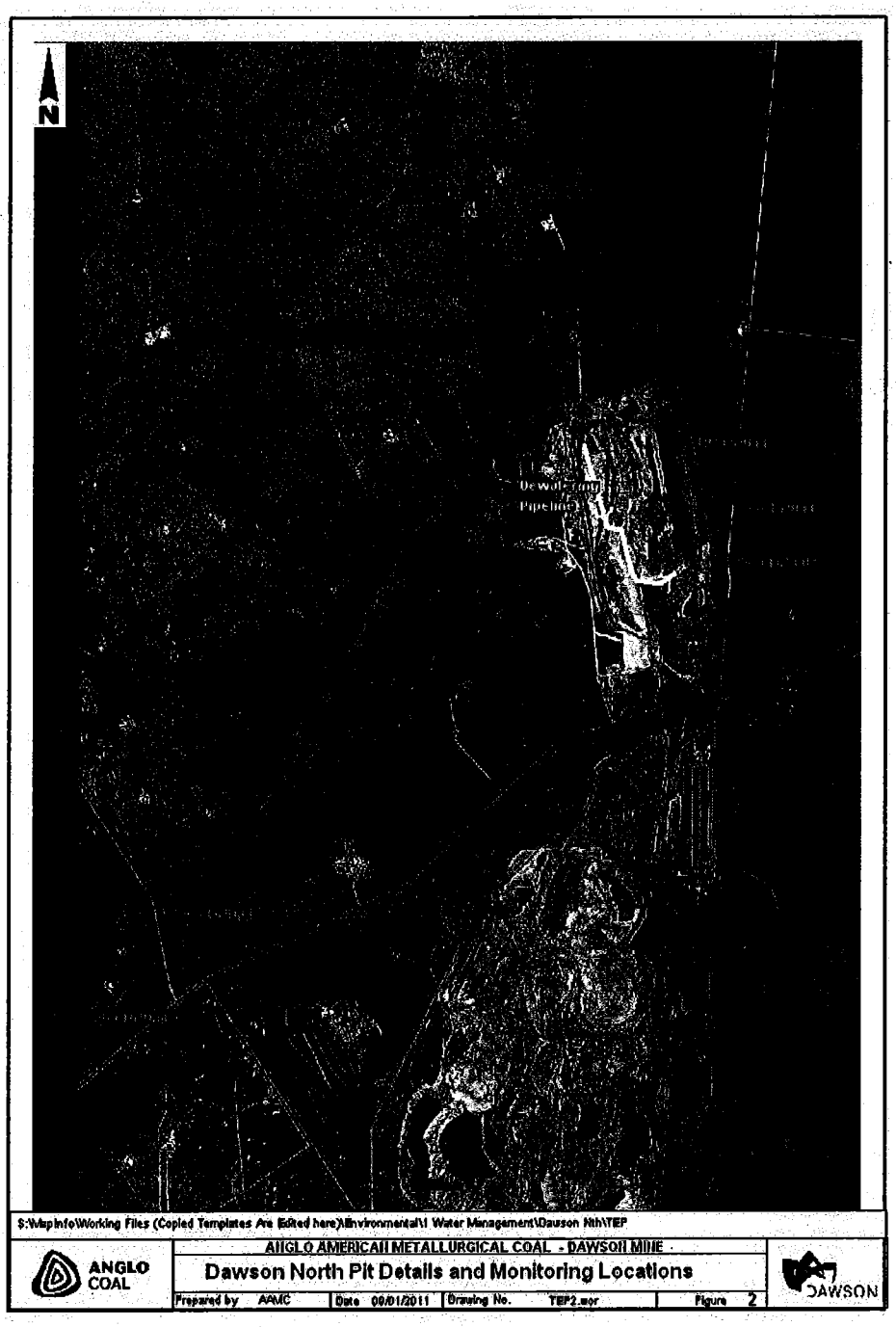


Figure 3: Map of Bottom Dam East and Drainage System
Source: Dawson Mine GIS Software

Figure 4: Map of Days Dam and Drainage System
Source: Dawson Mine GIS Software



Dawson North Pit Details and Monitoring Locations

3.0 OBJECTIVES

The purpose of this Transitional Environmental Program (TEP) is to adequately manage the environmental risks associated with pumping out the Dawson North Pit to enable it to return to operation. To achieve this, it is proposed that Dawson Mine conduct sustained controlled release events by pumping the water stored in the Dawson North Pit into the Dawson North Industrial Dam and allowing it to discharge through the spillway to Dawson North Lease Boundary Creek until the pit has been dewatered sufficiently to enable operations to re-commence.

In order to prevent a reoccurrence of the significant inflow of fresh water into the Dawson North Pit, the root causes are currently being addressed including a re-evaluation of the original hydraulic design with respect to any recent infrastructure changes, and the re-instating of the diversion channel bank.

The pumping of water out of the pit into Dawson North Lease Boundary Creek would be via the Dawson North Industrial Dam, which is the licensed release point for Dawson North. This will enable further dilution of the water from the pit before it passively discharges through the Dawson North Industrial Dam spillway (which has been constructed to minimise the risk of flow path erosion) by the addition of clean water from the eastern dams.

The current release conditions for Dawson North Industrial Dam requires a 0.5m3/sec flow in Kianga Creek and various water quality limits as described in Table 2 of the Final Model Water Conditions for Coal Mines in the Fitzroy Basin, (See Appendix A). It is proposed that under this TEP, that the Kianga Creek flow requirements and discharge water quality requirements be amended to enable a continuous controlled release.

3.1 Increasing the Release Flow Rate and Decreasing the Period of Release

The release flow rate has been increased to 700 L/second to allow the Dawson North pit water to be released during the wet season. It is estimated that around 3.5 months would be required to release all of the water currently within the Dawson North Pit and associated clean water to be used for shandying.

3.2 Decreasing the proposed EC Release Level from 3250 to 3000 uS/cm

At the request of DERM, Dawson North has done some more detailed analysis of what the minimum EC level that could be achieved with shandying of fresh water on site. It is proposed that a mix of 200 L/sec from bottom dam east with 500 L/sec. Of pit water will achieve a release EC of 3000 us/cm (see the table below for calculations).

Offsite Discharge Flow Rate and EC Calculation

Variable	Symbol	Value
Fresh Supply For Shandie EC (uS/cm) Bottom Dam East	Xf	[redacted]
Fresh Supply to Flow Rate (L/sec)	Qf	[redacted]
Dawson North Pit EC (uS/cm)	Xp	[redacted]
Pit Flow Rate (L/sec)	Qp	500
Flow Rate of Off Site Discharge (L/sec)	Qr	700
Result EC Discharging Off Site	**Xr**	3000

Where: (QfxXf) + (QpxXp) = (QrxXr).

Through in-field surveying, it has been calculated that just over 1 GL of water can be pumped from the Dawson North pit before shandying will be required. This is due to the EC stratification that has been monitored within the pit. This will leave around 2.5 GL of pit water that can be shandied with the estimated 1 GL of fresh water in Bottom Dam East. This indicates that the proposed flow rates of 500 L/sec from the pit and 200 L/sec and from bottom dam east are realistic to achieve a release EC of 3000 uS/cm.

Minimum flow rate of Dawson River being $10m^3/s$ (measured at Bindaree or closest monitoring station to where Kianga Creek meets Dawson River);

3.3 Proposed Minimum Flow of 10m3/second within the Dawson River

During discussions with DERM on the 1st February, Dawson Mines requested that the revised TEP contain a minimum flow rate within the Dawson River rather than requiring flow within Kianga Creek or specifying a dilution rate or EC level within the Dawson River. DERM indicated that they would consider this providing that Dawson Mines could provide some estimates of the release water salt contribution under a couple of upstream EC level scenarios. This information is provided below.

A wide range of scenarios were modelled considering no or some decrease in EC from the release point and different upstream EC levels within the Dawson River (the excel spreadsheet with the calculator has been provided to DERM). Dawson Mines believes the most realistic scenario is the one outlined in the table below where some dilution is achieved through the 43 km from the release point to the confluence of Kianga Creek with the Dawson River, and the upstream EC of the Dawson River is 480 uS/cm.

Dawson River Flow Upstream of Release (m3/sec)	Dawson River Salinity Upstream of Release (uS/cm)	Kianga Creek Flow at Confluence with the Dawson River (m3/sec)	Salinity at Confluence with the Dawson River (uS/cm)	Percentage Increase in Salt Load in Dawson River
5	480	0.7	2000	58
10	480	0.7	2000	29
15	480	0.7	2000	19
20	480	0.7	2000	15
25	480	0.7	2000	12
30	480	0.7	2000	9.7
35	480	0.7	2000	8.3
40	480	0.7	2000	7.3
100	480	0.7	2000	2.9

3.4 Proposal to Flush Kianga Creek with Fresh Water from 9-12 Dam

During discussions with DERM on the 1st February, it was suggested that a potential strategy that DERM would consider rather than a required minimum flow within Kianga Creek would be using fresh water from 9-12 Dam to periodically flush the salty water out rather than allowing the pools to dry out following the release therefore increasing the likelihood of environmental harm. It has been estimated that 220 ML of water would be required to flush the 44 km of stream with an average area of 5 m^2. It is proposed that this flushing would occur during and at the end of the discharge. Furthermore, given that there is an estimated 1 GL of water in 9-12 Dam, this water may also be useful in shandying during the release if required. Current EC concentrations in 9-12 dam have been recorded as ranging from 120-170uS/cm.

3.5 Discharging from Hillview Dam in association with Dawson North Pit

If a discharge event from Hillview Dam is required while discharging of Dawson North Pit is occurring, management plans will be implemented to ensure that the combined or individual dam release EC concentration doesn't exceed the 3000 uS/cm. This could be achieved through a number of mechanisms such as reducing flow from Dawson North Pit discharge or adding more clean water to the system to maintain dilution factors. Should the EC concentration in Hillview Dam be within existing approval conditions during the addition of clean water from Days Dam, this could be used to further reduce the EC concentration of the discharge down Kianga Creek.

3.6 Proposed Monitoring

Water Monitoring will be undertaken by Dawson Mines in accordance with REMP, the Dawson Central and North Water Management Plans and associated conditions resulting from TEP approval.

Dawson Mines will also undertake an additional macro-invertebrate and water quality monitoring study post discharging based on the study that was undertaken by ALS Water Resources Group in October 2010.

The purpose of this Transitional Environmental Program (TEP) is to adequately manage water at the Dawson Central operation. To achieve this, it is proposed that Dawson Mine conduct controlled release events from Hillview Dam and 9-12 Dam into Kianga Creek while co-currently pumping Days Dam and Bottom Dam east into Hillview Dam, with the potential for water quality parameters and flow rates of receiving water to be outside prescribed limits. By allowing these controlled and monitored discharges, this will reduce the likelihood of an uncontrolled release of water from the Dawson Central operation therefore reducing the risk of environmental harm.

Allowance for discharging water under this TEP will provide for greater management of water at Dawson Mine should further extreme rainfall events occur. The Dawson Mine is continuing flood immunity works that will progressively improve the capability for water storage across the operation.

3.7 Reporting

Results of insitu water quality parameters will be reported to DERM on a daily basis. Monthly progress reports outlining the activities and issues associated with the TEP will be issued to DERM along with proposed activities for the upcoming month. A final report defining how the objectives of the TEP have been achieved will be submitted upon completion of all actions.

4.0 HOW OBJECTIVES ARE TO BE ACHIEVED

Details of how the objectives of this TEP will be achieved are summarised in Table 1 with further detail provided below where necessary.

Table 1: Action Plan for Achieving TEP Objectives

Objective	Action	Responsibility	Time Frame	Performance Indicator	Completion Details
Undertake a controlled release from 9-12 Dam to reduce water volume with the potential to increase the flow rate in Kianga Creek upstream of Hillview Dam.	Install two (2) diesel pumps and piping infrastructure to pump water from 9-12 Dam into Kianga Creek upstream of the Hillview Dam release point	Dawson Mine pump crew will install and maintain the pumping infrastructure in consultation with Dawson environmental personnel	4th January 2011	Successful installation of pumping infrastructure.	completed
	Water to be pumped at a maximum rate of 300L/s into Kianga Creek where it will flow 13.8km before reaching the Hillview Dam release point.	Dawson Mine pump crew will operate and maintain the pumping infrastructure in consultation with Dawson environmental personnel	As required over the 6 month period commencing 4th January 2011	• Flow rate of Kianga Creek and Dawson River • Volume Discharged • Water Quality	
	Undertake water quality monitoring	Dawson Environmental personnel and BVIT personnel	As per TEP requirements over the 6 month term of the TEP	• Flow rate of Kianga Creek and Dawson River • Volume Discharged • Water Quality	
	Submit monitoring results and TEP reports to DERM as detailed by TEP	Dawson Environmental personnel	As per TEP requirements over the 6 month term of the TEP	Timely submission of monitoring data and reports to DERM	
	Install required pumps and pipelines to move water from Dawson North Pit to the Dawson North Industrial Dam	Dawson Pump Crew and Dawson Project Group	Within 7 days	Successful installation of infrastructure	
	Conduct monitoring of water contained within the pit, at the release point (RP-DN01T), and upstream and downstream reference points (AQ-DC01R and AQ-DC01T, respectively).	Dawson Environmental Department	Duration of TEP and on-going in accordance with current RWMP	Collection of all required samples and analysis of appropriate analytes	

Conduct sustained controlled release from Dawson North Pit into Dawson North Industrial Dam in accordance with TEP	Repair drainage channel bank, and ensure the capacity of the drainage channel is maintained	Dawson North Mine Operator	Ongoing	Inspection, survey information to confirm	
	Submit monitoring results and TEP reports to DERM as detailed by TEP	Dawson Environmental Department	Duration of TEP	Submitting required reports in accordance with deadlines.	
	Inform neighbouring framers and Banana Shire of release of water offsite	Dawson Environmental Department and Dawson Community Co-ordinator	Prior to Commencement		

Undertake a controlled release from Hillview Dam to maintain freeboard and manage excess water in the Dawson Central Operation.	Switch on two (2) siphons to release water from Hillview Dam into Kianga creek	Dawson Mine pump crew will operate and maintain the pumping infrastructure in consultation with Dawson environmental personnel	4th January 2011	Successful operation of pumping infrastructure.	
	Water to be pumped at a maximum rate of 1000L/s through the siphons into Kianga Creek. The water will travel approx 30km in Kianga Creek to reach the Dawson River	Dawson Mine pump crew will operate and maintain the pumping infrastructure in consultation with Dawson environmental personnel	As required over the 6 month period commencing 4th January 2011	• Flow rate of Kianga Creek and Dawson River • Volume Discharged • Water Quality	
	Undertake water quality monitoring	Dawson Environmental personnel and BVIT personnel	As per PoOps and TEP requirements over the 6 month term of the TEP	• Flow rate of Kianga Creek and Dawson River • Volume Discharged • Water Quality	
	Submit monitoring results and TEP reports to DERM as	Dawson Environmental personnel	As per PoOps and TEP requirements	Timely submission of monitoring data and reports to DERM	

	detailed by TEP		over the 6 month term of the TEP		
Pump water from Bottom Dam East into Hillview Dam to manage water across the Dawson central operation.	Install diesel pump at Bottom Dam East to pump water into Industrial Dam North.	Dawson Mine pump crew will install and maintain the pumping infrastructure in consultation with Dawson environmental personnel	As required over 6 month period	Successful installation of pumping infrastructure.	
	Pump water from Bottom Dam East to Industrial Dam North at a maximum flow rate of 200L/s	Dawson Mine pump crew will operate and maintain the pumping infrastructure in consultation with Dawson environmental personnel	As required over 6 month period	• Volume of Hillview Dam • Volume discharged	
Pump from Days Dam into Hillview Dam to manage water across the Dawson central operation.	Install an electric pump at Days Dam to pump water into Hillview Dam	Dawson Mine pump crew will install and maintain the pumping infrastructure in consultation with Dawson environmental personnel	As required over 6 month period	Successful installation of pumping infrastructure	
	Pump water from Days Dam into Hillview Dam at a maximum flow rate of 250L/s	Dawson Mine pump crew will operate and maintain the pumping infrastructure in consultation with Dawson environmental personnel	As required over 6 month period	• Volume of Hillview Dam • Volume discharged	

5.0 Transitional Environmental Program Conditions

The voluntary Transitional Environmental Program (TEP) is subject to 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, unless otherwise authorised under the *Environmental Protection Act 1994.*

2 The release of contaminants to waters must only occur from the release points specified in *Table 1: Dawson Central and North Discharge Locations* and depicted on the attached figures.

3 The release of contaminants to waters must not exceed the release limits stated in Table 2 at the monitoring points specified in Table 1 of this voluntary Transitional Environmental Program (TEP).

4 The release of contaminants to waters from the release point must be monitored at the locations specified in Tables 1 and 3 of this TEP.

5 If quality characteristics of the release exceed any trigger levels specified in *Table 5: Receiving water trigger investigation levels* during a release event, the Certificate of Approval holder must compare the downstream results in the receiving waters identified in *Table 6: Flow Measurement Location during discharge events* to the trigger values specified in *Table 5: Receiving water trigger investigation levels* 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: Receiving water trigger investigation levels* for any quality characteristic, compare the results of the downstream sites 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 certificate holder of the TEP 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]

Table 1: Dawson Central and North Discharge Locations.

Release Point (RP)	Northing GDA94	Easting GDA94	Contaminant Source	Monitor Point	Receiving Waters
RP - DCO1T	-243358.95	150039.09	Hillview Dam	End of pipe	Kianga Creek

RP – DCO2T	-243949.98	150336.97	14 Dam	End of pipe	Kianga Creek
	-243933.8	1500350.2	9-12 Dam	End of pipe	Kianga Creek
TBA	TBA	TBA	Bottom East Dam	End of pipe	Kianga Creek
RP-DN01T	-202441	7288330	Dawson North Industrial Dam	End of pipe	Kianga Creek

[1] *Discharge from this location is not to be included in the calculation of "natural flow" at the locations identified in Table 6 below. Reported flow rate must be revised during discharge from 9-12 Dam*

Table 2: Contaminant Release Limits.

Quality characteristic	Release Limit	Monitoring Frequency	Sample Type	Monitoring Point
Electrical conductivity (uS/cm)	3000 (maximum)	Daily during release (the first sample must be taken within 2 hours of commencement of release)	*In situ*[1]	During release from the discharge locations listed in Table 1; *when flow in the Dawson River is >=18.0m^3/sec.*
	2500 (maximum)		Samples require laboratory analysis[2]	During release from the discharge locations listed in Table 1; *when flow in the Dawson River is >=14.5m^3/sec.*
	2000 (maximum)			During release from the discharge locations listed in Table 1; *when flow in the Dawson River is >=11.0m^3/sec.*
	1500 (maximum)			During release from the discharge locations listed in Table 1; *when flow in the Dawson River is >=3.5 m^3/sec.*
	450 (AQ-DN06T)	Daily during release (the first	*In situ*[1]	During release from the discharge

		sample must be taken within 12 hours of commencement of release)	Samples require laboratory analysis[2]	location listed in Table 3
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] Samples require laboratory analysis[2]	During release from discharge locations listed in Table 1.
Turbidity (NTU)	600	Daily during release (the first sample must be taken within 2 hours of commencement of release)	*In situ*[1]	During release from discharge locations listed in Table 1.
[3]*Total Suspended Solids (mg/l)*	400	Daily during release (the first sample must be taken within 2 hours of commencement of release)	Samples require laboratory analysis[2]	During release from discharge locations listed in Table 1.
Sulphate (SO_4^{2-}) (mg/l)	400	Daily during release (the first sample must be taken within 2 hours of commencement of release)	Samples require laboratory analysis[2]	During release from discharge locations listed in Table 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 Transitional Environmental Program.*
[3] *Only required in the event Turbidity measurements are not available.*

Table 3: Receiving Water Upstream Background Sites and Downstream Monitoring Points.

Monitoring Points	Receiving Waters Location Description	Northing (GDA94)	Easting (GDA94)	Monitoring frequency
Upstream Background Monitoring Points				
AQ-DC02R	Kianga Creek upstream of the mine	-243933.96	150349.79	Daily during discharge
Downstream Monitoring Points				
AQ-DC03T	Kianga Creek downstream	-243340.29	150020.60	Daily during discharge
AQ-DN06T	Dawson River approximately 2 km downstream of confluence with Kianga Creek (Bindaree Weir)			Daily during discharge

Table 4: Receiving Water Contaminant Limit.

Quality characteristic	Release Limit	Monitoring Frequency	Sample Type	Monitoring Point
Electrical conductivity (*u*S/cm)	3000 (maximum)	Commencement of release (within 12 hours of release event) and thereafter daily during release	*In situ*[1]	AQ-DC03T
			Samples require laboratory analysis[2]	
	450 (maximum)	Commencement of release (with 12 hours of release event) and thereafter daily during release	*In situ*[1]	AQ-DN06T.
			Samples require laboratory analysis[2]	
pH (pH Unit)	6.5 (minimum) 9.0 (maximum)	Commencement of release (within 12 hours of release event) and thereafter at the monitoring frequency listed in Table 3	*In situ*[1]	From Receiving Waters sites listed in Table 3.
			Samples require laboratory analysis[2]	
Suspended solids (mg/L)	400	Commencement of release (within 12 hours of release event) and thereafter at the monitoring frequency listed in Table 3	Samples require laboratory analysis[2]	From Receiving Waters sites listed in Table 3.
Sulphate (SO_4^{2-}) (mg/L)	400	Commencement of release (within 12 hours of release event) and thereafter at the monitoring frequency listed in Table 3	Samples require laboratory analysis[2]	From Receiving Waters sites listed in Table 3.

[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.*

Table 5: Receiving water trigger investigation levels.

Quality characteristic[1]	Trigger levels (µg/L)	Monitoring frequency	Monitoring Point
Aluminium	100	Commencement of release (within 12 hours of release event) and thereafter weekly during	During release from discharge locations listed in Table 1.
Arsenic	13		
Cadmium	0.2		
Chromium	1.0		
Copper	2.0		
Iron	300		

Lead	10	release	
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	1000		
Nitrate	1100		
Petroleum hydrocarbons (C6-C9)	20		
Petroleum hydrocarbons (C10-C36)	100		
Fluoride (total)	2000		

[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.*

Table 6: Flow Measurement Location during discharge events.

Receiving waters	Release point (TEP RP)	Gauging station description	Northing (GDA94)	Easting (GDA94)	Minimum flow in receiving water required for a release event	Flow recording frequency
Dawson River		Bindaree (flow measurement)			= > 18m^3/sec with EC up to 3000 uS/cm	Continuous (minimum daily)
					= > 14.5m^3/sec with EC up to 2500 uS/cm	
					= > 11m^3/sec with EC up to 2000 uS/cm	
					= > 3.5m^3/sec with EC up to 1500 uS/cm	

Contaminant Release Events

7 Notwithstanding any other condition of this TEP, the release of contaminants to waters must only take place under the conditions identified in *Table 6: Flow Measurement Location during discharge events* for the contaminant release point(s) specified in *Table 1: Dawson Central and North Discharge Locations.*

8 The TEP certificate holder must determine and record stream flows at the location specified in *Table 6: Flow Measurement Location during discharge events* for receiving waters into which a release occurs.

9 Notwithstanding any other condition of this TEP, the release of contaminants to waters must only take place from the discharge locations identified in Table 1 at a maximum volume of 75ML per day.

The maximum daily volume consists of 60ML /day from Dawson North Industrial Dam (700l/s) and 15ML/day from Dawson Central 9-12 Dam (150l/s). Dawson may manage the onsite water within the maximum daily volume to meet the water quality objectives identified in Table 2.

10 The daily quantity of contaminants released from each release point must be measured and recorded at the release points identified in *Table 1: Dawson Central and North Discharge Locations.*

Notification of Release Events

11 The TEP certificate holder must notify the administering authority as soon as practicable (within no later than 6 hours of having commenced deliberately releasing mine affected water to the receiving environment from an authorised discharge point, and no later than 12 hours after any uncontrolled release from an authorised discharge point). Notification must include the submission of written advice 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) the 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).

12 The TEP certificate holder must notify the administering authority as soon as practicable, (no later than 24 hours) of the cessation of a release notified under condition 11 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 TEP (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 2 are exceeded, the certificate holder of the TEP must notify the administering authority within 24 hours of receiving the results.

14 The TEP certificate holder must, within 28 days of a release that exceeds the conditions of this TEP, 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.

Erosion and Sediment Control

15 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.

16 Erosion protection must be designed, installed and maintained as required at each release point authorised by this TEP 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 TEP. .

17 The certificate holder of this TEP must include within the cessation report required under condition 12 detail of 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.

Requirements to cease the release of mine affected water

18 The release of mine affected waters must cease immediately if any water quality limit as specified in *Table 4: Receiving Water Contaminant Limit or Table 5 Receiving water trigger investigation levels* is exceeded.

19 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.

20 The release of mine affected waters must cease immediately if the certificate holder of this TEP is directed to do so by the administering authority.

21 The release of mine affected waters authorised under this TEP must cease by **13 May 2011**. If above average wet conditions continue beyond that date, the TEP may be extended for an additional length of time agreed to by Anglo Coal Dawson Central and North Coal Mine and the department.

Monitoring Requirements

22 Where monitoring is a requirement of this TEP, ensure that a competent person(s) conducts all monitoring.

23 All monitoring undertaken as a requirement of this TEP must be undertaken in accordance with the administering authority's Water Sampling Manual.

Notification of emergencies, incidents and exceptions

24 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 TEP, the administering authority must be notified of the release by telephone, facsimile or email [redacted] and [redacted].

25 The notification of emergencies or incidents must include but not be limited to the following:
a) the holder of the TEP
b) the location of the emergency or incident
c) the number of the TEP
d) the name and telephone number of the designated contact person
e) the time of the release
f) the time the holder of the TEP 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.

26 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.

27 Conditions within this TEP may be amended or revised as agreed by Anglo Coal Dawson Central and North Coal Mine and the department.

Reporting

28 The TEP certificate holder must provide the administering authority, daily during the release of mine affected water, information on the release of contaminants to waters. The information must be provided in writing (either via facsimile [redacted] or email to [redacted] and include the following:
a) all in situ monitoring data for that day
b) the receiving water flow rate
c) the release flow rate
d) the volume of water released from the release point.

29 The TEP certificate holder must provide the administering authority, weekly during the release of mine affected water, information on the release of contaminants to waters. The information must be provided in writing (either via facsimile [redacted] or email to [redacted] and include the following:
a) all in situ monitoring data for that week
b) the range of receiving water flow rate
c) the range of release flow rate
d) the total volume of water released from the release point.

30 The certificate holder of this TEP must submit a report to the administering authority on the fifth business day of each month detailing:
   a) all activities undertaken under the TEP,
   b) how the TEP certificate holder has met the objectives of the TEP, 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 TEP certificate holder has complied with all conditions contained within the TEP

31 The certificate holder of this TEP must submit records of consultations with the Kianga Creek downstream landholders to the administering authority prior to the initiation of discharge under this TEP.

32 The certificate holder of this TEP must submit a report to the administering authority by **14 June 2011** including:
   a) details of the completion of the TEP,
   b) details on all activities undertaken under the TEP,
   c) identification of how the TEP certificate holder has met the objectives of the TEP, 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 TEP certificate holder has complied with all conditions contained within the TEP – Certificate of Approval, and
   e) confirmation that at closure of the TEP, the certificate holder will be able to comply with the Final Model Water Conditions for Fitzroy River Basin Coal Mines administered through the current Plan of Operations for the Dawson Central and North Coal Mine, located at ML5591, ML5592, ML5593, ML5596, ML5597, ML5598, ML5599, ML5600, ML5601, ML5603, ML5604, ML5606, ML5607, ML5611, ML5630, ML5643, ML5644, ML5646, ML5650, ML5656, ML80032, ML80034, and ML80070 and the *Environmental Protection Act 1994.*

DRAFT TRANSITIONAL ENVIRONMENTAL PROGRAM UNDER SECTION 333 OF THE *ENVIRONMENTAL PROTECTION ACT 1994*

Principal Holder:	Anglo Coal Australia Pty Ltd
EA Number:	MIN100510607
Title:	Dawson Mine Transitional Environmental Program: Release from Dawson South Industrial Dam
Date:	1st January 2011
Finish Date:	1st July 2011

1.0 BACKGROUND

Dawson Mine, one of Queensland's leading export coal operations, is owned by the Moura Joint Venture, comprising Anglo Coal Australia Pty Ltd (51%) and Mitsui Coal Holdings Pty Ltd (49%). The mine is operated by Anglo Coal Australia and is located in the southern part of the Bowen Basin, approximately 180km west of Gladstone.

A recent weather system has caused excessive rainfall across most of Central Queensland resulting in the flooding of tributaries across a large portion of the region. The weather station located in the town of Moura recorded a total monthly rainfall in December of 290.4mm (refer to Figure 1 for rainfall totals). Due to this recent weather event the Dawson Mine water inventory has risen significantly and many onsite water storages are nearing or have reached full capacity. The mine has implemented its Water Management Plan to appropriately manage or contain water across the operation. This includes the diversion of clean water around the site, controlled releases of water where possible and the pumping of water to water storages across site. There are currently three (3) dams at Dawson Mine which are releasing or have recently released; Hillview Dam, 14 Dam and 35ML Dam. These releases have been both controlled (within licence conditions) and uncontrolled and have been reported to the Department of Environment and Resource Management (DERM).

This application relates to the impact of the recent rainfall on the Dawson South Operation. This operation currently has seven (7) active water storages; Dawson South MIA Dam, Dawson South Dump Station 151 Dam, Dawson South C3 Dam, Dawson South C4 Dam, Dawson South Southern Sediment Dam, Dawson South Spill Drainage Dam and Dawson South Industrial Dam (See Figure 2). The Dawson South Industrial Dam is a worked water dam, receiving water flows from the surrounding catchment area as well as water pumped from the smaller water storages across the operation that capture and settle out flows from mining operations.

The Dawson South Industrial Dam is currently close to full capacity. There are limited options for pumping water North from the dam to the Dawson Central operation and the achievable pumping rate may not be suitable to remove water in a timely manner. One option which has been considered by Dawson Mine is to release water from the Dawson South Industrial Dam into the Dawson River which is currently in flood.

Due to the uncontrollable climatic conditions detailed, Dawson Mines requests the consideration of this Draft Transitional Environmental Program (TEP) in accordance with s333 of the *Environmental Protection Act 1994,* to allow for the management of increased water flows at the Dawson Mines. Specifically, this TEP proposes to allow for the controlled release of water from the Dawson South Industrial Dam into the Dawson River, with the potential for water quality parameters to be outside prescribed limits. Details of how

environmental aspects shall be managed under this TEP are detailed in the following sections of this application.

2.0 SUPPORTING INFORMATION

The Dawson South operation currently operates under environmental authority MIN100510607. Under this authority, this dam is a licensed release point provided certain water quality parameters are adhered to as specified by the licence conditions. The water quality in the Dawson South Industrial Dam is monitored on a monthly basis during normal mining operations. Historical monthly water monitoring results are provided in Appendix 1. Where a controlled release from the dam is undertaken, monitoring is completed as per the licence requirements.

