

# Queensland Floods Commission of Inquiry

## Statement of Andrew Stuart Brier (Rolleston Coal Mine)

CROWN LAW – (DERM Andrew Brier)  
Response to Req #1694638 & 1712484  
SM & Annexures ASB-01 to ASB-RO3-24  
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**QUEENSLAND FLOODS**  
**COMMISSION OF INQUIRY**

**STATEMENT OF ANDREW STEWART BRIER**

**ROLLESTON COAL MINE**

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

**Requirement from Queensland Floods Commission of Inquiry**

1. I have seen a copy of a letter dated 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.

**Role**

2. I am currently the General Manager Strategic Implementation, Coal and Coal Seam Gas Operations within the Regional Service Delivery Division in the Department of Environment and Resource Management. I have held this position since 21 February 2011 although I was involved in the management of flood related issues surrounding coal mines from the 10 January 2011 onwards.
3. Between 2010 and 2011 my roles were as follows:
  - 25/12/2009 to 05/08/2010 - Regional Manager GABSI & Major Projects
  - 06/08/2010 to 02/01/2011 - Regional Manager CSG Activities
  - 03/01/2011 to 20/02/2011 - Director LNG Enforcement Unit
  - 21/02/2011 onwards - General Manager Coal & CSG Operations

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

4. As a regulator DERM's compliance activities are designed to strategically review the performance of individual regulated entities on the basis of perceived risk.
5. DERM undertook pre wet season compliance programs to evaluate water management preparedness ahead of the 2010/2011 wet season. This primarily involved evaluating past wet season performance and preparedness ahead of the

next wet season in terms of having available dam storage capacity to meet the minimum design storage allowance required on the 1 November of any year.

6. Environmental authorities include requirements for companies to prepare Water Management Plans that outline the overall mine water management strategy for their site. The environmental authorities require an annual review of these plans to ensure learnings from past wet season performance are incorporated into forward plans and preparations for future wet seasons.
7. Environmental authorities for mine sites also include dam structural design, construction and operation requirements that are commensurate with flood risks given a mines location, including:
  - a. certified hazard assessment required for all dams;
  - b. must be designed to prevent floodwaters from entering the dam, wall failure and overtopping up to and including a specified flood event based on AEP;
  - c. certified design plans, high risk dams reviewed by DERM technical experts;
  - d. having a marked "mandatory reporting level" above which DERM must be notified immediately, and actions put in place to prevent or minimise environmental harm;
  - e. ensuring that dams are inspected by a suitably qualified and experienced person;
  - f. undertaking reviews annually about the effectiveness of the dam during the preceding wet season and modifying the water management system accordingly;
  - g. monitoring of water quality within the dam prior to the wet season;
  - h. maintaining a register of dams and relevant information.
8. A number of mines were inspected in November 2010 as part of the pre wet season compliance inspection program, specifically addressing on-site water management systems and conditions in the environmental authority (EA) (**ASB-R01-01**) relating to water management.
9. Rolleston Mine was not one of the mines inspected during this time however, a letter (**ASB-R01-02**) was sent to all mines that were not part of the compliance inspection program suggesting the review of the site's water management system prior to the upcoming wet season to ensure that its operations would be in compliance with the EA and the *Environmental Protection Act 1994*. The letter encouraged the site 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. The letter explained that if it was anticipated that the site may be unable to comply with the current conditions of the EA, a representative from the site should immediately contact DERM to discuss these issues.
10. Rolleston Mine's water management plan (**ASB-R01-03**) was received on 4 November 2010. This plan has been progressively implemented during 2010 and 2011 and has included the construction of a number of levees and diversions

designed to segregate overland flow water to bypass mine working areas prior to exiting the mining lease and reduce the likelihood of inundation.

**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. Rolleston Mine was not included in the list of mines to be inspected prior to the 2010-2011 wet season. This list was developed following an assessment of all coal mines in the region and the risk of a non-compliant discharge from each site on the receiving environment. Rolleston Mine was therefore defined as a low-risk site.
12. Rolleston Mine originally submitted a voluntary transitional environmental program TEP (**ASB-R02-01**) on 30 September 2010, with an updated version being received electronically on 18 October 2010. This TEP is discussed further in paragraph 14 with reference to associated documentation. This TEP was submitted to address water management issues on the Rolleston Coal Mine site and allow for the dewatering of Spring Creek pit which was in-undated during rain events over the 2009/2010 wet season. The Mine indicated the need to release water in order to maintain sufficient storage capacity in the water impoundments prior to the commencement of the 2010/2011 wet season, in order to avoid later uncontrolled discharges.
13. DERM did not have any specific concerns that the mine would be unable to comply with the water management conditions of their EA and their granted TEP at the time.
- b) Any terms that the mine operator has indicated it is unable to comply with, or breached
14. Rolleston identified that the release of significant quantities of water from Spring Creek dam was not possible under the conditions of the EA, mainly due to the natural flows in Bootes Creek being too brief and the volume too small to be able to discharge the volume of water required to significantly lower the water level in Spring Creek dam before the wet season begins.

15. As a result, and as discussed in paragraph 10, Rolleston submitted a voluntary TEP on 30 September 2010 to address water management issues on the Rolleston Coal Mine site and allow for the dewatering of Spring Creek pit which was inundated during rain events over the 2009/2010 wet season. The Mine indicated the need to release water in order to maintain sufficient storage capacity in the water impoundments prior to the commencement of the wet season, in order to avoid the potential of uncontrolled discharges at a later date.
- c) **Any terms that had to be amended from the Fitzroy model conditions because the model terms were unsuitable for this mine site**
16. The Rolleston Mine EA was amended on 30 November 2009 to contain the 'Model Water Conditions for Coal Mines in the Fitzroy Basin'. There is a potential that Rolleston Mine will apply to amend the EA to include the most recent Model Water Conditions however, there has not been an amendment application received to date.
- 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 Rolleston Mine EA to contain terms that do not adequately promote environmental protection and dam safety.

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**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 TEP between the dates specified.
19. Rolleston Mine submitted a voluntary draft TEP on 30 September 2010, with an amended version received electronically on 18 October 2010 (MAN10919) (**ASB-R03-07**). This amended TEP was assessed by DERM and a request for statutory approval (**ASB-R03-08**) was forwarded to the delegate for approval on 28 October 2010. The approved TEP, certificate of approval and notice of decision (**ASB-R03-09** and **ASB-R03-10**) were forwarded to the mine on 28 October 2010.
20. Rolleston Mine submitted an amended TEP (MAN11099) on 18 November 2010 (**ASB-R03-11**). This amended TEP was assessed by DERM and a request for statutory approval (**ASB-R03-12**) was forwarded to the delegate for approval on 29 November 2010. The approved TEP, certificate of approval and notice of decision (**ASB-R03-13** and **ASB-R03-14**) were forwarded to the mine on 29 November 2010.
21. Rolleston Mine submitted an amended TEP (MAN11779) on 19 January 2011 (**ASB-R03-15**). This amended TEP was assessed by DERM and a request for statutory approval (**ASB-R03-16**) was forwarded to the delegate for approval on 31 January 2011. The approved TEP, certificate of approval and notice of decision (**ASB-R03-17** and **ASB-R03-18**) were forwarded to the mine on 1 February 2011.
22. Rolleston Mine submitted a TEP (MAN12019) on 1 February 2011 (**ASB-R03-19**). This TEP was assessed by DERM and an assessment report requesting statutory approval (**ASB-R03-20**) was forwarded to the delegate for approval on 22 February 2011. The approved TEP, certificate of approval and notice of decision (**ASB-R03-21** and **ASB-R03-22**) were forwarded to the mine on 23 February 2011.

**b) Any relevant dam safety issues**

23. To the best of my knowledge, there were no relevant dam safety issues associated with the Rolleston Mine between the dates specified.

**c) Relevant correspondence with the mine operator and other stakeholders**

24. There are a number of documents that detail DERM's formal correspondence with the Rolleston Mine between the dates specified (**ASB-R03-23**).

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

25. DERM consulted with the Fitzroy Water Quality Advisory Group (FWQAG) on three occasions during the dates specified to discuss the releases from all mines in the Fitzroy Basin. This consultation formed part of the agenda at meetings of the FWQAG held in Rockhampton on 16 December 2010, 4 February 2011 and 7 April 2011.
26. 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.

27. DERM also consulted with Qld Health regarding mine water discharges. However the Rolleston Mine releases would not have been individually referred to as the discussions were based around whole of catchment water quality issues. The Rolleston Mine discharges would only have been discussed if there were specific water quality issues downstream of the mine.
28. The Director Environmental Health from Qld Health was also placed on the distribution list for the weekly Fitzroy Basin water quality report compiled by DERM (ASB-R03-18) 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**

29. 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-R03-e00a). Specific considerations with regard to the Rolleston TEP are contained within the individual requests for statutory approval for each TEP application attached in paragraphs 18, 19 and 20 above.
30. Draft TEPs may be submitted voluntarily by a mine operator, or DERM may require an operator to submit a draft TEP if it is satisfied that an activity or proposed activity is or may cause unlawful environmental harm. In either case, the draft TEP is prepared by the operator. DERM's role is to assess the draft TEP against the requirements of the EP Act and either approve the TEP, approve the TEP with conditions, or refuse to approve the TEP.
31. Section 338 of the EP Act (ASB-R03-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:
    - o the standard criteria
    - o additional information given in relation to the draft TEP and
    - o the views expressed at a conference held in relation to the draft TEP.
32. 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-R03-e01) and Part 2-Considering and making a decision about a draft TEP (ASB-R03-e02) is attached. Supplementing the guidelines are two correlating assessment report templates Part 1 Assessment

Report (**ASB-R03-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-R03-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-R03-e04a**) and a Request for Statutory Approval template (**ASB-R03-e04b**) was utilised by regional officers to assist with the TEP assessment process.

33. 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 EA 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.
34. Prior to making its decision, DERM may also (and as a matter of practice often does) enter into discussions with the proponent of a draft TEP and suggest amendments to the draft TEP.
35. 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 EA.
36. DERM typically requires mine operators to submit a draft TEP where DERM becomes aware that there is a non-compliance at the mine site that will require a significant amount of time and/or investment by the operator to rectify.
37. 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.
38. DERM has produced guidance material to assist environmental officers in assessing draft TEPs (**ASB-R03-24** and **ASB-R03-25**).
39. 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.
40. In the case of the Rolleston Mine, DERM considered a number of issues such as:
  - The distance of the release points at the mine to the nearest large watercourse;
  - Discharges of water with EC of up to 700uS/cm into dry ephemeral streams;
  - The background water quality parameters in the streams surrounding the mine;

- Downstream water quality in Bootes Creek, the Comet River and the Mackenzie River, being mindful of the DRAFT environmental values and water quality objectives for those streams;
- Water users located downstream of the mine and their 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**

41. 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.
42. When making any decision under the EP Act, including whether to approve a draft TEP, DERM must consider the "Standard Criteria" (ASB-R03-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 (ASB-R03-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.
43. Furthermore, part 2 and 3 of the *Environmental Protection Regulation 2008* (EP Reg) (ASB-R03-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.
44. 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 Rolleston Mine TEP's and when processing

amendments to the approved program DERM did take into consideration the economic and financial implications of the mines inability to extract coal if a release could not be authorised. This was primarily in relation to the decision to grant the 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**

45. When assessing the Rolleston Mine TEPs DERM took into consideration the downstream impacts of the proposed releases by ensuring the conditions of the TEP required adequate dilution to achieve downstream Electrical Conductivity (EC) targets. These targets included drinking water quality guidelines and aquatic ecosystem guidelines to ensure the protection of waterholes and refugia in the Comet River.
46. DERM also took into account releases from other mines into the system along with background water quality parameters to ensure cumulative impacts were minimised and downstream water users were adequately protected. DERM also took these other releases into account to ensure other mines were afforded the opportunity to releases water where required under similar programs.

**h) The terms of the TEP issued or ED given**

47. The terms of the approved TEPs have been noted in Item3 (a) above. No emergency direction was issued to the Rolleston Mine.