Discharges from Dawson South Industrial Dam are directed into the Dawson River, which is currently in flood. As at 3rd January 2011, the flow rate of this river was recorded as 3796m^3/s measured at the Dawson Mine automatic monitoring station at Woodleigh (AQDS01T). Communities both upstream and downstream of the discharge point along the river are also experiencing flood conditions at the time of submission of the TEP. As such, the environmental impact of water discharged from the Dawson South Industrial Dam is expected to be minimised through the dilution of dam water from high quantities of rainfall and the current flood status of the receiving waters. Based on monitoring results from the past eleven months, as provided in Appendix 1, the maximum EC that has been recorded in the dam is 6910µS/cm. Given the high influx of freshwater due to heavy rainfall into the dam combined with the large volume and high flow rate of the Dawson River at present, it is anticipated that the level of dilution will significantly decrease this EC, therefore reducing the risk of environmental harm.

Daily Rainfall (millimetres)

MOURA POST OFFICE

Station Number: 039071 · State: QLD · Opened: 1941 · Status: Open · Latitude: 24.57°S · Longitude: 149.97°E · Elevation: 148 m

2010	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	0	38.4	5.2	1.0	0	0	0	0	0	0	0	4.4
2nd	0	7.6	14.8	0	0	0	0	0	0	0	0.6	
3rd	0	0.6	10.4	0	0	0	1.0	0	0	0	0	27.6
4th	6.2	4.8	0	0	0	0	0	0	0	0	1.8	9.0
5th	22.4	0	13.2	0	0	0	0	0	10.2	0	2.6	1.0
6th	2.4	0	2.0	0	1.8	0	0	0	141.0	0	0	
7th	8.0	4.8	33.2	0	0	0	0	0	0	0	0	7.6
8th	0	0	0	0	0	0	3.0	0	0	0.8	0	
9th	0	38.2	0	0	0	0	1.2	0	0	0	3.6	
10th	0	0	0	12.6	0	0	0	0	0	0	0	
11th	0	0	0	0	0	0	0	69.8	1.0	0	0	
12th	0	4.8	0	34.6	0	0	0	0	0	9.2	0	2.2
13th	0	0	0	4.0	0	0	0	0	0	0	0	3.8
14th	0	0	0	0	0	0	0	0	0	0	0	
15th	0	0	0	0	0	8.0	0	0	0	0	0	
16th	0	50.8	0	0	0	0	0	0	0	34.0	2.0	
17th	0	12.2	0	0	0	0	0	0	0	0	3.2	
18th	0	6.4	0	0	0	0	0	0	1.0	0	10.8	3.6
19th	0	44.6	0	0.6	0	2.0	0	0	3.0	0	23.6	32.8
20th	0	0	0	0.4	0	2.8	5.0	0	22.6	0	4.6	31.4
21st	0	0	0	0	0	0	0	4.6	0.6	0	4.6	
22nd	0	0	25.6	0	1.6	0	0	0	7.0	0	7.0	
23rd	0	0	2.4	0	0	0	0	0	16.0	0	0	33.0
24th	0	0	0	0	0	0	0	6.0	0	0	9.6	0.8
25th	0	3.0	0	0	4.8	1.2	0	0	6.4	3.4	0	2.0
26th	0	6.4	0	0	3.0	0	2.4	10.6	1.0	0	0	29.8
27th	0	0	0	0	0	0	0	0	1.8	0	0	28.8
28th	0	0	0	0	0	0	0	0	0.8	0	0	58.0
29th	0		5.8	0	2.6	0	0	0	15.6	0	0	4.8
30th	0		0	0	0	0	0	0	0.8	0	2.6	
31st	2.0		0		0		0	0		0		
Highest daily	22.4	50.8	33.2	34.6	4.8	8.0	5.0	69.8	141.0	34.0	27.6	58.0
Monthly Total	41.0	222.6	112.6	53.2	13.8	14.0	13.2	91.0	229.4	47.4	80.8	290.4

Annual total for 2010 = 1209.4mm

↓ This day is part of an accumulated total
Quality control: 12.3 Done & acceptable, *12.3* Not completed or unknown

Figure 1: Table of Rainfall Data for Moura Weather Station 039071.
Source: Australian Government Bureau of Meteorology, 31st December 2010.

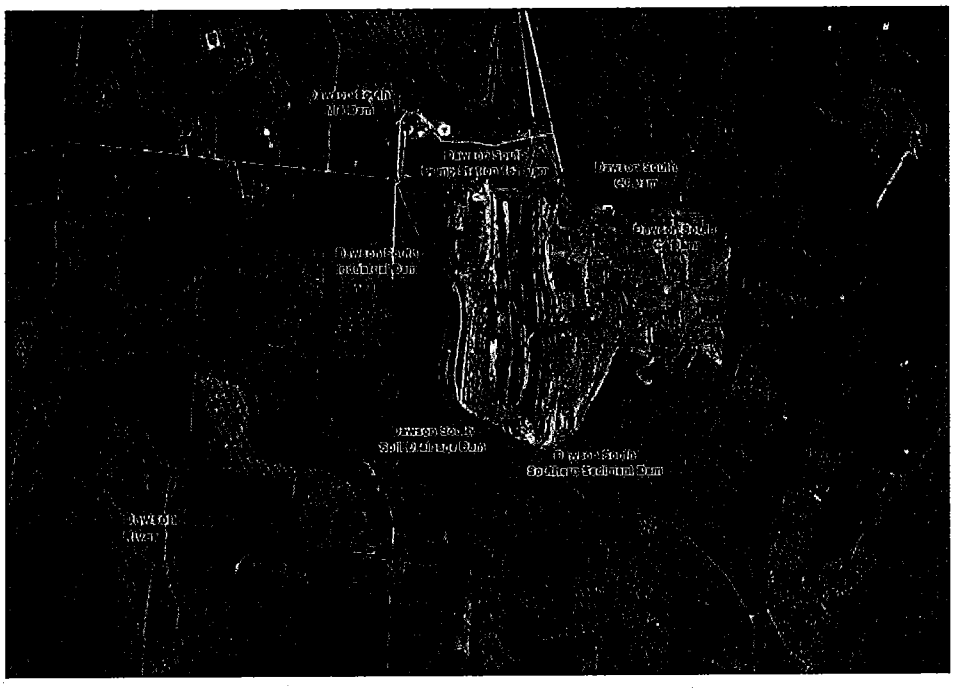


Figure 2: Map of Dawson South Operation Highlighting Drainage Systems
Source: Dawson Mine GIS Software

3.0 OBJECTIVES

The purpose of this Transitional Environmental Program (TEP) is to adequately manage water at the Dawson South operation by conducting a controlled release from the Dawson South Industrial Dam (RPDS01T). This will then reduce the likelihood of an uncontrolled release of water from the Dawson South operation which has the potential to cause environmental harm.

The objectives of this TEP are as follows:

- Reduce the volume of water stored onsite at Dawson South and maintain freeboard so as to prevent an uncontrolled release event;
- Outline how the release is to be conducted;
- Indicate performance indicators for the release;
- Outline monitoring requirements prior, during and after the release;
- Outline the appropriate resources to be allocated to the TEP; and
- Provide a timeframe for the commencement, duration and completion of the TEP.

Allowance for discharging water under this TEP will provide for greater management of water at the Dawson Mine South Operation should further extreme rainfall events occur from January through to July. The Dawson Mine is continuing flood immunity works that will progressively improve the capability for water storage across the operation.

4.0 HOW OBJECTIVES ARE TO BE ACHIEVED

Details of how the objectives of this TEP will be achieved are summarised in Table 1 with further detail provided below where necessary.

Table 1: Action Plan for Achieving TEP Objectives

Objective	Action	Responsibility	Time Frame	Performance Indicator	Completion Details
Undertake a controlled release from the Dawson South Industrial Dam to adequately manage water levels on site.	Install: (a) an electric pump into the dam and connect to the recently installed siphons over the dam wall into a natural drainage line; or (b) a diesel pump into the dam and connect to a pipeline over the dam wall into a natural drainage line.	Dawson Mine pump crew will install and maintain the pumping infrastructure in consultation with Dawson environmental personnel.	4th January 2011	Successful installation of pumping infrastructure	
	Water to be pumped into a natural drainage line to flow approximately 4km before entering the Dawson River at a rate of: (a) 1000L/s if siphons utilised (b) 100L/s to 120L/s if diesel pump and pipeline utilised	Dawson Mine pump crew will operate and maintain the pumping infrastructure in consultation with Dawson environmental personnel.	As required over the 6 month term of the TEP commencing 4th January 2011.	• Flow rate of Dawson River • Volume Discharged • Water Quality	
	Undertake water quality monitoring	Dawson Environmental personnel and BVIT personnel	As per licence and TEP requirements over the 6 month term of the TEP	• Flow rate of Dawson River • Volume Discharged • Water Quality	
	Submit monitoring results and TEP reports to DERM as detailed by TEP	Dawson Environmental personnel	As per licence and TEP requirements over the 6 month term of the TEP	Timely submission of monitoring data and reports to DERM	

4.1 Responsibility and Resources

Dawson environmental personnel will be primarily responsible for coordinating the release of water from the Dawson South Industrial Dam, including ensuring monitoring and reporting requirements as per licence and TEP conditions are met.

The following resources will be available during the release event:

- Dawson Mine Environmental personnel;
- Dawson Mine Pump and infrastructure crew;
- Bureau Veritas International Trade (BVIT) personnel
- Monitoring equipment (incl sample bottles, gloves, etc);
- Dedicated pumps and piping for transportation of water across site;
- Citect program for analysis of automatic water monitoring results; and
- DERM personnel.

4.2 Time Frame

Dawson Mine request that this TEP be implemented for a period of up to six (6) months. This does not suggest, however, that the release event will continue for the full six (6) month period. The focus for the immediate future is to discharge a sufficient water volume that will allow for the management of water levels on site following recent rainfall events. The release event will cease when the Dawson South Industrial Dam reaches a capacity whereby sufficient freeboard is maintained to adequately manage the risk of subsequent rain events.

Should another weather system similar or more severe than the recent event lead to similar water volumes being received within the Dawson region, the timeframe of this TEP will allow for further discharge of water for flood mitigation if necessary. The Dawson Mine will notify DERM of the necessity for further releases as per the requirements of this TEP.

4.3 Performance Indicators

4.3.1 Flow Rate

According to the Dawson South Environmental Authority (MIN100510607) the flow rate in the Dawson River must be greater than or equal to $2m^3/s$ in order to release (See Figure 3).

Table 4: Contaminant Release during Flow Events

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Dawson River	RP-DS01T	AQ-DS01T	-244947.2	1495950.2	> or = $2m^3$/sec	Continuous (minimum daily)

Figure 3: Table of Flow Conditions Required to Conduct Controlled Release at RPDS01T.
Source: Environmental Authority MIN100510607

The flow rate obtained from the Dawson Mine automatic monitoring station at Woodleigh (AQDS01T) will be used to monitor flow in the Dawson River to ensure it remains at greater than $2m^3/s$ during the release. Given the flow rate of the Dawson River of $3796m^3/s$ as at 3rd January 2010, it is not expected that water will be discharged below the minimum flow requirement. If the flow rate reaches $2m^3/s$ or below and should further discharge be required, Dawson Mine will advise DERM of the intent to continue to release and discuss the action plan for water management at Dawson South Industrial Dam moving forward.

4.3.2 Water Quality

Water contaminant release limits are contained in the Dawson South Environmental Authority (MIN100510607) as detailed in Figures 4 and 5. There is the potential to release water outside these limits under this TEP. It is expected, however, that the current flood levels and flow rates in Dawson River will allow for sufficient dilution of any contaminants therefore reducing the risk of environmental harm. If the level of any parameter listed in Figure 4 and Figure 5 is recorded to be outside of the given limits at the downstream monitoring point this will be communicated to DERM through daily reporting of physical parameters and weekly recordings of remaining parameters.

A water sample was taken by a Dawson Mine contractor (BVIT) at Dawson South Industrial Dam on 31st December 2010.

Appendix A contains water quality results for Dawson South Industrial Dam over a period starting 1st January 2010 to 30th November 2010.

Table W2: Contaminant Release Limits

Electrical conductivity (uS/cm)	1500	Future limit to be determined to achieve aquatic ecosystem protection (no drinking water value): An end-of-pipe limit to achieve in the range 0 to 1000 EC in the receiving waters - for mines in the upper catchments must have natural flow i.e. the 20th percentile flow trigger.	Daily during release	
pH (pH Unit)	6.5 (minimum) 9.0 (maximum)	6.5 (minimum) 9.0 (maximum)	Daily during release	
Turbidity (NTU)	560	560	Daily during release*	Turbidity is required to assess ecosystems impacts and can provide instantaneous results
Suspended Solids (mg/L)	400	Limit to be determined based on receiving water reference data and achievable best practice sedimentation control and treatment	Daily during release*	Suspended solids are required to measure the performance of sediment and erosion control measures.
Sulphate (SO_4^{2-}) (mg/L)	400	Limit to be determined	Daily during release*	Drinking water environmental values from NHMRC 2006 guidelines OR ANZECC & ARMCANZ 2000 stock water quality guidelines.

** local trigger values need to be developed*

Figure 4: Table of Water Quality Required to Conduct Controlled Release at RPDS01T.
Source: Environmental Authority MIN100510607

Table W3: Release Contaminant Trigger Investigation Levels

Quality characteristic	Trigger level (µg/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 the 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 (inorganic)	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	1000	*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 W3: Release Contaminant Trigger Investigation 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 if its is determined that there is no need to monitor for certain individual quality characteristics these can be removed from Table W3: Release Contaminant Trigger Investigation 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.

Figure 5: Table of Water Quality (Metals) required to conduct controlled release at Dawson South Industrial Dam
Source: Environmental Authority MIN100510607

5.0 MONITORING

Water samples will be collected at the release point (RPDS01T) as well as the upstream (AQDS01R) and downstream (AQDS01T) monitoring points of Dawson River. Physical parameters will be monitored on a daily basis during the release event and metals, ammonia and nitrate will be monitored on a weekly basis.

Water samples will be collected either by Dawson Mine personnel or Dawson Mine contractors BVIT. All samples will be analysed in the BVIT laboratory by trained and competent lab technicians.

6.0 REPORTING

Results of insitu water quality parameters will be reported to DERM on a daily basis. Monthly progress reports outlining the activities and issues associated with the TEP will be issued to DERM along with proposed activities for the upcoming month. A final report defining how the objectives of the TEP have been achieved will be submitted upon completion of all actions.

Appendix A: Water Quality Results for DS Industrial Dam 01/01/2010 – 30/11/2010

January:

Environmental, Health & Safety Services
Bureau Veritas - International Trade Australia
ABN: 64 001 285 927
46 RAEDON ST
BILOELA QLD 4715
PH: 07 49925600 FAX: 07 49925115

ORIGIN: Dawson South Stage 1

DESCRIPTION: Water Quality - Monthly Sampling

REPORTED TO: [redacted]

DATE REPORTED: 16/02/10

JOB NO: Bi1498502

REC'D: Jan-10

PAGE: 5 of 55

Sample ID		Old Woodleigh	Control Site	MIA Dam	Industrial Dam	Pit 25	C4 Sediment Dam	C3 Sediment Dam	C2 Sediment Dam
Date Sampled		14/01/10	14/01/10	14/01/10	14/01/10	-	14/01/10	-	-
Sample No.		M7760	M7758	M7761	M7759	-	M7762	-	-
pH		7.7	7.6	8.8	9.0	-	8.2	-	-
Conductivity	µS/cm	260	170	6050	6910	-	870	-	-
Temperature	°C	30.8	30.7	30.4	33.5	-	31.3	-	-
Dissolved Oxygen	mg/L	8.6	8.1	9.4	8.6	-	6.7	-	-
Turbidity	NTU	538.0	676.0	18.1	59.4	-	31	-	-
RL*	m					-		-	-
Total Solids	mg/L	538	528	5766	4710	-	664	-	-
Total Dissolved Solids	mg/L	482	482	5718	4654	-	628	-	-
Total Suspended Solids	mg/L	56	46	48	56	-	36	-	-
Sulphate	mg/L	43	60	1029	1446	-	7	-	-
DISSOLVED METALS						-		-	-
Aluminium	ug/L	87	NR	NR	<5	-		-	-
Arsenic	ug/L	<5	NR	NR	12	-		-	-
Boron	ug/L	33	NR	NR		-		-	-
Cadmium	ug/L	<5	NR	NR	<5	-		-	-
Chromium	ug/L	<5	NR	NR		-		-	-
Cobalt	ug/L	<5	NR	NR	<5	-		-	-
Copper	ug/L	<5	NR	NR	<5	-		-	-
Iron	ug/L	200	NR	NR		-		-	-
Lead	ug/L	<5	NR	NR	<5	-		-	-
Manganese	ug/L	<5	NR	NR		-		-	-
Mercury	ug/L		NR	NR		-		-	-
Nickel	ug/L	<5	NR	NR	<5	-		-	-
Selenium	ug/L	<5	NR	NR		-		-	-
Silver	ug/L	<5	NR	NR		-		-	-
Uranium	ug/L	<5	NR	NR		-		-	-
Vanadium	ug/L	6	NR	NR		-		-	-
Zinc	ug/L	<5	NR	NR	<5	-		-	-
TOTAL METALS						-		-	-
Aluminium	ug/L	7300	8600	370	960	-	850	-	-
Arsenic	ug/L	<5	<5	7	13	-	14	-	-
Boron	ug/L	36				-		-	-
Cadmium	ug/L	<5			<5	-		-	-
Chromium	ug/L	<5	<5	<5		-	<5	-	-
Cobalt	ug/L	<5			<5	-		-	-
Copper	ug/L	9	9	<5	<5	-	<5	-	-
Iron	ug/L	4500				-		-	-
Lead	ug/L	6			<5	-		-	-
Manganese	ug/L	180	180	42		-	160	-	-
Mercury	ug/L	<0.1				-		-	-
Nickel	ug/L	6	6	<5	<5	-	<5	-	-
Selenium	ug/L	<5	<5	10		-	<5	-	-
Silver	ug/L	<5				-		-	-
Uranium	ug/L	<5				-		-	-
Vanadium	ug/L	19				-		-	-
Zinc	ug/L	41	32	15	8	-	10	-	-
TPH FRACTIONS						-		-	-
C6 - C9	ug/L	<20.0				-		-	-
C10 - C14	ug/L	<40				-		-	-
C15 - C28	ug/L	<100				-		-	-
C29 - C36	ug/L	<100				-		-	-
						-		-	-
Fluoride	mg/L	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	-
Ammonia as N	mg/L	<1				-		-	-
Total Fluoride	mg/L	<0.1			0.4	-		-	-
Nitrate as N	mg/L	1.5	1.4	14.0	<0.5	-	<0.5	-	-
Chloride	mg/L		8	1200	1200	-	180	-	-
Orthophosphate as P	mg/L		<0.5	<0.5	<0.5	-	<0.5	-	-
TRH	mg/L	-	-	-	-	-	-	-	-

ND - Nil Detected
NR - Not Required
^ Sample lost in transit.

*- Guidelines apply only to Kianga Weir. Remaining samples are dirty water and guidelines do not apply.

This is preliminary report number 1

February:

Bureau Veritas - International Trade Australia
ABN: 64 001 285 927
46 RAEDON ST
BILOELA QLD 4715
[redacted]

ORIGIN: Dawson South Stage 1

DESCRIPTION: Water Quality - Monthly Sampling

REPORTED TO: [redacted]

DATE REPORTED: 10/03/10

JOB NO: Bi1498502

REC'D: Feb-10

Sample ID		Old Woodleigh	Control Site	MIA Dam	Industrial Dam	Pit 25	C4 Sediment Dam	C3 Sediment Dam	C2 Sediment Dam
Date Sampled		04/02/10		04/02/10	04/02/10	DRY	05/02/10	DRY	DRY
Sample No.		M7831		M7833	M7832	-	M7836	-	-
pH		7.4		8.8	9.6	-	7.4	-	-
Conductivity	µS/cm	0		8.07	4.46	-	0.74	-	-
Temperature	°C	29.7		29.9	33.3	-	25.9	-	-
Dissolved Oxygen	mg/L	8.1		11.0	>24.0	-	6.8	-	-
Turbidity	NTU					-		-	-
RL	m					-		-	-
Total Solids	mg/L					-		-	-
Total Dissolved Solids	mg/L					-		-	-
Total Suspended Solids	mg/L					-		-	-
Sulphate	mg/L					-		-	-
DISSOLVED METALS									
Aluminium	ug/L			-		-	-	-	-
Arsenic	ug/L			-		-	-	-	-
Boron	ug/L			-	NR	-	-	-	-
Cadmium	ug/L			-		-	-	-	-
Chromium	ug/L			-	NR	-	-	-	-
Cobalt	ug/L			-		-	-	-	-
Copper	ug/L			-		-	-	-	-
Iron	ug/L			-	NR	-	-	-	-
Lead	ug/L			-		-	-	-	-
Manganese	ug/L			-	NR	-	-	-	-
Mercury	ug/L			-	NR	-	-	-	-
Nickel	ug/L			-		-	-	-	-
Selenium	ug/L			-	NR	-	-	-	-
Silver	ug/L			-	NR	-	-	-	-
Uranium	ug/L			-	NR	-	-	-	-
Vanadium	ug/L			-	NR	-	-	-	-
Zinc	ug/L			-		-	-	-	-
TOTAL METALS									
Aluminium	ug/L			-		-	-	-	-
Arsenic	ug/L			-		-	-	-	-
Boron	ug/L			-	NR	-	-	-	-
Cadmium	ug/L			-		-	-	-	-
Chromium	ug/L			-	NR	-	-	-	-
Cobalt	ug/L			-		-	-	-	-
Copper	ug/L			-		-	-	-	-
Iron	ug/L			-	NR	-	-	-	-
Lead	ug/L			-		-	-	-	-
Manganese	ug/L			-	NR	-	-	-	-
Mercury	ug/L			-	NR	-	-	-	-
Nickel	ug/L			-	NR	-	-	-	-
Selenium	ug/L			-	NR	-	-	-	-
Silver	ug/L			-	NR	-	-	-	-
Uranium	ug/L			-	NR	-	-	-	-
Vanadium	ug/L			-	NR	-	-	-	-
Zinc	ug/L			-		-	-	-	-
TPH FRACTIONS									
C6 - C9	ug/L			-	NR	-	-	-	-
C10 - C14	ug/L			-	NR	-	-	-	-
C15 - C28	ug/L			-	NR	-	-	-	-
C29 -C36	ug/L			-	NR	-	-	-	-
Fluoride	mg/L			-		-	-	-	-
Ammonia as N	mg/L			-	NR	-	-	-	-
Total Fluoride	mg/L			-	NR	-	-	-	-
Nitrate as N	mg/L			-	NR	-	-	-	-
Chloride	mg/L			-	NR	-	-	-	-
Orthophosphate as P	mg/L			-	NR	-	-	-	-
TRH	mg/L	-	-	-	NR	-	-	-	-

ND - Nil Detected
NR - Not Required
^ Sample lost in transit.

*- Guidelines apply only to Kianga Weir. Remaining samples are dirty water and guidelines do not apply

March:

Bureau Veritas - International Trade Australia
ABN: 64 001 285 927
46 RAEDON ST
BILOELA QLD 4715
PH: 07 49925600 FAX: 07 49925115
[redacted]

ORIGIN: Dawson South Stage 1

DESCRIPTION: Water Quality - Monthly Sampling

REPORTED TO: [redacted]

DATE REPORTED: 30/03/10

JOB NO: Bi1498502

REC'D: Feb-10

Sample ID		Old Woodleigh	Control Site	MIA Dam	Industrial Dam	Pit 25	C4 Sediment Dam	C3 Sediment Dam	C2 Sediment Dam
Date Sampled		23/03/10		23/03/10	23/03/10	23/03/10	23/03/10	23/03/10	DRY
Sample No.		M8022	*	M8023	M8021	M8024	M8026	M8027	-
pH		7.4		9.0	8.6	8.20	8.3	8.300	-
Conductivity	µS/cm	210		4750.00	530.00	3080.00	350.00	190.000	-
Temperature	°C	25.8		26.9	27.1	27.80	30.7	29	-
Dissolved Oxygen	mg/L	9.3		10.4	13.6	10.80	11.4	14.000	-
Turbidity	NTU					-		-	-
RL	m					-		-	-
Total Solids	mg/L					-		-	-
Total Dissolved Solids	mg/L	260				-		-	-
Total Suspended Solids	mg/L	21				-		-	-
Sulphate	mg/L	10				-		-	-
DISSOLVED METALS									
Aluminium	ug/L	280		-	130	-	-	-	-
Arsenic	ug/L	5		-	8	-	-	-	-
Boron	ug/L	87		-	NR	-	-	-	-
Cadmium	ug/L	<5		-	<5	-	-	-	-
Chromium	ug/L	<5		-	NR	-	-	-	-
Cobalt	ug/L	<5		-	<5	-	-	-	-
Copper	ug/L	6		-	<5	-	-	-	-
Iron	ug/L	390.00		-	NR	-	-	-	-
Lead	ug/L	<5		-	<5	-	-	-	-
Manganese	ug/L	100		-	NR	-	-	-	-
Mercury	ug/L	<0.1		-	NR	-	-	-	-
Nickel	ug/L	<5		-	<5	-	-	-	-
Selenium	ug/L	<5		-	NR	-	-	-	-
Silver	ug/L	<5		-	NR	-	-	-	-
Uranium	ug/L	<5		-	NR	-	-	-	-
Vanadium	ug/L	9		-	NR	-	-	-	-
Zinc	ug/L	77		-	35	-	-	-	-
TOTAL METALS									
Aluminium	ug/L	700		-	620	-	-	-	-
Arsenic	ug/L	5		-	9.400	-	-	-	-
Boron	ug/L	87		-	NR	-	-	-	-
Cadmium	ug/L	<5		-	<5	-	-	-	-
Chromium	ug/L	<5		-	NR	-	-	-	-
Cobalt	ug/L	<5		-	<5	-	-	-	-
Copper	ug/L	7		-	<5	-	-	-	-
Iron	ug/L	890.00		-	NR	-	-	-	-
Lead	ug/L	<5		-	<5	-	-	-	-
Manganese	ug/L	100		-	NR	-	-	-	-
Mercury	ug/L	<0.1		-	NR	-	-	-	-
Nickel	ug/L	<5		-	<5	-	-	-	-
Selenium	ug/L	<5		-	NR	-	-	-	-
Silver	ug/L	<5		-	NR	-	-	-	-
Uranium	ug/L	<5		-	NR	-	-	-	-
Vanadium	ug/L	8		-	NR	-	-	-	-
Zinc	ug/L	78		-	35	-	-	-	-
TPH FRACTIONS									
C6 - C9	ug/L	<20		-	NR	-	-	-	-
C10 - C14	ug/L	<40		-	NR	-	-	-	-
C15 - C28	ug/L	<100		-	NR	-	-	-	-
C29 - C36	ug/L	<100		-	NR	-	-	-	-
Fluoride	mg/L	<0.5		-		-	-	-	-
Ammonia as N	mg/L	<1		-		-	-	-	-
Total Fluoride	mg/L			-		-	-	-	-
Nitrate as N	mg/L	<0.5		-		-	-	-	-
Chloride	mg/L			-		-	-	-	-
Orthophosphate as P	mg/L			-		-	-	-	-
TRH	mg/L	-	-	-		-	-	-	-

ND - Nil Detected
NR - Not Required
^ Sample lost in transit.

*- Guidelines apply only to Kianga Weir. Remaining samples are dirty water and guidelines do not apply.

This is preliminary report number 2

April:

Bureau Veritas - International Trade Australia
ABN: 64 001 285 927
46 RAEDON ST
BILOELA QLD 4715
PH: 07 49925600 FAX: 07 49925115
[redacted]

ORIGIN: Dawson South Stage 1

DESCRIPTION: Water Quality - Monthly Sampling

REPORTED TO: [redacted]

DATE REPORTED:

JOB NO: Bi1498502

REC'D: Apr-10

Sample ID		Old Woodleigh	Control Site	MIA Dam	Industrial Dam	Pit 25	C4 Sediment Dam	C3 Sediment Dam	C2 Sediment Dam
Date Sampled		19/04/10	19/04/10	19/04/10	19/04/10	19/04/10	19/04/10	19/04/10	DRY
Sample No.		M8093	M8091	M8094	M8092	M8095	M8096	M8097	-
pH		7.6	7.2	8.9	9.0	8.20	8.3	7.7	-
Conductivity	µS/cm	300	320	2890.00	680.00	3430.00	490.00	210.0	-
Temperature	°C	24.6	24.1	24.9	24.2	24.60	23.8	23.9	-
Dissolved Oxygen	mg/L	8.4	7.8	10.0	9.4	9.00	9.3	7.7	-
Turbidity	NTU								-
RL	m								-
Total Solids	mg/L								-
Total Dissolved Solids	mg/L								-
Total Suspended Solids	mg/L								-
Sulphate	mg/L								-
DISSOLVED METALS									
Aluminium	ug/L								-
Arsenic	ug/L								-
Boron	ug/L								-
Cadmium	ug/L								-
Chromium	ug/L								-
Cobalt	ug/L								-
Copper	ug/L								-
Iron	ug/L								-
Lead	ug/L								-
Manganese	ug/L								-
Mercury	ug/L								-
Nickel	ug/L								-
Selenium	ug/L								-
Silver	ug/L								-
Uranium	ug/L								-
Vanadium	ug/L								-
Zinc	ug/L								-
TOTAL METALS									
Aluminium	ug/L								-
Arsenic	ug/L								-
Boron	ug/L								-
Cadmium	ug/L								-
Chromium	ug/L								-
Cobalt	ug/L								-
Copper	ug/L								-
Iron	ug/L								-
Lead	ug/L								-
Manganese	ug/L								-
Mercury	ug/L								-
Nickel	ug/L								-
Selenium	ug/L								-
Silver	ug/L								-
Uranium	ug/L								-
Vanadium	ug/L								-
Zinc	ug/L								-
TPH FRACTIONS									
C6 - C9	ug/L								-
C10 - C14	ug/L								-
C15 - C28	ug/L								-
C29 -C36	ug/L								-
Fluoride	mg/L								-
Ammonia as N	mg/L								-
Total Fluoride	mg/L								-
Nitrate as N	mg/L								-
Chloride	mg/L								-
Orthophosphate as P	mg/L								-
TRH	mg/L								-

ND - Nil Detected
NR - Not Required
^ Sample lost in transit.

*- Guidelines apply only to Kianga Weir. Remaining samples are dirty water and guidelines do not apply.

This is preliminary report number 1

Bureau Veritas - International Trade Australia
ABN: 64 001 285 927
46 RAEDON ST
BILOELA QLD 4715
PH: 07 49925600 FAX: 07 49925115

ORIGIN: Dawson South Stage 1

DESCRIPTION: Water Quality - Monthly Sampling

REPORTED TO: [redacted]

DATE REPORTED:

JOB NO: Bi1498502

REC'D: Apr-10

Sample ID		Old Woodleigh	Control Site
Date Sampled		19/04/10	19/04/10
Sample No.		M8093	M8091
pH		7.6	7.2
Conductivity	µS/cm	300	320
Temperature	°C	24.6	24.1
Dissolved Oxygen	mg/L	8.4	7.8
Turbidity	NTU	72.0	73.0
RL	m		
Total Solids	mg/L		
Total Dissolved Solids	mg/L	200	200
Total Suspended Solids	mg/L	48	45
Sulphate	mg/L	<15	<15
DISSOLVED METALS			
Aluminium	ug/L	4500	4000
Arsenic	ug/L	<5	<5
Boron	ug/L	50	50
Cadmium	ug/L	<0.2	<0.2
Chromium	ug/L	6	7
Cobalt	ug/L	<5	<5
Copper	ug/L	<5	<5
Iron	ug/L	600.00	600.00
Lead	ug/L	<5	<5
Manganese	ug/L	75	75
Mercury	ug/L	<1	<1
Nickel	ug/L	<5	<5
Selenium	ug/L	<5	<5
Silver	ug/L	<5	<5
Uranium	ug/L	<5	<5
Vanadium	ug/L	10	10
Zinc	ug/L	14	13
TOTAL METALS			
Aluminium	ug/L	2	2
Arsenic	ug/L	<5	<5
Boron	ug/L	<50	<50
Cadmium	ug/L	<5	<5
Chromium	ug/L	<5	<5
Cobalt	ug/L	<5	<5
Copper	ug/L	<5	<5
Iron	ug/L	2300.00	2300.00
Lead	ug/L	<5	<5
Manganese	ug/L	0	0
Mercury	ug/L	<0.1	<0.1
Nickel	ug/L	<5	<5
Selenium	ug/L	<5	<5
Silver	ug/L	<5	<5
Uranium	ug/L	<5	<5
Vanadium	ug/L	8	8
Zinc	ug/L	28	29
TPH FRACTIONS			
C6 - C9	ug/L	<20	<20
C10 - C14	ug/L	<50	<50
C15 - C28	ug/L	<100	<100
C29 - C36	ug/L	<100	<100
Fluoride	mg/L	<0.5	<0.5
Ammonia as N	mg/L	<1	<1
Total Fluoride	mg/L		
Nitrate as N	mg/L	1.000	1.400
Chloride	mg/L		
Orthophosphate as P	mg/L		
TRH	mg/L		

PR 25	C4 Sediment Dam	C3 Sediment Dam	C2 Sediment Dam
19/04/10	19/04/10	19/04/10	DRY
M8095	M8096	M8097	-
8.20	8.3	7.7	-
3430	490	210	-
24.60	23.8	23.9	-
9.00	9.3	7.7	-

ND - Nil Detected
NR - Not Required
^ Sample lost in transit.

*- Guidelines apply only to Kianga Weir. Remaining samples are dirty water and guidelines do not apply.

This is preliminary report number 1

May:

Bureau Veritas - International Trade Australia
ABN: 64 001 285 927
46 RAEDON ST
BILOELA QLD 4715
PH: 07 49925600 FAX: 07 49925115
[redacted]

ORIGIN: Dawson South Stage 1

DESCRIPTION: Water Quality - Monthly Sampling

REPORTED TO: [redacted]

DATE REPORTED: 22/06/10

JOB NO: Bi1498502

REC'D: May-10

Sample ID		Old Woodleigh	Control Site	MIA Dam	Industrial Dam	Pit 25	C4 Sediment Dam	C3 Sediment Dam	C2 Sediment Dam
Date Sampled		13/05/10	13/05/10	13/05/10	13/05/10	INACCESSIBLE	13/05/10	13/05/10	DRY
Sample No.		M8172	M8171	M8174	M8173	-	M8175	M8176	-
pH		7.4	7.3	9.3	9.5	-	8.2	8.1	-
Conductivity	µS/cm	410	470	4040.00	890.00	-	570.00	250.0	-
Temperature	°C	20.5	20.2	21.2	21.8	-	20.9	20.3	-
Dissolved Oxygen	mg/L	8.1	7.8	10.8	11.7	-	8.7	9.5	-
Turbidity	NTU			12.0		-	9	13.000	-
RL	m	-	-	-	-	-	-	-	-
Total Solids	mg/L	-	-	-	-	-	-	-	-
Total Dissolved Solids	mg/L	-	-	1900	-	-	250	75.0	-
Total Suspended Solids	mg/L	-	-	23	-	-	<20	22.000	-
Sulphate	mg/L	-	-	420	-	-	23	0.500	-
DISSOLVED METALS									
Aluminium	ug/L	490	550	11	26	-	200	<5	-
Arsenic	ug/L	<5	<5	8	8	-	14	7	-
Boron	ug/L	-	-	-	-	-	-	-	-
Cadmium	ug/L	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	-
Chromium	ug/L	-	-	-	-	-	-	-	-
Cobalt	ug/L	<5	<5	<5	<5	-	<5	<5	-
Copper	ug/L	<5	<5	<5	<5	-	<5	<5	-
Iron	ug/L	600.00	500	<100	<100	-	<100	<100	-
Lead	ug/L	<5	<5	<5	<5	-	<5	<5	-
Manganese	ug/L	-	-	-	-	-	-	-	-
Mercury	ug/L	-	-	-	-	-	-	-	-
Nickel	ug/L	<5	<5	<5	<5	-	<5	<5	-
Selenium	ug/L	-	-	-	-	-	-	-	-
Silver	ug/L	-	-	-	-	-	-	-	-
Uranium	ug/L	-	-	-	-	-	-	-	-
Vanadium	ug/L	-	-	-	-	-	-	-	-
Zinc	ug/L	<5	<5	<5	<5	-	<5	<5	-
TOTAL METALS									
Aluminium	ug/L	1400	1500	47	580	-	320	33	-
Arsenic	ug/L	<5	<5	8	9.000	-	13	9	-
Boron	ug/L	-	-	-	-	-	-		-
Cadmium	ug/L	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	-
Chromium	ug/L	-	-	-	-	-	-	-	-
Cobalt	ug/L	<5	<5	<5	<5	-	<5	<5	-
Copper	ug/L	<5	<5	<5	<5	-	<5	<5	-
Iron	ug/L	2200.00	2300.00	<100	600.000	-	200	800	-
Lead	ug/L	<5	<5	<5	<5	-	<5	<5	-
Manganese	ug/L	-	-	-	-	-	-	-	-
Mercury	ug/L	-	-	-	-	-	-	-	-
Nickel	ug/L	5	<5	<5	<5	-	<5	<5	-
Selenium	ug/L	-	-	-	-	-	-	-	-
Silver	ug/L	-	-	-	-	-	-	-	-
Uranium	ug/L	-	-	-	-	-	-	-	-
Vanadium	ug/L	-	-	-	-	-	-	-	-
Zinc	ug/L	19	21	<5	18	-	<5	14	-
TPH FRACTIONS									
C6 - C9	ug/L	-	-	-	-	-	-	-	-
C10 - C14	ug/L	-	-	-	-	-	-	-	-
C15 - C28	ug/L	-	-	-	-	-	-	-	-
C29 -C36	ug/L	-	-	-	-	-	-	-	-
Fluoride	mg/L	-	-	-	-	-	-	-	-
Ammonia as N	mg/L	-	-	-	-	-	-	-	-
Total Fluoride	mg/L	-	-	-	-	-	-	-	-
Nitrate as N	mg/L	-	-	-	-	-	-	-	-
Chloride	mg/L	-	-	-	-	-	-	-	-
Orthophosphate as P	mg/L	-	-	-	-	-	-	-	-
TRH	mg/L	-	-	-	-	-	-	-	-

ND - Nil Detected
NR - Not Required
^ Sample lost in transit

*- Guidelines apply only to Kianga Weir. Remaining samples are dirty water and guidelines do not apply

This is preliminary report number 2

June:

Bureau Veritas - International Trade Australia
ABN: 64 001 285 927
46 RAEDON ST
BILOELA QLD 4715
PH: 07 49925600 FAX: 07 49925115
[redacted]

ORIGIN: Dawson South Stage 1

DESCRIPTION: Water Quality - Monthly Sampling

REPORTED TO: [redacted]

DATE REPORTED:

JOB NO: Bi1498502

REC'D: Jun-10

Sample ID		Old Woodleigh	Control Site	MIA Dam	Industrial Dam	Pit 25	C4 Sediment Dam	C3 Sediment Dam	C2 Sediment Dam
Date Sampled		23/06/10	23/06/10	23/06/10	23/06/10	-	23/06/10	23/06/10	DRY
Sample No.		M8264	M8262	M8265	M8263	-	M8266	M8267	-
pH		7.7	7.7	8.6	8.1	-	8.4	8.6	-
Conductivity	µS/cm	480	490	3230.00	870.00	-	530.00	260.0	-
Temperature	°C	18.8	19.0	18.7	19.6	-	19.5	20.1	-
Dissolved Oxygen	mg/L	8.3	9.8	10.3	7.8	-	9.2	10.8	-
Turbidity	NTU	16.000	24.000	-	43.000	-	-	-	-
RL	m	-	-	-	-	-	-	-	-
Total Solids	mg/L	-	-	-	-	-	-	-	-
Total Dissolved Solids	mg/L	300.0	290.0	-	570.0	-	-	-	-
Total Suspended Solids	mg/L	<20	20.000	-	<20	-	-	-	-
Sulphate	mg/L	4.800	4.700	-	120.000	-	-	-	-
DISSOLVED METALS									
Aluminium	ug/L	<5	1100	-	490	-	-	-	-
Arsenic	ug/L	<5	<5	-	<5	-	-	-	-
Boron	ug/L	49	33	-	-	-	-	-	-
Cadmium	ug/L	<0.2	<0.2	-	<0.2	-	-	-	-
Chromium	ug/L	<5	<5	-	-	-	-	-	-
Cobalt	ug/L	<5	<5	-	<5	-	-	-	-
Copper	ug/L	<5	<5	-	<5	-	-	-	-
Iron	ug/L	<100	300	-	400	-	-	-	-
Lead	ug/L	<5	<5	-	<5	-	-	-	-
Manganese	ug/L	47	32	-	-	-	-	-	-
Mercury	ug/L	<0.1	<0.1	-	-	-	-	-	-
Nickel	ug/L	<5	<5	-	<5	-	-	-	-
Selenium	ug/L	<5	<5	-	-	-	-	-	-
Silver	ug/L	<5	<5	-	-	-	-	-	-
Uranium	ug/L	<5	<5	-	-	-	-	-	-
Vanadium	ug/L	<5	<5	-	-	-	-	-	-
Zinc	ug/L	38	<5	-	<5	-	-	-	-
TOTAL METALS									
Aluminium	ug/L	660	1100	-	1300	-	-	-	-
Arsenic	ug/L	<5	<5	-	<5	-	-	-	-
Boron	ug/L	37	37	-		-	-	-	-
Cadmium	ug/L	<0.2	<0.2	-	<0.2	-	-	-	-
Chromium	ug/L	<5	<5	-	-	-	-	-	-
Cobalt	ug/L	<5	<5	-	<5	-	-	-	-
Copper	ug/L	<5	<5	-	<5	-	-	-	-
Iron	ug/L	1200	1700	-	2400	-	-	-	-
Lead	ug/L	<5	<5	-	<5	-	-	-	-
Manganese	ug/L	57	77	-	-	-	-	-	-
Mercury	ug/L	<0.1	<0.1	-	-	-	-	-	-
Nickel	ug/L	<5	<5	-	<5	-	-	-	-
Selenium	ug/L	<5	<5	-	-	-	-	-	-
Silver	ug/L	<5	<5	-	-	-	-	-	-
Uranium	ug/L	<5	<5	-	-	-	-	-	-
Vanadium	ug/L	<5	<5	-	-	-	-	-	-
Zinc	ug/L	39	<5	-	<5	-	-	-	-
TPH FRACTIONS									
C6 - C9	ug/L	<20	<20	-	-	-	-	-	-
C10 - C14	ug/L	-	<50	-	-	-	-	-	-
C15 - C28	ug/L	-	<100	-	-	-	-	-	-
C29 -C36	ug/L	-	<100	-	-	-	-	-	-
Fluoride	mg/L	<0.5	<0.5	-	-	-	-	-	-
Ammonia as N	mg/L	<1	<1	-	-	-	-	-	-
Total Fluoride	mg/L	-	-	-	-	-	-	-	-
Nitrate as N	mg/L	<0.1	<0.1	-	-	-	-	-	-
Chloride	mg/L	-	-	-	-	-	-	-	-
Orthophosphate as P	mg/L	-	-	-	-	-	-	-	-
TRH	mg/L	-	-	-	-	-	-	-	-

ND - Nil Detected
NR - Not Required
^ Sample lost in transit.

*- Guidelines apply only to Kianga Weir. Remaining samples are dirty water and guidelines do not apply.

This is preliminary report number 1

July:

Bureau Veritas - International Trade Australia
ABN: 64 001 285 927
46 RAEDON ST
BILOELA QLD 4715
PH: 07 49925500 FAX: 07 49925115
[redacted]

ORIGIN: Dawson South Stage 1

DESCRIPTION: Water Quality - Monthly Sampling

REPORTED TO: [redacted]

DATE REPORTED: 1/09/10

JOB NO: Bi1498502

REC'D: Jul-10

Sample ID		Old Woodleigh	Control Site	MIA Dam	Industrial Dam	Pit 25	C4 Sediment Dam	C3 Sediment Dam	C2 Sediment Dam
Date Sampled		09/07/10	09/07/10	09/07/10	09/07/10	-	09/07/10	9/07/10	DRY
Sample No.		M8361	M8362	M8364	M8363	-	M8365	M8366	-
pH		7.7	7.8	8.5	8.2	-	8.2	8.6	-
Conductivity	µS/cm	470	460	3520.00	850.00	-	520.00	220.0	-
Temperature	°C	16.8	16.6	16.4	16.2	-	16.4	17.6	-
Dissolved Oxygen	mg/L	8.1	8.2	10.2	8.4	-	8.5	11.7	-
Turbidity	NTU	6.000	20.000	5.500	46.000	-	20.000	28.000	-
RL	m	-		-	-	-	-	-	-
Total Solids	mg/L	260	320	2300	580	-	350	250	-
Total Dissolved Solids	mg/L	270.0	320.0	2300.0	570.0	-	290.0	220.0	-
Total Suspended Solids	mg/L	<20	28.000	<20	24.000	-	<20	26.000	-
Sulphate	mg/L	4.900	4.400	660.000	120.000	-	32.000	0.900	-
DISSOLVED METALS									
Aluminium	ug/L	170	400	120	760	-	1200	240	-
Arsenic	ug/L	<5	<5	9	<5	-	5	8	-
Boron	ug/L	31	31	-	-	-	-	-	-
Cadmium	ug/L	<0.2	<0.2	-	<0.2	-	-	-	-
Calcium	ug/L	-	-	47	-		28	23	
Chromium	ug/L	<5	<5	<5	-	-	<5	<5	-
Cobalt	ug/L	<5	<5	-	<5	-	-	-	-
Copper	ug/L	<5	<5	<5	<5	-	<5	<5	-
Iron	ug/L	<100	<100	100	<100	-	500	2	-
Lead	ug/L	<5	<5	-	<5	-	-	-	-
Magnesium	ug/L	-	-	39	-		9	7	
Manganese	ug/L	11	5	12	-	-	48	240	-
Mercury	ug/L	<0.1	<0.1	-	-	-	-	-	-
Nickel	ug/L	<5	<5	<5	<5	-	<5	<5	-
Postassium	ug/L	-	-	8	-		10	19	
Selenium	ug/L	<5	<5	12	-	-	<5	<5	-
Silver	ug/L	<5	<5	-	-	-	-	-	-
Sodium	ug/L	-	-	710	-		59	10	
Uranium	ug/L	<5	<5	-	-	-	-	-	-
Vanadium	ug/L	<5	<5	-	-	-	-	-	-
Zinc	ug/L	<5	<5	12	<5	-	16	16	-
TOTAL METALS									
Aluminium	ug/L	160	580	-	2400	-	-	-	-
Arsenic	ug/L	<5	<5	-	<5	-	-	-	-
Boron	ug/L	32	33	-	-	-	-	-	-
Cadmium	ug/L	<0.2	<0.2	-	<0.2	-	-	-	-
Calcium	ug/L	-	-		-				
Chromium	ug/L	<5	<5	-	-	-	-	-	-
Cobalt	ug/L	<5	<5	-	<5	-	-	-	-
Copper	ug/L	<5	<5	-	<5	-	-	-	-
Iron	ug/L	500	1200	-	2100	-	-	-	-
Lead	ug/L	<5	<5	-	<5	-	-	-	-
Magnesium	ug/L	-	-		-				
Manganese	ug/L	73	100	-	-	-	-	-	-
Mercury	ug/L	<0.1	<0.1	-	-	-	-	-	-
Nickel	ug/L	<5	<5	-	<5	-	-	-	-
Postassium	ug/L	-	-		-				
Selenium	ug/L	<5	<5	-	-	-	-	-	-
Silver	ug/L	<5	<5	-	-	-	-	-	-
Sodium	ug/L	-	-	710	-		59	10	
Uranium	ug/L	<5	<5	-	-	-	-	-	-
Vanadium	ug/L	<5	<5	-	-	-	-	-	-
Zinc	ug/L	14	14	-	16	-	-	-	-
TPH FRACTIONS									
C6 - C9	ug/L	<20	<20	-	-	-	-	-	-
C10 - C14	ug/L	<50	<50	-	-	-	-	-	-
C15 - C28	ug/L	<100	<100	-	-	-	-	-	-
C29 -C36	ug/L	<100	<100	-	-	-	-	-	-
Fluoride	mg/L	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	-
Ammonia as N	mg/L	<1	<1	-	-	-	-	-	-
Total Fluoride	mg/L	-	-	-	-	-	-	-	-
Nitrate as N	mg/L	<0.1	<0.1	23.000	2.900	-	<0.1	<0.1	-
Chloride	mg/L	83	84	830	72	-	37	11	-
Orthophosphate as P	mg/L	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	-
TRH	mg/L	-	-	-	-	-	-	-	-

ND - Nil Detected
NR - Not Required
^ Sample lost in transit.

*- Guidelines apply only to Kianga Weir. Remaining samples are dirty water and guidelines do not apply.

This is preliminary report number 2

August:

Bureau Veritas - International Trade Australia
ABN: 64 001 285 927
46 RAEDON ST
BILOELA QLD 4715
PH: 07 49925600 FAX: 07 49925115
[redacted]

ORIGIN: Dawson South Stage 1

JOB NO: Bi1498502

DESCRIPTION: Water Quality - Monthly Sampling

REC'D: Aug-10

REPORTED TO: [redacted]

DATE REPORTED: 22/09/10

Sample ID		Old Woodleigh	Control Site	MIA Dam	Industrial Dam	Pit 25	C4 Sediment Dam	C3 Sediment Dam	C2 Sediment Dam
Date Sampled		10/08/10	10/08/10	10/08/10	10/08/10		10/08/10	10/08/10	
Sample No.		M8485	M8483	M8486	M8484		M8487	M8488	
pH		7.6	7.4	7.9	8.3		8.3	7.8	
Conductivity	µS/cm	640	760	3580.00	3860.00		570.00	310.0	
Temperature	°C	17.8	17.8	18.2	18.0		18.4	18.2	
Dissolved Oxygen	mg/L	8.5	7.9	3.7	10.0		8.6	6.8	
Turbidity	NTU	6.400	7.500	17.000	4.300		11.000	30.000	
RL	m			-	-		-	-	
Total Solids	mg/L			-	-		-	-	
Total Dissolved Solids	mg/L	360 0	350 0	2300.0	3300.0		310.0	200 0	
Total Suspended Solids	mg/L	<20	<20	<20	<20		<20	37.000	
Sulphate	mg/L	5.600	6.900	530.000	980 000		33.000	1.000	
DISSOLVED METALS									
Aluminium	ug/L	<5	<5	-	<5	-	-	-	-
Arsenic	ug/L	<5	<5	-	<5	-	-	-	-
Boron	ug/L	43	42	-	-	-	-	-	-
Cadmium	ug/L	<0.2	<0.2	-	<0.2	-	-	-	-
Calcium	ug/L	-	-	-	-	-	-	-	-
Chromium	ug/L	<5	<5	-	-	-	-	-	-
Cobalt	ug/L	<5	<5	-	<5	-	-	-	-
Copper	ug/L	<5	<5	-	<5	-	-	-	-
Iron	ug/L	<100	<100	-	<100	-	-	-	-
Lead	ug/L	<5	<5	-	<5	-	-	-	-
Magnesium	ug/L	-	-	-	-	-	-	-	-
Manganese	ug/L	56	26	-	-	-	-	-	-
Mercury	ug/L	<0.1	<0.1	-	-	-	-	-	-
Nickel	ug/L	<5	<5	-	8	-	-	-	-
Postassium	ug/L	-	-	-	-	-	-	-	-
Selenium	ug/L	<5	<5	-	-	-	-	-	-
Silver	ug/L	<5	<5	-	-	-	-	-	-
Sodium	ug/L	-	-	-	-	-	-	-	-
Uranium	ug/L	<5	<5	-	-	-	-	-	-
Vanadium	ug/L	<5	<5	-	-	-	-	-	-
Zinc	ug/L	17	21	-	26	-	-	-	-
TOTAL METALS									
Aluminium	ug/L	45	89	-	98	-	-	-	-
Arsenic	ug/L	<5	<5	-	<5	-	-	-	-
Boron	ug/L	38	37	-	-	-	-	-	-
Cadmium	ug/L	<0.2	<0.2	-	0	-	-	-	-
Calcium	ug/L	-	-	-	-	-	-	-	-
Chromium	ug/L	<5	<5	-	-	-	-	-	-
Cobalt	ug/L	<5	<5	-	<5	-	-	-	-
Copper	ug/L	<5	<5	-	<5	-	-	-	-
Iron	ug/L	100	200	-	100	-	-	-	-
Lead	ug/L	<5	<5	-	<5	-	-	-	-
Magnesium	ug/L	-	-	-	-	-	-	-	-
Manganese	ug/L	99	44	-	-	-	-	-	-
Mercury	ug/L	<0.1	<0.1	-	-	-	-	-	-
Nickel	ug/L	<5	<5	-	9	-	-	-	-
Postassium	ug/L	-	-	-	-	-	-	-	-
Selenium	ug/L	<5	<5	-	-	-	-	-	-
Silver	ug/L	<5	<5	-	-	-	-	-	-
Sodium	ug/L	-	-	-	-	-	-	-	-
Uranium	ug/L	<5	<5	-	-	-	-	-	-
Vanadium	ug/L	<5	<5	-	-	-	-	-	-
Zinc	ug/L	6	7	-	12	-	-	-	-
TPH FRACTIONS									
C6 - C9	ug/L	<20	<20	-	-	-	-	-	-
C10 - C14	ug/L	<50	<50	-	-	-	-	-	-
C15 - C28	ug/L	<100	<100	-	-	-	-	-	-
C29 -C36	ug/L	<100	<100	-	-	-	-	-	-
Fluoride	mg/L	-	-	-	-	-	-	-	-
Ammonia as N	mg/L	<1	<1	-	-	-	-	-	-
Total Fluoride	mg/L	-		-	-	-	-	-	-
Nitrate as N	mg/L	<0.1	<0.1	-	-	-	-	-	-
Chloride	mg/L	-	-	-	-	-	-	-	-
Orthophosphate as P	mg/L	-	-	-	-	-	-	-	-
TRH	mg/L	-	-	-	-	-	-	-	-

ND - Nil Detected
NR - Not Required
^ Sample lost in transit.

*- Guidelines apply only to Kianga Weir. Remaining samples are dirty water and guidelines do not apply.

This is preliminary report number 1

September:

Bureau Veritas - International Trade Australia
ABN: 64 001 285 927
46 RAEDON ST
BILOELA QLD 4715
PH: 07 49925600 FAX: 07 49925115
[redacted]

ORIGIN: Dawson South Stage 1

DESCRIPTION: Water Quality - Monthly Sampling

REPORTED TO: [redacted]

DATE REPORTED:

JOB NO: Bi1498502

REC'D: Sep-10

Sample ID		Old Woodleigh	Control Site	MIA Dam	Industrial Dam	Pit 25	C4 Sediment Dam	C3 Sediment Dam	C2 Sediment Dam
Date Sampled		14/09/10	14/09/10	14/09/10	14/09/10	INACCESSIBLE	14/09/10	14/09/10	
Sample No.		M8603	M8604	M8606	M8605		M8607	M8608	
pH		7.1	7.2	8.5	8.4		8.6	7.5	
Conductivity	µS/cm	210	160	2960.00	3790.00		470.00	170.0	
Temperature	°C	21.8	22.7	25.7	25.2		25.7	26.1	
Dissolved Oxygen	mg/L	7.9	7.9	9.1	10.3		9.7	7.0	
Turbidity	NTU	400.000	350.000	42.000	6.000		51.000	50.000	
RL	m	-	-	-	-		-	-	
Total Solids	mg/L	-	-	-	-		-	-	
Total Dissolved Solids	mg/L	370.0	220.0	<20	2900.0		280.0	130.0	
Total Suspended Solids	mg/L	170.000	120.000	<20	<20		24.000	<20	
Sulphate	mg/L	0.400	-	490.000	-		37.000	2.000	
DISSOLVED METALS									
Aluminium	ug/L	2700	3400	-	10		-	-	
Arsenic	ug/L	<5	<5	-	<5		-	-	
Boron	ug/L	28	28	-	-		-	-	
Cadmium	ug/L	<0.2	<0.2	-	<0.2		-	-	
Chromium	ug/L	<5	<5	-	-		-	-	
Cobalt	ug/L	<5	<5	-	<5		-	-	
Copper	ug/L	<5	<5	-	<5		-	-	
Iron	ug/L	1300	1600	-	<100		-	-	
Lead	ug/L	<5	<5	-	<5		-	-	
Manganese	ug/L	9	10	-	-		-	-	
Mercury	ug/L	<0.1	<0.1	-	-		-	-	
Nickel	ug/L	<5	<5	-	<5		-	-	
Selenium	ug/L	<5	<5	-	-		-	-	
Silver	ug/L	<5	<5	-	-		-	-	
Uranium	ug/L	<5	<5	-	-		-	-	
Vanadium	ug/L	8	9	-	-		-	-	
Zinc	ug/L	9	11	-	9		-	-	
TOTAL METALS					-				
Aluminium	ug/L	3400	3200	-	80		-	-	
Arsenic	ug/L	<5	<5	-	<5		-	-	
Boron	ug/L	30	29	-	-		-	-	
Cadmium	ug/L	<0.2	<0.2	-	<0.2		-	-	
Chromium	ug/L	<5	<5	-	-		-	-	
Cobalt	ug/L	<5	<5	-	<5		-	-	
Copper	ug/L	7	7	-	<5		-	-	
Iron	ug/L	3300	3100	-	100		-	-	
Lead	ug/L	<5	<5	-	<5		-	-	
Manganese	ug/L	120	120	-	-		-	-	
Mercury	ug/L	<0.1	<0.1	-	-		-	-	
Nickel	ug/L	<5	<5	-	<5		-	-	
Selenium	ug/L	<5	<5	-	-		-	-	
Silver	ug/L	<5	<5	-	-		-	-	
Uranium	ug/L	<5	<5	-	-		-	-	
Vanadium	ug/L	14	14	-	-		-	-	
Zinc	ug/L	41	40	-	26		-	-	
TPH FRACTIONS									
C6 - C9	ug/L	<20	<20	-	-		-	-	
C10 - C14	ug/L	<50	<50	-	-		-	-	
C15 - C28	ug/L	<100	<100	-	-		-	-	
C29 - C36	ug/L	<100	<100	-	-		-	-	
Fluoride	mg/L			-	-		-	-	
Ammonia as N	mg/L	<1	<1	-	-		-	-	
Total Fluoride	mg/L			-	-		-	-	
Nitrate as N	mg/L	0.400	0.500	-	-		-	-	
Chloride	mg/L			-	-		-	-	
Orthophosphate as P	mg/L			-	-		-	-	
TRH	mg/L			-	-		-	-	

ND - Nil Detected
NR - Not Required
^ Sample lost in transit.

*- Guidelines apply only to Klanga Weir. Remaining samples are dirty water and guidelines do not apply.

This is preliminary report number 1

October:

Bureau Veritas - International Trade Australia
ABN: 64 001 285 927
46 RAEDON ST
BILOELA QLD 4715
PH: 07 49925600 FAX: 07 49925115
[redacted]

ORIGIN: Dawson South Stage 1

DESCRIPTION: Water Quality - Monthly Sampling

REPORTED TO: [redacted]

DATE REPORTED:

JOB NO: Bi1498502

REC'D: Oct-10

Sample ID		Old Woodleigh	Control Site	MIA Dam	Industrial Dam	Pit 25	C4 Sediment Dam	C3 Sediment Dam	C2 Sediment Dam
Date Sampled		11/10/10	11/10/10	11/10/10	11/10/10	INACCESSIBLE	11/10/10	11/10/10	
Sample No.		M8709	M8710	M8711	M8712		M8713	M8714	
pH		7.4	7.7	8.5	8.2		7.9	7.7	
Conductivity	µS/cm	210	180	2530.00	3390.00		460.00	160.0	
Temperature	°C	23.7	24.1	24.9	24.9		24.1	24.9	
Dissolved Oxygen	mg/L	7.0	7.4	9.9	9.2		7	7.7	
Turbidity	NTU	280 000	290.000		5.400				
RL	m	-	-	-	-		-	-	
Total Solids	mg/L	-	-	-	-		-	-	
Total Dissolved Solids	mg/L	320.0	340.0		2200.0				
Total Suspended Solids	mg/L	60 000	68.000		<20				
Sulphate	mg/L	2.400	2.700		810.000				
DISSOLVED METALS									
Aluminium	ug/L	2800	2800	-	14		-	-	
Arsenic	ug/L	<5	<5	-	5		-	-	
Boron	ug/L	25	26	-	-		-	-	
Cadmium	ug/L	<0.2	<0.2	-	<0.2		-	-	
Chromium	ug/L	<5	<5	-	-		-	-	
Cobalt	ug/L	<5	<5	-	<5		-	-	
Copper	ug/L	<5	<5	-	<5		-	-	
Iron	ug/L	1900	1500	-	<100		-	-	
Lead	ug/L	<5	<5	-	<5		-	-	
Manganese	ug/L	7	8	-	-		-	-	
Mercury	ug/L	<0.1	<0.1	-	-		-	-	
Nickel	ug/L	<5	<5	-	<5		-	-	
Selenium	ug/L	<5	<5	-	-		-	-	
Silver	ug/L	<5	<5	-	-		-	-	
Uranium	ug/L	<5	<5	-	-		-	-	
Vanadium	ug/L	9	9	-	-		-	-	
Zinc	ug/L	8	11	-	8		-	-	
TOTAL METALS					-				
Aluminium	ug/L	2800	2800	-	140		-	-	
Arsenic	ug/L	<5	<5	-	5		-	-	
Boron	ug/L	27	26	-	-		-	-	
Cadmium	ug/L	<0.2	<0.2	-	<0.2		-	-	
Chromium	ug/L	<5	<5	-	-		-	-	
Cobalt	ug/L	<5	<5	-	<5		-	-	
Copper	ug/L	5	<5	-	<5		-	-	
Iron	ug/L	6700	7700	-	200		-	-	
Lead	ug/L	<5	<5	-	<5		-	-	
Manganese	ug/L	140	110	-	-		-	-	
Mercury	ug/L	<0.1	<0.1	-	-		-	-	
Nickel	ug/L	<5	<5	-	<5		-	-	
Selenium	ug/L	<5	<5	-	-		-	-	
Silver	ug/L	<5	<5	-	-		-	-	
Uranium	ug/L	<5	<5	-	-		-	-	
Vanadium	ug/L	11	10	-	-		-	-	
Zinc	ug/L	18	18	-	9		-	-	
TPH FRACTIONS									
C6 - C9	ug/L	<20	<20	-	-		-	-	
C10 - C14	ug/L	<50	<50	-	-		-	-	
C15 - C28	ug/L	<100	<100	-	-		-	-	
C29 -C36	ug/L	<100	<100	-	-		-	-	
Fluoride	mg/L			-	-		-	-	
Ammonia as N	mg/L	<1	<1	-	-		-	-	
Total Fluoride	mg/L			-	-		-	-	
Nitrate as N	mg/L	0.900	0.600	-	-		-	-	
Chloride	mg/L			-	-		-	-	
Orthophosphate as P	mg/L			-	-		-	-	
TRH	mg/L			-	-		-	-	

ND - Nil Detected
NR - Not Required
^ Sample lost in transit.