**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**

48. A condition of the TEP Certificate of Approval (MAN10919) required Rolleston Coal Mine to notify the Ranger-in-Charge of the Albinia National Park, Central Highlands Regional Council and any other relevant/potentially effected users/landholders downstream of the discharge into Bootes Creek, under TEP MAN10919, prior to the discharge taking place. The notification process must be documented and include:
  - written documentation of notification including dates, contacted persons and any pertinent comments; and
  - details of discharge information provided to the stakeholders.
49. Due to parameters set in the Certificates of Approvals, 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**

50. The reasons for the decisions are contained within the TEP approval documents noted in Item 3 (a) above.

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

51. The Rolleston Mine did not breach any conditions of its TEPs. There were no emergency directions issued to Rolleston Mine during this period.

**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.**

52. 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-R04-01). Applications must be able to demonstrate that the management intent for the receiving water will be met despite the discharge occurring.
53. 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-R04-02) 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-R04-03) and associated procedural information (ASB-R04-04 and ASB-R04-05). 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-R04-06) which informs assessments and resultant authority conditions
54. 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.

55. 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.
56. 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.
57. The EP Act and the subordinate *Environmental Protection (Water) Policy 2009* 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.
58. During the 2010/11 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.
59. TEPs issued during or as a result of the 2010/11 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.
60. DERM has observed that salinity (measured by EC) 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.
61. DERM does not believe that discharges from mine sites as a result of the 10/11 wet season have contributed significantly to the currently elevated EC 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.
62. This rising salinity is currently causing some minor issues in drinking water supplies in the lower Mackenzie and Fitzroy Rivers. The 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.

63. 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.
64. 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.
65. 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.
66. There is no evidence that rising EC in stream flow in the Fitzroy river system or mine water discharges across the state as a result of the 2010/11 wet season have had any adverse impact on the environment. DERM has investigated a number of breaches of conditions of both EAs and TEPs and has concluded that no environmental harm has resulted from any non compliant release.
67. 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.
68. Monitoring has shown high EC levels in a number of local catchments upstream of mines. These levels are therefore not influenced by mine water discharges. DERM believes that the major cause of this increase in salinity and hardness is the increasing contribution of groundwater to stream flows rather than the effects of mine water discharges

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

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

70. I am informed that Rolleston Mine is likely to benefit from the new Fitzroy Model Conditions as a result of increased flexibility in mine affected water discharge conditions that can be applied to mines close to the boundary of a catchment.

**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.**

71. With regard to the Rolleston 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.
72. Additional discharge of mine affected water may prove advantageous, giving the Rolleston Mine more flexible discharging arrangements.
73. 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. Individual mine sites will need to conduct a relevant analysis to determine the detailed impacts or benefits of adopting the new model conditions.

**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**

74. 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
75. 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**

76. To the best of my knowledge I believe that the storage of mine affected water at the Rolleston Mine in dams and ponds is an appropriate management strategy and is consistent with the strategies used across the coal mining industry in Central Queensland.
77. Using another method such as desalination or purification may provide additional opportunities to discharge water from the site that is better quality and does not have a significant impact on the receiving environment. It is of DERM's opinion that Rolleston Mine is not impacted in the same way when compared to other mines in the Fitzroy Basin, with regards to water quality. Water in contact with coal and/or mining waste rock and spoil at the Rolleston Mine does not increase in salinity to the same degree as water at other coal mines across the Bowen Basin. Typical EC concentrations of mine affected water are less than 1000uS/cm the Rolleston Coal Mine.

**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**

78. 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.
79. Effective mine site water management should follow these general principles:
- Limit the extent of site disturbance and limit catchment areas that report to site water management infrastructure.
  - Recycle water in the process circuit or for other uses, such as dust suppression, as much as possible.
  - Optimising the volume of water discharged from the site (having regard to the mass and concentration of contaminants expected to reach the receiving waters).
  - Segregating water by quality or source and reducing contaminant concentrations in water where possible.
  - Avoiding the accumulation of large volumes of contaminated water on-site.
  - Undertake a risk assessment that meets with DERM's requirements when sizing and designing storage dams.
  - Protecting groundwater resources from contamination.
  - Protecting the mine workings and infrastructure from floodwater inundation.
80. The management of mine affected water at the Rolleston Mine using methods such as desalination or purification, and not dams or ponds may require the EA holder to amend conditions of the current EA.

81. Any amendment to implement measures such as desalination or purification may also require the EA holder to make amendments to the associated Environmental Management Plan (EM Plan) and Water Management Plan (WM Plan) to detail how the environmental impacts of these methods will be managed by the mine.
82. Any amendment that would constitute a significant increase in harm would be subject to public notification.
83. The use of a desalination or purification plant does have potential additional environmental impacts such as brine generation, which must be effectively managed to minimise the risk of brine being released to the environment either through uncontrolled releases or through seepage from containment structures. This is one specific issue that must be considered should the Rolleston Mine decide to implement such measures to manage mine affected water.
84. Also, when making the decision to amend an EA under the EP Act, DERM must consider the "Standard Criteria" (ASB-R09-01) as specified in Schedule 4 of the EP Act. Furthermore, part 2 and 3 of the EP Regulation (ASB-R09-02) stipulate requirements for all environmental management decisions and additional regulatory considerations with respect to potential emissions from proposed activities.
85. DERM defines brine as saline water with a total dissolved solid concentration greater than 40,000 milligrams per litre. For comparison, good quality drinking water has total dissolved solids values of up to 500 milligrams per litre. The total dissolved solids value of sea water is between 36,000 and 38,000 milligrams per litre.
86. If desalination or purification was to be implemented at the Rolleston Mine, storage options would need to be explored for containment of brine. Such storages would be required to be designed and constructed in accordance with the 'site water management' section of the document titled 'Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland' Department of Minerals and Energy, 1995 (ASB-R09-03).

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

Signed  .....  
Andrew Stuart Brier

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

 .....  
~~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]

**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](http://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

- 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](mailto:info@floodcommission.qld.gov.au).

A handwritten signature in blue ink, appearing to read 'C. Holmes', is positioned above a horizontal line.

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

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- 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](mailto:info@floodcommission.qld.gov.au).



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Commissioner  
Justice C E Holmes

**Environmental Authority (Mining Activities) Non Code Compliant Level 1  
Mining Project**  
**Permit<sup>1</sup> Number: MIM800090802 – Rolleston Coal Mine**

Section 258 - Environmental Protection Act 1994

Takes Effect From: 30 November 2009

**Details**

Permit Holder(s)	Name	Address
Principal Holder	Xstrata Coal Queensland Pty Ltd	Level 10, Riverside Centre 123 Eagle St BRISBANE QLD 4000
Joint Holder	ICRA Rolleston Pty Ltd	Level 15 Commonwealth Bank of Australia Building 240 Queen St BRISBANE QLD 4000
Joint Holder	Sumisho Coal Australia Pty Limited	Level 34 Central Plaza One BRISBANE QLD 4000

Activity(s)	Location(s)
Mining Lease	ML70307 MDL227

The anniversary date of the environmental authority is *10 December* each year.

The environmental authority is subject to the attached conditions of approval.



Delegate  
Environmental Protection Act 1994  
30 November 2009

<sup>1</sup> Permit includes licences, approvals, permits, authorisations, certificates, sanctions or equivalent/similar as required by legislation administered by the Department of Environment and Resource Management.

## Department Interest – General Environment

### Financial Assurance

- A1 Provide a financial assurance in the amount and form required by the administering authority prior to the commencement of activities proposed under this environmental authority.
- A2 The financial assurance is to remain in force until the administering authority is satisfied that no claim on the assurance is likely.

### Maintenance of Measures, Plant and Equipment

- A3 The holder must:
- install all measures, plant and equipment necessary to ensure compliance with the conditions of this environmental authority; and
  - maintain such measures, plant and equipment in a proper condition; and
  - operate such measures, plant and equipment in a proper manner.

### Monitoring

- A4 Record, compile and keep for a minimum of five (5) years all monitoring results required by this environmental authority and make available for inspection all or any of these records upon request by the administering authority.
- A5 Where monitoring is a requirement of this environmental authority, ensure that a competent person(s) conducts all monitoring.

### Storage and Handling of Flammable and Combustible Liquids

- A6 Spillage of all flammable and combustible liquids must be contained within an on-site containment system and controlled in a manner that prevents environmental harm (other than trivial harm) and maintained in accordance with Section 5.9 of AS 1940 - Storage and Handling of Flammable and Combustible Liquids of 1993.

### Definitions

- A7 Words and phrases used throughout this environmental authority are defined in the Definitions section. Where a definition for a term used in this environmental authority is sought and the term is not defined within this environmental authority, the definitions in the *Environmental Protection Act 1994*, its Regulations and Environmental Protection Policies must be used.

## Department Interest – Air

### Dust nuisance

- B1 Subject to Conditions B2 and B3 the release of dust or particulate matter or both resulting from the mining activity must not cause an environmental nuisance, at any sensitive or commercial place.
- B2 When requested by the administering authority, dust and particulate monitoring must be undertaken within a reasonable and practicable timeframe nominated by the administering authority to investigate any complaint (which is neither frivolous nor vexatious nor based on mistaken belief in the opinion of the authorised officer) of environmental nuisance at any sensitive or commercial place, and the results must be notified within fourteen (14) days to the administering authority following completion of monitoring.

### Odour nuisance

- B3 The release of noxious or offensive odour(s) or any other noxious or offensive airborne contaminant(s) resulting from the mining activity must not cause an environmental nuisance at any sensitive or commercial place.
- B4 When requested by the administering authority, odour monitoring must be undertaken within a reasonable and practicable timeframe nominated by the administering authority to investigate any complaint (which is neither frivolous nor vexatious nor based on mistaken belief in the opinion of the authorised officer) of environmental nuisance at any sensitive or commercial place, and the results must be notified within fourteen (14) days to the administering authority following completion of monitoring.

## Department 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 1 (Contaminant release points, sources and receiving waters) and depicted in Appendix 1 (Release points (RP) and monitoring points (MP) for Rolleston Coal Mine) of this environmental authority.

**Table 1 (Contaminant release points, sources and receiving waters)**

Release Point (RP)	Easting (GDA94)	Northing (GDA94)	Contaminant Source and Location	Monitoring Point	Receiving waters description
RP 1	643688	7297724	Booles Creek Discharge Point 1	End of pipe	Booles Creek
RP 2	646373	7294170	Meteor Creek Discharge Point 1	End of pipe	Meteor Creek
RP 3	644115	7295882	Environment Dam	Spillway	Booles Creek
RP 4	641432	7298357	Booles Creek Discharge Point 2	End of pipe	Booles Creek
RP 5	643974	7290327	Meteor Creek Discharge Point 2	End of pipe	Meteor Creek

**W3** The release of contaminants to waters must not exceed the release limits stated in Table 2 (Contaminant release limits) when measured at the monitoring points specified in Table 1 (Contaminant release points, sources and receiving waters) for each quality characteristic.

**Table 2 (Contaminant release limits)**

Quality Characteristic	Interim Release Limits until 30-NOV-2011	Future Release Limits from 1-DEC-2011	Monitoring frequency
Electrical conductivity (uS/cm)	1500	1000	Daily during release (the first sample must be taken within 2 hours of commencement of release)
pH (pH Unit)	6.6 (minimum) 9.0 (maximum)	6.5 (minimum) 9.0 (maximum)	Daily during release (the first sample must be taken within 2 hours of commencement of release)
Turbidity (NTU)	NA*	NA*	Daily during release* (first sample within 2 hours of commencement of release)
Suspended Solids (mg/L)	1200	Limit to be determined based on receiving water reference data and achievable best practice sedimentation control and treatment	Daily during release* (first sample within 2 hours of commencement of release)
Sulphate (SO <sub>4</sub> <sup>2-</sup> ) (mg/L)	1000	1000	Daily during release* (first sample within 2 hours of commencement of release)

Note: NA – not available, \* local trigger values need to be developed

**W4** The release of contaminants to waters from the release points must be monitored at the locations specified in Table 1 (Contaminant release points, sources and receiving waters) for each quality characteristics and at the frequency specified in Table 2 (Contaminant release limits) and Table 3 (Release contaminant trigger investigation levels).