*- Guidelines apply only to Kianga Weir. Remaining samples are dirty water and guidelines do not apply.

This is preliminary report number 1

November:

Bureau Veritas - International Trade Australia
ABN: 64 001 285 927
46 RAEDON ST
BILOELA QLD 4715
PH: 07 49925600 FAX: 07 49925115
[redacted]

ORIGIN: Dawson South Stage 1 **JOB NO:** Bi1498502

DESCRIPTION: Water Quality - Monthly Sampling **REC'D:** Nov-10

REPORTED TO: [redacted]

DATE REPORTED: 2/12/10

Sample ID		Old Woodleigh	Control Site	MIA Dam	Industrial Dam	Pit 25	C4 Sediment Dam	C3 Sediment Dam	C2 Sediment Dam
Date Sampled		08/11/10	08/11/10	08/11/10	08/11/10	INACCESSIBLE	08/11/10	08/11/10	
Sample No.		M8786	M8787	M8789	M8788		M8790	M8791	
pH		7.3	7.2	8.5	8.1		8.7	7.8	
Conductivity	µS/cm	210	210	3330.00	3690.00		490.00	180.0	
Temperature	°C	25.5	25.5	26.0	30.0		25.8	27.5	
Dissolved Oxygen	mg/L	7.1	8.7	9.8	11.8		8.9	7.0	
Turbidity	NTU	200.000	210.000	17.000	32.000		88.000	32.000	
RL	m	-	-	-	-		-	-	
Total Solids	mg/L	-	-	-	-		-	-	
Total Dissolved Solids	mg/L	250.0	240.0	2100.0	2400.0		310.0	150.0	
Total Suspended Solids	mg/L	16.000	26.000	8.000	18.000		22.000	18.000	
Sulphate	mg/L			250.000			16.000	<5	
DISSOLVED METALS									
Aluminium	ug/L	460	610	-	<50		-	-	
Arsenic	ug/L	1	1	-	6		-	-	
Boron	ug/L	<50	<50	-	-		-	-	
Cadmium	ug/L	<0.2	<0.2	-	<0.2		-	-	
Chromium	ug/L	<1	<1	-	-		-	-	
Cobalt	ug/L	<1	<1	-	1		-	-	
Copper	ug/L	2	2	-	<1		-	-	
Iron	ug/L	290	340	-	<50		-	-	
Lead	ug/L	<1	<1	-	<1		-	-	
Manganese	ug/L	<5	<5	-	-		-	-	
Mercury	ug/L	<0.1	<0.1	-	-		-	-	
Nickel	ug/L	2	2	-	2		-	-	
Selenium	ug/L	<1	<1	-	-		-	-	
Silver	ug/L	<5	<5	-	-		-	-	
Uranium	ug/L	<5	<5	-	-		-	-	
Vanadium	ug/L	<5	<5	-	-		-	-	
Zinc	ug/L	<1	<1	-	<1		-	-	
TOTAL METALS					-				
Aluminium	ug/L	10000	8100	-	440		-	-	
Arsenic	ug/L	2	2	-	6		-	-	
Boron	ug/L	<50	<50	-	-		-	-	
Cadmium	ug/L	<0.2	<0.2	-	<0.2		-	-	
Chromium	ug/L	3	3	-	-		-	-	
Cobalt	ug/L	2	2	-	2		-	-	
Copper	ug/L	5	5	-	2		-	-	
Iron	ug/L	6	5400	-	470		-	-	
Lead	ug/L	3	3	-	<1		-	-	
Manganese	ug/L	84	84	-	-		-	-	
Mercury	ug/L	<0.1	<0.1	-	-		-	-	
Nickel	ug/L	3	4	-	2		-	-	
Selenium	ug/L	<1	<1	-	-		-	-	
Silver	ug/L	<5	<5	-	-		-	-	
Uranium	ug/L	<5	<5	-	-		-	-	
Vanadium	ug/L	13	13	-	-		-	-	
Zinc	ug/L	8	8	-	<1		-	-	
TPH FRACTIONS									
C6 - C9	ug/L	300	<20	-	-		-	-	
C10 - C14	ug/L	<50	<50	-	-		-	-	
C15 - C28	ug/L	<100	<100	-	-		-	-	
C29 - C36	ug/L	<100	<100	-	-		-	-	
Fluoride	mg/L			-	-		-	-	
Ammonia as N	mg/L	0.030	0.050	-	-		-	-	
Total Fluoride	mg/L			-	-		-	-	
Nitrate as N	mg/L	0.160	0.210	-	-		-	-	
Chloride	mg/L			-	-		-	-	
Orthophosphate as P	mg/L			-	-		-	-	
TRH	mg/L			-	-		-	-	

ND - Nil Detected
NR - Not Required
^ Sample lost in transit.

*- Guidelines apply only to Kianga Weir. Remaining samples are dirty water and guidelines do not apply.

This is preliminary report number 1

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

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
Queensland Government

(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.

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

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.

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

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

Queensland Government

☐ 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

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:	

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 Professor Barry Hart 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

Assessing draft Transitional Environmental Programs

- 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 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.
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 RECOMMENDATION
XXXX

XXXX
Senior Environmental Officer

Signed –

Date -

Reviewed & Endorsed By	
XXXX Senior Environmental Officer	**Delegate** Manager - Emerald

Signed – Date:	Signed – Date:

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.

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

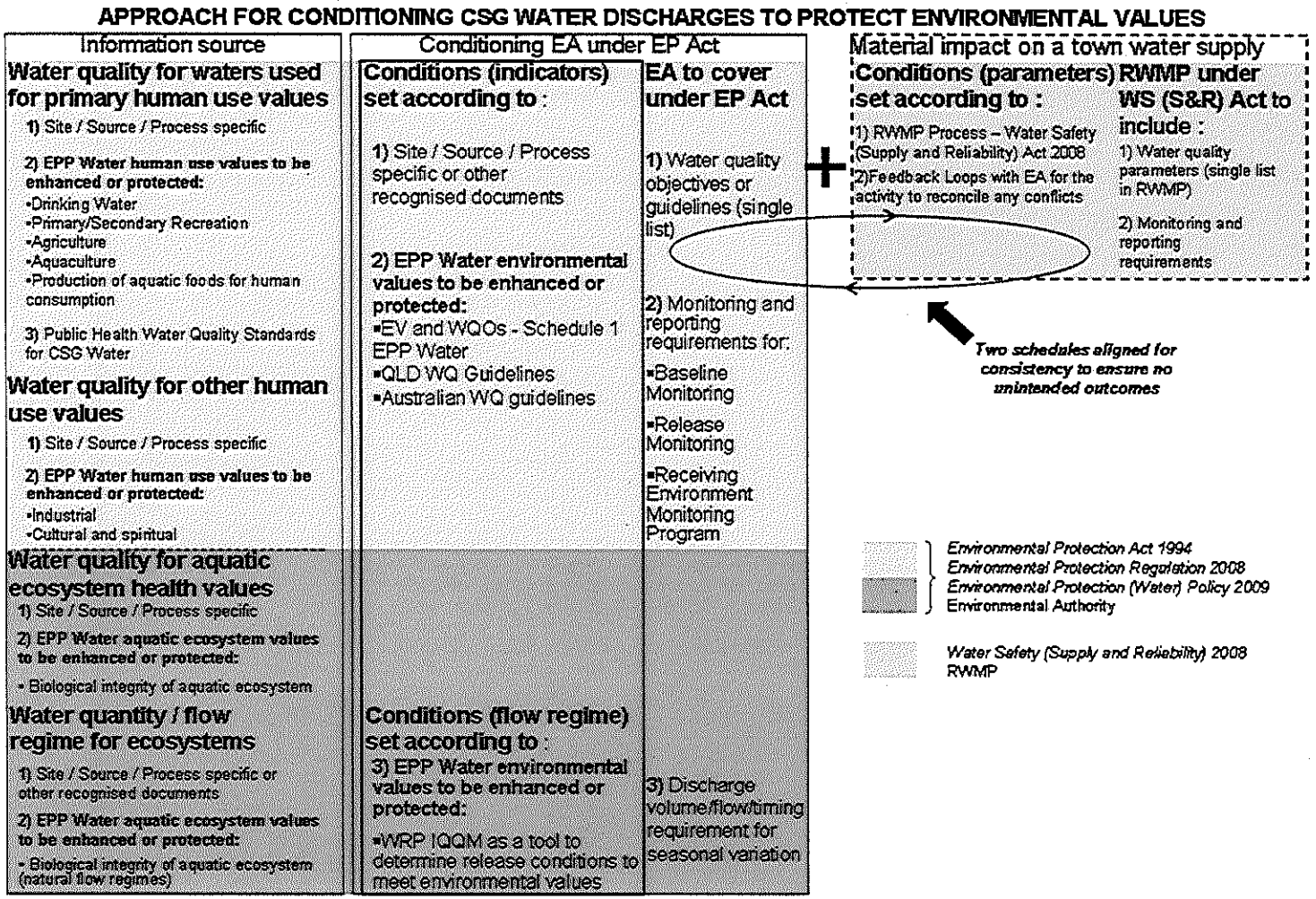
Note: Where a term is not defined in this guideline, the definition in the *Environmental Protection Act 1994*, its regulations and Environmental Protection Policies must be used.

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 75^{th} percentiles for median EC, 80^{th} 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 within 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

ecoaccess
environmental licences and permits

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 2.5 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 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;*
- *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

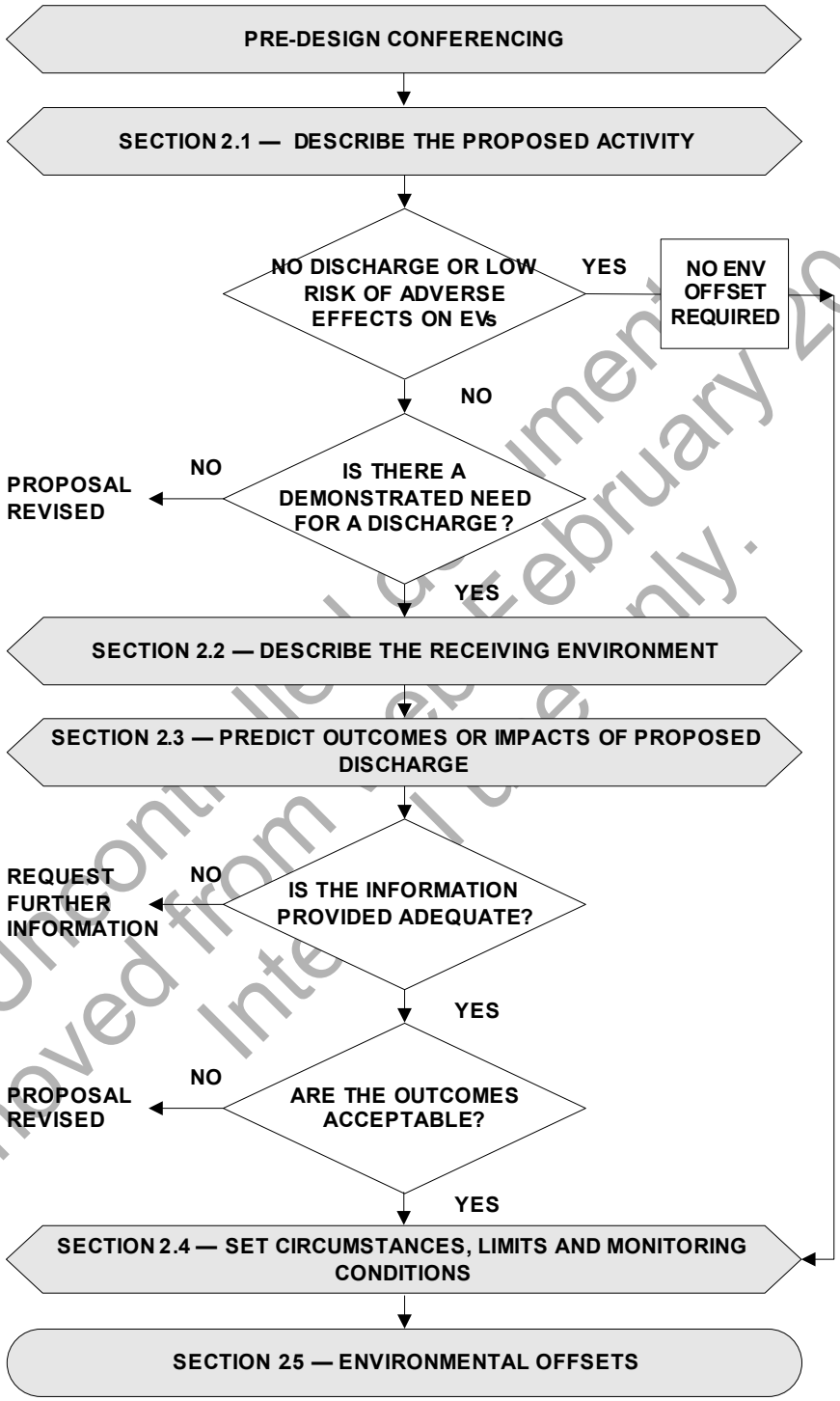


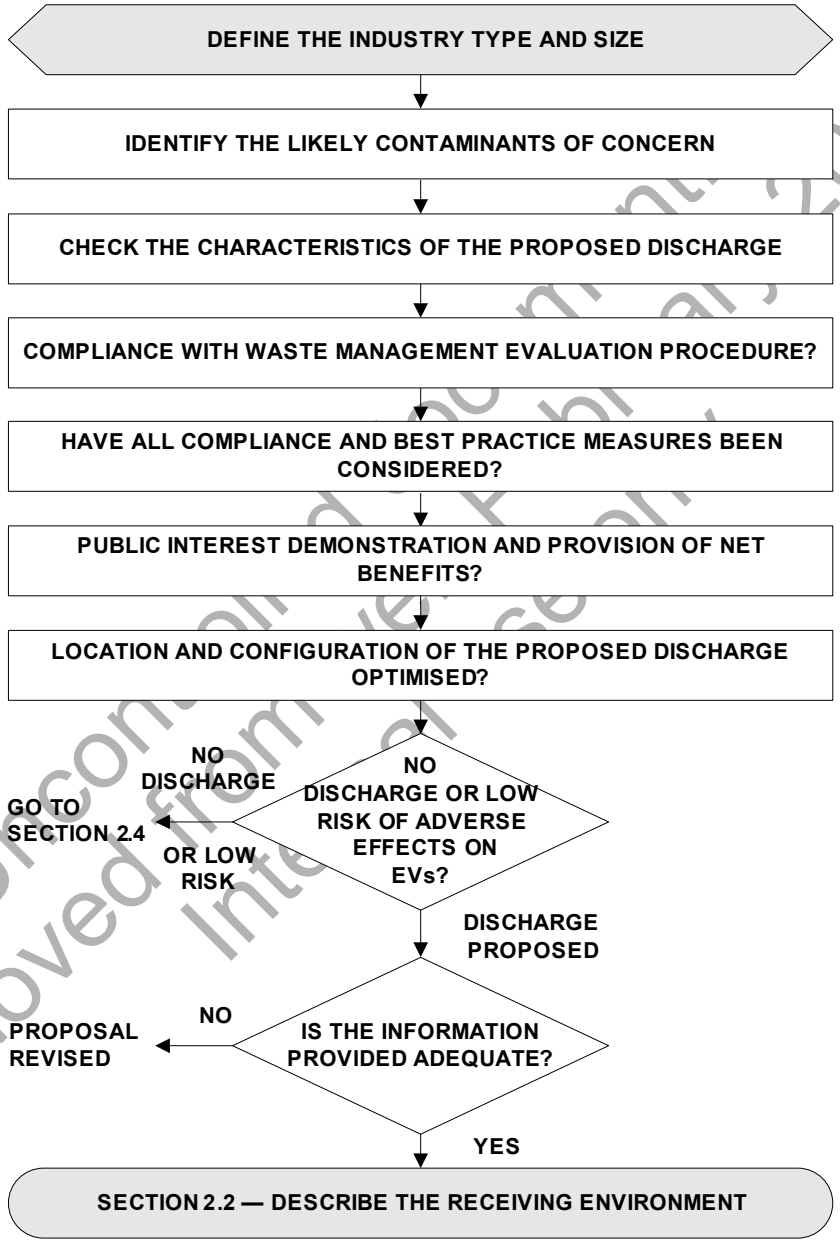
Table 1 — Task list for assessing the discharge of residual waste water

Section	Activity	Tasks list
2.1	Describe the proposed activity	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	Describe the receiving environment	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	Predict outcomes of the proposed activity	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	Set limits, circumstances and monitoring conditions	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 8.3.6.

Table 2 — Potential issues of concern and water quality contaminants

Point source discharges	Potential issues	Water quality contaminants
Sewage effluent	Asphyxiation of aquatic animal life (e.g. low dissolved oxygen levels leading to fish kills), algal blooms, smothering of flora and fauna, impairment of ecosystem structure and function, and public health risks.	Carbonaceous material, nutrients, pathogens, suspended solids, toxicants (metals/metalloids, pesticides, residual disinfectants and pharmaceuticals).
Abattoir effluent	Asphyxiation of aquatic animal life (e.g. low dissolved oxygen levels leading to fish kills), algal blooms, smothering of flora and fauna, impairment of ecosystem structure and function, and public health risks.	Carbonaceous material, suspended solids, nutrients, pathogens, residual disinfectants and toxicants.
Mine discharges	Toxicity of sulphate, acid/alkaline solutions and metals/metalloids. Increased availability of metals due to pH changes, smothering of flora and fauna impairment of ecosystem structure and function, and salinisation. May affect stock and irrigation water.	pH, sulphate, temperature, suspended solids, turbidity, salinity, toxicants (metals/ metalloids and other chemicals, including fluoride).
Aquaculture discharges	Asphyxiation of aquatic animal life (e.g. low dissolved oxygen levels leading to fish kills), algal blooms, smothering of flora and fauna, impairment of ecosystem structure and function, diseases and introduced species.	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	Low dissolved oxygen levels leading to fish kills, elevated temperatures may lead to fish kills and other effects on fauna and flora.	Carbonaceous material, temperature and antifouling agents.
Chemical processing plants	Toxicity of acids, alkalis, metals or industrial chemicals. Increased availability of metals from pH changes, smothering of flora and fauna, algal blooms and low dissolved oxygen levels leading to fish kills.	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	Toxicity of metals and metalloids. Smothering of flora and fauna. Elevated temperatures and salinisation.	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.

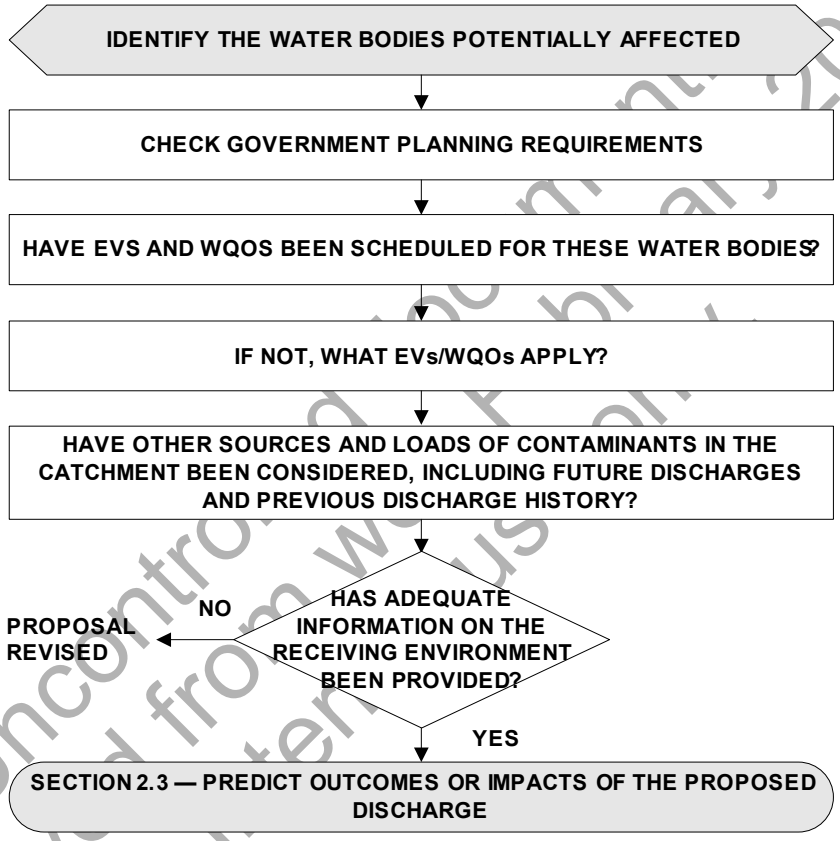
Pre-design conferencing is offered by the EPA to all prospective applicants seeking direction and advice on development applications; including on the preparation of development applications and the necessary documentation to ensure that lodged applications are supported by the requisite information 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

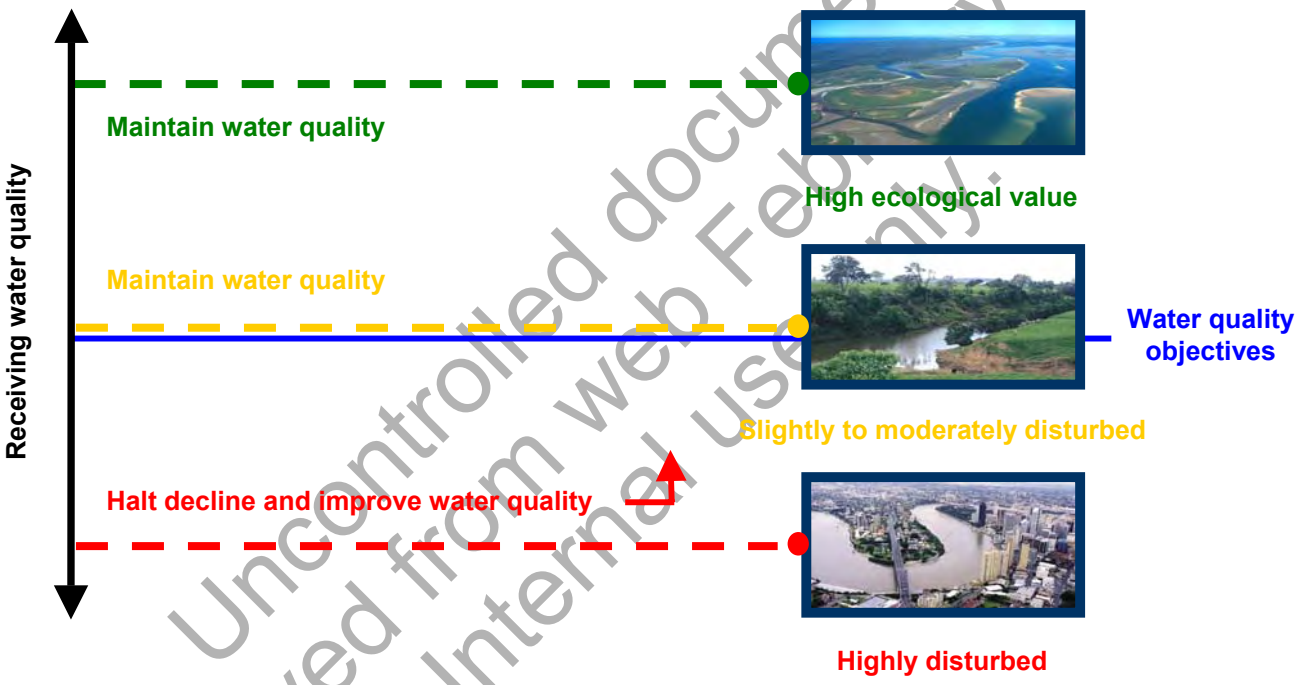


2.2.1 Identify the water bodies potentially affected by the proposed discharge

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 (DRNW), 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
Aquatic ecosystems EVs The level of aquatic ecosystems protection that the WQOs are intended to protect includes: • High ecological value ecosystems • Slightly to moderately ecosystems • Highly disturbed ecosystems	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.
Human use EVs include:	
• Recreation and aesthetics	Primary contact recreation (e.g. swimming). Secondary contact recreation (e.g. boating). Visual recreation (e.g. natural landscape).
• Drinking water	Water sources used for drinking water.
• Primary industries	Irrigation, general agricultural use and stock watering. Stock watering. Human consumption of aquatic foods (fish, crustacean and mollusks) — commercial and recreational sources. Aquaculture.
• Industrial	Generic processes (heating and cooling). Specific industries (textile, chemical, paper and pulp). Power generation (hydro-electric).
• Cultural and spiritual	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.

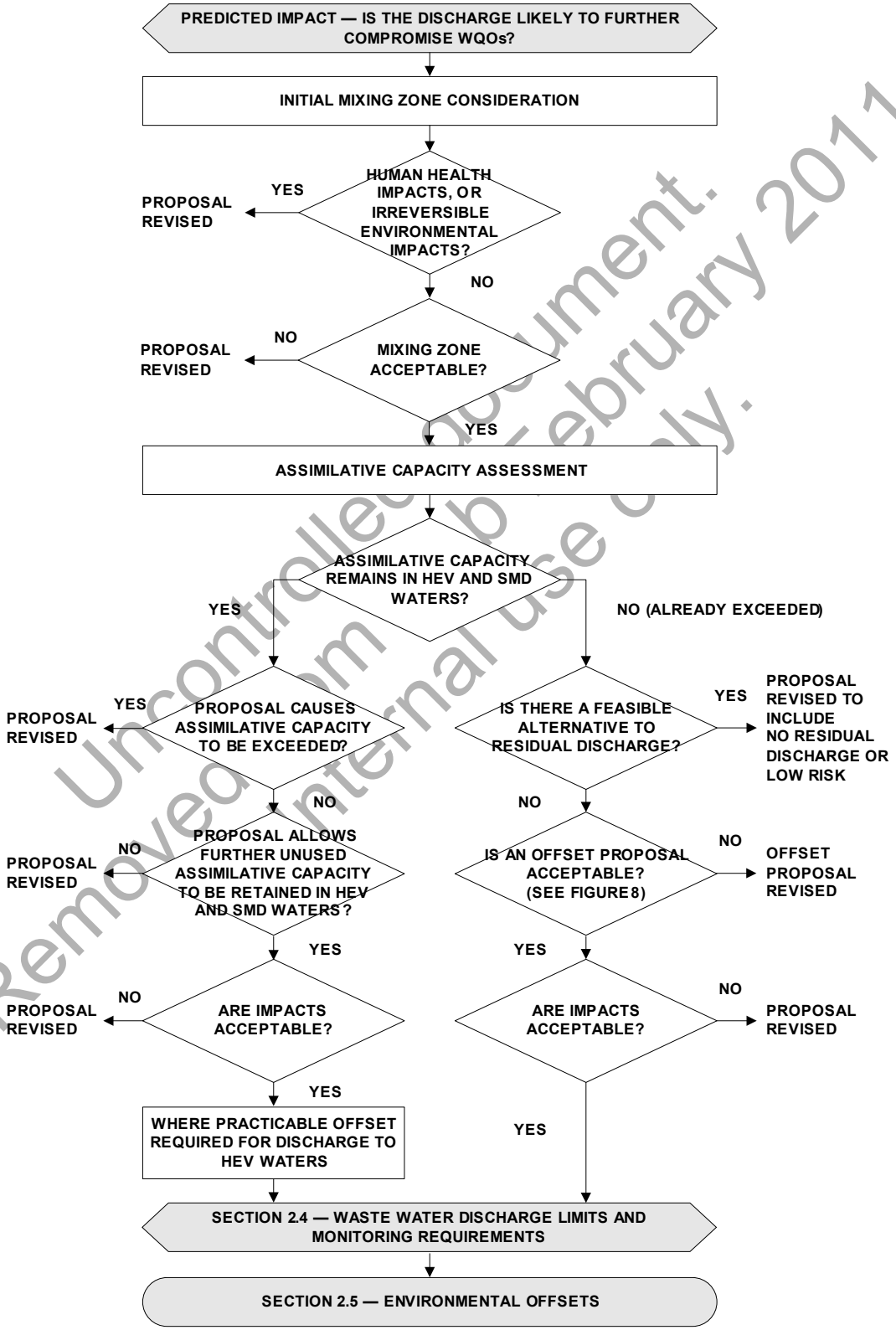
If not demonstrated, the application should be revised following an information request.

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.

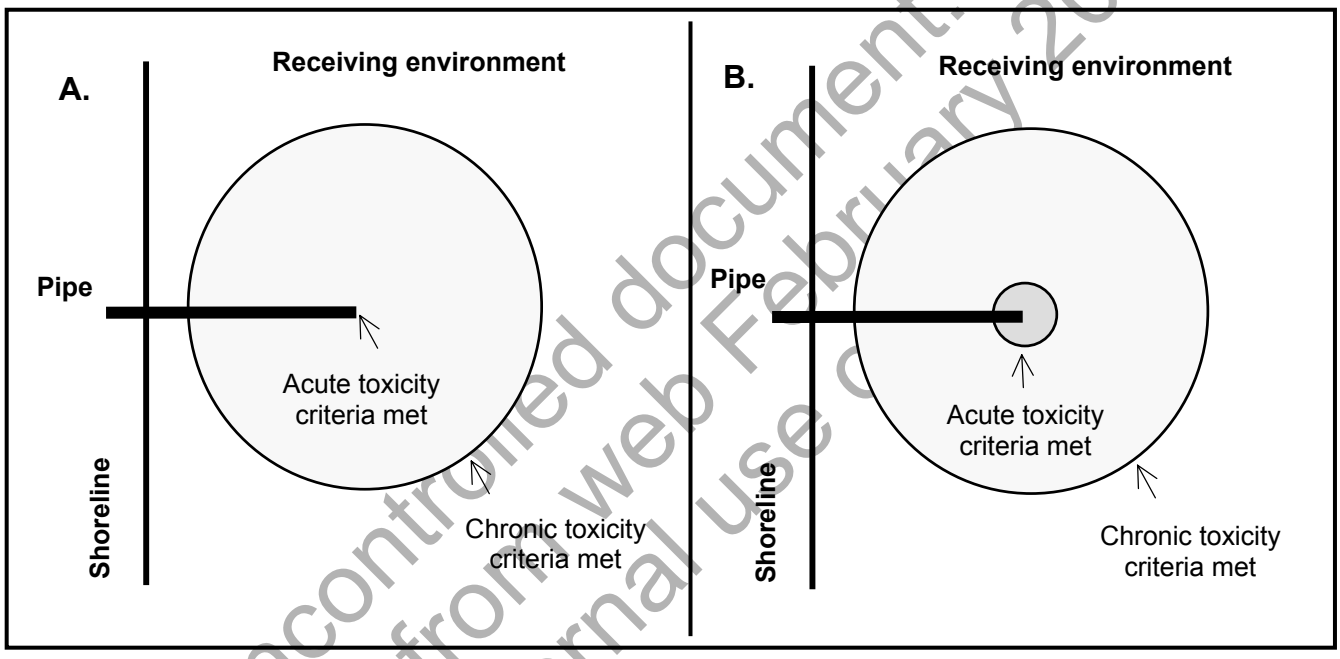


Figure 6 — Spatially defining an initial mixing zone.

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 adsorbed 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.

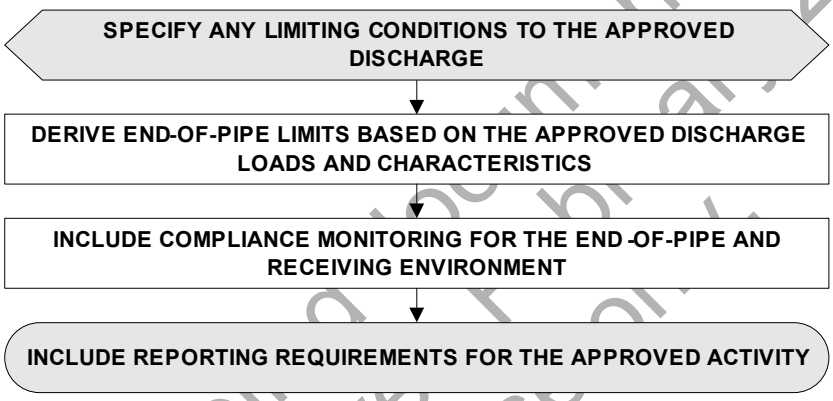
Pre-design conferencing is encouraged to address the prediction of impacts of the discharge on receiving waters, mixing zone and assimilative capacity requirements.

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

Contaminant type	Limit type/s	Guidance for limits
Toxicants	Maximum No observed effect level (NOEL)	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 Maximum Mass loads	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	Maximum	Use levels achievable by BPEM (e.g. 50 mg/L)
Salinity	Maximum	Maximum to prevent local impacts.
Pathogenic indicators	Maximum Median 4 out of 5	Limits based on 2005 National Health and Medical Research Council (NHMRC) Water Guidelines (e.g. for faecal coliforms, *Enterococcus spp.* and pathogenic protozoa).

Contaminant type	Limit type/s	Guidance for limits
Temperature	Maximum Minimum	Maximum temperature elevation based on receiving waters.
Residual disinfectant	Maximum Minimum	Maximum based on likely decay time and effects on biota.
Dissolved oxygen concentration	Minimum	Best practice environmental management.
Oxygen demand and suspended solids	Mass loads 80th percentile Maximum	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:

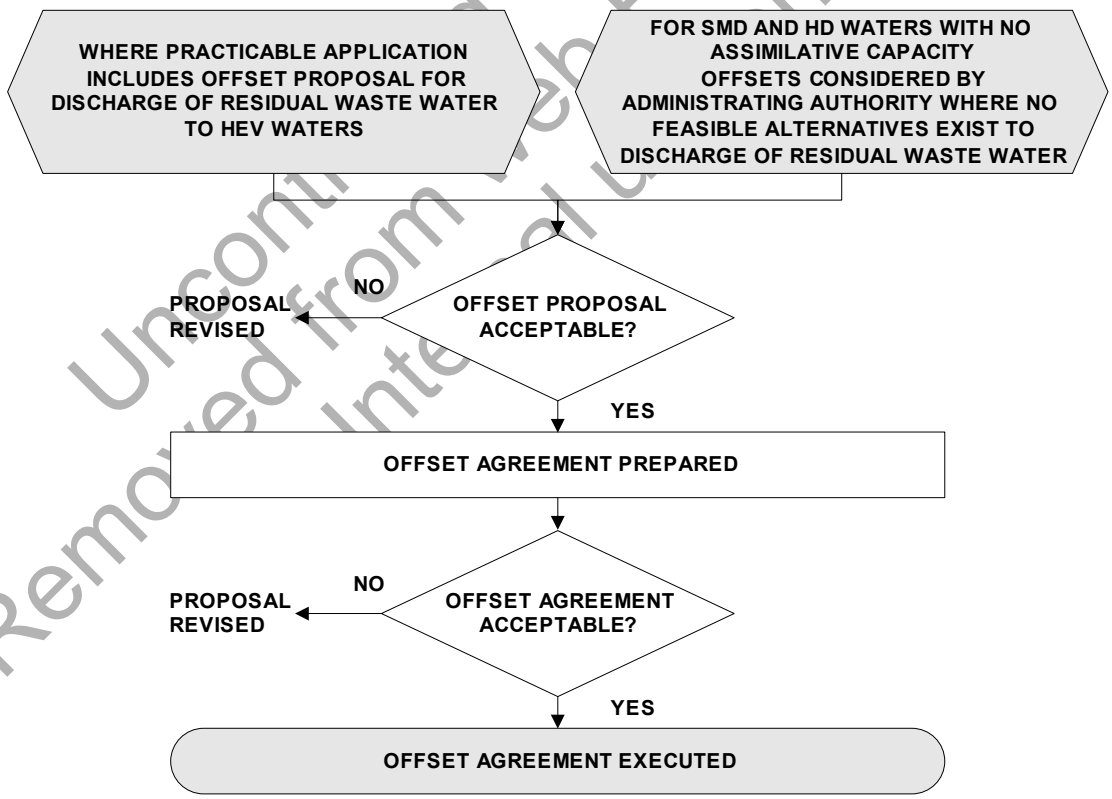
- HEV waters, where practicable the application includes a like kind environmental offset proposal - counterbalancing the discharge of residual waste water (the discharge) from the proposed ERA[15]; and
- SMD and HD waters with no assimilative capacity, environmental offsets (offsets) may be considered 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 EPP 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
Aquatic ecosystem	EPA website for the Queensl and Water Quality Guidelines and physical-chemical reference data. National water targets online for nutrients, turbidity and salinity. National Wa ter Qu ality Manag ement Strategy web site fo r biological, toxicant and sediment gui delines. Fact she ets on biological indicators and groundwater are at the above site.
Recreation and aesthetics	National Water Quality Management Strategy website. National water targets online for nutrients, turbidity and salinity. World Health Organisation Guidelines.
Drinking water	Australian Drinking Water Guidelines (NHMRC 2004).
Primary industries	National Water Quality Management Strategy website.
Industrial	National Water Quality Management Strategy website.
Cultural and spiritual	EIS asse ssments a nd other site specifi c information whe re 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 waste water 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 8 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 SDPWO 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 3.2.2.1 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 EPA.EV@epa.qld.gov.au

Disclaimer

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,

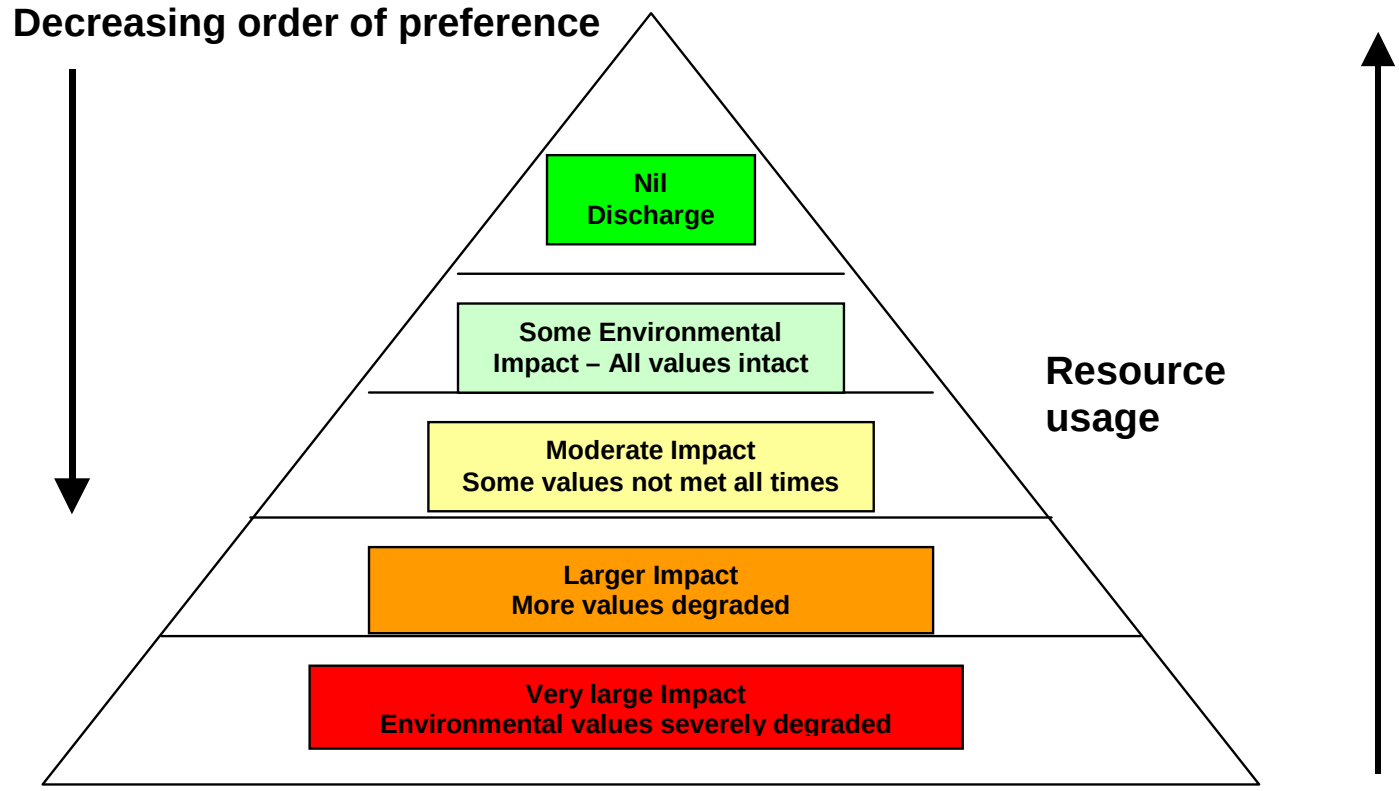


Figure 1. Decision preference hierarchy

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.

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 [redacted] or by telephone [redacted].

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.

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;

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

  - 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.

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:

- If the median value of the sample or test data falls within the water quality objectives (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), the water quality objectives are met and the waters are ecologically healthy; 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
- If both the median value of the sample or test data *and* 20th or 80th percentile values fall outside the water quality objectives (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), the water quality objectives are not met and the waters are moderately/heavily impacted (HD waters).

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

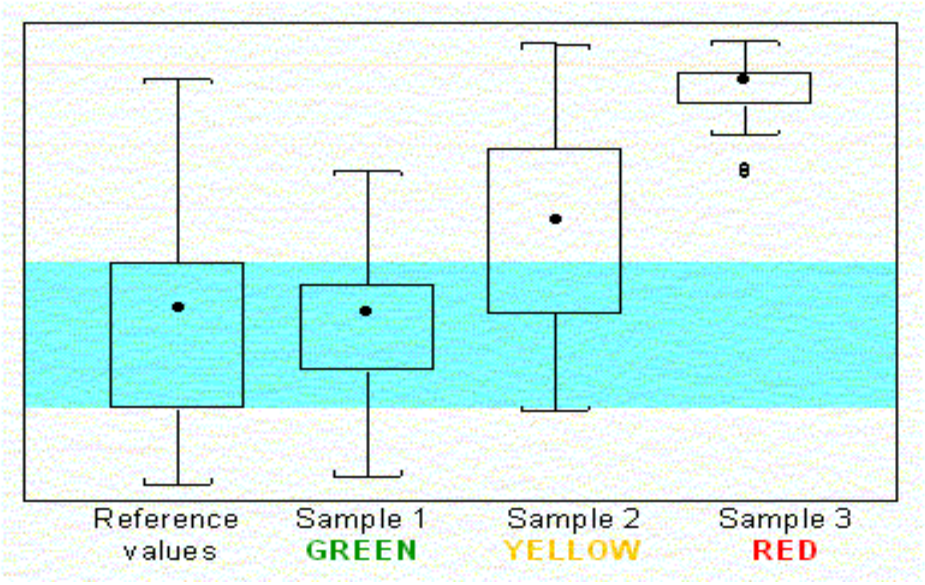


Figure 2. Box plot presentation of sample or test data against WQOs

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	Green
			Yellow
	More sample/test sites yellow than green?	Yes	Yellow
	Any sample/test sites red?	Yes	Red
			Red

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.

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.)

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

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 waster 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 (GREEN, YELLOW and RED 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 sightly/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 HEV waters 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 GREEN ZONE assessment - proposed discharge of waste water to SMD waters with assimilative capacity (WQOs met prior to and post the discharge):

- 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 RED ZONE 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.

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

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) $= \dfrac{\text{Load (kg day}^{-1})}{K_T\ (\text{day}^{-1})}$ (Note from above, K_T (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 (∆TN)

∆TN 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 (∆TN)

∆TN 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.

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.

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/traenvrn.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.

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

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.**	***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***.
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 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.

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

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 ($NO3^-$), nitrite ($NO2^-$), ammonia (NH3) and ammonium ($NH4^+$). 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 (NO3 and $NH4^+$) 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.

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

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/.

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

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.

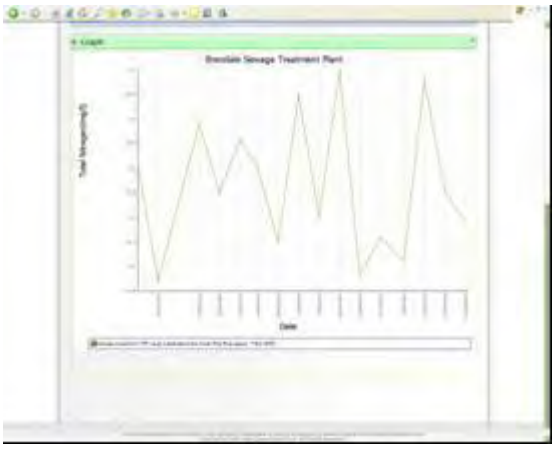
Further information can be obtained by emailing water.data@epa.qld.gov.au or from http://www.epa.qld.gov.au/environmental_management/water/water_quality_monitoring

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.



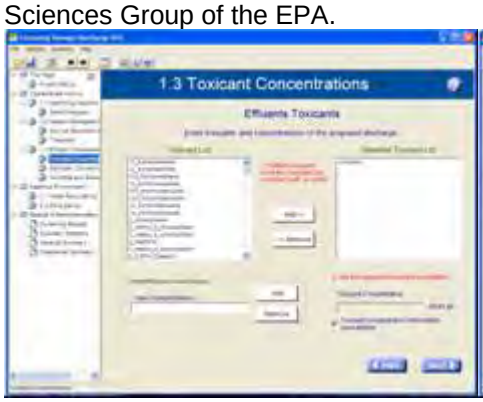
Point source data is available to EPA staff, other organisations and the community on request from water.data@epa.qld.gov.au. Information on the database is available to the public from http://www.epa.qld.gov.au/environmental_management/water/water_quality_monitoring/reporting_of_licensed_discharges_to_waterways/.
For further information, email psd.help@epa.qld.gov.au or contact the Freshwater & Marine Sciences Group of the EPA.

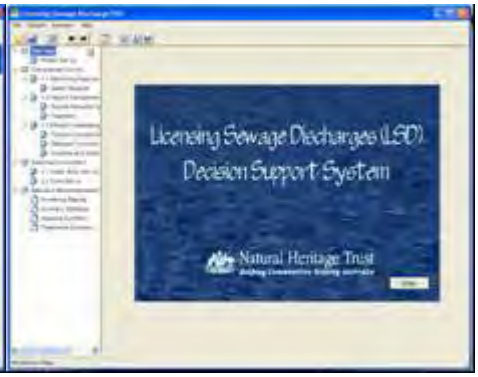
Licensing Sewage Discharges Decision Support System (LSD DSS)

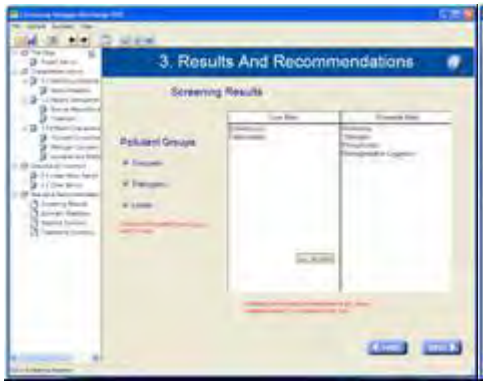
The Licensing Sewage Discharges Decision Support System (LSD DSS) is a support tool for the assessment of the aquatic aspects of proposed discharges from sewage treatment plants. It has been designed to be used by licensing officers in the early stages of screening a licensed application. There is an 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.







Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

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

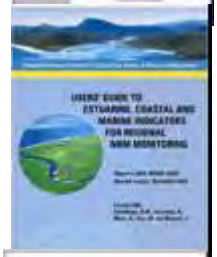
OzCoasts/OzEstuaries Website

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



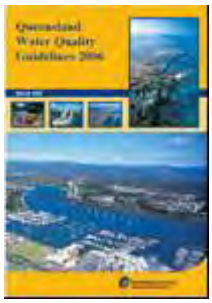
The Coastal CRC's User's Guide to Estuarine, Coastal and Marine Indicators for Regional NRM Monitoring, Coastal Zone CRC. These guidelines were designed to assist regional natural resource managers choose indicators when dealing with estuarine and marine environment. It provides substantial information 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/

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: (3896 9250) or fax (38969277)
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

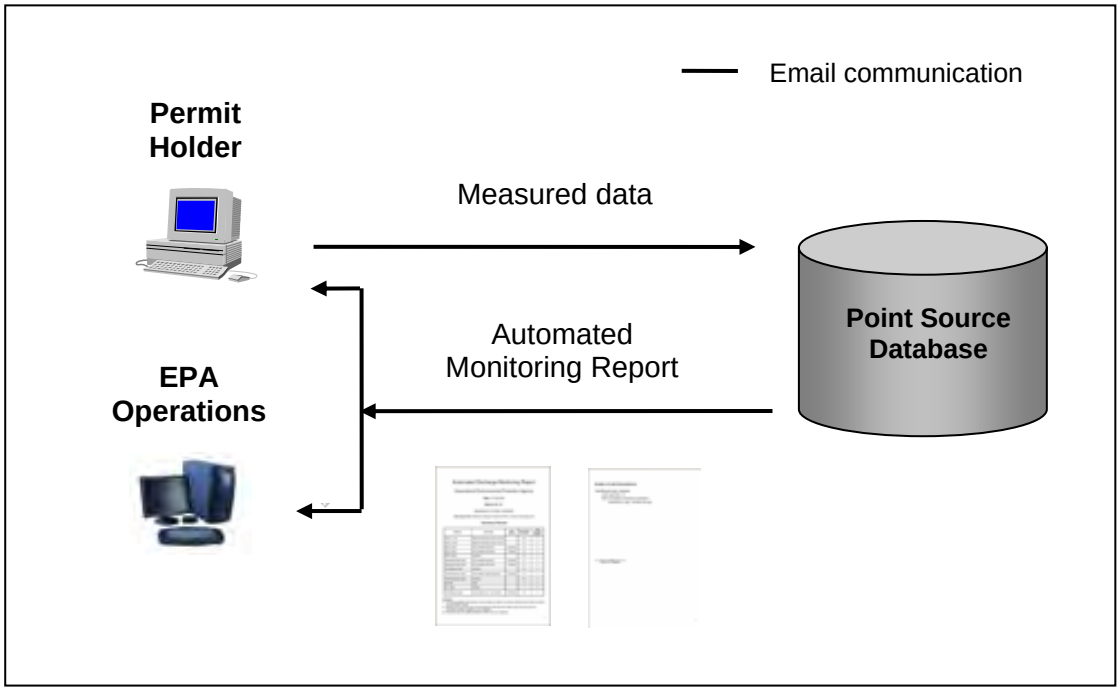
The Point Source Database (PSD) was designed and developed by the EPA to hold monitoring data for discharges to water required under EPA development permits for environmentally relevant activities (ERA's). It allows electronic submission of data and undertakes automated checks of the data against compliance 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

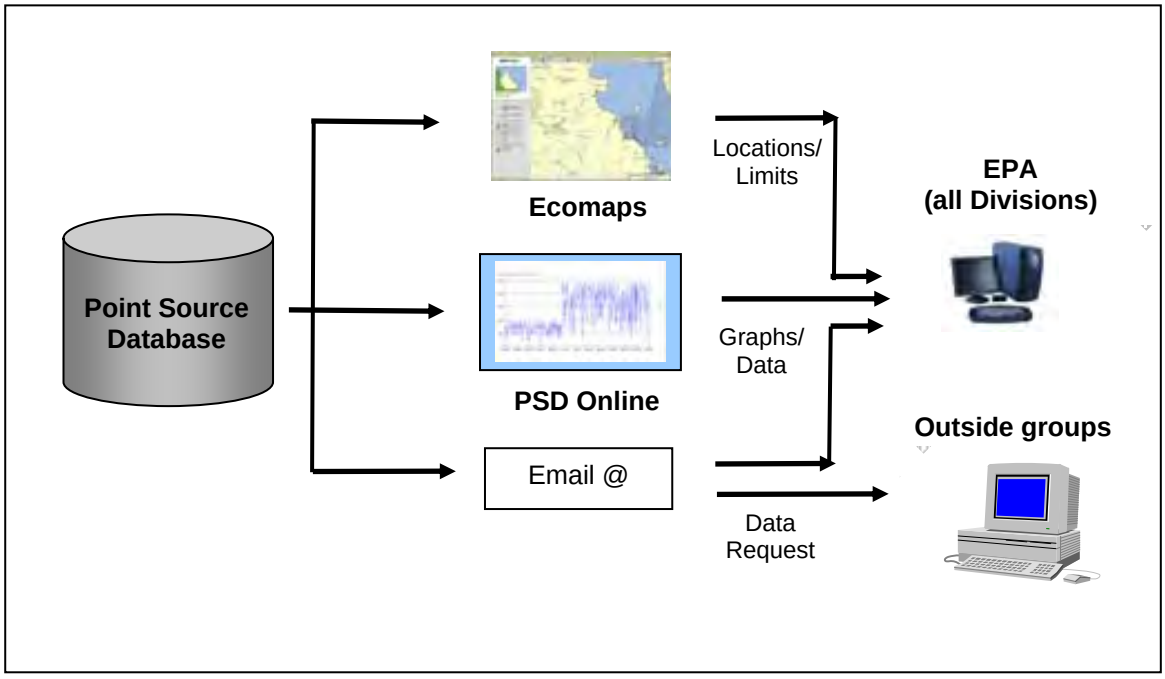


Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

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 completed templates 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.

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 on [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*

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.

1

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

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.

2

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

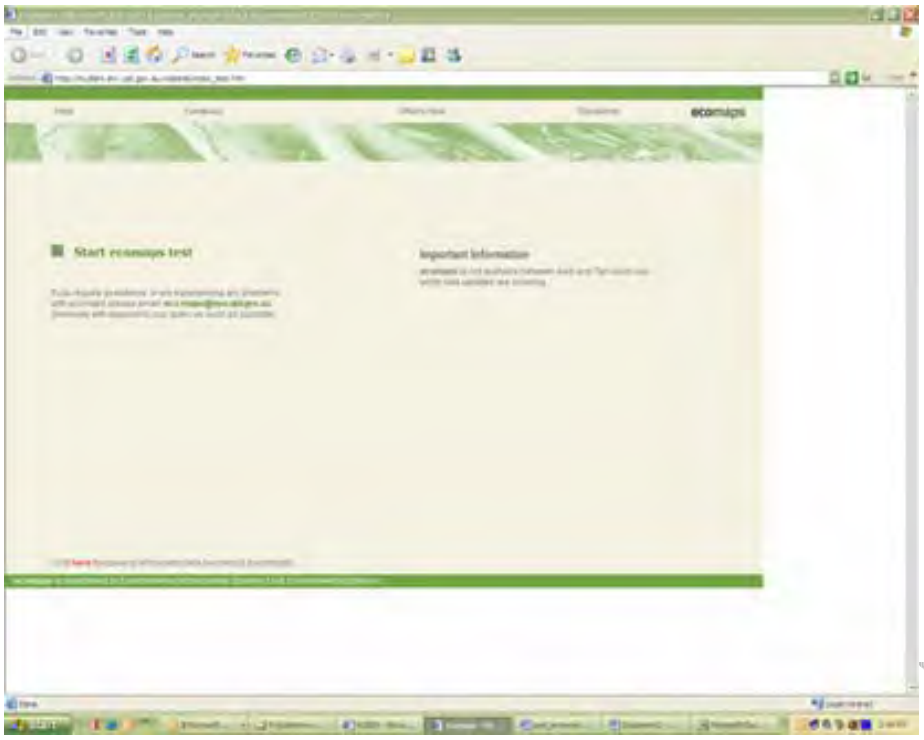
Although all care has been taken with the compilation of the data, please note that the information presented in this layer may contain errors or not be up-to-date. In terms of permit limits, Environmental Management Plans or other statutory mechanisms may be in place that are not recorded on these layers. 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

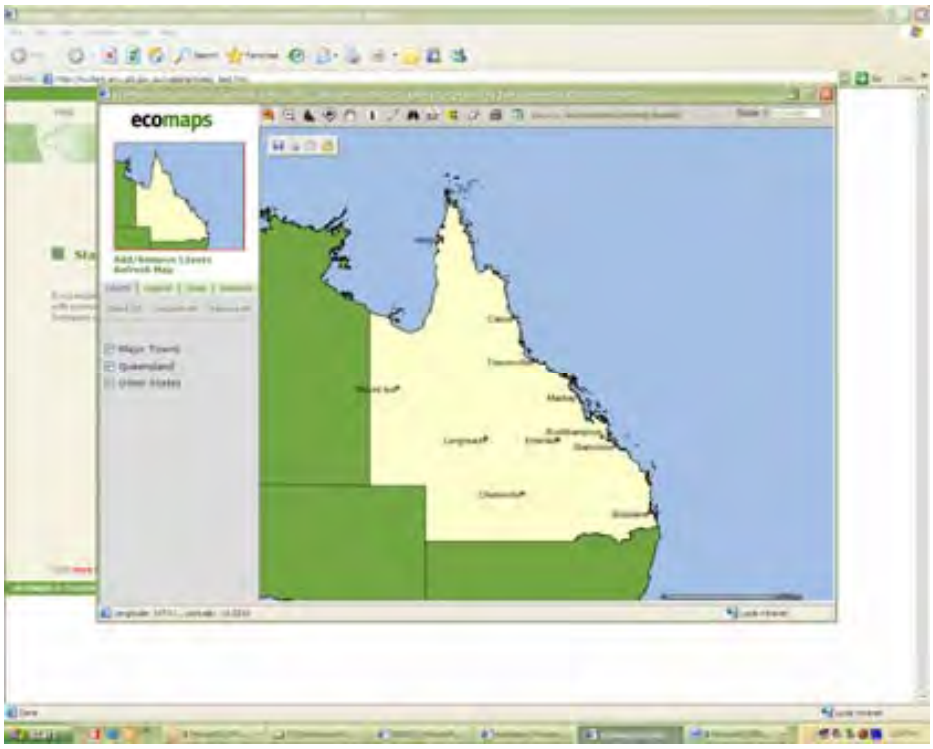
Step 1 – Start Ecomaps using the link and click on Start “ecomaps test”

http://mudlark.env.qld.gov.au/website/index.htm

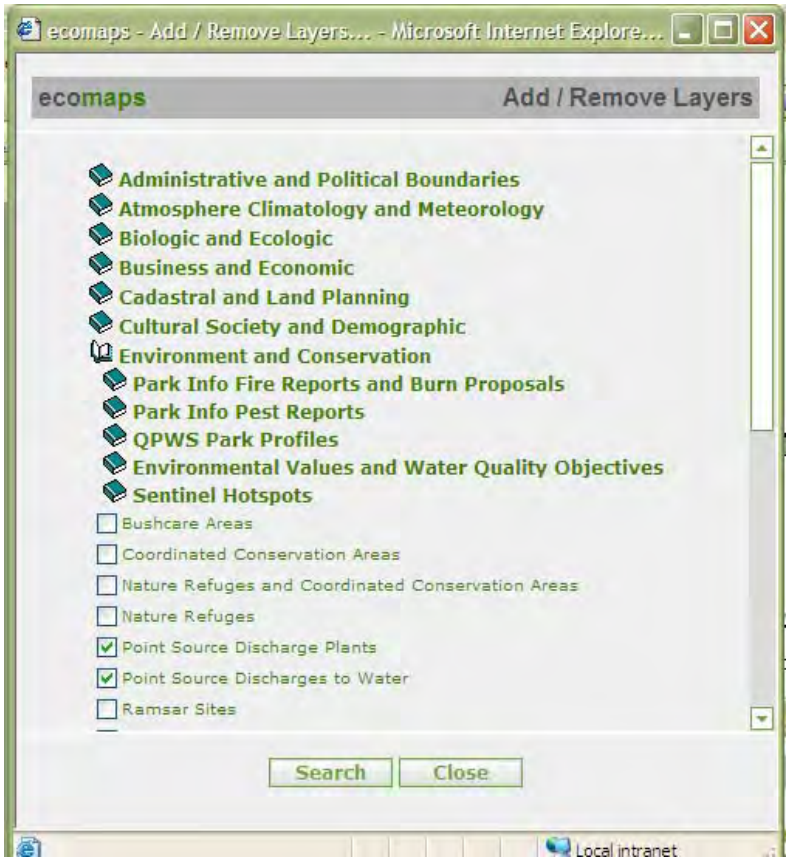


Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

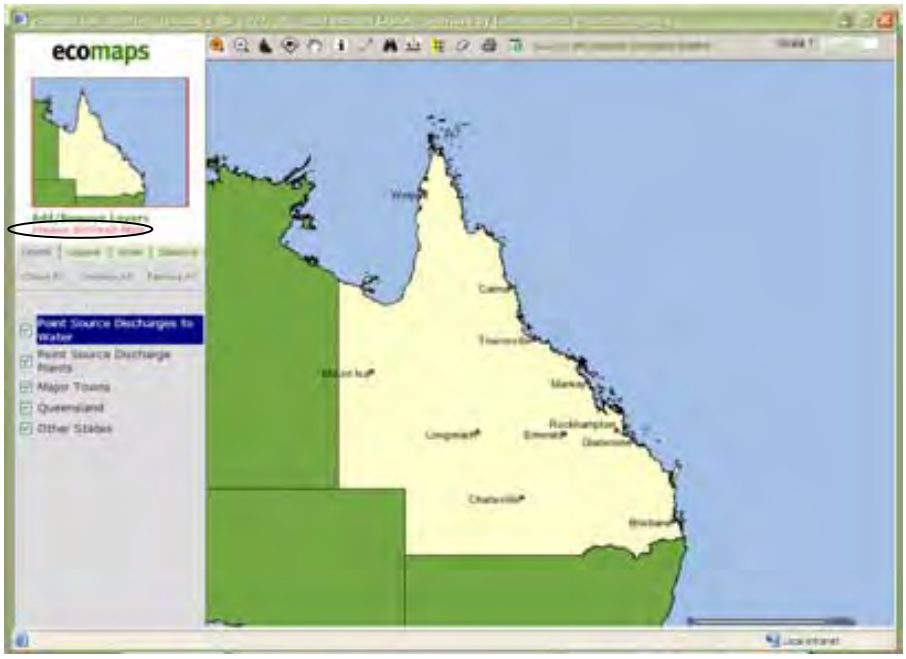
Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service



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



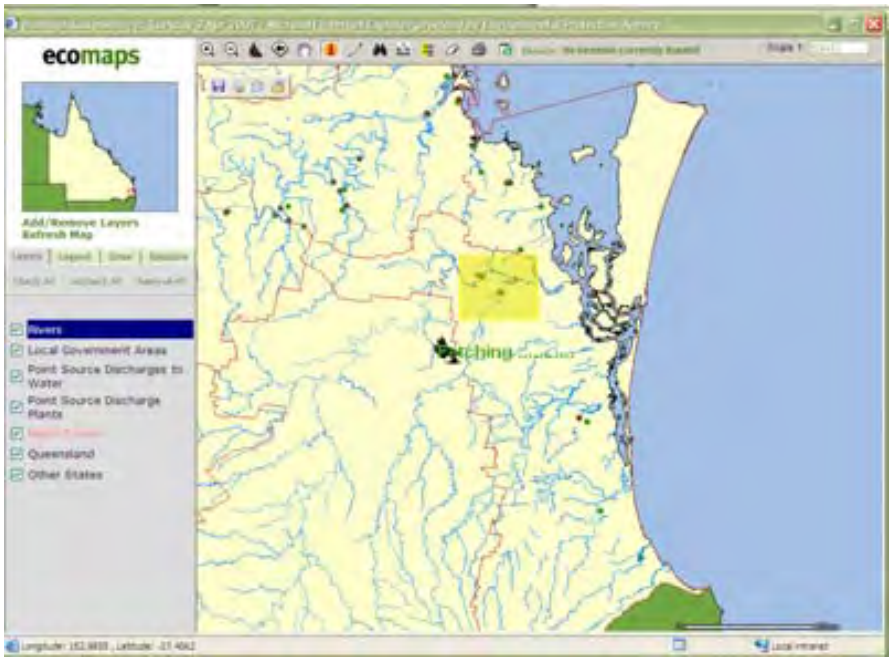
Step 3 – Check both boxes on the main screen and then Refresh Map



Step 4 – Add any other layers you want such as local government boundaries, rivers etc. and then Refresh Map

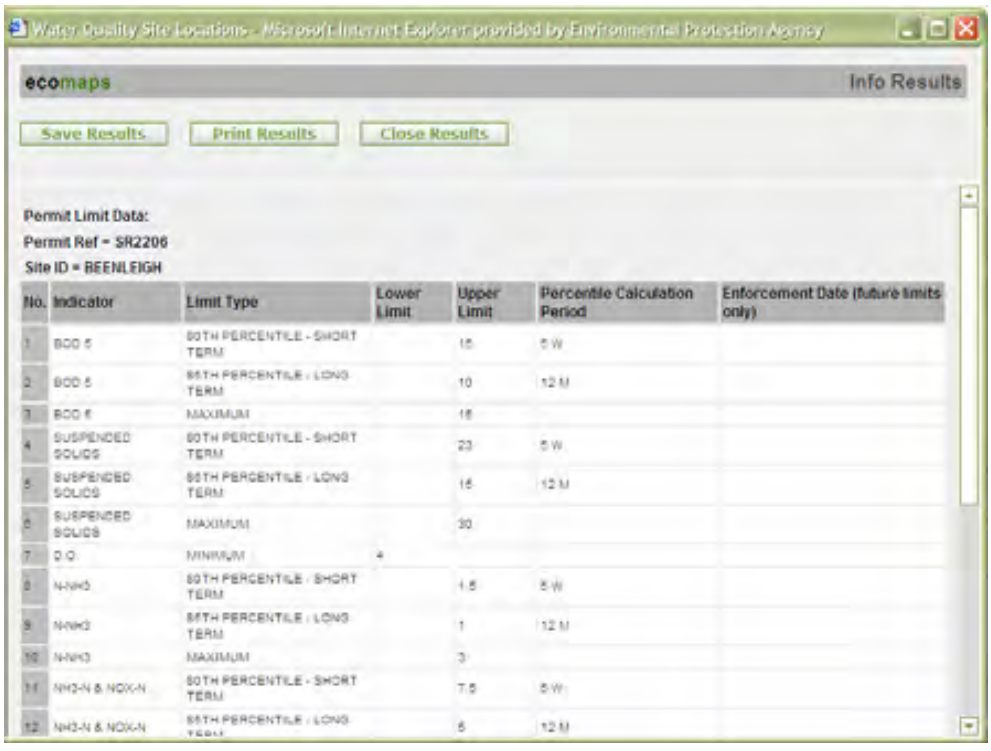
Step 5 – Zoom into some area of choice using the magnifying glass symbol

Step 6 – Click on i symbol and then choose Rectangle Select and select an area



Scroll down till you see the point source information:

Step 7 – Click on View Permit Limit Data for your Plant/Discharge of choice:



Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

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 Trigge r Val ues* (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/gfmwq-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.