**Table 3 (Release contaminant trigger investigation levels)**

Quality Characteristic	Trigger Levels (µg/L)	Monitoring Frequency
Aluminium	650	Within 2 hours of commencement of release and thereafter weekly during release
Arsenic	13	
Cadmium	0.2	
Chromium	3	
Copper	13	
Iron	520	
Lead	10	
Mercury	0.2	
Nickel	11	
Boron	370	
Cobalt	90	
Molybdenum	34	
Selenium	10	
Silver	1	
Uranium	1	
Vanadium	10	
Ammonia	900	
Nitrate	1100	
Petroleum hydrocarbons (C6-C9)	20	
Petroleum hydrocarbons (C10-C38)	100	
Zinc	8	

**Note:**

1. All metals and metalloids must be measured as total (unfiltered) and dissolved (filtered). Trigger levels for metals/metalloids apply if dissolved results exceed trigger.
2. The list of quality characteristics required to be monitored as per Table 3 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 it is determined that there is no need to monitor for certain individual quality characteristics these can be removed from Table 3.
3. SMD – slightly/moderately disturbed level of protection, guideline refers ANZECC & ARMCANZ (2000).
4. LOR – typical reporting for method stated. ICPMS/CV FIMS – analytical method required to achieve LOR.

- W5** If quality characteristics of the release exceed any of the trigger levels specified in Table 3 (Release contaminant trigger investigation levels) during a release event, the environmental authority holder must compare the downstream results in the receiving waters to the trigger values specified in Table 3 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 in Table 3 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 4 (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 4 (Contaminant release during flow events) for the contaminant release point(s) specified in Table 1 (Contaminant release points, sources and receiving waters).

**Table 4 (Contaminant release during flow events)**

Receiving water description	Release Point	Gauging station description	Easting (GDA94)	Northing (GDA94)	Minimum Flow In Receiving Water Required for a Release Event	Flow recording Frequency
Bootes Creek	RP 1	Bootes Creek Discharge Point 1	643888	7297724	0.75m³/s (750L/s)	Continuous (minimum daily)
Bootes Creek	RP 3	Environment Dam	644115	7295002		
Bootes Creek	RP 4	Bootes Creek Discharge Point 2	641432	7206357		
Meteor Creek	RP 2	Meteor Creek Discharge Point 1	640373	7294170	2.5m³/s (2500L/s)	
Meteor Creek	RP 5	Meteor Creek Discharge Point 2	643974	7290327		

- W0** Contaminant release flow rate must not exceed 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 1 (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:
- release commencement date/time;
  - expected release cessation date/time;
  - release point/s;
  - release volume (estimated);
  - receiving water/s including the natural flow rate; and
  - 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 of 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 Agency 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 2 (Contaminant release limits) are exceeded, the holder of the environmental authority must notify the administering authority within twenty-four (24) hours of receiving the results.
- W15** The authority holder must, within twenty-eight (28) days of a release that exceeds the conditions of this authority, provide a report to the administering authority detailing:
- a) the reason for the release;
  - b) the location of the release;
  - c) all water quality monitoring results;
  - d) any general observations;
  - e) all calculations; and
  - f) any other matters pertinent to the water release event.

#### **Monitoring of Water Storage Quality**

- W16** Water storages stated in Table 5 (Water storage monitoring) which are associated with the release points must be monitored for the water quality characteristics specified in Table 6 (Onsite water storage contaminant limits) at the monitoring locations and at the monitoring frequency specified in Table 5.

**Table 5 (Water storage monitoring)**

Water Storage Description	Easting (GDA94)	Northing (GDA94)	Monitoring Location	Frequency of Monitoring
Environment Dam	643833	7295779	Embankment	Quarterly
Pa Water Dam	643253	7296718	Embankment	
Sediment Dam 5	644003	7294574	Embankment	
Sediment Dam 6	644857	7294123	Embankment	
Meteor West PWD	641839	7290898	Embankment	
Onca Road PWD	641415	7298376	Embankment	
Spring Creek PWD	643999	7290058	Embankment	

**W17** In the event that waters storages defined in Table 5 (Water storage monitoring) exceed the contaminant limits defined in Table 6 (Onsite water storage contaminant limits), the holder of the environmental authority must implement measures, where practicable, to prevent access to waters by all livestock.

**Table 6 (Onsite water storage contaminant limits)**

Quality Characteristic	Test Value	Contaminant Limit
pH (pH unit)	Range	Greater than 4, less than 9.5 <sup>2</sup>
EC (µS/cm)	Maximum	5970 <sup>1</sup>
Sulphate (mg/L)	Maximum	1000 <sup>1</sup>
Aluminium (mg/L)	Maximum	6 <sup>1</sup>
Arsenic (mg/L)	Maximum	0.6 <sup>1</sup>
Cadmium (mg/L)	Maximum	0.01 <sup>1</sup>
Cobalt (mg/L)	Maximum	1 <sup>1</sup>
Copper (mg/L)	Maximum	1 <sup>1</sup>
Lead (mg/L)	Maximum	0.1 <sup>1</sup>
Nickel (mg/L)	Maximum	1 <sup>1</sup>
Zinc (mg/L)	Maximum	20 <sup>1</sup>

Note:

<sup>1</sup> Contaminant limit based on ANZECC & ARMICANZ (2000) stock water quality guidelines.

<sup>2</sup> Page 4.2-15 of ANZECC & ARMICANZ (2000) 'Soil and animal health will not generally be affected by water with pH in the range of 4-9'.

Note: Total measurements (infiltrant) must be taken and analysed. Soils at Rolleston are particularly alkaline sometimes producing run off above pH 9.

#### Receiving Environment Monitoring and Contaminant Trigger Levels

**W18** The quality of the receiving waters must be monitored at the locations specified in Table 8 (Receiving water upstream background sites and downstream monitoring points) and shown in Appendix 1 (Release points (RP) and monitoring points (MP) at Rolleston Coal Mine) for each quality characteristic and at the monitoring frequency stated in Table 7 (Receiving waters contaminant trigger levels).

**Table 7 (Receiving waters contaminant trigger levels)**

Quality Characteristic	Trigger Level	Monitoring Frequency
pH	6.5 – 8.0	Daily during the release
Electrical Conductivity (µS/cm)	315 (Bootes Creek) 500 (Meteor Creek)	
Suspended Solids (mg/L)	1170	
Sulphate (SO <sub>4</sub> <sup>2-</sup> ) (mg/L)	250	

**Table 8 (Receiving water upstream background sites and down stream monitoring points)**

Monitoring Point (MP)	Receiving Waters Location Description	Easting (GDA94)	Northing (GDA94)
Upstream Background Monitoring Points			
MP 1	Bootes Creek Upstream	638993	7295468
MP 2	Meteor Creek Upstream	643885	7290040
Downstream Monitoring Points			
MP 3	Bootes Creek Downstream	644141	7297437
MP 4	Meteor Creek Downstream	646677	7294504
MP 5	Bootes Creek Downstream	647001	7290451
MP 6	Meteor Creek Downstream	644310	7290101

**Notes:**

- The upstream monitoring point should be within 9km from the release point.
- the downstream point should not be greater than 6km from the release point.
- The data from background monitoring points must not be used where they are affected by releases from other mines.

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

1. 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
2. where the downstream results exceed the upstream results, complete an investigation in accordance with the ANZECC & ARMCANZ 2000 methodology, into the potential for environmental harm and provide a written report to the administering authority in the next annual return, outlining:
  - (i) details of the investigations carried out; and
  - (ii) actions taken to prevent environmental harm.

*NOTE: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with W19 2(ii) of this condition, no further reporting is required for subsequent trigger events for that quality characteristic.*

#### **Receiving Environment Monitoring Program (REMP)**

**W20** A REMP must be developed and implemented by 1 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 Meteor and Bootes Creeks and connected waterways within 10km downstream of the release.

- W21** The REMP must address (but not necessarily be limited to) the following:
- a) Description of potentially affected receiving waters including key communities and background water quality characteristics based on accurate and reliable monitoring data that takes into consideration any temporal variation (e.g. seasonality);
  - b) Description of applicable environmental values and water quality objectives to be achieved (i.e. as scheduled pursuant to the *Environmental Protection (Water) Policy 2009*);
  - c) Any relevant reports prepared by other governmental or professional research organisations that relate to the receiving environment within which the REMP is proposed;
  - d) Water quality targets within the receiving environment to be achieved, and clarification of contaminant concentrations or levels indicating adverse environmental impacts during the REMP;
  - e) Monitoring for any potential adverse environmental impacts caused by the release;
  - f) Monitoring of stream flow and hydrology;
  - g) Monitoring of toxicants should consider the indicators specified in Table 3 (Release contaminant trigger investigation levels) to assess the extent of the compliance of concentrations with water quality objectives and/or the ANZECC & ARMCANZ 2000 guidelines for slightly to moderately disturbed ecosystems;
  - h) Monitoring of physical chemical parameters as a minimum those specified in Table 2 (Contaminant release limits) (in addition to dissolved oxygen saturation and temperature);
  - i) Monitoring biological indicators (for macroinvertebrates in accordance with the AusRivas methodology) and metals/metalloids in sediments (in accordance with ANZECC & ARMCANZ 2000, BATLEY and/or the most recent version of AS5667.1 *Guidance on Sampling of Bottom Sediments*) for permanent, semi-permanent water holes and water storages;
  - j) The locations of monitoring points (including the locations specified in Table 8 (Receiving water upstream background sites and downstream monitoring points) which are background and downstream impacted sites for each release point);
  - k) The frequency or scheduling of sampling and analysis sufficient to determine water quality objectives and to derive site specific reference values within 2 years (depending on wet season flows) in accordance with the *Queensland Water Quality Guidelines 2006*. For ephemeral streams, this should include periods of flow irrespective of mine or other discharges;
  - l) Specify sampling and analysis methods and quality assurance and control;
  - m) Any historical datasets to be relied upon;
  - n) Description of the statistical basis on which conclusions are drawn; and
  - o) Any spatial and temporal controls to exclude potential confounding factors.
- W22** A report outlining the findings of the REMP, including all monitoring results and interpretations in accordance with Conditions W20 and W21 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 Reuse**

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

**Table 9 (Stock water release limits)**

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

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

**Table 10 (Irrigation water release limits)**

Quality characteristic	Units	Minimum	Maximum
pH	pH units	6.5	8.5
Electrical Conductivity	µS/cm	N/A	Site specific value to be determined in accordance with ANZECC & ARMCANZ (2000) Irrigation Guidelines and provided through an amendment process

- W25** Water contaminated by mining activity may be piped or trucked off the mining lease for the purpose of supplying water to a third party for the purpose of construction and/or road maintenance in accordance with the conditions of this environmental authority.
- W26** Water contaminated by mining activity may be piped or trucked for the purpose of supplying water to an adjoining mine in accordance with the conditions of this environmental authority. The volume, pH and electrical conductivity of water transferred to an adjoining mine must be monitored and recorded.

- W27** If the responsibility of water contaminated by mining activities (the water) is given or transferred to another person in accordance with conditions W23, W24, W25 or W26:
- a) the responsibility of the water must only be given or transferred in accordance with a written agreement (the third party agreement); and
  - b) include in the third party agreement a commitment from the person utilising the water to use water in such a way as to prevent environmental harm or public health incidences and specifically make the persons aware of the General Environmental Duty (GED) under section 319 of the *Environmental Protection Act 1994*, environmental sustainability of the water disposal and protection of environmental values of waters.

**Water General**

- W28** 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 2 hour of each other where possible; and
  - d) carried out on representative samples.
  - e) laboratory testing must be undertaken using a laboratory accredited (e.g. NATA) method of analysis.

*NOTE: Condition W28 b) 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.*

- W29** The release of contaminants directly or indirectly to waters must not:
- a) produce any visible discolouration of receiving waters; nor
  - b) 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.

**Annual Water Monitoring Reporting**

- W30** 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**

- W31** Temporarily destroying native vegetation, excavating, or placing fill in a watercourse, lake or spring necessary for and associated with mining operations must be undertaken in accordance with Department of Natural Resources and Water *Guideline - Activities in a Watercourse, Lake or Spring associated with Mining Activities*.

**Water Management Plan**

- W32** A Water Management Plan must be developed and implemented by 1 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.
- W33** The Water Management Plan must be developed in accordance with the administering authority's *Guideline for Preparing a Water Management Plan 2009* 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.

**W34** 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.

**W35** 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.

**Stormwater and Water sediment controls**

**W36** 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.

**W37** 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.

**W38** 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**

**W39** The hazard category of each dam must be determined by a suitably qualified and experienced person at least once in each two-year period.

**W40** Dams having a hazard category determined to be significant or high must be specifically authorised by an environmental authority.

**Fitzroy River Basin Study**

**W41** The administering authority and the holder of this environmental authority both acknowledge that the conditions for release of contaminants to Meteor and Bootes Creeks 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.

**Sewage effluent**

**W42** All effluent released from the treatment plant must be monitored at the frequency and for the parameters specified in Table 11 (Sewage effluent quality targets for dust suppression and irrigation).

**Table 11 (Sewage effluent quality targets for dust suppression and irrigation)**

Quality characteristics	Release limit	Units	Limit type	Monitoring frequency
5-day Biochemical Oxygen Demand (uninhibited)	5	mg/l	max	Quarterly
pH	6.5-8		range	Weekly
Free Chlorine Residual	1	mg/l	max	Quarterly
Faecal Coliforms, based on the average of a minimum of five samples collected	1000	Colonies per 100 millilitres	max	Quarterly

**W43** Sewage effluent used for dust suppression or irrigation must not exceed sewage effluent release limits defined in Table 11 (Sewage effluent quality targets for dust suppression and irrigation).

**W44** Sewage effluent from sewage treatment facilities must be reused or evaporated and must not be directly released from the sewage treatment plant to any waterway or drainage.

- W45** Septic systems may be constructed and used for the purposes, capacities and durations detailed in Table 12 (Temporary septic system requirements). No effluent from the septic systems is to be discharged from the licensed place and the locations of the facilities detailed in the Plan of Operations.
- W46** The sewage treatment facility including the effluent absorption trench area must be sized according to AS/NZS 1547:2000 "On-site domestic-wastewater management".
- W47** The subsurface irrigation of effluent must be carried out in a manner such that:
- a) vegetation is not damaged;
  - b) soil erosion and soil structure damage is avoided;
  - c) there is no surface ponding of effluent;
  - d) percolation of effluent beyond the plant root zone is minimised;
  - e) the capacity of the land to assimilate nitrogen, phosphorus, salts, organic matter as measured by oxygen demand and water is not exceeded; and
  - f) the quality of groundwater is not adversely affected.
- W48** Notices must be prominently displayed on any effluent disposal area warning the public that the area is irrigated with effluent. These notices must be maintained in a visible and legible condition.

**Table 12 (Temporary septic system requirements)**

Purpose	Maximum Equivalent Persons	Maximum Operating Period
Site Offices	10	18 months
Mine Infrastructure Area	30	18 Months
Dragline Construction Workforce Ablutions	85	18 Months
Coal Handling Plant Construction Ablutions	70	18 Months
Spring Creek Dam Site	20	18 Months
Meteor Creek Dams Site	20	18 Months
Coal Handling Control Room	5	Permanent
Train Loadout	5	Permanent

#### Groundwater

- W49** Groundwater levels must be monitored and groundwater draw down fluctuations in excess of 2m per year, not resulting from the pumping of licensed bores or natural variations, must be notified within fourteen (14) days to the administering authority following completion of monitoring.
- W50** The method of water sampling required by this environmental authority must comply with that set out in the latest edition of the administering authority's Water Quality Sampling Manual or an alternative method as agreed in writing by the administering authority.

## Department Interest – Noise and vibration

### Noise nuisance

- D1** Subject to Conditions D2 and D3 noise from the mining activity must not cause an environmental nuisance, at any sensitive or commercial place excluding dwellings located within mining lease 70307.
- D2** When requested by the administering authority, noise monitoring must be undertaken within a reasonable and practicable timeframe nominated by the administering authority to investigate any complaint (which is neither frivolous nor vexatious nor based on mistaken belief in the opinion of the authorised officer) of environmental nuisance at any sensitive or commercial place, and the results must be notified within fourteen (14) days to the administering authority following completion of monitoring.
- D3** Monitoring must include:
- (i) LA, max adj, T ;
  - (ii) the level and frequency of occurrence of impulsive or tonal noise;
  - (iii) atmospheric conditions including wind speed and direction; and
  - (iv) location, date and time of recording.
- D4** The method of measurement and reporting of noise levels must comply with the latest edition of the administering authority's Noise Measurement Manual or other method as agreed in writing by the administering authority.

### Vibration and Airblast overpressure nuisance

- D5** Blasting must only be conducted during daylight hours.
- D6** Vibration and airblast overpressure from the mining activity must not cause an environmental nuisance, at any sensitive or commercial place.
- D7** When requested by the administering authority, vibration monitoring must be undertaken within a reasonable and practicable timeframe nominated by the administering authority to investigate any complaint (which is neither frivolous nor vexatious nor based on mistaken belief in the opinion of the authorised officer) of environmental nuisance at any sensitive or commercial place, and the results must be notified within fourteen (14) days to the administering authority following completion of monitoring.

**D8** If the environmental authority holder can provide evidence through monitoring that the limits defined in Table 13 (Airblast overpressure and vibration limits) are not being exceeded then the holder is not in breach of Condition D6. Monitoring must include:

- a) location of the blast(s) within the mining area (including which bench level);
- b) atmospheric conditions including temperature, relative humidity and wind speed and direction; and
- c) location, date and time of recording.

**Table 13 (Airblast overpressure and vibration limits)**

Parameter	Threshold Value
Airblast Overpressure	115 db (linear peak) for four (4) out of five (5) consecutive blasts initiated and not greater than 120 db (Linear peak) at any time
Vibration	Not greater than 10 mm/s peak particle velocity at any time

NOTE: The method of measurement and reporting of vibration levels must comply with the latest edition of the administering authority's vibration and air blast overpressure monitoring guideline.

## Department Interest – Waste

### General

**E1** A waste management plan must be developed and implemented in accordance with the *Environmental Protection (Waste Management) Policy 2000*.

### Storage and Disposal of tyres

- E2** Tyres stored awaiting disposal or transport for take-back and recycling or waste-to-energy options should be stockpiled in volumes less than three (3) metres in height and two hundred (200) square metres in area and at least ten (10) metres from any other tyre storage area.
- E3** All reasonable and practicable fire prevention measures must be implemented, including removal of grass and other materials within a ten (10) metre radius of the scrap tyre storage area.
- E4** Disposing of scrap tyres resulting from the mining activities in spoil emplacements is acceptable, provided tyres are placed as deep in the spoil as reasonably practicable.
- E6** Scrap tyres resulting from the mining activities disposed within the operational land must not impede saturated aquifers or compromise the stability of the consolidated landform.

## Department Interest – Land

### Vegetation communities

**F1** Strategies to manage the impact on significant vegetation communities (endangered or of concern Sattler & Williams 2001) must be implemented during the continuation of this authority.

**F2** In order to compensate the likely loss of approximately 118 hectares of native Bluegrass (*Dicanthium* spp.) on the Mining Lease (ML):

- the part of the ML area nominated by the environmental authority holder for Bluegrass re-establishment will be approximately 130 hectares;
- the re-establishment of the Bluegrass area shall be undertaken so that:
  - (i) the Bluegrass re-establishment is to occur progressively commencing within eighteen (18) months of an area becoming available for rehabilitation after mining; and
  - (ii) the area is managed as a sustainable Bluegrass community during the life of the mine.
- the success of the re-establishment and ongoing viability of the Bluegrass community to be monitored and reported to the administering authority.
- The success criteria to be applied to the Bluegrass establishment and management are to be established by the administering authority, in consultation with Environment Australia and the environmental authority holder.

**NOTE:** For the purpose of Condition F2:

*"approximately" can be taken to mean 95% or more; and*

*"native Bluegrass" has the meaning "Dichanthium sericeum grassland +/- emergent trees (e.g. Eucalyptus argophylla, E. melanophylla and Corymbia erythrophylla) or open woodland.*

**NOTE:** For the purpose of Condition F2, the nominated area for Bluegrass re-establishment is defined on Appendix 2 (Map of bluegrass re-establishment area on ML70307) as "Bluegrass Rehab Areas".

**F3** Prior to surrender of the Mining Lease and upon completion of rehabilitation requirements of the environmental authority, the environmental authority holder shall make provision for continued protection of the Bluegrass re-establishment area.

**F4** The environmental authority holder will compile a Cover Material Management Plan for the mine prior to the commencement of mining activities under the Mining Lease.

**F5** The environmental authority holder will develop a Weed and Pest Management Plan (WPMP) for the Mining Lease area in consultation with local NR&M and BSC Land Protection Officers within ninety (90) days of commencement of mining activities under the ML.

**Rehabilitation landform criteria**

**F6** All areas significantly disturbed by mining activities must be rehabilitated to a stable landform with a self-sustaining vegetation cover in accordance with Table 14 (Final land use and rehabilitation approval schedule) and Table 15 (Landform design).

**Table 14 (Final land use and rehabilitation approval schedule)**

	Disturbance type					
	Residual Void(s)	Waste rock dump(s)	Infra-structure	ROM area(s)	Road(s) and track(s)	Riparian Areas
Projective surface area (ha)	175	2225	16	25	55	9
Map reference (refer schedule I)	Based on Figure 20.1 Supp. EIS					
Reference site (optional)	Refer to condition F10					
Post mine land use / description	none / void	native bluegrass (approx 130ha or more) and woodland	native woodland	native woodland	native woodland	Riparian Areas
Post mine land suitability classification	5	3	2 to 3	2	2 to 3	2 to 3
Projective cover range (%)	None	Refer to condition F10				
Species mix	None	Refer to condition F10				

**F7** Progressive rehabilitation must commence within eighteen (18) months of when areas larger than five (5) hectares become available within the operational land.

**F8** Overburden material must be monitored for EC, pH and ESP prior to mining in order to identify problematic materials and enable selective handling of spoil.

**F9** Sufficient cover material must be salvaged for strategic use in rehabilitation.

**F10** Complete an investigation into rehabilitation of disturbed areas and submit a report to the administering authority proposing acceptance criteria to meet the outcomes in Table 14 (Final land use and rehabilitation approval schedule) and landform design criteria in Table 15 (Landform design) three (3) years after seeding of relevant rehabilitation areas.

**Table 15 (Landform design)**

Disturbance type	Landform design criteria	Projective surface area (ha)
Residual Void(s)	<ul style="list-style-type: none"> <li>Low wall – angle of repose</li> <li>High wall to remain as mined where stable</li> </ul>	175
Waste rock dump(s)	<ul style="list-style-type: none"> <li>&lt;15% slope on external slopes</li> <li>sodic spoil (as defined in the EIS) covered with greater than or equal to 0.5 m benign material</li> <li>minimum 150mm, average 200mm cover material</li> </ul>	2226
Infrastructure and Camp(s)	<ul style="list-style-type: none"> <li>&lt;5% slope</li> <li>minimum 150mm, average 200mm cover material</li> </ul>	18
ROM area(s)	<ul style="list-style-type: none"> <li>&lt;5% slope</li> <li>minimum 150mm, average 200mm cover material</li> </ul>	25

NOTE: Highwall stability is to be assessed by a competent 3rd party who is a member of a credible accreditation body (e.g. National professional engineers register)

#### Residual void outcome

**F11** Residual voids must comply with the following outcomes:

- residual voids must not cause environmental harm to land, surface waters or any recognised groundwater aquifer, other than the environmental harm constituted by the existence of the residual void itself and subject to any other condition within this environmental authority; and
- residual voids must comply with Table 16 (Residual void design).

**F12** Complete an investigation into residual voids and submit a report to the administering authority proposing acceptance criteria to meet the outcomes in Condition F11 and landform design criteria in Table 16 (Residual void design), within 3 years of the creation of the first residual void.

**Table 16 (Residual void design)**

Void Identification	Void wall - competent rock max slope (°)	Void wall - incompetent rock max slope (°)	Void maximum surface area (ha)
Meteor Creek Pit	65 to 75°	37 to 45°	117
Booles Creek Pit	65 to 75°	37 to 45°	44
Spring Creek Pit	65 to 75°	37 to 45°	12

#### Infrastructure

**F13** All infrastructure, constructed by or for the environmental authority holder during the mining activities including water storage structures, must be removed from the site prior to mining lease surrender, except where agreed in writing by the post mining land owner / holder and the administering authority.

NOTE: This is not applicable where the landowner / holder is also the environmental authority holder.

**Exploration**

**F14** Exploration activities must be conducted in accordance with the Code of Environmental Compliance for exploration and mineral development projects.

**F15** On MDL 227, only "standard exploration activities" are permitted.

**Department Interest – Community**

**Complaint response**

**G1** All complaints received must be recorded including details of complainant, reasons for the complaint, investigations undertaken, conclusions formed and actions taken. This information must be made available for inspection by the administering authority on request.