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

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	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

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

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[C]	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[C]	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

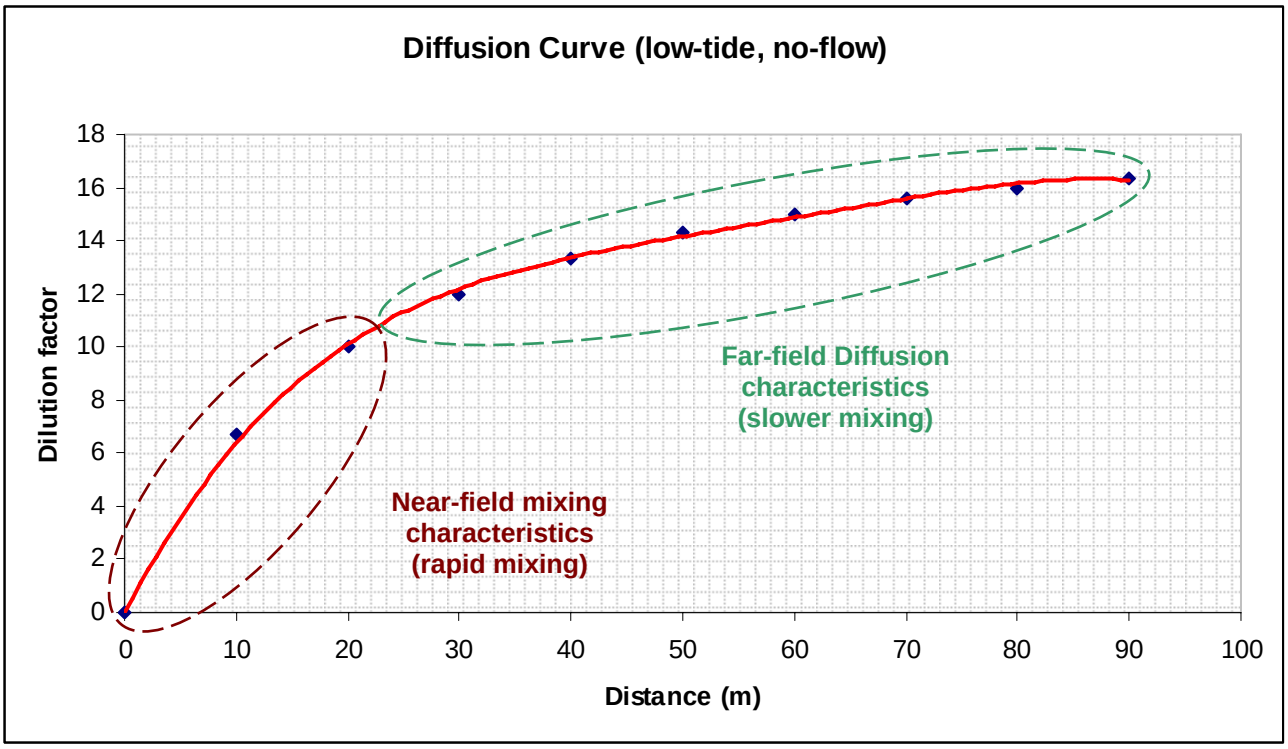


Figure 1. Example Diffusion Curve and related mixing characteristics

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.

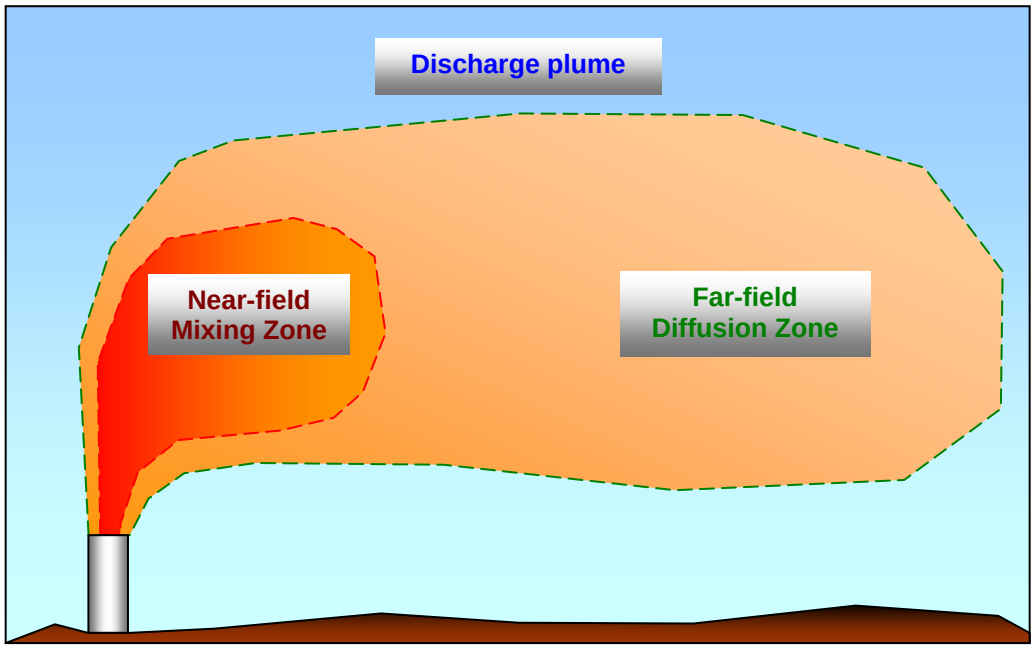


Figure 2. Representative diagram of a Near-field Mixing Zone and Far-field Diffusion.

Toxicity zone mapping can be performed by correlating the diffusion curve with the measured or estimated toxicant concentrations in the discharged effluent, or alternatively, DTA results. This approach can be taken in regards to identifying acute and chronic toxicity zones within the plume; see below (Section 00).

Acute Toxicity and Chronic Toxicity Mixing Zone

In regards to toxicity assessment, the typical mixing zone of an effluent discharge may posses up to two distinct areas relating to toxicity; the:

- acute toxicity zone, and
- chronic toxicity zone.

The ideal situation is where there is neither an acute nor a chronic toxicity zone however this is rarely the case. More typically, there will either be Chronic Toxicity Zone within the plume (Figure 3 A), or both an Acute and a Chronic Toxicity Zone within the plume (Figure 3 B).

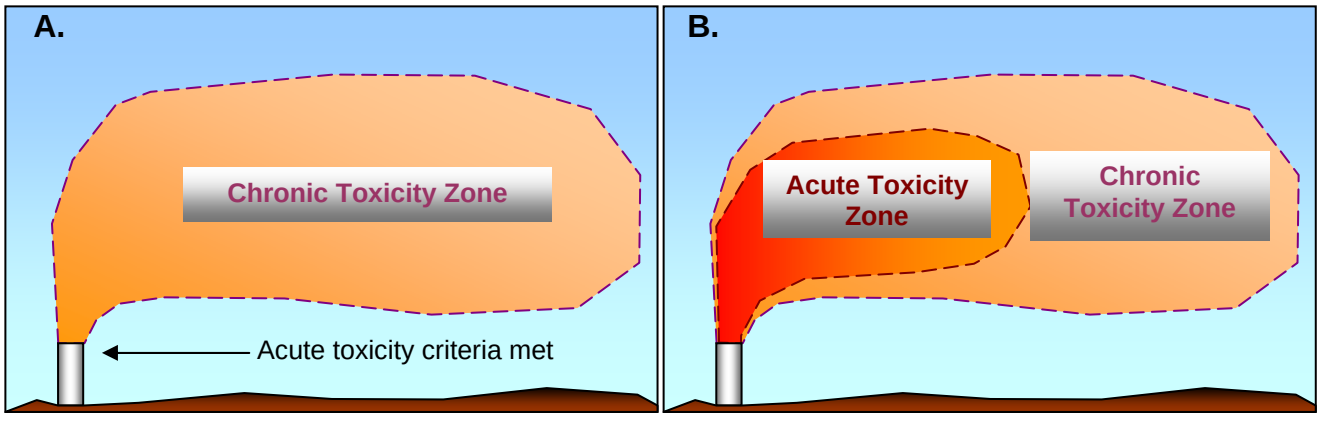


Figure 3. Acute and Chronic Toxicity Zones in a Mixing Zone

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 Krassoi, 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:

- 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

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	Laboratory	96 hours acute	Juvenile survival	WE, chemicals, sediment, leachates, groundwater*	Marine	USEPA OPPTS 850.1020
Hyale crassicornis						
Melita spp.						
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

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

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

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, nemoticide, 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: CRC-WQT (2007)

1 Detected in STP and AWTP effluent {{57 Watkinson, A.J. 2007;}}

2 Detected in AWTP product water {{57 Watkinson, A.J. 2007;}}

Statewide Mine Activities: Flood-related Issues

Update #53 as at 1pm 28 July 2011

Contact: Andrew Brier, General Manager, Coal and CSG Operations
Ph: [redacted]

Known flood and wet season related incidents relating to mines

Site	Company	Nature of Breach	Date of Breach	Compliance/Investigation Activity
Condamine Catchment				
1. Commodore Coal Mine	Millmerran Power Partners	Total suspended solids. To Back Creek.	26/12/10 - 14/1/11	DERM provided comments on the draft TEP for release of water to Back Ck above suspended solids limit and to improve water management on site. Final draft TEP was approved on 5 May 2011. Site currently in compliance with TEP conditions.
2. Peabody Wilkie Creek	Peabody Pty Ltd	Inundation of non-active mining pits, voluntary releasing to Wilkie Creek. Mine affected water actively released to Wilkie Creek above TSS limits.	28/12/11 - 19/1/11 19/1/11 - 31/1/11 16/5/11	Draft TEP has been submitted for approval for release to adjacent farm dams and to Wilkie Creek above release limits. Notice requiring additional info has been sent. Response to information request was received on 11 April. This has been reviewed and TEP approved on 29 April. Warning notice issued 3/6/11 for non-compliance with reporting requirements of TEP. Site now in compliance with TEP conditions. Releases to Wilkie Creek in June resulted in exceedance of suspended solids EA limit (background + 10%) and failed to comply with daily monitoring requirements during the release. DERM is investigating the non-compliances with a view to issuing a PIN.
3. Cameby Downs	Syntech Resources	Overtopping of dirty water dams (1 & 2), Breach of sedimentation dam.	26/12/10 - 14/1/11	Warning Notice sent by DERM on 20 April regarding releases to waters above TDS limit during and after flood events in early 2011.
4. Kogan Creek	Aberdare Collieries Pty Ltd	Water storage facilities at capacity and impacting on supply to power station. Ash dam (IADA) is above MRL and unauthorised discharge is imminent.	31/12/10 - 4/1/11	Release was avoided and well below MRL.
5. New Acland	New Acland Coal Pty Ltd	Recent monitoring indicates release occurred above EA limits	Between 26/12/10 - 4/1/11 - continuing within EA conditions	Warning letter be sent by DERM regarding releases to waters above TDS limit on 18/5/11.
Border Rivers Catchment				
6. Texas Silver	Alcyone Resources	Release in breach of EA conditions but releasing under TEP has ceased.	13/1/11- 2/2/11	
Fitzroy Catchment				

7. Blackwater	BMA Coal	1. Released water for three hours with a higher electrical conductivity than the limit set in its EA; 2. Released water for a short period when the flow in the receiving water had receded below the authorised limit. 3. Released water with higher electrical conductivity than the limit set in its EA.	30 Nov 10 19 Dec 10 19 Jan 11	Compliance and Investigation Unit has provided preliminary recommendations to Central West Region (CWR) for its approval. . Warning Letter sent 30 June 2011 in accordance with the Compliance & Investigation Unit's recommendations.
8. German Creek	Anglo Coal	Discharged from an unauthorised discharge point Four discharges with elevated electrical conductivity from an unauthorised discharge point. Discharge ceased 16/2/11, notification received 17/2/11.	1 Dec 10 2 Dec 10 16 Jan 11 22 Jan 11 11 Feb 11	CWR issued a warning letter on 15 December 2010 for the unauthorised release of water to German Creek on 1 – 2 December 2010. CWR issued a Warning Notice on 19 January 2011 for the unauthorised release of mine affected water from Grasstree Dam on 16 January 2011. CWR is investigating and considering issuing a PIN for the unauthorised releases of mine affected water from Grasstree Dam on 11 February 2011. CWR is in process of issuing a PIN for this unauthorised release. PIN is being issued for this release, documents have been reviewed waiting for final approvals. PIN issued 4 July 2011 – PIN Number – Q200000040003013. Final reports were received on 18 July (were due on 27 May 2011). Currently being assessed.
9. Oaky Creek	Xstrata	Discharged from an unauthorised discharge point	20 Nov 10 - 22 Nov 10 3 Dec 10 - 7 Dec 10 20 Dec 10 26 Dec 10 - 31 Dec 10 6 Jan 11 6 Mar 11 - 8 Mar 11 20 Mar 11 - 25 Mar 11 3 Apr 11	A warning letter was sent on 3 Dec 10 regarding earlier breaches. No action has been taken by the region for Dec 10 - Apr 11 breaches. A draft TEP was approved on 11 Apr 11 to allow releases from the eight locations not authorised under current EA. There have been no non-compliant releases under TEP.
10. Ensham	Ensham Resources	Released water with a higher electrical conductivity than the limit set in its EA	11 Dec 10	Warning letter issued on 4 July 2011.
11. Moorvale	Macarthur Coal	Released water with a higher pH levels than the limit set in its EA; and Released water with a higher electrical conductivity than the limit set in its EA	12 Dec 10 1 Jan 11 1 Apr 2011	Warning notice issued on 5 July 2011 for 12 December 2010 and 1 January 2011 and 1 April 2011 non-compliances. Compliance and Investigation Unit has provided preliminary recommendations to CWR for its approval of 1 April non-compliance.
12. Coppabella	Macarthur Coal	Released water for a short period when the flow in the receiving water had receded below the authorised limit	3 Dec 10	Warning notice issued on 5 July 2011.
13. Callide	Anglo Coal	Released water with a higher electrical conductivity than the limit set in its EA; and Released water when the flow in the receiving water	19 Dec 10 4 Jan 11	A DERM brief has been prepared. Penalty infringement notices and warning letters have been prepared for Dunn Creek Dam TEP, Lake

		had receded below the authorised limit. Release of mine affected waters from Lake Gasteen exceeded Callide's discharge limits during no flow conditions with EC levels ranging from 956 – 1085 uS/cm. DERM requested cessation of discharge on 05/04/11. Callide advised that pumping ceased but natural inflow and water backup prevented immediate cessation. Release of mine affected waters from Lake Gasteen exceeded Callide's discharge limits under TEP amendment (approved 25/03/11) during no flow conditions with EC level ranging from 1114 - 1264uS/cm. Release of mine affected waters from Oaky Creek exceeded Callide's discharge limits during no flow conditions with EC levels ranging from 1010 – 1064 uS/cm. Release of mine affected waters from Dunn Creek exceeded its dilution limits. As a result of rise in water level in Callide Dam, the receiving waters of Dunn Creek Dam are now part of ponded area of Callide Dam. As a result, dilution of Dunn Creek Dam discharge is prevented prior to entering the Callide Dam. DERM requested cessation of discharge on 05/04/11. Callide advised that pumping ceased but natural inflow and water backup prevented immediate cessation.	11/02/11 - 21/02/11 24/02/11 - 28/02/11 03/03/11 24/03/11 27/03/11 - 30/03/11 2/04/11 – 09/04/11 24/04/11 25/02/11 – 03/03/11 05/03/11 30/03/11, 18/04/11 28/02/11 – 11/04/11, 19/04/11 – 23/04/11	Gasteen Dam TEP, Oaky Creek Diversion Dam TEP and will be issued on 15 July 2011.
14. Cook	Cook Resource Mining	Released water with a higher electrical conductivity than the limit set in its EA	4 Dec 10 12 Dec 10	Compliance and Investigation Unit has provided preliminary recommendations to CWR for its approval. Enforcement recommendation from C&I to forward warning letter to mine. Letter was signed 27 June 2011 and will be sent 28 June 2011. Ecotrack to be updated once letter is sent.
15. Yarrabee	Yancoal	Released water outside of authority. The release was to land and not to a watercourse, and water quality was within approved parameters.	20 Dec 10	Project Manager has been in contact with the client regarding actions taken to remedy the non compliance. No further action likely to be taken by the department.
16. Moranbah North	Anglo	Released water for a short period when the flow in the receiving water had receded below the authorised limit.	1 Dec 10 23 Dec 10	CWR issued a warning notice on 28 January 2011 for failing to comply with the requirements of an emergency direction.
17. Dawson	Anglo	Released water with a higher electrical conductivity than the limit set in its EA. Discharged from an unauthorised discharge point	29 Dec 10 23 Jan 11	Compliance and Investigation Unit has referred this matter back to CWR without a recommendation as there was insufficient information provided to the Compliance and Investigation Unit to finalise a recommendation. A warning letter has been prepared and sent to the client on 4 July 2011.

18. Rolleston	Xstrata	Released water from a non-authorised discharge point.	30 Dec 10	No further action is likely to be taken by the department
19. South Walker Ck	BHP Mitsui	Released water when the flow in the receiving water had receded below the authorised limit	19 Jan 11	No compliance action proposed by ES-Mining considering nature of the release (high rainfall event, release over dam spillway, limited quantity of water released, water quality within EA limits for duration of the release) and actions of the EA holder (attempts to prevent and control the release, TEP submitted 10/1/11 requesting releases to Sandy Creek under low-flow events which was still being considered by the department when the non-compliant release occurred).
20. Kestral	Rio Tinto Coal	Released water outside of authority. The release was to land and not to a watercourse, and water quality was within approved parameters.	19 Jan 11	Compliance and Investigation Unit has provided preliminary recommendations to CWR for its approval. Warning letter to be sent by the project manager.
21. Baralaba	Cockatoo Coal	Released water with a lower pH than the limit set in its EA	23 Jan 11	Compliance and Investigation Unit has referred this matter back to CWR without a recommendation as there was insufficient information provided to the Compliance and Investigation Unit to finalise a recommendation. A warning letter has been prepared and sent to the client on 4 July 2011.
22. Poitrel	BHP Mitsui	Released water with a higher electrical conductivity than the limit set in its TEP	23 Jan 11	No compliance action proposed by ES Mining given downstream limits for EC were not triggered and Poitrel's cessation of the release upon realisation that EC limits were being breached and corrective actions taken to ensure compliance of all future releases.
23. Lake Vermont Coal	Bowen Basin Coal Pty Ltd	Released water with high EC from RP3 for 2 hrs. Notification received 17/2/11	16 Feb 11	Warning letter issued on 21 March 2011
24. Carborough Downs	Vale Australia	Potential breach of EA conditions for 18 hours with discharge of water slightly above EA condition of 1500 EC. The last sample taken the day before discharge ceased was 1505 EC.	22 Dec 10	Warning letter issued on 4 July 2011.
25. German Creek	Anglo Coal (German Creek) Pty Ltd	Released water for two days exceeding the end of pipe release limits contained within the Oak Park TEP. (MAN11523).	2 March - 3 March 2011	CWR is investigating and considering issuing a PIN for exceeding the authorised release limit of mine affected water. In process of completing investigation reports and issuing PIN. German Creek is also a month behind in providing a final assessment to the administering authority (was due 27 May). Final reports to be provided by 11 July 2011. PIN issued on 4 July 2011. Final reports were received on 18 July (were due on 27 May 2011). Currently being assessed. Further information was requested for this final report.

26. German Creek	Anglo Coal (German Creek) Pty Ltd	Released water exceeding the end of pipe release limits contained within the German Creek TEP (MAN11619).	18 March - 5 April 2011 7 April 2011	CWR is investigating and considering issuing a PIN for exceeding the authorised release limit of mine affected water. In process of completing investigation reports and issuing PIN. German Creek is also a month behind in providing a final assessment to the administering authority (was due 27 May). Final reports to be provided by 11 July 2011. PIN issued on 4 July 2011. Final reports were received on 18 July (were due on 27 May 2011). Currently being assessed.
27. Hail Creek Mine	Rio Tinto	Release of water exceeding the end of pipe limits for turbidity contained in the Hail Creek TEP (MAN11801)	17 May 2011	Warning notice issued on 5 July 2011.
28. Isaac Plains Coal Mine	Vale Australia (IP) P/L	Release of water not in compliance with TEP (MAN12479) water quality limits. EC was slightly above limits nominated for available flow rates in receiving water on two occasions.	10 April 2011 11 April 2011	Warning letter issued on 4 July 2011
Burdekin Catchment				
29. Newlands	Xstrata	Released water with a higher electrical conductivity than the limit set in its EA. Volume of water released exceeded the daily limit in the TEP	3 Dec 10 20 Jan 11	Compliance and Investigation Unit has provided partial recommendations to CWR for its approval. A warning letter has been prepared and sent to the client on 4 July 2011.
30. Sonoma	QCoal	Released water with a higher electrical conductivity than the limit set in its EA Released water with a higher electrical conductivity than the limit set in its EA. pH and EC levels exceeded TEP conditions at downstream location in Pelican Creek.	30 Nov 10 10 Jan 11 20 Jan 11	Warning notice issued for 30 November 2010, 10 January 2011 and 20 January 2011
31. Balcooma Mine (Mt Garnet)	Kagara Pty Ltd	Release of contaminated stormwater containing low pH and elevated levels of electrical conductivity	Intermittently over 2010/2011 wet season.	EPO issued 28 March 2011. Works required by the EPO have been undertaken. Reports on the works required by the EPO have been lodged by the client and are currently under review by the department.
32. Thalanga Copper Mine	Kagara Copper Pty Ltd	Exceedence water quality - elevated levels of pH, EC, sulphate, copper, cadmium and zinc.	Intermittently over 2010/2011 wet season.	TEP issued 18 February 2011 To date the client has met all TEP milestones.
33. Surveyor Mine (Mt Garnet)	Kargara Pty Ltd	Discharge of contaminated waters commenced 2 March. pH outside licence limits, elevated EC levels. Discharge has ceased	02/03/11 – 09/03/11	EPO issued 28 March 2011 Works required by the EPO have been undertaken. Reports on the works required by the EPO have been lodged and are currently under review by the department.
North West Mines				
34. Eloise Copper Mine	FMR Investments Pty Ltd	Release of contaminated stormwater containing elevated levels of sulphate	08/01/11 – 10/01/11	Environmental Evaluation issued 7 June 2011
35. Mt Oxide mine - Abandoned	DEEDI	Landowner has advised of visible blue precipitate re-occurring in a limited area downstream of the abandoned mine. Inspection being conducted today,	28 Jan 11	DEEDI has verbally advised DERM (North Region) that approximately $1-2M will be set aside for remedial works during 2011/12. Officers

		16 March.		from DERM and DEEDI met on 26 July to discuss recommendations on remedial works.
36. Century Mine	MMG Century Limited	Discharges from various sediments dams on site - elevated levels of electrical conductivity and certain metals.	Intermittently over 2010/2011 wet season.	The Compliance and Investigation Unit has commenced the department's formal investigation. Interviews conducted on 18 July. MMG has committed to providing a copy its report on the potential environmental impacts as a result of the discharges. MMG committed to submitting a voluntary TEP by 22 July for construction of a clean water diversion to ensure design storage allowance in the tailings dam can be met by 1 November 2011. This TEP has not been received.
37. Birla Mt Gordon Mine	Aditya Birla Group	Release from unauthorised release points of water with elevated levels of metals and low pH	10 March 2011	1. Breach of Court Order – The Compliance and Investigation Unit has commenced the department's formal investigation. Interviews conducted on 13 July. 2. Advice from Legal Services has been requested regarding the preparation of an Environmental Evaluation.
38. Mount Isa Mines	Xstrata Plc trading as Xstrata Mount Isa Mines Limited	Releases from the Black Star Waste Rock Dump and sediment dam at George Fisher mine. Water Quality unknown, department awaiting results from inspection on 23 March 2011. Discharges have ceased.	George Fisher Mine – 12-13 March 2011; Black Star mine – 15 March 2011	No enforcement action required.
39. Ernest Henry Mine	Ernest Henry Mining Pty Ltd	Releases from the Southern and Northern Sediments ponds have some minor receiving water triggers for EC, Copper and Zinc. Results show full compliance with EA contaminant limits.	Date samples collected on DERM 15 March 2011	No enforcement action required.
40. Kidston Mine	Kidston Gold Mines Ltd	Exceedence water quality - elevated levels of pH, EC, sulphate, copper, cadmium and zinc.	Breach notified on 31/3/02011	An EPO was issued on 24 June 2011. The company will submit a report detailing their proposed program of works to address the requirements of the EPO by 5 August.
Burnett River Catchment				
41. Mount Rawdon Mine	Newcrest Mining Ltd – Mt Rawdon	Dams below the waste rock dump and the tailings dam have been allowed to overflow rather than returning the water into the tailings storage facility (TSF) due to the TSF being above the MRL. This has resulted in stormwater having some metals slightly above EA limits.	Possibly 23 Dec 10: confirmed by samples taken 27 Dec 10 and subsequently.	Client submitted a Voluntary Draft TEP for assessment, which was approved on 18th February 2011. End date is 1st November 2011.
Mitchell River Catchment				
42. Wolfram Camp Mine	Wolfram Camp mining Pty ltd	Discharge from raw water dam. Discharge in excess of environmental authority limits with elevated levels of metals / metalloids and fluoride.	Intermittently over 2010/2011 wet season.	Environmental Evaluation issued on 28 March 2011 The company submitted an Environmental Report on 16 June and a review of the report has identified some areas of concern. The company lodged a voluntary TEP on 4 July to address some of the matters identified in the EE Report. The department is continuing to liaise with the company to address the outstanding

				concerns.
Mary River Catchment				
43. D'Aguilar Gold Mine	D'Aguilar Gold Pty Ltd	Release of water that has been in contact with contaminants. TSF water with low levels of metals.	Apparently after 10 January 2011.	Client submitted a Voluntary Draft TEP for assessment, which was approved on 11th March 2011. End date is 29th April 2011. The client has submitted the final report in relation to the TEP, which will be duly assessed to ensure compliance.

Applications Recently Received

Poitrel (BHP Mitsui) New TEP received 14 June 2011. TEP replaces previously approved TEO (release under the previous TEP ceased on 13 May 2011 and a final report has been submitted) and requests release of mine affected water outside of current environmental authority conditions, specifically electrical conductivity up to 3500 uS/cm to New Chum Creek with no minimum flow requirement but minimum flow of $10m^3$/sec in the Isaac River. BMC resubmitted this TEP to the department on 25 July 2011, including information requested to support a works program.