## Definitions

"acceptance criteria" means the measures by which the actions implemented to rehabilitate the land are deemed to be complete. The acceptance criteria indicate the success of the rehabilitation outcome or remediation of areas which have been significantly disturbed by the mining activities. Acceptance criteria may include information regarding:

- vegetation establishment, survival and succession;
- vegetation productivity, sustained growth and structure development;
- fauna colonisation and habitat development;
- ecosystem processes such as soil development and nutrient cycling, and the recolonisation of specific fauna groups such as collembola, mites and termites which are involved in these processes;
- microbiological studies including recolonisation by mycorrhizal fungi, microbial biomass and respiration;
- effects of various establishment treatments such as deep ripping, topsoil handling, seeding and fertiliser application on vegetation growth and development;
- resilience of vegetation to disease, insect attack, drought and fire; and
- vegetation water use and effects on ground water levels and catchment yields.

"acid rock drainage" means any contaminated discharge emanating from a mining activity formed through a series of chemical and biological reactions, when geological strata is disturbed and exposed to oxygen and moisture as a result of mining activity.

"administering authority" means the Department of Environment and Resource Management or its successor.

"appropriately qualified person" means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relative to the subject matter using the relevant protocols, standards, methods or literature.

"airblast overpressure" means energy transmitted from the blast site within the atmosphere in the form of pressure waves. The maximum excess pressure in this wave, above ambient pressure is the peak airblast overpressure measured in decibels linear (dB).

"ambient (or total) noise" at a place, means the level of noise at the place from all sources (near and far), measured as the Leq for an appropriate time interval.

"competent person" means a person with the demonstrated skill and knowledge required to carry out the task to a standard necessary for the reliance upon collected data or protection of the environment.

"authority" means environmental authority (mining activities) under the *Environmental Protection Act 1994*.

"BSC" means the Bauhinia Shire Council or any authority serving the same function as this body at the time of writing.

"blasting" means the use of explosive materials to fracture-

- (a) rock, coal and other minerals for later recovery; or
- (b) structural components or other items to facilitate removal from a site or for reuse.

"commercial place" means a place used as an office or for business or commercial purposes, other than a place within the boundaries of the operational land.

"dam" means a land-based structure or a void that is designed to contain, divert or control flowable substances, and includes any substances that are thereby contained, diverted or controlled by that land-based structure or void and associated works. However, a dam does *not* mean a fabricated or manufactured tank or container designed to a recognised standard, *nor* does a dam mean a land-based structure where that structure is designed to an Australian Standard. In case there is any doubt, a levee (dyke or bund) is a dam, but (for example) a bund designed for spill containment to AS1940 is *not* a dam.

"environmental authority" means an environmental authority granted in relation to an environmentally relevant activity under the *Environmental Protection Act 1994*.

"environmental authority holder" means the holder of this environmental authority.

"Environmental Impact Statement" or "EIS" means the document "Rolleston Coal Mine Environmental Impact Statement, August 2002".

"flowable substance" means matter or a mixture of materials which can flow under any conditions potentially affecting that substance. Constituents of a flowable substance can include water, other liquids, fluids or solids, or a mixture that includes water and any other liquids, fluids or solids either in solution or suspension.

"hazard" in relation to a dam as defined, means the potential for environmental harm resulting from the collapse or failure of the dam to perform its primary purpose of containing, diverting or controlling flowable substances.

"hazard category" means a category, either low significant or high, into which a dam is assessed as a result of the application of tables and other criteria in the Site Water Management Technical Guideline for Environmental Management of Exploration and Mining in Queensland (DME 1995).

"hazardous waste" means any substance, whether liquid, solid or gaseous, derived by or resulting from, the processing of minerals that tends to destroy life or impair or endanger health.

" $L_{A10, adj, 10 mins}$ " means the A-weighted sound pressure level (adjusted for tonal character and impulsiveness of the sound) exceeded for 10% of any 10-minute measurement period, using Fast response.

" $L_{A1, adj, 10 mins}$ " means the A-weighted sound pressure level (adjusted for tonal character and impulsiveness of the sound) exceeded for 1% of any 10-minute measurement period, using Fast response.

" $L_{A, max (adj, T)}$ " means the average maximum A-weighted sound pressure level adjusted for noise character and measured over any 10 minute period, using Fast response.

"land" in the "land schedule" of this document means land excluding waters and the atmosphere.

"land capability" as defined in the DME 1995 Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland.

"land suitability" as defined in the DME 1995 Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland.

"land use" term to describe the selected post mining use of the land, which is planned to occur after the cessation of mining operations.

"mandatory reporting level" means the volume below the spillway crest, equivalent to the lower of the AEP, 72 hour storm or the AEP wave allowance (AEP is the annual exceedance probability).

"mineral" means a substance which normally occurs naturally as part of the earth's crust or is dissolved or suspended in water within or upon the earth's crust and includes a substance which may be extracted from such a substance, and includes—

- (a) clay if mined for use for its ceramic properties, kaolin and bentonite;
- (b) foundry sand;
- (c) hydrocarbons and other substances or matter occurring in association with shale or coal and necessarily mined, extracted, produced or released by or in connection with mining for shale or coal or for the purpose of enhancing the safety of current or future mining operations for coal or the extraction or production of mineral oil therefrom;
- (d) limestone if mined for use for its chemical properties;
- (e) marble;
- (f) mineral oil or gas extracted or produced from shale or coal by in situ processes;
- (g) peat;
- (h) salt including brine;
- (i) shale from which mineral oil may be extracted or produced;
- (j) silica, including silica sand, if mined for use for its chemical properties;

- (k) rock mined in block or slab form for building or monumental purposes;  
but does not include—
- (l) living matter;
- (m) petroleum within the meaning of the *Petroleum Act 1923*;
- (n) soil, sand, gravel or rock (other than rock mined in block or slab form for building or monumental purposes)  
to be used or to be supplied for use as such, whether intact or in broken form;
- (o) water.

"natural flow" means the flow of water through waters caused by nature.

"NR&M" means the Queensland Department of Natural Resources and Mines or future Government agency performing the function of this department at time of writing.

"noxious" means harmful or injurious to health or physical well being, other than trivial harm.

"offensive" means causing reasonable offence or displeasure; is disagreeable to the sense; disgusting, nauseous or repulsive, other than trivial harm.

"peak particle velocity (ppv)" means a measure of ground vibration magnitude which is the maximum rate of change of ground displacement with time, usually measured in millimetres/second ( $\text{mms}^{-1}$ ).

"protected area" means - a protected area under the *Nature Conservation Act 1992*; or  
- a marine park under the *Marine Parks Act 2004*; or  
- a World Heritage Area.

"progressive rehabilitation" means rehabilitation (defined below) undertaken progressively or a staged approach to rehabilitation as mining operations are ongoing.

"receiving environment" means all groundwater, surface water, land and sediments that are not disturbed areas authorised by this environmental authority.

"receiving waters" means all groundwater and surface water that are not disturbed areas authorised by this environmental authority.

"reference site" (or analogue site) may reflect the original location, adjacent area or another area where rehabilitation success has been completed for a similar biodiversity. Details of the reference site may be as photographs, computer generated images and vegetation models etc.

**"rehabilitation"** the process of reshaping and revegetating land to restore it to a stable landform and in accordance with the acceptance criteria set out in this environmental authority and, where relevant, includes remediation of contaminated land.

**"representative"** means a sample set which covers the variance in monitoring or other data either due to natural changes or operational phases of the mining activities.

**"residual void"** means an open pit resulting from the removal of ore and/or waste rock which will remain following the cessation of all mining activities and completion of rehabilitation processes.

**"saline drainage"** means the movement of waters, contaminated with salt(s), as a result of the mining activity.

**"self-sustaining"** means an area of land which has been rehabilitated and has maintained the required acceptance criteria without human intervention for a period nominated by the administering authority.

**"significant disturbance"** — includes land:

- (a) if it is contaminated land; or
- (b) it has been disturbed and human intervention is needed to rehabilitate it:
  - i. to a state required under the relevant environmental authority; or
  - ii. if the environmental authority does not require the land to be rehabilitated to a particular state — to its state immediately before the disturbance.

Some examples of disturbed land include:

- areas where soil has been compacted, removed, covered, exposed or stockpiled;
- areas where vegetation has been removed or destroyed to an extent where the land has been made susceptible to erosion (vegetation & topsoil);
- areas where land use suitability or capability has been diminished;
- areas within a watercourse, waterway, wetland or lake where mining activities occur;
- areas submerged by tailings or hazardous contaminant storage and dam walls in all cases;
- areas under temporary infrastructure. Temporary infrastructure includes any infrastructure (roads, tracks, bridges, culverts, dams, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads etc) which is to be removed after mining activities have ceased; or
- areas where land has been contaminated and a suitability statement has not been issued.

However, the following areas are not included:

- areas off lease (e.g. roads or tracks which provide access to the mining lease);
- areas previously significantly disturbed which have achieved the rehabilitation outcomes;
- by agreement with the administering authority, areas previously significantly disturbed which have not achieved the rehabilitation objective(s) due to circumstances beyond the control of the mine operator (such as climatic conditions);

- areas under permanent infrastructure. Permanent infrastructure includes any infrastructure (roads, tracks, bridges, culverts, dams, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads etc) which is to be left by agreement with the landowner. The agreement to leave permanent infrastructure must be recorded in the Landowner Agreement and lodged with the administering authority;
- disturbances that pre-existed the grant of the tenure unless those areas are disturbed during the term of the tenure.

**"sensitive place"** means:

- a dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises;
- a motel, hotel or hostel;
- an educational institution;
- a medical centre or hospital;
- a protected area under the *Nature Conservation Act 1992*, the *Marine Parks Act 2004* or a World Heritage Area; or
- a public park or gardens; or
- a place used as a workplace, an office or for business or commercial purposes which is not part of the mining activity and does not include employees accommodation or public roads.

**"spillway"** means passage or outlet from the dam through which surplus water flows.

**"stable"** means geotechnical stability of the rehabilitated landform where instability related to the excessive settlement and subsidence caused by consolidation / settlement of the wastes deposited, and sliding / slumping instability has ceased.

**"standard exploration activity"** means the following criteria found in the *Code of Environmental Compliance for Exploration and Mineral Development Projects*:

- (1) the mining activities do not, or will not, cause more than 10 ha of any land to be Significantly Disturbed\* at any one time;
- (2) no more than 5000 m<sup>2</sup> are disturbed at any campsite at any one time;
- (3) no more than 20 m<sup>3</sup> of any substance is extracted from each kilometre of any riverine area in any one year;
- (4) the mining activities are not, or will not be, carried out in a category A or B Environmentally Sensitive Area\*;
- (5) the mining activities do not include a level 1 environmentally relevant activity.

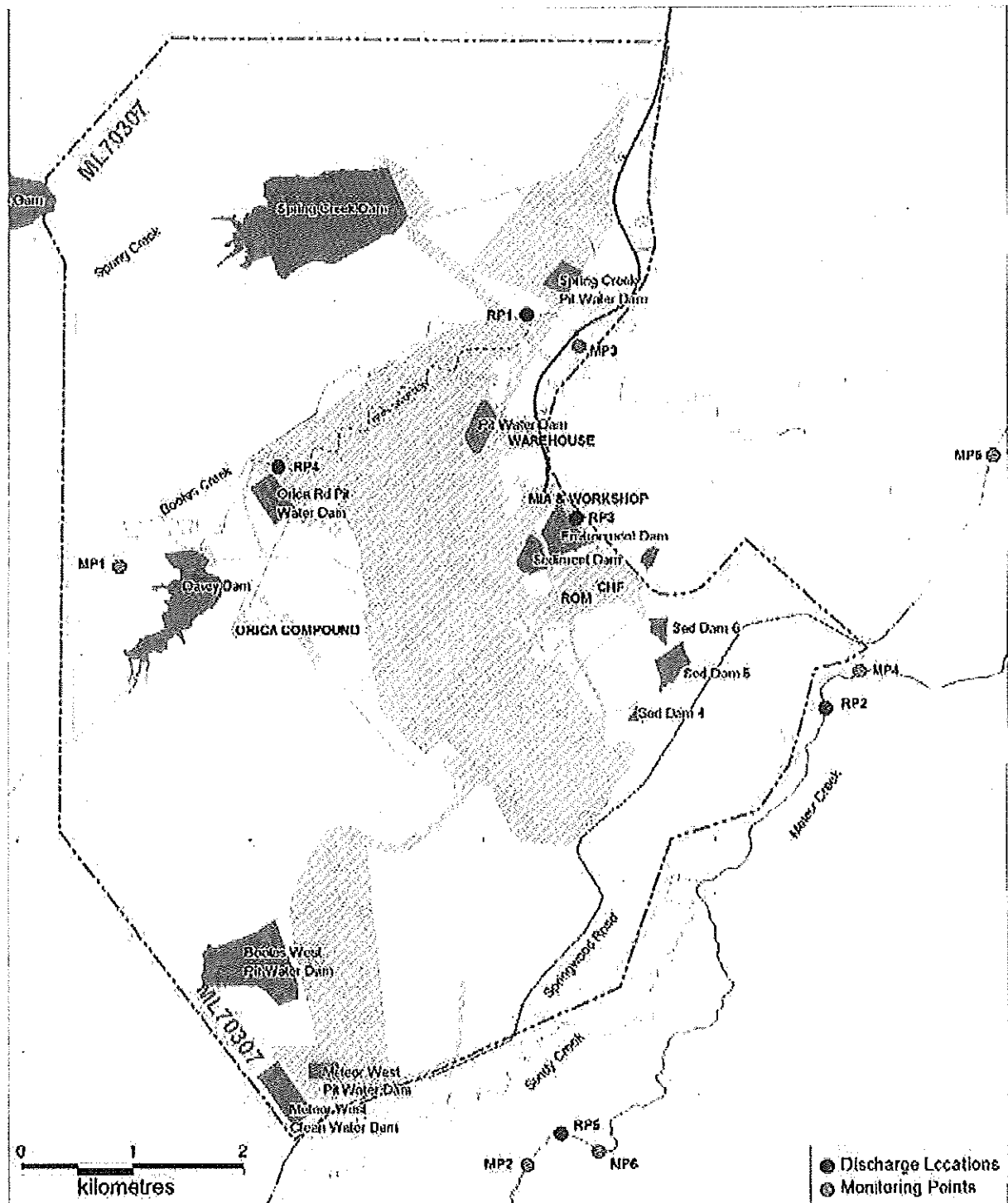
**"supplementary report"** means the report titled "Rolliston Coal Project Supplementary EIS, November 2002".

**"trivial harm"** means environmental harm which is not material or serious environmental harm and will not cause actual or potential loss or damage to property of an amount of or amounts totalling more than \$5,000.

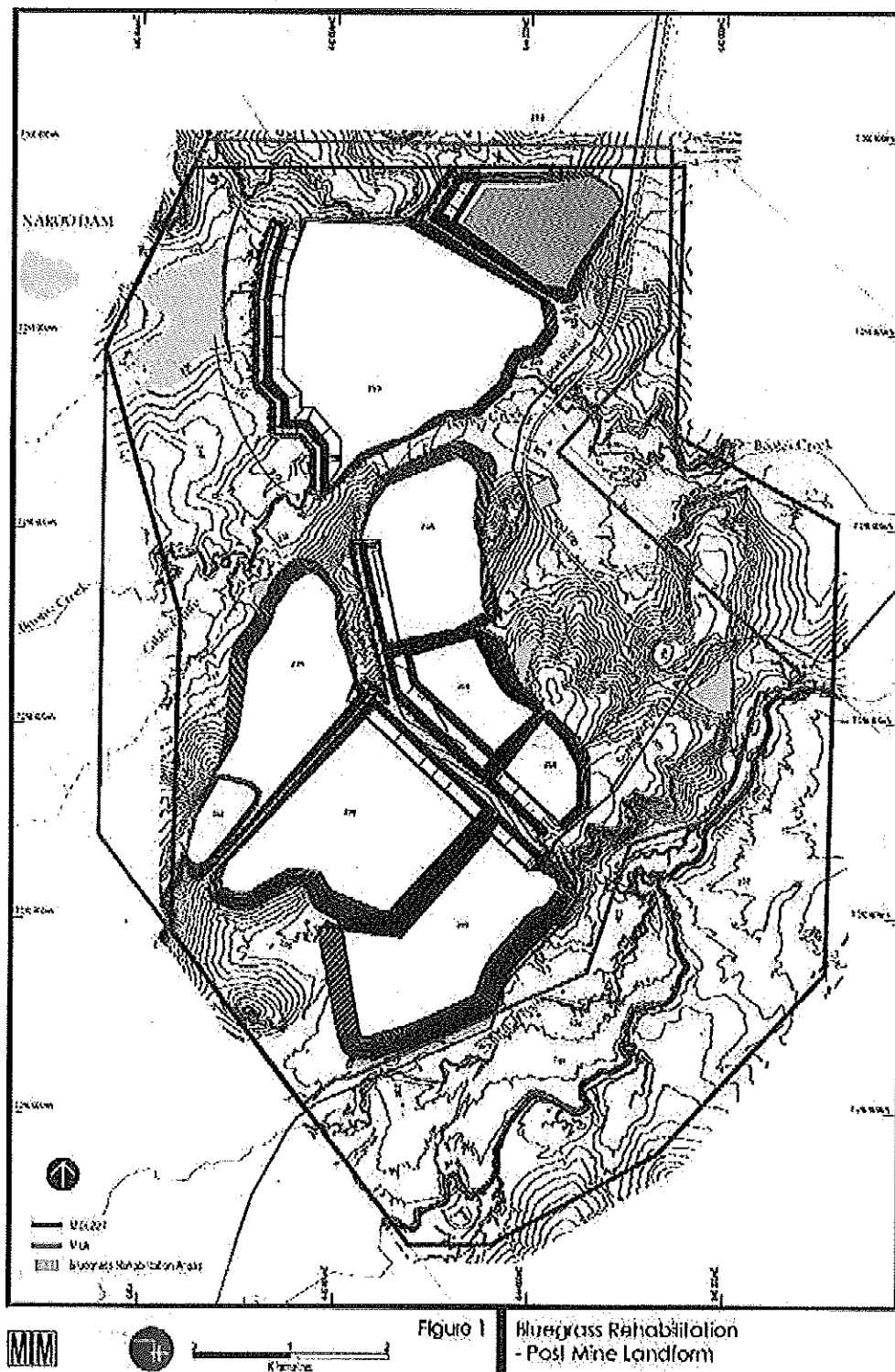
"20th percentile flow" means the 20th percentile of all daily flow measurements (or estimations) of daily flow over a 10 year period for a particular site. The 20th percentile calculation should only include days where flow has been measured (or estimated), i.e. not dry weather days.

"waters" includes river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined water natural or artificial watercourse, bed and bank of any waters, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, and groundwater and any part thereof.

Appendix 1 (Release points (RP) and monitoring points (MP) at Rolleston Coal Mine)



Appendix 2 (Map of bluegrass re-establishment area on ML70307)



END OF ENVIRONMENTAL AUTHORITY

CA

File/Ref

[Insert Date]

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

[CC: Name]

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. [REDACTED]].

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  
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ABN 46 640 294 485

# Rolleston Coal

## Water Management Plan



# Rolleston Coal

## Water Management Plan

Prepared for

Xstrata Coal

Prepared by

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24 November 2010

60103576

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## Quality Information

Document Rolleston Coal

Ref 60103576

Date 24 November 2010

Prepared by

Reviewed by

### Revision History

Revision	Revision Date	Details	Authorised	
			Name/Position	Signature
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## Table of Contents

Executive Summary	i
1.0 Introduction	1
1.1 Background	1
1.1.1 Site Description	1
1.1.2 2010 Floods	3
1.1.3 DERM Requirements	3
1.2 Objectives	3
1.3 Water Management Strategy	5
2.0 Available Data	6
2.1 Previous Investigations	6
2.2 Climate Data	8
2.2.1 Historical Climate Data	8
2.2.2 Design Rainfall	8
2.2.3 Data Drill	9
2.3 Stream Gauging Data	9
2.4 Flood Models	9
2.5 Hydraulics	9
2.6 Geotechnical Data	9
2.7 Site Data	10
2.8 Topographical Data	10
2.8.1 Survey Data	10
2.8.2 Mining Plan	10
3.0 Methodology	11
4.0 Design Criteria	13
4.1 The Clean Water System	13
4.1.1 Flood Diversion Levees and Drains	13
4.1.2 Clean Water Levees and Drains	13
4.2 The Pit Water System	13
4.2.1 Pit Water Diversion Levees and Drains	13
4.2.2 Spoil Sediment Dams	14
4.2.3 Hazardous Dams	14
4.3 The Sediment System	15
4.3.1 Sediment Dams	15
5.0 Water Quality Assessment	16
5.1 Receiving Environment	16
5.2 Environmental Values and Beneficial Uses	16
5.3 Background Water Quality – Surface Water	17
5.4 Background Water Quality – Groundwater	20
5.5 Environmental Impacts	23
5.5.1 Impacts of Discharged Waters	23
5.5.2 Groundwater Contamination and Drawdown	23
5.5.3 Accumulation of Salts and Metals	23
5.5.4 Cumulative Effects of Other Industries Discharging into the Waterways	23
6.0 Contaminant Source Study	24
7.0 Water Balance Model	25
7.1 AWBM Model	25
7.1.1 Overview	25
7.1.2 Model Setup	25
7.1.3 Calibration	25
7.1.4 Verification	26
7.1.5 Historical Runoff Sequence	27
7.1.6 Yield Analysis	28
7.2 GoldSim Water Balance Model	29
7.2.1 Overview	29
7.2.2 Model Setup	1

	7.2.3	Storages	1
	7.2.4	Groundwater Inflow	5
	7.2.5	Losses	5
	7.2.6	Demands	6
	7.2.7	Controlled Releases	6
	7.2.8	Water Balance Results	7
8.0		Water Management System	9
	8.1	Objectives	9
	8.2	Existing Mine Water Management System	9
	8.2.1	Existing Pits	9
	8.2.2	Existing Pit Water Storage	9
	8.2.3	Existing Pumps and Pipelines	11
	8.2.4	Operation of Existing Infrastructure	11
	8.3	Clean Water Management System	11
	8.3.1	Overview	11
	8.3.2	Raw Water Storages	12
	8.3.3	Flood Diversions	12
	8.3.4	Clean Water Diversions	12
	8.4	Pit Water Management System	13
	8.4.1	Overview	13
	8.4.2	Pit Water Storage	13
	8.4.3	Pit water transfers	13
	8.4.4	Operation of Mine Water Releases	14
	8.4.5	Sediment Dams	18
	8.4.6	Diversions	18
	8.5	Sediment Water Management System	18
	8.6	Water Management Plans	19
	8.6.1	Overview	19
	8.6.2	2012 Water Management Plan	19
	8.6.3	2016 Water Management Plan	23
	8.6.4	2021 Water Management Plan	26
	8.7	Emergency and Contingency Planning	29
	8.8	Responsibilities, Monitoring and Review	31
	8.8.1	Responsibilities	31
	8.8.2	Compliance Water Monitoring	34
	8.8.3	Recommendations for Additional Water Monitoring	34
	8.8.4	Review Procedures	35
9.0		Conclusions and Recommendations	37
	9.1	Conclusions	37
	9.2	Recommendations	39
10.0		References	40
Appendix A			
	Storage Contaminant Levels.....		A
Appendix B			
	Hazardous Dam Calculations .....		B
Appendix C			
	Civil Design.....		C
Appendix D			
	Particle Size Distribution.....		D
Appendix E			
	Water Quality Parameters.....		E
Appendix F			
	Groundwater Quality Parameters.....		F

Appendix G	
Schedule of Infrastructure .....	G
Appendix H	
Hydrology.....	H
Appendix I	
Contaminant Source Study .....	I
Appendix J	
Emergency and Contingency Guidelines .....	J
Appendix K	
Environmental Authority .....	K
Appendix L	
Water Management Plans .....	L

## Executive Summary

### Context and Objectives

AECOM Australia Pty Ltd has been commissioned by Rolleston Coal to develop a Water Management Plan (WMP) for its operations. A WMP is required to comply with Condition W32 of Rolleston Coal's current Environmental Authority MIM800090802 (EA) issued by the Department of Environment and Resource Management (DERM).