Wet Season Mine-water Management
TEP Status

SUMMARY

A total of 100 TEPs have been approved or have had amendments approved since 1 December 2010
A further 1 has been received and is currently undergoing assessment

TEP SUMMARY	Central West	South West	South East	North	TOTALS
New TEP Approvals	53	4	3	1	**61**
Approved amendments to existing TEPs	39				**39**
TEPs under assessment	1				**1**
TEPs refused	16	1			**17**
TEPs likely to be received in near future					

Mine	Company	Received Date / PN submitted	Approval action	Expiry Date	Authorisation outside EA Conditions	Comments
Condamine Catchment						
Kogan Creek Power Station	CS Energy	13-Jan-11	TEP **refused** 24-Jan-11 **R-1**		Potential discharge from ash dam to Kogan Creek. IADA is above MRL and just below spillway. Further rainfall will result in an unauthorised release from IADA	CS Energy lodged a TEP application to authorise a release from the IADA but it was refused by DERM. CS Energy held meeting with DERM on 27/1/11 to discuss refusal. CS Energy advised that it wishes to lodge another TEP to authorise release from the IADA. DERM issued letter to CS Energy 1/2/11 stating DERM would be reluctant to approve a short term TEP to authorise a release to allow the IADA to return to DSA
Kogan Creek Mine	CS Energy	06-Jan-11	11-Jan-11 **N-1**	29-Apr-11	Discharge of mine affected water outside TSS release limits. Mine continues to release mine affected water to Kogan Creek in accordance with TEP conditions (TSS up to 1000mg/L).	Approved 11/1/11. Mine operator notified DERM that release of mine affected water ceased on 10/2/11 as in situ monitoring indicated water quality is above release limits for TSS.Discharge has not recommenced. TEP is in force until 29 April. Report on TEP due by 27 May 2011 **Expired**
Peabody Wilkie Creek	Peabody Australia	18-Mar-11	29-Apr-11 **N-2**	31-May-12	1. Transfer water from A Pit and D Pit to adjacent landowners for irrigation. 2. Minimise the potential environmental impact from the discharge of water from A Pit and D Pit into Wilkie Creek, where discharge is necessary outside of current EA limits.	Approved 29 April: TEP authorises discharge to Wilkie Creek with increase of EC limit. Warning notice issued 3/6/11 for non-compliance with reporting requirements of TEP. Company now in compliance with TEP conditions.
Commodore Coal Mine	Millmerran Power Partners	01-May-11	05-May-11 **N-3**	30-Nov-13	Discharge of mine affected water outside TSS limits of EA. TEP is to upgrade current water management infrastructure.	Site discharging under TEP release limits.

Mine	Company	Received Date / PN submitted	Approval action	Expiry Date	Authorisation outside EA Conditions	Comments
Border Rivers Catchment						
Texas Silver	Alcoyne Resources	TEP submitted 17-Jan-11	24-Jan-11 **N-4**	30-Apr-11	Release in breach of EA conditions, which prevents discharge. Mine released mine-affected water to Dry Creek between 24/1/11 and 2/2/11. Release was in accordance with TEP conditions, which authorises release within ANZECC guidelines.	Mine advised on 4/2/11 that release of mine affected water had ceased on 2/2/11. Mine will advise DERM of any further releases. **Expired**
Fitzroy Catchment						
1. Rolleston	Xstrata	30-Sep-10	28-Oct-10 **N-5**		Increased pH and EC. Downstream monitoring at lease boundary	Rolleston submitted a Program Notice on 30 December 2010.
		18-Jan-11	01-Feb-11 (Amendment) **A-1**	29-Aug-11	Extension of TEP until 30/06/11. Reasonable quality discharge water	Amendment to existing TEP
		01-Feb-11	23-Feb-11 **N-6**	29-Aug-11	This TEP approves the discharge of water into Meteor Creek via Sandy Creek using a natural drainage depression used for discharging mine-affected water to Meteor Creek (via Sandy Creek), with contaminant release limits of 1500uS/cm, ph 6.5 – 9.0. The contaminant release limits in TEP are consistent with the current EA MIM800090802 for Rolleston.	
2. Ensham	Ensham Resources	07-Dec-10	10-Dec-10 **N-7**	Superseded	Additional discharge location, Increased EC and reduction of flow in receiving waters (Boggy Creek). Flow trigger on Nogoa River and Downstream monitoring at numerous locations in Nogoa River and Mackenzie River (including Bedford Weir)	
		05-Jan-11	05-Jan-11 (Amendment) **A-2**	Superseded	Amendment to TEP authorised additional increase in EC and release to Nogoa River. Monitoring required.	Amendment to existing TEP Allows for the release of approximately 15,000 megalitres at about 250 megalitres per day to the Nogoa River
		21-Jan-11	11-Feb-11 (Amendment) **A-3**	30-Jun-11	TEP amendment allows an increase EC limits, revised receiving water flow rate, and modified discharge locations. The revised TEP conditions require continued meeting of dilution (50:1) in the receiving water.	Amendment to existing TEP. **Expired**
3. Poitrel	BHP Mitsui	14-Dec-10	15-Dec-10 **N-8**	Superseded	Increased EC (to 1500uS/cm) and reduction of flow in receiving waters (New Chum Creek) Flow Trigger in Isaac River and downstream monitoring in Isaac River	
		10-Jan-11	19-Jan-11 (Amendment) **A-4**	Superseded	TEP approved release during periods of no flow into New Chum ck 4km from Isaacs River. Discharge waters up to 2500uS/cm.	Amendment to existing TEP
		02-Feb-11	11-Feb-11 (Amendment) **A-5**	30-Jun-11	TEP proposes to increase release limit for EC to 3500 uS/cm (up from currently allowed 2500 uS/cm).	Amendment to existing TEP **Expired**

		14-Jun-11	TBA **Ass-1**		TEP requests release of mine affected water outside of current environmental authority conditions, specifically electrical conductivity up to 3500 uS/cm to New Chum Creek with no minimum flow requirement but minimum flow of $10m^3$/sec in the Isaac River.	Amendment to existing TEP TEP is not considered critical to operations but has been submitted in response to predictions of a wetter than usual July/August. BMC resubmitted this TEP to the department on 25 July 2011, including information requested to support a works program.
4. South Walker	BHP Mitsui	16-Dec-10	18-Dec-10 **N-9**	Superseded	Increased pH and EC. Staged EC increase for set flow dilutions, Downstream Monitoring in Bee Creek	
		02-Jan-11	20-Jan-11 (Amendment) **A-6**	30-Jun-11	Discharge up to 2500uS/cm to Walker ck during low flow	Amendment to existing TEP **Expired**
		06-Jan-11	27-Jan-11 **N-10**	Superseded	Proposed elevation in EC (1000uS/cm) and no flow in Sandy Ck.	
		04-Feb-11	09-Feb-11 (Amendment) **A-7**	Superseded	The amended TEP allows for the release of water with elevated electrical conductivity up to 3500uS/cm to Walker Creek with an amended downstream EC trigger of 1000uS/cm in Bee Creek.	Amendment to existing TEP
		14-Feb-11	15-Feb-11 (Amendment) **A-8**	30-Jun-11	The amended TEP allows the downstream limit for electrical conductivity (EC) in Bee Creek be changed to 1000 uS/cm (up from 500 uS/cm) for releases to Sandy Creek. This is consistent with the amended TEP issued 9 February 2011 for releases to Walker Creek.	Amendment to existing TEP **Expired**
		06-Jun-11	08-Jun-11 (Amendment) **A-9**	31-Jan-12	Seeks to extend the end date the TEP MAN1579 remains in force to 30 December 2011, which is 6 months longer than currently allowed.	Amendment to existing TEP
		06-Jun-11	08-Jun-11 (Amendment) **A-10**	31-Jan-12	Seeks to extend the end date of TEP MAN11720 remains in force till 30 December 2011. TEP's are critical as access to active mining pits is still restricted due to rainfall events experienced over the 2010/2011 wet season.	Amendment to existing TEP
5. Isaac Plains	Vale	16-Dec-10	18-Dec-10 **N-11**	Superseded	Additional discharge location, Reduction of flow in receiving waters (Smokey Creek), flow trigger in Isaac River and Downstream monitoring in Isaac River	
		13-Jan-11	17-Jan-11 (Amendment) **A-11**	Superseded	Additional discharge location and no flow in Smokey Ck, Billies Gully and Isaac River. Downstream monitoring in Isaac River.	Amendment to existing TEP
		03-Mar-11	03-Mar-11 (Amendment) **A-12**	Superseded	Amendment to water quality (electrical conductivity and pH) limits and monitoring locations to facilitate dewatering of pit water as per original TEP. An increase of electrical conductivity release limits from 600EC to 720EC at end of pipe for release events under no-flow conditions in the Isaac River.	Amendment to existing TEP

					An increase of pH release limits from 9.0 to 9.3 at end of pipe for all release occurrences; Downstream (MP6) pH limits remain at 9.0, with the addition of a trigger to notify the administering authority at 8.5pH; Removal of water quality limits at the 'interim' monitoring location (MP4 - Smokey Creek), however monitoring & reporting for requirements for background analysis will still occur	
		17-Mar-11	18-Mar-11 (Amendment) **A-13**	30-Jun-11	TEP approves a staged increase of EC for end of pipe release limits. An increase in downstream EC during lower flow conditions from 500EC to 600EC. No change to downstream EC during higher flow periods. Water quality requirements have not changed for releases under no flow conditions (<0.1m3/sec)	Company has indicated that removal of the remaining 1500ML of water from site is critical to continued operations from main pit. IPCM have advised that the release of mine affected water ceased at all remaining discharge locations on 11 April 2011. Approximately 700ML of flood water remain on-site. Ability to dewater under the TEP ceased on 30 May 2011. TEP remains in-force until 30 June 2011. **Expired**
6. Cook	Cook Resource Mining	14-Dec-10	24-Dec-10 **N-12**	30-Jun-11	Increased EC and Turbidity, Downstream monitoring in Blackwater Creek	Cook has submitted TEP completion report, which is currently being reviewed by the department. **Expired**
		28-Jun-11	TEP **refused** on 26-Jul-11 **R-2**		TEP seeks approval to authorise discharges from Cook Colliery and Leichardt Washery at the end of pipe EC limit of 3500uS/cm with 500 EC at downstream Blackwater Creek.	TEP seeks to authorise release of mine affected water for extended period of time under conditions of previous TEP until planned infrastructure upgrades are completed to ensure compliance with EA. Application was refused on 26 July 2011 due to insufficient information being provided as part of the TEP.
7. Callide	Anglo Coal	17-Dec-10	24-Dec-10 **N-13**	30-Jun-11	TEP authorises discharge from Dunn Creek Dam with Increased EC, increased dilution to achieve downstream water quality, Downstream monitoring at Callide Creek	**Expired**
		1-Feb-11	TEP application withdrawn 4-Feb-11		TEP proposes to revise EC to 2000 during periods of high flow, revise EC to 2000 during periods of moderate flow (more that 20% of receiving flow) but limit discharge to 40ML per day, and revise EC to 950 during periods of no flow in the receiving waters.	
		08-Feb-11	11-Feb-11 **N-14**	Superseded	TEP authorises discharge of mine affected water from Lake Gasteen discharge location into Callide Creek at low or no flow conditions. EC limits vary depending on receiving water flow rates.	The TEP is not considered critical to mining operations.
		18-Feb-11	25-Feb-11 **N-15**	Superseded	The TEP allows Callide to discharge into Oaky Creek from NV8 (authorised discharge location). This TEP increases the EC concentration to 1800 (1400 uS/cm within EA) during discharge with flow in the receiving water and an EC concentration of 950 during discharge with no flow. The TEP will end on 15 June 2011	The TEP is not critical to operations TEP approved and issued to client on 25/02/11.

		08-Mar-11	TEP amendment **refused** on 31-Mar-11 **R-3**		Dunn Creek Dam TEP amendment requests higher EC limits on discharge and reduction of flow in receiving waters to 0 and lower dilution ratios.	Amendment to existing TEP TEP Refused on 31-Mar-2011
		08-Mar-11	25-Mar-11 (Amendment) **A-14**	29-Jul-11	Lake Gasteen TEP amendment requests higher EC limits on discharge during both flow and no flow conditions and lower dilution ratios.	Amendment to existing TEP Approved 25/03/11.
		11-Mar-11	31-Mar-11 (Amendment) **A-15**	29-Jul-11	Oaky Creek Diversion Dam TEP amendment requests higher EC limits on discharge during no flow conditions.	Amendment to existing TEP ERS comments received. Draft conditions for TEP amendment agreed to by Callide Mine on 30/03/11. Approved 31/03/11.
		03-May-11	TEP **refused** on 11-May-11 **R-4**		Dunn Creek Dam TEP amendment requests extension to reporting timeframe due to staffing and contractual constraints.	TEP refused on 11 May 2011
8. Moranbah North	Anglo Coal	20-Dec-10	24-Dec-10 **N-16**	Superseded	TEP Titled: Additional Discharge Location TEP. Additional discharge locations, Increased pH and EC. Flow trigger in Isaac River, staged release of high EC water at higher flows. Downstream monitoring in Isaac River	
		16-Dec-10	24-Dec-10 (Amendment) **A-16**	30-Jun-11	TEP Titled: Worked Water Management TEP Change in monitoring locations and flow requirements from the environmental dam as authorised under existing TEP	Amendment to existing TEP granted in August 2010 **Expired**
		22-Feb-11	22-Mar-11 (Amendment) **A-17**	24-Feb-12	The application was approved to remove the use of water spray misters.	Amendment to existing TEP.
9. Minerva	Yancoal Australia	20-Dec-10	24-Dec-10 **N-17**	Superseded	Increased EC and reduction of flow in receiving waters (Sandhurst Creek) Downstream monitoring, consideration of high background EC for downstream monitoring in Sandhurst Creek	
		17-Jan-11	10-Feb-11 (Amendment) **A-18**	Superseded	TEP authorises the release of water with conductivity of up to 2000uS/cm to Sandhurst Creek. The release requires a passing flow to be present in the receiving waters of the Nogoa River.	Amendment to existing TEP.
		22-Feb-11	23-Feb-11 (Amendment) **A-19**	30-Jun-11	This TEP amendment authorises the change in monitoring point MP3 from the Duck Ponds Station on the Nogoa River to the Comet Weir on the Comet River and to reduce their discharge rate to permit discharges where the flow in the Comet River falls below 5 cumecs but still maintaining a 33:1 dilution factor.	Amendment to existing TEP. **Expired**

10. Kestral	Rio Tinto Coal	23-Dec-10	24-Dec-10 **N-18**	30-Jun-11	Increased EC (to 3500uS/cm) and reduction in receiving water flow rate. Downstream monitoring in Crinum Creek with trigger of 600uS/cm	**Expired**
11. Carborough Downs	Vale Australia	23-Dec-10	24-Dec-10 **N-19**	30-Jun-11	Additional discharge locations and reduction of flow rate in receiving water (Various). Greater dilution of releases and downstream monitoring	**Expired**
12. Peak Downs	BMA	21-Dec-10	13-Jan-11 **N-20**	Superseded	Increased EC and reduction in receiving water flow rate. Downstream monitoring required to achieve 1000uS/cm in stream	
		04-Feb-11	01-Mar-11 (Amendment) **A-20**	30-Jun-11	TEP allows for additional discharge of mine affected water to Ripstone Creek during periods of Low/No flow in Ripstone Creek. Flow trigger of $5m^3/s$ in Isaac River for all no flow releases to Ripstone Creek. EC increased to 6000uS/cm maximum. from 1 release point only. Releases to Harrow, Cherwell and Boomerang creeks remain the same as in the TEP approved 13 Jan 2011.	Amendment to existing TEP. The TEP was re-issued on 1 Mar 2011 in order to fix some administrative and transcribing errors **Expired**
		08-Jun-11	10-Jun-11 (Amendment) **A-21**	30-Aug-11	TEP Allows Peak Downs Mine to continue to discharge mine affected water until 20 June 2011 to take advantage of anticipated high flows. No change to conditions.	Amendment to existing TEP. Due to ongoing issues with excess mine affected water in pits, it is expected that BMA will lodge new TEP applications for its sites to enable discharging to continue until November 2011. Conditions will be negotiated at pre-lodgement meetings prior to the submission of the new applications.
		16-Jun-11	14-Jul-11 **N-21**	30-Jan-12	The TEP application allows the extension of the period of time that mine water can be released providing flow and water quality conditions are met until 30 November 2011. The TEP application includes a works program for planned upgrades of the water management system. The department approved this TEP on 14 July 2011.	BMA has lodge TEP application for 6 sites to enable releases to continue until November 2011 due to ongoing issues with excess mine affected water in pits. DERM will hold discussions with BMA to ensure works are continuing to be undertaken to improve the water management system on each of the BMA sites before the applications are decided. TEP approved 14 July 2011.
13. German Creek	Anglo Coal	21-Dec-10	20-Jan-11 **N-22**	30-Jun-11	Increased EC and reduction in receiving water flow rate to German Ck through multi discharge points. Downstream monitoring required. Referred to as "German Creek" TEP	**Expired** Final report has been received late (18 July 2011 due on 27 May 2011) currently being assessed.
		13-Jan-11	14-Jan-11 **N-23**	30-Jun-11	Increased EC and reduction in receiving water flow rate. Downstream monitoring required. Referred to as "Oak Park" TEP	**Expired** Final report has been received late (18 July 2011 due on 27 May 2011) currently being assessed. Further information has been requested for this TEP final Report.
		01-Feb-11	TEP **refused** on 27-Jul-11 **R-5**		Referred to as "Grasstree" TEP TEP proposes to release water with EC of 14,000uS/cm. This is in case of an overflow situation as per previous unauthorised discharges into German Creek. Anglo also proposing to release water with 2500uS/cm from Pit R into Cattle Creek and then a	TEP is considered critical to mining operations as there is significant accumulation of water/flooding in the underground workings from infiltration of rainfall runoff from Pit R. Currently undergoing technical assessment by ERS. Initial comments indicate that the TEP is high risk and

					500 or upstream background electrical conductivity$_3$ + 10% at the downstream monitoring point at Oaky Creek. TEP also proposes no flow conditions for German Creek and >0.5m^3/s for Cattle Creek. It includes 7 MPs 1 upstream 2 at end of pipe/spillway and 4 at downstream monitoring points.	therefore needs further justification and information provided by the mine. Comments were provided to the mine on 2 Feb 2011, • There is no flow triggers for RP1 (14000uS/cm release) essentially releasing high EC into a no flow situations • -The flow limits for RP2 is located approx. 4.5km downstream from release point. • -Water storages have no current EC measurements • -Pits and Water storages have not been clearly identified • -More explanation on how the 14000uS/cm EC limit is going to be met when the Dam is at 17000uS/cm Further information requested from German Ck on 11/02/2011. The department contacted German Ck seeking its response on 16, 18 and 22 Feb 11. Should a response not be provided by 1 March 2011 the TEP may have to be refused, and Anglo Coal will be required to re-submit a new TEP. Phone call with German Creek on 24/02/11 following up with information request. Client hasn't had a chance to look at the TEP, and will submit the information prior to the due date of 1/03/11. Client resubmitted TEP 28/02/11. Comments received from ERS on 1/032011. TEP currently under assessment by CWR. Discussions were held with on site contact on 10/03/2011 where the department raised concerns with the current TEP and the proposed release. A meeting to be organised with Anglo German Creek. A site visit and meeting to discuss the Grasstree TEP proposal has been organised for 29 March 2011. Site visit of the Grasstree section of the German Creek Coal Mine undertaken on 29/03/11. The department discussed the TEP requirements and will provide the German Creek Coal Mine with further comments following the inspection. Mine was advised that the TEP will not be approved and it will need to resubmit a new document. Application was refused on 27 July 2011 due to assessment timeframe being passed.
14. Goonyella Riverside	BMA	22-Dec-10	19-Jan-11 **N-24**	30-Jun-11	Increased EC and reduction in receiving water flow rate (discharge to Eureka Creek and the Isaac River ~~under low flow conditions). EC to 3000us/cm~~	TEP submitted and assessed by ERS. Comments provided back to mine on 13 January 2011and further ~~info was provided.~~ Company advised TEP not considered urgent. Currently undergoing technical assessment by ERS.

						Expired
		04-Feb-11	TEP application withdrawn 9-Feb-11		Amendment seeks to increase EC to 3500uS/cm and reduce receiving water flow rate in Isaac River and reduce dilution. Downstream trigger of 1000uS/cm has been proposed in Isaac River.	Amendment to existing TEP
		16-Jun-11	14-Jul-11 **N-25**	30-Jan-12	The TEP application allows the extension of the period of time that mine water can be released providing flow and water quality conditions are met until 30 November 2011. The TEP application includes a works program for planned upgrades of the water management system. The department approved this TEP on 14 July 2011.	BMA has lodged TEP applications for 6 sites to enable releases to continue until 30 November 2011 due to ongoing issues with excess mine affected water in pits. DERM will hold discussions with BMA to ensure works are continuing to be undertaken to improve the water management system on each of the BMA sites before the applications are decided. TEP approved on 14 July 2011.
15. Burton	Peabody Pacific	02-Jan-11 (plumb tree)	13-Jan-11 **N-26**	31-May-11	Increased EC. Downstream monitoring required	**Concluded**
		06-Jan-11(the Void)	08-Feb-11 **N-27**	01-Sep-11	TEP authorises the release of water with electrical conductivity of up to 5500uS/cm from the northern part of the operation (Void) to receiving waters including the Isaac River. Downstream EC trigger to cease release is 500uS/cm	
		08-Feb-11	TEP **refused** on 02-Mar-2011 **R-6**		Burton Mine proposes to release high EC water (5500uS/cm) directly into the Burton Gorge Dam.	The TEP has been considered by ERS which has advised that the proposed TEP is problematic in that it has the potential to change the water chemistry of the Burton Gorge dam to the detriment of ecosystems that have adapted to low EC conditions. Ideal mixing is unlikely to occur. Further urgent discussions are progressing with ERS. DERM has advised Peabody that the TEP requires further scientific analysis and that feedback will be provided by 24/02/2011 at the latest. Peabody was satisfied with this advice. The release of high EC water would cause harm to biota within the raw water supply and may pose significant risk to drinking water supplies. The documents supplied by the mine have been forwarded to Qld Health for further comment due to this being a potable water supply for the mine. In its current form, it is likely this application will be refused. The TEP was refused on grounds of the potential environmental degradation due to the introduction of high EC waters to an enclosed freshwater environment. Refusal notice will be sent to client on 2 March 2011.

		04-May-11	TEP **refused** on 27-Jul-11 **R-7**		Burton Mine proposes to mix mine affected water with clean water and release directly into the Burton Gorge Dam	TEP sent to AQAEH group on 6 May 2011 for advice. Awaiting comments from AQAEH group. Project manager sent email to proponent on 26 May 2011 requesting further information regarding the TEP. A meeting is proposed on 8 June 2011 between the proponent. The project manager and Ian Ramsay from AQAEH to discuss TEP comments. Application refused on 27 July 2011 due to assessment timeframe being passed.
16. Dawson Central/North	Anglo	04-Jan-11	TEP application withdrawn 04-Feb-11			Assessed by ERS and further information was requested on 6/01/2011. Meeting occurred on 1 February with Dawson, where they provided information as requested and negotiations were undertaken in an effort to get a decision. Mine are currently putting together the proposal as discussed for further departmental consideration.
		18-Jan-11	TEP application withdrawn 04-Feb-11		Proposal revised (27/01/11) to discharge an estimated 3,700 ML with an EC limit of 3250 into Kianga Creek at low or no flow for up to 8 months at 250l/s. Considerable distance to Dawson River	Mine advised this TEP is critical to mining operations. Revised proposal was forwarded to ERS for comment on 27 Jan 11. Further feedback provided to company on 31 Jan 11. CWR is assessing the revised proposal. This TEP may be rolled into the one document with the application above, awaiting revised documentation from mine.
		04-Feb-11 Replaces the previously submitted Dawson Central and Dawson North	18-Feb-11 **N-28**	30-Jun-11	TEP proposes discharge of 3,700 ML of 4000 us/cm water in Kianga Creek with no flow for 3.5 months from Dawson North Pit, Discharge from Hillview Dam into Kianga Creek at low or no flow conditions may be required to shandy discharge from Dawson North Pit, Discharge from 14 Dam into Kianga Creek may occur if above average rainfall events occur. In addition to Hillview Dam, bottom dam east and 9-12 dam water with low EC may be used to shandy discharge from Dawson Pit North or flush Kianga Creek during discharge. TEP authorises discharge activities at Dawson Central and North operations. The TEP supports dewatering of the Dawson North Pit through the Dawson North Industrial Dam. The TEP provides for a discharge of up to 75ML/day with elevated EC concentrations in Kianga Creek at low and no flow conditions.	TEP accepted 18 February 2011. The mine is currently assessing site conditions for best implementation of discharge activities. Recent natural elevated EC concentrations in the Dawson River may minimise discharge volume. **Expired**
		19-Apr-11	Amendment to TEP **refused** on 12-May-11 **R-8**		TEP amendment request additional releases through the 2011 dry season due to continuing inflow from groundwater to pits on site.	Amendment to TEPs refused 12 May 2011; proposed amendments did not include sufficient justification and compliance with legislation to approve.
		10-Jun-11	11-Jun-11 **N-29**	08-Aug-11	TEP extension requested due to forecast of rainfall event.	Extension of TEP until 8 August 2011 approved by the department on 11 June 2011
		20-Jun-11	Amendment to TEP **refused** **R-9**	30-Nov-11	TEP amendment proposes to revise discharge parameters and extend discharge until 30 November 2011. Application is being assessed by the department.	Amendment to TEP refused as regional water quality does not support continued discharge activities.
17. Dawson South	Anglo	04-Jan-11	13-Jan-11 **N-30**	30-Jun-11	TEP approves discharge of up to 4500 us/cm water into Dawson River with minimum flow of 10m3/sec	**Expired**

					Downstream monitoring required	
		24-Mar-11	TEP **refused** on 30-Mar-11 **R-10**		TEP amendment proposes to allow discharge of mine affected water with no limit of EC concentrations as long as EC concentrations are less than 10% of the EC concentration at the far downstream monitoring location	TEP refused on 30 March 2011 Until the department has completed an investigation regarding elevated levels of EC in the Dawson River, an accurate assessment of the capacity of the Dawson River to accept further contaminants can not be supported.
		19-Apr-11	Amendment to TEP **refused** on 12-May-11 **R-11**		TEP amendment request additional releases through the 2011 dry season due to continuing inflow from groundwater to pits on site.	Amendment to TEPs refused 12 May 2011; proposed amendments did not include sufficient justification and compliance with legislation to approve.
		10-Jun-11	11-Jun-11 **N-31**	08-Aug-11	TEP extension request due to forecast of rainfall event.	Extension of TEP until 8 August 2011 approved by the department on 11 June 2011.
18. Oaky Creek	Xstrata	05-Jan-11	TEP **refused** on 27-Jan-11 **R-12**		Multiple additional release points into Oaky and Sandy creeks. TEP seeking approval to investigate problems with water management system and improve infrastructure. TEP proposed to remain in effect > 12 months.	TEP refused on 27/01/11 TEP not considered critical to mining operations Proponent to resubmit TEP as two TEPs: 1. to authorise additional release points until May 2011; and 2. to undertake long term works to water management infrastructure and interim water management.
		21-Feb-11	11-Apr-11 **N-32**	01-Apr-13	TEP authorises the discharge mine affected water from eight release points additional to those already approved under EA MIN100924209 for a period of 27 months. TEP also makes a commitment to apply for a second TEP to authorise the construction of infrastructure on site and remove the smaller dams that release water during rainfall events.	
		16-Jun-11	08-Jul-11 (Amendment) **A-22**	01-Apr-13	TEP amendment application seeks to extend the timeline for developing and submitting a second TEP detailing the capital works upgrade until 31 August 2011(originally required to be submitted to DERM by 30 June 2011). No change to conditions has been proposed.	Amendment to existing TEP
19. Millenium	Peabody	07-Jan-11	28-Jan-11 **N-33**	30-Jun-11	Approved elevated EC to low flow in New Chum Creek. Downstream monitoring is required in New Chum Creek and the Isaac River.	**Expired**
20. Lake Lindsay	Anglo Coal	13-Jan-11	14-Jan-11 **N-34**	30-Jun-11	Increased EC and reduction in receiving water flow rate. Downstream monitoring required	**Expired** Final report has been received late (18 July 2011 due on 27 May 2011) currently being assessed.
21. Saraji	BMA	14-Jan-11	27-Jan-11 **N-35**	Superseded	Discharge to Phillips and Hughes Ck's up to 8000 uS/cm. Reduced flow for receiving waters	
		04-Feb-11	18-Feb-11 (Amendment) **A-23**	30-Jun-11	The approved TEP allows for discharge of mine water of up to 8000uS/cm to downstream trigger of 1000uS/cm and 500uS/cm in the Isaac. Flow trigger will be maintained at 0.5m^3/s	Amendment to existing TEP. **Expired**

		08-Jun-11	10-Jun-11 (Amendment) **A-24**	30-Aug-11	TEP allows Saraji Mine to continue to discharge mine affected water until 30 June 2011 to take advantage of anticipated high flows. No change to conditions.	Amendment to existing TEP. Due to ongoing issues with excess mine affected water in pits, it is expected that BMA will lodge new TEP applications for its sites to enable discharge to continue until November 2011. Conditions will be negotiated at pre-lodgement meetings prior to the submission of the new applications.
		16-Jun-11	14-Jul-11 **N-36**	30-Jan-12	The TEP application allows the extension of the period of time that mine water can be released providing flow and water quality conditions are met until 30 November 2011. The TEP application includes a works program for planned upgrades of the water management system. The department approved this TEP on 14 July 2011.	BMA has lodged TEP applications for 6 sites to enable releases to continue until November 2011 due to ongoing issues with excess mine affected water in pits. DERM will hold discussions with BMA to ensure works are continuing to be undertaken to improve the water management system on each of the BMA sites before the applications are decided. TEP approved on 14 July 2011.
22. Baralaba	Cockatoo Coal	14-Jan-11	08-Feb-11 **N-37**	29-Jul-11	TEP authorises the release of mine affected water to the Dawson River from an inundated mine pit. Water quality is in accordance with Baralaba's Environmental Authority (EA).	TEP is considered critical to mining operations. TEP accepted 8 February 2011. Discharge continues.
		19-Apr-11	12-May-11 (Amendment) **A-25**	30-Sep-11	TEP amendment requests additional releases through the 2011 dry season, also requests different release rate. Amended application approved by the department on 12 May 2011.	Amendment to existing TEP.
		09-Jun-11	10-Jun-11 (Amendment) **A-26**	30-Sep-11	TEP amendment requests revision of receiving water pH concentration due to elevated pH concentration in the upstream environment. Request reviewed by the department and approved 10 June 2011.	Amendment to existing TEP.
		21-Jun-11	09-Jul-11 (Amendment) **A-27**	30-Sep-11	TEP application to decrease discharge volume due to decreased flow in the receiving environment.	Amendment to existing TEP
23. Lake Vermont	Lake Vermont Resources PL	14-Jan-10	29-Jan-11 **N-38**	30-Aug-11	TEP approved release of mine affected water to Carfax Gully with no natural flow.	
24. Hail Creek	Rio Tinto Coal	18-Jan-11	29-Jan-11 **N-39**	30-Jun-11	TEP to authorise release through additional discharge points and low flow in receiving waters. Increase in EC to 2000uS/cm as well as increase in ph, turbidity and sulphate. Discharge under no flow allowed if mine releases clean water to create flow.	**Expired**
		18-Apr-11	TEP **refused** on 20-May-11 **R-13**	20-May-11	TEP to discharge additional volumes of water from release points. Extension of the TEP end date to 30 September 2011 Amending EC release limit to 2400 µs/cm across all release points to account for escalation of upstream salinity.	TEP sent to AQAEH group on 27 April 2011 for advice. AQAEH group provided comments on 10 May 2011 noting that TEP should not be accepted based on potential impact to the receiving marine environment Assessment Manager has not forwarded TEP advice to ~~Hail creek yet due to the department decision regarding~~ order Hail Creek to cease current TEP discharge. DERM notified Rio Tinto on 9 May 2011 that Hail Creek must cease discharges under the current TEP by COB 20 May 2011 due to increases in electrical conductivity

						levels in the downstream Connor River TEP amendment application refused on 20 May 2011 due to current increase in EC in the downstream Connor River.
		02-Jun-11	10-Jun-11 (Amendment) **A-28**	30-Sep-11	Extension of TEP, seeks to authorise the discharge of approximately 4000ML of mine affected water to Bee Creek (Connors River). Proposed discharge at up to 2000uS/cm. End date is 30 Sep 2011	Amendment of existing TEP for extension to discharge until 30 June 2011.
		28-Jun-11	11-Jul-11 (Amendment) **A-29**	30-Sep-11	TEP amendment application authorises increase water to be released and increase the electrical conductivity up to 3000uS/cm to Bee Creek with no minimum flow requirement.	Amendment to existing TEP. TEP approved on 11 July 2011.
25. Jellinbah	Jellinbah Resources PL	20-Jan-11	TEP application withdrawn 04-Feb-11		TEP application to pump mine affected water with elevated EC (~2500 uS/cm) to Blackwater Creek	TEP is considered critical to mining operations. Currently being assessed by CWR and technical assessment by ERS. The main issue is the lack of flow in the waterway and lack of conjoining streams to the Mackenzie River. The discharge would not be suitably diluted by the time it arrives at the river. Is the possibility of environmental harm to Blackwater Creek if the water is released without a small flow in the creek
		04-Feb-11	11-Feb-11 **N-40**	30-Jun-11	TEP authorises release of mine affected water with elevated EC (~2500 uS/cm) to Blackwater Creek	TEP is considered critical to mining operations. **Expired**
		15-Mar-11	05-Apr-11 (Amendment) **A-30**	30-Jun-11	Extension of TEP period from 40 days to 12 months. There is no change to the approved release parameters TEP was revised and requested an additional 20 days pumping rather than the extension to 12 Months.	Amendment to existing TEP. Jellinbah were authorised on 25 March 2011 via email to discharge water in accordance with the resubmitted TEP that provides for a further 20 days of pumping. Conditions remain unchanged from existing TEP Amended TEP was approved on 05 April 2011 to authorise additional 20 days pumping. **Expired**
		13-Apr-11	19-Apr-11 (Amendment) **A-31**	30-Jun-11	TEP was revised and requested an additional 20 days pumping to take advantage of flows.	Amendment to existing TEP **Expired**
		13-May-11	03-Jun-11 **N-41**	31-Oct-11	TEP to release mine affected water to Blackwater and Twelve Mile Creek during no flow event	New TEP. Jellinbah was authorised via telephone and email to release on 30 May 2011 Ceased releasing 8 June due to high EC at Coolmairinga
26. Yarrabee	Yancoal Australia	25-Jan-11	10-Feb-11 **N-42**	30-Jun-11	TEP authorises release into Twelve Mile Ck under no/low flow conditions. Water quality of high conductivity 2000uS/cm and pH of between 6.5 and 9.	TEP is considered critical to mining operations Program Notice was accepted. **Expired**
		14-Apr-11	03-May-11 (Amendment) **A-32**	15-Sep-11	Amendment application authorises change of downstream monitoring point in Mackenzie River and extend the TEP timeframe by 6 weeks. Extended to cease releases by 15 July 2011. Final report is due to DERM by 15 September 2011.	Amendment to existing TEP Ceased releasing 8 June due to high EC at Coolmairinga