Rolleston Coal's approach to water management on site aims broadly to:

- separate the water collected on site into three distinct systems:
  - a clean water system which diverts clean water around the pits and operations areas of the mine;
  - a pit water system to isolate and reduce the pit water catchment and storage volume; and
  - a sediment system to collect and treat runoff from rehabilitated areas prior to discharge,
- minimise the pit water catchment and resulting storages required;
- optimise the reuse of pit water on site; and
- protect the pits and other infrastructure from flooding.

This WMP describes the water management infrastructure needed on site to achieve the water management objectives.

The WMP is based on the water storage balance calculated for the mine plans in 2012, 2016 and 2021. This ensures that the infrastructure needed to provide for effective water management in the short, medium and long term is identified.

The WMP has been developed in accordance with the guideline *Preparation of a water management plan for mining activities (2009)* issued by the Department of Environment and Resource Management (DERM). It includes consideration of:

- a Contaminant Source Study undertaken by Rolleston Coal;
- current emergency and contingency planning and whether any improvements are required; and
- responsibilities, monitoring and review procedures.

### Summary of Findings

In accordance with the guideline, *Preparation of water management plan for mining activities (2009)*, the following were undertaken:

- A review of orthophotos and topographic maps in conjunction with the Fitzroy ROP to determine the Environmental Values for the region and downstream beneficial uses: it was determined that farm use, stock watering and aquatic ecosystem protection are the Environmental Values for Meteor Creek. Electrical Conductivity, pH, and Suspended Solids are the main pollutants that may affect these values. These are managed by containing the pit water catchment within levees and drains for collection and treatment in the pit water system. These pollutants are discharged to the environment only under controlled releases in accordance with the EA to prevent downstream impacts.
- Contaminant Source Studies: various contaminant sources were identified in the different precincts on the site, however it was determined that the spoil which is slightly saline and exhibits moderate to high sodicity and dispersive qualities is the biggest contributor in the form of Electrical Conductivity, pH, and Suspended Solids. These are managed by constructing sediment dams within the spoil to prevent runoff to the environment and to assist the removal of suspended solids from the runoff before collecting in the pit water system. Pit water is used preferentially on site for operational usage such as haul road dust suppression, irrigation and released only under controlled conditions in accordance with EA.
- Review of existing water quality results: currently background water quality parameters exceed the guideline values for ecosystem protection (ANZECC, 2000 and Queensland Water Quality Guidelines – DERM (2009)) for slightly to moderately disturbed systems. Water quality in the pits is better than that of the background water quality and meets the criteria for stock watering, therefore maximising release opportunities is possible. As a result, the impact of mining activities by Rolleston Coal on the receiving waters is expected to be minor.

### Water Balance

Site water balance calculations were made having regard to:

- losses from evaporation and seepage;
- losses from site demands including from the coal handling facility, irrigation, dust suppression and controlled releases to the environment; and
- inflows from groundwater and a range of potential rainfall intensities.

The water balance for each mine plan over a range of rainfall intensities is summarised in Table 1.

Table 1 Summary of Site Water Balance (ML/year) for Mine Plans over a Range of Annual Rainfall Intensities

	20 <sup>th</sup> Percentile	50 <sup>th</sup> Percentile	80 <sup>th</sup> Percentile	95 <sup>th</sup> Percentile
2012 Mine Plan	-282	2	6	1,590
2016 Mine Plan	-6	5	11	1,158
2021 Mine Plan	-299	-21	24	87

The site water balance takes maximum advantage of release opportunities based on trigger values of flows in the receiving creeks and electrical conductivity trigger concentrations as stipulated in the EA, and the release flow is limited to 1000 l/s based on the design of the new Meteor West discharge pipeline. These discharges do not reach the EA prescribed limit of 20% of the flow in the receiving waters. Maximum advantage is taken of the fact that the water quality in the pits meets the EA water release limits for reuse for stock watering and irrigation, therefore, no water is sent off site other than for controlled releases.

The 95<sup>th</sup> percentile rainfall year is where Rolleston aim to achieve system reliability to prevent water accumulating in the pits and taking an averaged demand of 250ML/year for irrigation use, the overall balance is a surplus of pit water. Annual rainfall of this intensity is the same as the heavy rainfall resulting from ex-tropical cyclone Olga which caused significant flooding on site in early 2010.

Through the 100 year sequence that was modelled for a 95<sup>th</sup> percentile rainfall year, the number of years in which the pits could not be dewatered are:

- 2010 – 6yrs;
- 2016 – 5 yrs;
- 2021 – 1yr.

This can be catered for operationally by pumping to the Devils Triangle and Bootes North Pit voids.

The water management plans are considered effective and will protect the pits from flooding and allow Rolleston Coal to comply with the requirements of their EA by minimising the volume of pit water that has to be managed in the pit water dams and maximizing release opportunities. No uncontrolled releases will occur from the pit water dams. The system makes maximum use of on site water usage in the form of road dust suppression and irrigation of rehabilitation areas.

### Infrastructure Requirements

This WMP also considers the infrastructure requirements needed to achieve the water management objectives for each mine plan.

The major water management infrastructure required by 2012 is:

- three pit water dams (Diversion Pit Water Dam, Spring Creek Pit Water Dam, Spring Creek Evaporation Ponds) with combined capacity of approximately 1400ML;
- additional emergency and contingency storage in the form of Devil's Triangle pit void;
- 7 km of levees and diversion drains;
- 10 km of 400mm diameter spine pipeline.

The major additional water management infrastructure required by 2016 is:

- 10.5 km levees and diversion drains.

The major additional water management infrastructure required by 2021 is:

- 7.6 km of levees and diversion drains.

***Emergency and Contingency Planning***

Current emergency and contingency plans are generally considered to be adequate. However, a detailed Risk Analysis will be undertaken on site with all operational managers to review the new infrastructure incorporated in this Water Management Plan and assess the associated risks.

The findings of this Risk Analysis may result in the alteration of this Water Management Plan. The revised plans will include for the design and certification of new structure and annual inspections of critical infrastructure by an RPEQ, and the revised Emergency and Contingency Planning Report will be submitted to DERM as an addendum.

***Currency and Adequacy***

In accordance with Rolleston Coal's EA, the water management plans will be reviewed before and after the wet season (ie by 1 November and 1 May respectively).

The water management plans will also be reviewed after any incidents or uncontrolled releases. The water balance will be updated every two years to ensure that it is kept up to date with changes on site, and to incorporate any site data collected in the preceding years.

## 1.0 Introduction

### 1.1 Background

#### 1.1.1 Site Description

AECOM Australia Pty Ltd has been commissioned by Rolleston Coal to develop the Water Management Plan for their operations. Rolleston Coal is an open cut mine situated 16 km west of Rolleston in the southern Bowen Basin, Central Queensland. Rolleston is within the Fitzroy catchment. See Figure A for the site locality.

The mine has been operational since mid 2003 and exports 8 to 10 million tonne per annum (Mtpa) of thermal coal. The coal is mined by a combination of truckshovel, dozers and/or draglines, crushed, sized and blended on site without washing. The coal is then transported to the Port of Gladstone via rail. Coal resources within the current mining lease have been estimated at 275 Mt, with a strip ratio of 6.5 bulk cubic metres of overburden per tonne of coal. The life of mine within the current mining lease is 20 years minimum.

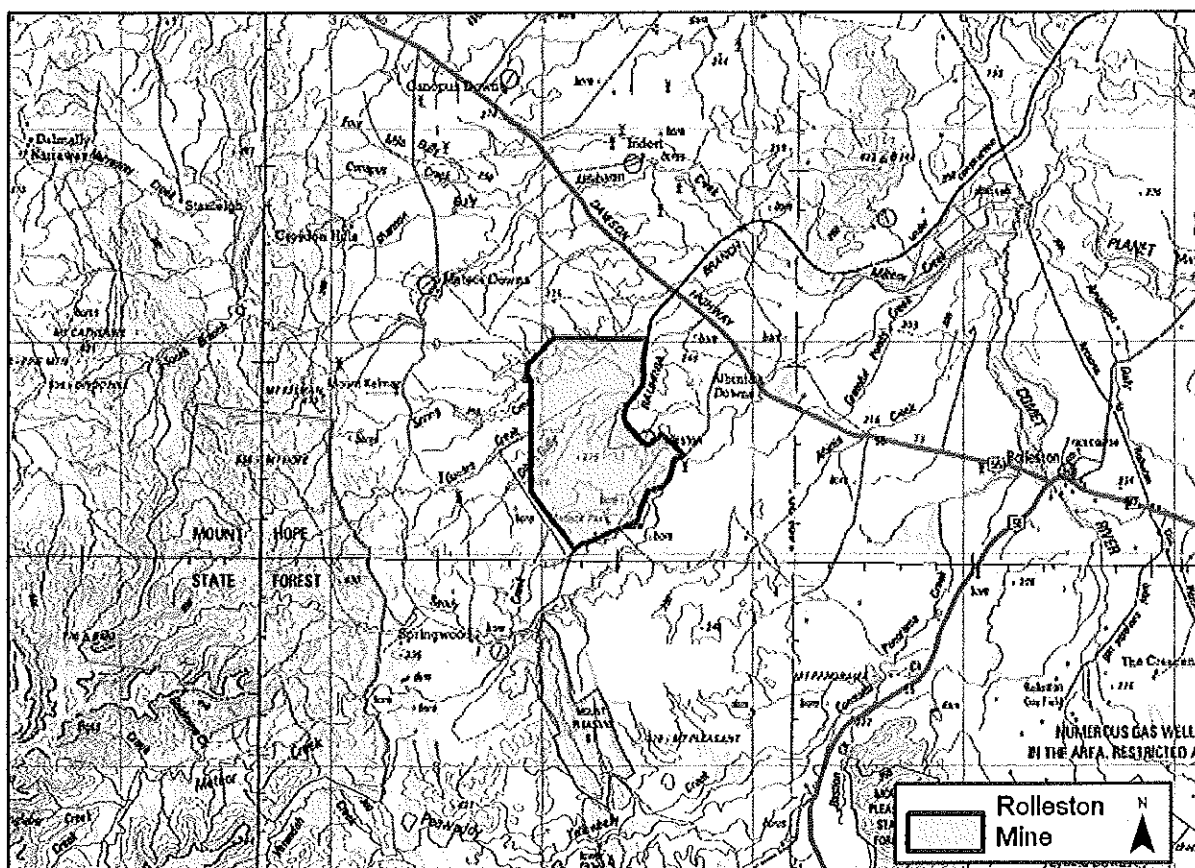


Figure A Rolleston Coal Mine – Locality Plan

Rolleston Coal is intersected by a number of creeks. These include:

- Spring Creek (catchment 104 km<sup>2</sup>);
- Boates Creek (catchment 90 km<sup>2</sup>);
- Gibbs Gully (catchment 20 km<sup>2</sup>);
- Sandy Creek (catchment 112 km<sup>2</sup>); and
- Meteor Creek (catchment 700 km<sup>2</sup>).

See Figure 1 for an overall layout of the mine site showing pits, pit water dams and clean water dams.



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#### Legend

- Watercourse
- Rolleston Lease Boundary
- Existing Dam
- Proposed New Dams
- Disturbed Catchment Area

#### ROLLESTON COAL MINE Dam and Pit Locations

Figure 1

The Department of Environment and Resource Management (DERM) have determined that the creeks classified as watercourses under the Water Act (2000) are:

- Bootes Creek;
- Meteor Creek; and
- Sandy Creek.

There are currently two raw water dams within the current mining lease, Naroo Dam and Davey Dam, however Davey Dam will eventually be mined through. The topography of the site presents a number of challenges, including the requirement of a number of creek and flood diversions to protect the pits and a limited number of sites that are suitable for additional pit water dams.

### 1.1.2 2010 Floods

Two significant storms occurred at Rolleston in February 2010 as a result of ex-tropical cyclone Olga:

- a 10 year ARI flood on 1 February 2010; and
- a 50 year ARI flood 5 days later on 5 February 2010.

The heavy rainfall caused significant flooding on site and a piping failure of the Naroo Dam embankment which flooded the downstream Spring Creek Dam. As a result, emergency releases were required from Spring Creek Dam to Bootes Creek, however a few days later, the Spring Creek Dam embankment failed due to overtopping. This led to the flooding and closing of mining operations in the Spring Creek Pit. The flooding caused damage to the access road to Rolleston mine and the site was evacuated. Subsequently, Spring Creek Dam has been repaired and converted to a pit water dam. Repairs to Naroo Dam have not yet commenced.