27. Coppabella	Macarthur Coal	27-Jan-11	TEP **refused** **R-14**		TEP proposes 3 discharge points to release water (EC limit 3500 PH 6.5 – 9.5 Turbidity – 3000NTU) accumulated in pits and water storages into nearby Thirty Mile Creek and Harrybrandt Creek. The TEP propose to discharge during no flow events.	TEP has been assessed by ERS. Comments have been provided back to mine and mine submitted further information. Coppabella responded to the department's comments and provided an updated TEP on 11 February 2011. The updated TEP is currently being reassessed by the region. Further information was requested from the mine on 17/02/11. Followed up on 21/02/11 and message was left with the mine requesting status of information request. Message left with client on 24/02/2011 regarding the submission of information request. Client advised that information will be submitted 24 February 2011. The department is still waiting on revised draft TEP to be submitted by the client. The client advised on the 24 February 2011, that information will be submitted on 28 February 2011. Client was contacted by phone on 02/03/2011 and indicated that revised TEP was to be submitted and that the expected submission date would be late this week or early next week. Client advised on 4/03/11 that information will be submitted on 7/03/11. The client has indicated that it will likely submit the revised TEP to the department on 11/03/11. Revised TEP submitted to the department on 15/03/11. Sent to ERS for advice on 16/03/11. The client has noted that this TEP will most likely be withdrawn and that the decision is with the CEO of Macarthur. Discussion with client on 13 April 2011 indicates that TEP is still likely to be withdrawn as it will not achieve much. A pre lodgement meeting is likely to occur to discuss options for a longer term TEP that deals with water management issues on site. Amendment Refused
28. Moorvale	Macarthur Coal	27-Jan-11	20-Apr-11 **N-43**	31-Aug-11	TEP authorises release of water up to 2500uS/cm to North Creek under no flow conditions. Flow trigger in Isaac River. Dilution requirement to achieve 600uS/cm downstream in Isaac River.	
		10-Apr-11	20-Apr-11 (Amendment) **A-33**	30-Sep-11	TEP amendment to permit release of water up to 2500uS/cm to North Creek under no flow conditions. ~~Flow trigger in Isaac River of minimum 0.7cumecs.~~ Dilution requirement to achieve no more than 120uS/cm at downstream in Isaac River using 50L/sec	Amendment to existing TEP Amendment to TEP was requested due to the environment dam reaching 124% of storage capacity. Moorvale has built a levee on the top of the dam

					release volume. Max release volume of 120ML. Release of mine water is permitted until 30 June 2011.	embankments over the spillway to prevent uncontrolled releases, however required the release of ~111ML to achieve water level below spillway.
		10-Jun-11	10-Jun-11 (Amendment) **A-34**	30-Sep-11	TEP amendment to amend existing TEP as a result of accumulation of mine affected water in the main environment dam. Moorvale temporarily raised the dam wall over spillway to prevent uncontrolled release, but still had limited capacity to manage excess water effectively on-site under EA conditions. Principal changes proposed were to receiving water flow rate, EC level and release volume.	Amendment to existing TEP
29. Norwich Park	BMA	28-Jan-11	11-Feb-11 **N-44**	30-Jul-11	TEP allows the release of mine affected water with elevated Electrical Conductivity (8000uS/cm).	
		08-Jun-11	10-Jun-11 (Amendment) **A-35**	30-Aug-11	TEP Allows Norwich Park Mine to continue to discharge mine affected water until 30 June to take advantage of anticipated high flows. No change to conditions.	Amendment to existing TEP Due to ongoing issues with excess mine affected water in pits, it is expected that BMA will lodge new TEP applications for their sites to enable discharging to continue until November 2011. Conditions will be negotiated at pre-lodgement meetings prior to the submission of the applications.
		16-Jun-11	14-Jul-11 **N-45**	30-Jan-12	The TEP application allows the extension of the period of time that mine water can be released providing flow and water quality conditions are met until 30 November 2011. The TEP application includes a works program for planned upgrades of the water management system. The department approved this TEP on 14 July 2011.	BMA has lodged TEP applications for 6 sites to enable releases to continue until November 2011 due to ongoing issues with excess mine affected water in pits. DERM will hold discussions with BMA to ensure works are continuing to be undertaken to improve the water management system on each of the BMA sites before the applications are decided. TEP approved on 14 July 2011.
30. Blackwater	BMA Coal	26-Jan-11	18-Feb-11 **N-46**	01-Jul-11	TEP allows the release of mine affected water with elevated electrical conductivity from New Deep creek Dam with no flow in receiving water.	**Expired**
		16-Jun-11	14-Jul-11 **N-47**	30-Jan-12	The TEP application allows the extension of the period of time that mine water can be released providing flow and water quality conditions are met until 30 November 2011. The TEP application includes a works program for planned upgrades of the water management system. The department approved the TEP on 14 July 2011.	BMA has lodged TEP applications for 6 sites to enable releases to continue until November 2011 due to ongoing issues with excess mine affected water in pits. DERM will hold discussions with BMA to ensure works are continuing to be undertaken to improve the water management system on each of the BMA sites before the applications are decided. TEP approved on 14 July 2011.
31. Red Mountain (Infrastructure) Joint Venture (RMIJV)	Millennium Coal Pty Ltd & BHP Mitsui Coal Pty Ltd	03-Feb-11	11-Feb-11 **N-48**	31-Jul-11	TEP authorises increase to limits for EC to 2000 uS/cm (increased from current EA limit of 1400 uS/cm) for releases to New Chum Creek during period of no flow, provided there is adequate flow in the Isaac River. TEP also proposes a maximum release flow rate, based on 1% of flow in the Isaac River at DERM's Goonyella gauging station plus 400 litres per second.	The TEP is not considered critical to operations.

32. Boonal Joint Venture	Jellinbah Resources PL & Yancoal Australia	03-Feb-11	14-Feb-11 **N-49**	30-Jun-11	TEP authorises the release of water from the Boonal loadout facility to Bullock Creek. Electrical Conductivity authorised is 500uS/cm. Water must also go through clarifier to remove suspended solids to an acceptable level.	The TEP is critical to operations as it cannot store any more water on site and the water is surplus. Possible issue with the low pH(4) has been resolved, discharge will be between 6 and 9pH, high aluminium content is to be filtered and removed. Discharge will be low volume, low EC. Has Not released water since obtaining TEP. **Expired**
33. Gregory Crinum	BMA/ BHP Coal Pty Ltd and others	14-Feb-11	28-Feb-11 **N-50**	30-Jun-11	TEP allows for releases of higher EC water during periods of low flow in Crinum Creek.	**Expired**
		08-Jun-11	10-Jun-11 (Amendment) **A-36**	30-Aug-11	TEP allows Gregory Crinum Mine to continue to discharge mine affected water until 30 June 2011 to take advantage of anticipated high flows. No change to conditions.	Amendment to existing TEP Due to ongoing issues with excess mine affected water in pits, it is expected that BMA will lodge new TEP applications for their sites to enable discharging to continue until November 2011. Conditions will be negotiated at pre-lodgement meetings prior to the submission of the new applications.
		16-Jun-11	14-Jul-11 **N-51**	30-Aug-12	The TEP application allows the extension of the period of time that mine water can be released providing flow and water quality conditions are met until 30 November 2011. The TEP application includes a works program for planned upgrades of the water management system. The department approved this TEP on 14 July 2011.	BMA has lodged TEP applications for 6 sites to enable releases to continue until November 2011 due to ongoing issues with excess mine affected water in pits. DERM will hold discussions with BMA to ensure works are continuing to be undertaken to improve the water management system on each of the BMA sites before the applications are decided. TEP approved on 14 July 2011.
34. East End Mine	Cement Australia	18-Feb-11	28-Mar-11 **N-52**	29-Jul-11	East End Mine has requested a TEP to amend the volume and contaminant limits of the current EA The TEP allows discharge for up to 30 ML / day with an EC of 4000 for up to 6 months. Consistent with the EA; the TEP also allows the release water from East End Mine pit to East End Creek to Shulz Lagoon.	East End mine has reported reduced production capacity due to water in the mine pit TEP provides discharge of up to 30 ML/day based on a staged EC concentrations and receiving water flow rates, low and no flow conditions are also included. Discharge under the TEP initiated 30 March 2011.
		18-Apr-11	20-Apr-11 (Amendment) **A-37**	29-Jul-11	Increased EC limit downstream to 2000uS/cm	Amendment to existing TEP
35. Curragh	Wesfarmers Resources Ltd	Draft 18-Feb-11	No action required.		The TEP proposes to release water with EC up to 5000 uS/cm with various dilution ratios.	Early draft of proposed TEP has been forwarded to the department from Stanwell Corporation. CWR met with Curragh on 22/02/11 regarding the TEP application and other matters relating to water management on site. A draft and incomplete version of a TEP was received by the department on 18 February 2011.. Curragh advised this document should not have been sent to DERM and should not be considered by the department. Curragh are considering its otions particualry in the light that a TEP has on their categroy three discount. The

						department may or may not receive a TEP for consideration.
		22-Mar-11	TEP **refused** on 27-07-11 **R-15**		TEP is for longer term water management issues to November 2012 – additional release points, proposed changes to contaminant release limits and receiving water flow conditions	Mining operations continue but have been impeded by water issues. The department provided comments back to the site in relation to the draft TEP on 5 April 2011. The department advised the site that the draft TEP in its current form is not acceptable and changes would need to be made in various aspects of the TEP. Curragh to supply further information on reworked TEP following comments provided by the department. Application refused on 27 July 2011 due to assessment timeframe being passed.
		29-Apr-11	13-May-11 **N-53**	31-Nov-11	Approved on 13 May 2011 based on merits that the proposed TEP period was shortened (up to 31 November 2011); releasing of mining affected water will be locked with the water flow in the receiving rivers (min ratio 1:20); and that the higher EC (>5000 uS/cm) water will be discharged at a release point down stream of the Black Water Creek to avoid further deteriorate the water quality.	On 31 May 2011, a meeting was held with the client who requested to increase pH limit of realising water (up to 9.5). After consultation with a water quality scientist, the request was conditionally approved, which is that occasional or temporal release of high pH water (up to 9.5) is acceptable, but prolonged realise such high pH water should be restrained
36. Calliope Limestone Quarry	Unimin	24-Feb-11	TEP application withdrawn 25-Feb-11		The draft TEP requests a new discharge location along an unnamed drainage channel to Awoonga Dam. Water quality is within EA conditions	TEP is not considered critical to mining operations. Technical assessment of proposed TEP is being undertaken by ERS. Assessment of TEP application and discussion with Unimin identified the discharge could be undertaken under the current EA conditions and the TEP was not required. The TEP application was withdrawn via an email on 25 February 2011.
37. North Goonyella Coal Mine (NGCM)	Peabody	03-Mar-11	15-Mar-11 **N-54**	30-Sep-11	TEP allows the release of mine affected water to Goonyella Creek during no flow events, but dependent on there being flow in the Isaac River. Release limits were revised to max. 2500 uS/cm for electrical conductivity (down from the EA limit of 3000 uS/cm) and pH in the range of 6.0 to 9.2.	
38. Foxleigh	Anglo Coal	24-Mar-11	01-Apr-11 **N-55**	30-Jun-11	TEP allows the release of mine affected water to Roper Creek at a higher EC limit (3500uS/cm)	**Expired** Final report has been received 22 July 2011 due on 27 May 2011. The mine has advised that no activities were undertaken under this TEP.
		07-Apr-11	TEP **refused** **R-16**	30-Jun-11	The amended TEP proposes to increase the EC limit from 3500uS/cm to 6000uS/CM for releases to Roper Creek	Amendment to existing TEP TEP sent to Freshwater and Marine Science on 11 April 2011 for further advice regarding acute toxicity potential. Refused due to timeframe being exceeded.

39. McFarlane	QER	08-Apr-11	TEP application withdrawn 29-Apr-11	TBA	TEP amendment requested change in discharge location and removal of 2 monitoring points. No changes to discharge limits.	TEP application was withdrawn on 29 April 2011

Burdekin Catchment						
Newlands	Xstrata	15-Dec-10	23-Dec-10 **N-56**	30-Jun-11	Increased EC and reduction in receiving water flow rate. Downstream monitoring required.	**Expired**
		11-Jan-01	28-Jan-11 (Amendment) **A-38**	30-Jun-11	TEP authorises the release of mine affected water with elevated EC (up to 5500uS/cm) to Cerito Creek with downstream monitoring in Rosella Creek and the Bowen River.	Amendment to existing TEP Mine advised that this TEP is critical to the Mine's operations **Expired**
		24-May-11	TEP **refused** on 08-Jun-11 **R-17**	30-Jun-11	Amendment application received 24 May 2011 to extend discharge activities. Assessment will be undertaken and decision included in the near future.	Amendment Refused
Sonoma	Qcoal	01-Jan-11	07-Jan-11 **N-57**	01-Jun-11	Increased EC levels and downstream monitoring required.	**Expired**
		22-Feb-11	24-Feb-11 (Amendment) **A-39**	30-Jun-11	TEP titled: Emergency Release of Mine Water This TEP authorises the release of water with EC up to 850uS/cm to Pelican Creek.	Amendment to existing TEP TEP is considered critical to the mine's operation. Approved TEP sent to client on 24 February 2011. **Expired**
Thalanga Copper Mine	Kagara Copper Pty Ltd	08-Feb-11	18-Feb-11 **N-58**	31-Oct-13	TEP authorises releases from east evaporation pond whilst the company undertakes studies and site changes to remove contamination, reduce catchment size and increase storage capacity.	The TEP will bring the site back into compliance with licence release limits and hazardous dam conditions.
Burnett River Catchment						
Mt Rawdon	Newcrest Mining Ltd – Mt Rawdon	Resubmitted following DERM comments on 21-Jan-11	18-Feb-11 **N-59**	30-Nov-11	TEP authorises dams below the waste rock dump and the tailings dam to overflow rather than returning the water into the Tailings Storage Facility due to the TSF being above the MRL. Stormwater leaving the ML had some metals slightly above EA limits but the water overflowing the Perry River weir complies with EA limits.	TEP considered critical to the mine's operation. Water levels in the dams below the tails dam and the waste rock dump are now well below spillway levels and water is again being used for processing.
Bremer River Catchment						
New Oakleigh Coal Mine	New Oakleigh Coal	27-Jan-11	01-Feb-11 **N-60**	11-Feb-11	Water Management: TEP issued after the flood event. TEP authorises discharge of captured flood water from extraction pit at a higher electrical conductivity. (1500 us/cm as opposed to background + 15% of offsite gully) Monitoring required along discharge path and downstream.	**TEP Concluded 25 February 2011** **Expired**
Mary River Catchment						
D'Aguilar Gold Mine	D'Aguilar Gold Pty Ltd	01-Feb-11	11-Mar-11 **N-61**	29-Apr-11	Water Management. TEP requests authorisation to release water that has overflowed the TSF into the Shamrock Pit to be released by pumping. Also deals	End date for TEP was 29 April 2011. The client submitted the final report by the due date, which will now be duly assessed to ensure compliance.

					with measures to increase storage capacity of contaminated water.	**Expired**

LNG/CSG activities: Flood-related Issues

Update 58 as at 28 July 2011

Contact: Andrew Brier, General Manager Coal & CSG Operations
Ph: [redacted]

Known flood and wet season related incidents relating to LNG/CSG Activities

Site	Company	Nature of Breach	Date of Breach	Compliance/Investigation Activity
1. Molopo Energy (near Moura)	Molopo Energy Ltd	Produced water overtopping evaporation pond	7 Dec 10	Molopo energy has submitted a total of 3 reports in relation to soil and water sampling undertaken at the impacted site. Results were forwarded to Water Services on 11 May 2011 and Water Services has provided a response to Petroleum and Gas on 17 May 2011. DERM contacted Molopo on 21 June 2011 in regards to a letter issued to Molopo on 7 June 2011. Molopo advised it had not received the letter and intended to submit requested documents by 5 July 2011.
2. Moranbah	Arrow Energy	Controlled discharge of produced water to prevent pond overtopping	13/14 Dec 10 20 Dec 10 to 5 Jan 11. 31 Jan – 4 Feb DERM approved TEP for discharge of CSG water on 4 February 2011.	DERM approved TEP for discharge of CSG water on 4 February 2011. The MGP TEP expired on 31 May 2011. Arrow submitted the final TEP report as per objective 5 of the TEP on 31 May 2011. DERM to finalise its assessment of the final TEP Report by 17 June 2011. DERM has completed its assessment of the Final TEP Report and found that Arrow has complied with the conditions and objectives of the TEP. No further action is required.
3. Peat gas field (near Wandoan)	APLNG(Origin)	Controlled discharge of produced water to prevent pond overtopping Program notice accepted. TEP due to be submitted to department July 2011.	27/28 Dec 10	Environmental Services met with Origin on 07/04/11 to discuss progress of the submission of a draft TEP for the discharge. Origin has verbally agreed to a completion of works date by October 2011, before next wet season. On 15 July 2011, APLNG submitted a draft TEP for comment.
4. Denison Trough gas fields (Westgrove north of Injune) ****NB** This is a conventional gas operation**	APLNG(Origin)	Controlled discharge of produced water to prevent pond overtopping Program notice accepted. TEP due to be submitted to department July 2011.	27/28 Dec 10	Environmental Services met with Origin on 07/04/11 to discuss progress of the submission of a draft TEP for the discharge. Origin has verbally agreed to a completion of works date by October 2011, before next wet season. On 15 July 2011, APLNG submitted a draft TEP for comment.
5. Roma gas field (Coxon Creek)	Santos	Spill of drilling fluid as a result of sump failure	31 Dec 10	DERM conducted a site inspection / investigation with Santos on 07/01/11. Water and Soil samples were collected by DERM and Santos. Upon review of all sample results it was determined that there was no environmental harm to

				adjacent environment. Santos provided correspondence that rehabilitation of the site will be conducted within 3 months after termination of well drilling and completion activities. Inspections will be conducted as part of the annual compliance plan to ensure rehabilitation is undertaken at wells as required. No further action is required. **Concluded**
6. Tipton RO Plant (20-30km SW Dalby)	Arrow Energy	Spill of hydrochloric acid as a result of localised flooding	Between 18 Dec 10 and 5 Jan 11	Environmental Services has investigated. Arrow is to submit formal confirmation that the storage area has been moved from any potential flood area. On 3 May Arrow verbally advised that a formal report will be submitted by the end of the week. A consultant is currently undertaking a flood study which will be used to identify future chemical storage sites. In the interim, chemical storage at the Tipton RO site has been relocated to higher ground at the Daandine ROP plant. On 27/5 DERM reminded Arrow that final report has not been submitted and expectation is that this should be finalised. 6/6 Matter finalised NFA required. **Concluded**
7. Tipton RO Plant (20-30km SW Dalby)	Arrow Energy	Oil water pond inundated by floodwaters leading to a release from the pond. Total volume of pond less than 1ML.	Between 10 Jan and 12 Jan	Environmental Services has investigated. Arrow is to submit a formal plan for reconfiguration of the water supply system on site. On 3 May Arrow verbally advised that a formal report will be submitted by the end of the week. Any changes to the operation of the oil water dam must consider the DXP approval which is currently in a review process by DERM. It is anticipated that a new dam will be constructed and the bunding which trapped water during the January flood period will be removed during construction of the new dam. On 27/5 DERM reminded Arrow that final report has not been submitted and expectation is that this should be finalised. 6/6 - Arrow advised that bund surrounding pond has been broken to prevent future stormwater inundation. .Arrow verbally requested more time to continue their investigation into correction measures for inadequate capacity of oily water pond. 16/6 – DERM requested from Arrow a detailed report on the oily water dam including current capacity, contents composition, management practices (present and future). Report due on 1 August.
8. QGC Kenya frac ponds (20km SW Chinchilla)	QGC	Overtopping of 4 frac ponds from incident rainfall. Report received by DERM 31/1/11.	Probably evening of 10/1/11	Further information was requested and is due 25 March 2011. Information received and no further action required. Letter sent to QGC on 19 April 2011 detailing breach of conditions and NFA. This issue could be removed from report. Matter finalised – NFA. **Concluded**

9. Ramyard (Peat)	Origin (APLNG)	Notification (not a program notice) advising Origin believes there may have been minor flooding of dams at Ramyard (Peat) field. Investigation commenced.	Probably January 2011	Wet weather access has been a continual problem for the area. A site inspection is currently planned for early July. Focus of the inspection is pre-planning of site design for coming wet season.

Wet Season CSG/LNG Water Management

TEP Status

A total of 7 TEPs have been approved or have had amendments approved since 1 December 2010. A further one has been received and is currently undergoing assessment. One TEP has been refused.

CSG Operation	Company	Received Date / PN submitted	Approval date	Expiry Date	Authorisation outside EA Conditions	Comments
Fitzroy Catchment						
Spring Gully	APLNG	21/12/10 and resubmitted on 24/12 and 28/12	Approved 28/12/10	28/01/2011	Discharge of RO brine if MRL reached or an engineering concern identified but only if 1:100 dilution, a base flow in creek equal to minor flood and mixing zone limits achieved.	NO discharges yet required. Existing TEP extended to 25 Feb without change to allow for appropriate assessment/discussion of proposed amendment. The initial TEP has been amended twice (28/01/11, 25/02/11) to extend it until conditions of a new TEP have been agreed. The amended TEP was approved on 04/03/11 for the term to 30/09/11. **Concluded**
		11/1/11 and later version incorporating DERM comments resubmitted 25/2/11	Amendments approved on 28/01/11, 25/02/11 and 04/03/2011	30/09/2011	Amendment focuses on allowing higher EC within mixing zone, due to influence of higher EC background water quality. Amendment approved on 04/03/2011allows commencement of release when:: Eurombah Creek is flowing at 240ML per day or 0.2m of water over the Wybara crossing; and A dilution of at least 1:100 (release water to flow in the creek) is met. The controlled release must cease if: The EC is measured above 1500uS/cm at MP3 or MP4, or 100uS/cm at MP5 or MP6; or The freeboard of the cell from which release is occurring is 0.65m; or Water flow in the creek less than 240ML/day;or A dilution level 1:100 can not be maintained.	The TEP has been reissued with agreed amended conditions. This TEP will expire on 30/9/11. Release of water (including brine) under this TEP occurred on 19 April 2011from 7:15 AM to 5: 10 PM, an estimated 36 ML was released. The flow volume in Eurombah Creek was well above 240 ML/d as required by the TEP. In-situ tests of water quality were in compliance. A summary of monitoring data was submitted by APLNG before 23 May 2011 and assessed by DERM officers who concluded that the information was insufficient and requested a full laboratory report to be provided. Full laboratory report (Certificates of Analysis) was submitted and assessed by DERM officers. Assessment indicates compliance with the water quality limits authorised under the TEP. No further action is required.
Moranbah Gas Project (MGP)	Arrow	23 December 2010 and resubmitted 31 December 2010, 28 January 2011 and 4 February 2011	Approved 04/02/2011	31/03/2011	Discharge of CSG water to Isaac River only if dams 1, 2, 5 or 10 at MGP exceed target fill heights (DSA for dams 1, 5 and 10, but 4m below DSA for dam 2), a dilution of at least 400 parts river flow to 1 part discharge can be maintained at all times and flow in Isaac River is greater than 1090 ML/day.	Discharge to cease on 31 March 2011. Arrow has notified that they have developed a management plan to restore or remove dam 2 from service to satisfy objective 3 of TEP. P&G is following up. DERM has approved an application for amendment to extend the Milestone date for Objective 4 from 31 March to 13 May 2011. The decision to grant the amendment was based on - • No increase in environmental harm is expected as a result of this amendment • All previous conditions and requirements of the approved draft TEP will remain. High concentration of Fluoride (9.0 mg/L) was detected

CSG Operation	Company	Received Date / PN submitted	Approval date	Expiry Date	Authorisation outside EA Conditions	Comments
						downstream of TEP discharge for the sample taken on 26/03/11 and reported on 6/04/11. Upstream Fluoride was 0.1 mg/L in the River on 26/03/11. Subsequent sampling indicated downstream Fluoride level as 0.2 mg/L. It has since been confirmed by Arrow that the laboratory made an analysing error. Discharge ceased at 7pm on 27 March 2011. Arrow is aware that no more releases are authorised after 13 May 2011, as per objective 4 of the TEP. The TEP expired on 31 May 2011. Arrow submitted the final TEP report as per objective 5 of the TEP on 31 May 2011. DERM has completed its assessment of the Final TEP Report and found that Arrow has complied with the conditions and objectives of the TEP. No further action is required. **Concluded**
Condamine Catchment						
Daandine	Arrow	13/01/2011	Approved 18/01/2011	28/02/2011	Discharge of RO permeate to flood flows – Wilkie Ck	Discharge from RO dam and put more assoc water through RO plant and discharge, rather than let associated water dams overflow. Arrow has formally advised they have ceased all discharge. **Concluded**
		15/02/2011	Draft TEP submitted. Request for further information sent – response due 7 March Additional information was requested by DERM on 28 February. A response was provided on 11 March 2011, with a revised version of the TEP submitted by Arrow at that time. 17 May – Decision date extended at Arrow request to allow time for response from water supply regulator. Revised		To authorise all weather discharge of RO permeate from the permeate dam, to enable reduction in volume of associated water in ponds via the RO plant, to reduce risk of discharge from associated water ponds.	Proposal to discharge RO permeate overland to unnamed tributary of Wilkie Ck. LNG EU met with landholders concerned about the proposed TEP 1/3/11. TEP application seeks to discharge into a tributary of Wilkie Creek, whether or not there is flow in the tributary (or creek). DERM advised Queensland Health of the application. QH requested more information. DERM has sought input from Water Sciences and soil sciences on the TEP. DERM has been clear with Arrow that DERM expects Arrow to contact affected landholders about ongoing flows in the creek (Baker access issues) and Council in relation to how the flows will get across Kumbarilla Lane. Soil salinity testing has been raised as an issue. 17 May - Arrow is considering a proposal to change discharge location to a point which discharges directly to Wilkie Creek, reducing impacts upon the surrounding environment. Changes to the proposed draft TEP will be provided on 27 May 2011. 7 June – meeting with Arrow representatives regarding significant amendments to the TEP including change of discharge point direct to Wilkie creek, propose to discharge

CSG Operation	Company	Received Date / PN submitted	Approval date	Expiry Date	Authorisation outside EA Conditions	Comments
			due date 16 June 2011. 17 June – Information request to be issued on 29 June – revised due date extended to 18 July 2011.			500ML "modified" (calcium dosed) RO permeate. Its emerging need is that it will not meet DSA requirements by November. DERM's position put clearly is that the correct mechanism is through the BUA currently under negotiation, and through amendments to the EA. Arrow maintains there is insufficient time for them to finalise the BUA or amend EA. Regional office is now taking a stronger line on the use of TEPs to correct poor planning, but will consider any application by Arrow. Region is keen that Arrow does not use the TEP as a mechanism to avoid negotiating on the BUA. 17 June – Draft TEP was received from Arrow for the release of amended RO permeate directly to Wilkie Creek. TEP has been assessed and it has been decided that additional information is required in order to properly asses the application. The information request will be issued on 29 June 2011. A due date and subsequent (new) date of application has been set at 18 July 2011. 18 July – Info request and amended TEP received. Due date for a decision will be 15 August 2011.
Fairview Roma Arcadia	Santos	24/01/2011	**Refused 02/0221/11**		Proposal to discharge from 100 associated water dams into flood flows to maintain storage capacity for future water management	Santos has verbally advised that it will consider internally whether TEP is the appropriate tool to seek remediation of the dams. **Concluded**
Mt Kingsley / Arcadia	Santos	03/02/2011	Approved 22/03/2011	31/12/2011	The TEP requires Santos to undertake an assessment as to the reasons behind overtopping of mud and water dams at three sites in November 2010 in order to develop strategies to prevent recurrence.	Santos has submitted reports in accordance with TEP objectives. DERM sent response letter providing comments on completion of TEP objectives. DERM letter outlines further expectations regarding compliance. Santos is to submit a further report before 30 July 2011.
Scotia	Santos	14/02/2011	Approved 28/04/2011	25/10/2011	Proposal to discharge from site dam to avoid overtopping.	Installation of an RO plant to treat associated water and use of resultant good quality permeate as stock water, dust suppression and discharge to an unnamed creek.
		08/06/2011 (Amendment)	Approved 04/07/2011	19/02/2012	Proposal to discharge from site dam to avoid overtopping.	Santos submitted an amendment to the current TEP as its contractor has not been able to supply an RO Plant within the required timeframe. No significant change to the objectives of the TEP, other than extending the timeframe by 4 months to allow commissioning of the RO plant.