### 1.1.3 DERM Requirements

This Water Management Plan has been prepared in accordance with the guideline *Preparation of a water management plan for mining activities* (2009) issued by DERM, and Schedule C32 of the draft Environmental Authority (EA) Permit Number 101140410 which is currently under consideration by DERM. At the time of preparing this water management plan, the Environmental Authority Permit Number MIM800090802 remains in force by DERM, however the water management plan was checked against both permits to ensure compliance as the water management plan will be operational through the currency of both permits.

Requirements of the mine water management plan are to:

- assess the likelihood and consequence of risks to water quality within and around the mine,
- identify controls to reduce these risks to acceptable levels; and
- provide mechanisms for handling on site water that will enable Rolleston Coal to comply with the Water Quality criteria for controlled release, irrigation and stock watering as stipulated in the EA.

## 1.2 Objectives

The objectives of the Water Management Plan are to provide facilities and procedures to enable Rolleston Coal to meet the Water Quality conditions as stipulated in the Environmental Authority. This includes examining and addressing water use, generation and management on site to minimise the quantity of pit water that is released to the environment. A breakdown of the water quality conditions of the EA and the measures employed in the Water Management Plan to address these are shown in Table 2.

Table 2 Environmental Authority Water Quality Conditions

Draft EA Condition Number	Condition Description	Comment
C1-C6	Contaminant release	<p>Pit water is not released directly to the environment but contained in pit water dams and released under controlled conditions.</p> <p>Designated release points have been defined in the EA and Meteor West, Diversion Pit Dam and Spring Creek Dam are situated at the released points.</p> <p>Water quality is monitored at the release and monitoring points designated in the EA against the release and trigger limits</p>

Draft EA Condition Number	Condition Description	Comment
C7 – C11	Contaminant Release Events	Releases are triggered by minimum flows and water quality triggers based on flows at the Bootes Creek and Meteor Creek of 75m <sup>3</sup> /s and 2.5m <sup>3</sup> /s respectively, and limited to 20% of receiving water flow rate.
C12-C13	Notification of Release Events	Rolleston Coal has implemented procedures for notification of DERM of all release events, including emergency releases.
C14-C15	Notification of Release Events Exceedance	Rolleston Coal has implemented procedures for notification of DERM of all release events exceedances
C16-C17	Monitoring of Water Storage Quality	Water quality samples are taken at Pit water dams more frequently than the minimum stipulated intervals in the EA.
C18-C22	Receiving Environment Monitoring and Contaminant Trigger Levels and REMP	Ongoing water quality monitoring is undertaken at the designated monitoring locations in accordance with the requirements of the EA.
C23-C27	Water Reuse	Water quality is checked at least quarterly for compliance with the EA requirements for irrigation and stock watering. All water reuse is contained within the site.
C48-52	Groundwater	Groundwater is monitored at the specified locations 6 monthly for compliance with the EA requirements
G1-G14	Dams and Levees	Release dams classified as hazardous dams are designed to the hazardous Dam's code with DSA, MRL and rated spillways. Inspections are conducted on an annual basis prior to the 1 November and the reports submitted to DERM

Incompliance with the guideline *Preparation of a water management plan for mining activities* (2009) issued by DERM, the following have also been undertaken to ensure that the Water management Plan is robust and complies with the EA.

- environmental values and beneficial uses of Meteor Creek and the downstream Comet River were reviewed to ensure that the correct water quality criteria was used;
- background surface water and groundwater quality was reviewed to determine the opportunities for releasing from the pit water dams;
- the contaminant source studies undertaken by Rolleston Coal were reviewed to understand the potential contaminants on site and to interpret the water quality data obtained for groundwater and background water quality samples taken;
- the water management system was detailed for three mine plans (2012, 2016 and 2021) to ensure robustness and consistency of the plans over a long period, to maximise utilization of infrastructure, and to ensure that they offer protection to the mine from floods and do not result in any uncontrolled releases to the environment;
- a site water balance model was prepared for the three mine plans to assess the quantity of pit water produced on the site and to determine the storage volumes required to handle the accumulated pit water and optimise the releases opportunities in accordance with the EA;
- current emergency and contingency plans were assessed against key risks identified in the guideline and outline the measures put in place to mitigate the risks. A detailed risk workshop will be conducted to review all the components of the new water management plans and identify any potential risks that each may pose and to outline any measures that may need to be put in place to mitigate the risks; and
- ongoing monitoring and review procedures were detailed and responsibilities assigned to the appropriate manager in order to comply with the requirements of the EA.

### **1.3 Water Management Strategy**

The objectives of the water management system are to separate the clean water, pit water and sediment catchments. A brief description of the three systems is provided below.

#### **Clean Water System**

- Divert clean water around the pits and operational areas of the mine with levees and drains.
- Protect the pits from flooding.

#### **Pit Water System**

- Isolate pit water catchments from the clean water catchments.
- Preferentially reuse pit water to minimise the volume of pit water that is discharged and reduce the volume of water used by the mine.
- Capture and contain the minimal pit water catchment and reduce the volume of pit water required to be stored on site.

#### **Sediment System**

- Isolate sediment catchments from the clean water catchments.
- Capture runoff from ancillary works or rehabilitated areas that may contain sediments that must be removed prior to discharge to the environment.

## 2.0 Available Data

### 2.1 Previous Investigations

#### ***Water Resources Plan (WRP) - Fitzroy Basin (1999)***

The WRP provides a framework for sustainably managing water and regulating the taking of overland flow for the Fitzroy basin.

The WRP was used to understand the Environmental Values of Meteor Creek and the Comet River catchments and the flow objectives.

#### ***Fitzroy Basin Resource Operations Plan (ROP) (Jan 2004 – amended July 2009 Rev 2)***

The ROP covers the management of environmental flow objectives for aquatic ecosystems and water allocations security for holder of resource operations licences as specified in the WRP.

The ROP was used to understand the Environmental Values of Meteor Creek and the Comet River catchment.

#### ***Study of cumulative impacts on water quality of mining activities in the Fitzroy River basin (April 2009)***

This study examines available data to report on the implications of water discharges from mines on water quality in the Fitzroy River Basin. This study was initiated in response to concerns about water quality following the discharge of very large quantities of water from mines in the Fitzroy River Basin from February to September 2008.

The Study was used to understand the water quality objectives for the Fitzroy River Basin and how these related to the criteria applied in the Environmental Authority.

#### ***Environmental Impact Statement (EIS) (2002)***

An EIS for Rolleston Coal was completed by Environmental Resources Management (ERM) Australia in 2002. The report assesses the potential implications of Rolleston Coal on the environment and social values of the site and surrounding areas, as well as the socio-economic benefits of physical infrastructure at the site. The EIS scope of works included the following:

- mine study area;
- rail corridor;
- ballast siding;
- Bootes Creek Diversion; and
- accommodation in Rolleston and Springwood.

The EIS was approved the Coordinator General in February 2003, subject to conditions outlined in the *Evaluation Report on the Environmental Impact Statement of the Rolleston Coal Project*, 20 February 2003.

The EIS was used to understand the previous investigations previously undertaken such as contaminant sources studies, and to gain insight into mining operations as employed on the Rolleston Coal mine site.

#### ***Rolleston Coal Environmental Management Plan (EMP) (Jan 2009)***

The EMP details the Rolleston Coal approach to actively managing environmental performance and establishes clear goals and provides mechanisms to regularly measure performance.

The EMP was reviewed to understand current practises on the mine site and to assess compliance with the EA.

#### ***Spring Creek Temporary Diversion Design Report (2010)***

The *Spring Creek Temporary Diversion Design Report* was completed by AECOM in 2010. The report details the design of the Spring Creek temporary diversion, which facilitates mining of the coal resources of the Spring Creek Pit.

The Report was used to understand what water is being diverted away from the Spring Creek Pit and to determine what other measures were required to suit the mining sequence.

**Surface Water Management Review (2010)**

AECOM Australia Pty Ltd completed the *Rolleston Coal Surface Water Management Review* in January 2010. The review included:

- a water management audit;
- preliminary water management plans for 2010 and 2012;
- a preliminary water balance model;
- a recommendation of additional wet season storage and supply of water;
- a dam safety audit; and
- conceptual and detailed engineering design of components of the water management plan, according to immediate needs of Rolleston Coal, including Bootes West Pit Water Dam 1, Bootes West Pit Water Dam 2, Irrigation dam and associated clean water diversion works.

The Water Management Plan presented in this report is based on aspects of the preliminary water management plans presented in *Surface Water Management Review (2010)*, however takes into consideration recent changes in the mining sequence and water management due to flooding in early 2010.

**Groundwater Inflow and Dewatering Assessment (2009)**

The *Rolleston Coal Mine Meteor West Boxcut / Mine Groundwater Inflow and Dewatering Assessment* was completed in December 2009 by Australasian Groundwater and Environmental Consultants Pty Ltd (AGE).

The objectives of this report were to:

- provide an assessment of inflow to the boxcut and mining strips over time for input to the Water Management Plan;
- discuss options for dewatering the alluvium or capturing inflow before it enters the mine pit; and
- assess the potential impact of the boxcut and subsequently open cut mining on land owners bores located in the alluvium along Meteor Creek and, in particular, the potential impact on a high yielding bore used for irrigation.

The long term stabilised groundwater inflow into Meteor West pit determined in the AGE assessment (0.2 ML/day/km pit strikeface) was used as an input into the water balance model.

The assessment was used to gain an understanding of groundwater trends and the long term effects on groundwater infiltration to the pits in the water balance model.

**Bootes Creek Temporary Diversion (2008)**

The *Bootes Creek Temporary Diversion Design Report, Revision 1*, was completed by Water Solutions Pty Ltd on 23 April 2008. The report details the design of the Bootes Creek temporary diversion which allows mining of the adjacent southern corridor before the permanent Bootes Creek Diversion is opened.

The report was used to understand the catchments incorporated in the diversion and how the diversion fitted into the overall strategy of surface water management on the site.

**Rolleston Coal Mine Emergency Management Plan (Dec 2008)**

The *Rolleston Coal Mine Emergency Management Plan* details the effective emergency responses, crisis management and business continuity plans that need to be in place to manage site emergencies and business crisis.

The Plan was used to review current emergency and contingency plans and to assess where additional focus needs to be applied to ensure that the new water management plans are comprehensively covered.

**Rolleston Coal Mine Emergency Response Procedure (Aug 2008)**

The *Rolleston Coal Mine Emergency Response Procedure* provides a framework for effective and immediate response to an emergency situation to minimise harm to people, property, the environment community and business reputation and loss to the business.

The Procedure was used to review current emergency and contingency plans and to assess where additional focus needs to be applied to ensure that the new water management plans are comprehensively covered.

### ***Rolleston Coal Mine Emergency Management Guidelines (Jan 2009)***

The *Rolleston Coal Mine Emergency Management Guidelines* provide effective management of site Emergency Management System and to minimise harm to people, property, the environment community and business reputation and loss to the business in the event of an emergency.

The Guideline was used to review current emergency and contingency plans and to assess where additional focus needs to be applied to ensure that the new water management plans are comprehensively covered.

## **2.2 Climate Data**

### **2.2.1 Historical Climate Data**

Historical rainfall and PAN evaporation data was obtained from the Bureau of Meteorology (BoM) for 80 weather stations in the vicinity of the Rolleston Coal mine. Rainfall data from all the weather stations was used to assess which were the most appropriate to be used based on an assessment of orthographic affects to determine which had the best correlation between rainfall and runoff. The selected station was then used in the calibration and verification of the AWBM model. PAN evaporation data from weather station number 35147 (Emerald DPI Field Station) was used in the AWBM model and GoldSim model.

The weather stations used for the AWBM and GoldSim water balance model are shown in Table 3.

Table 3 BoM Weather Stations

Station No.	Station Name	Latitude	Longitude	Opening Year	Closing Year
35004	BABBILOORA STATION	-25.1933	147.1347	1923	2005
35147	EMERALD DPI FIELD STATION	-23.4669	148.1519	1967	2007

### **2.2.2 Design Rainfall**

The design rainfall intensity-frequency-duration (IFD) curves based on *ARR Volume 2* (1987) for Rolleston Coal mine is shown in Figure 2. The IFD curves were used to design diversion drains, levees and collection sumps for Average Recurrence Intervals of 100 years or less.

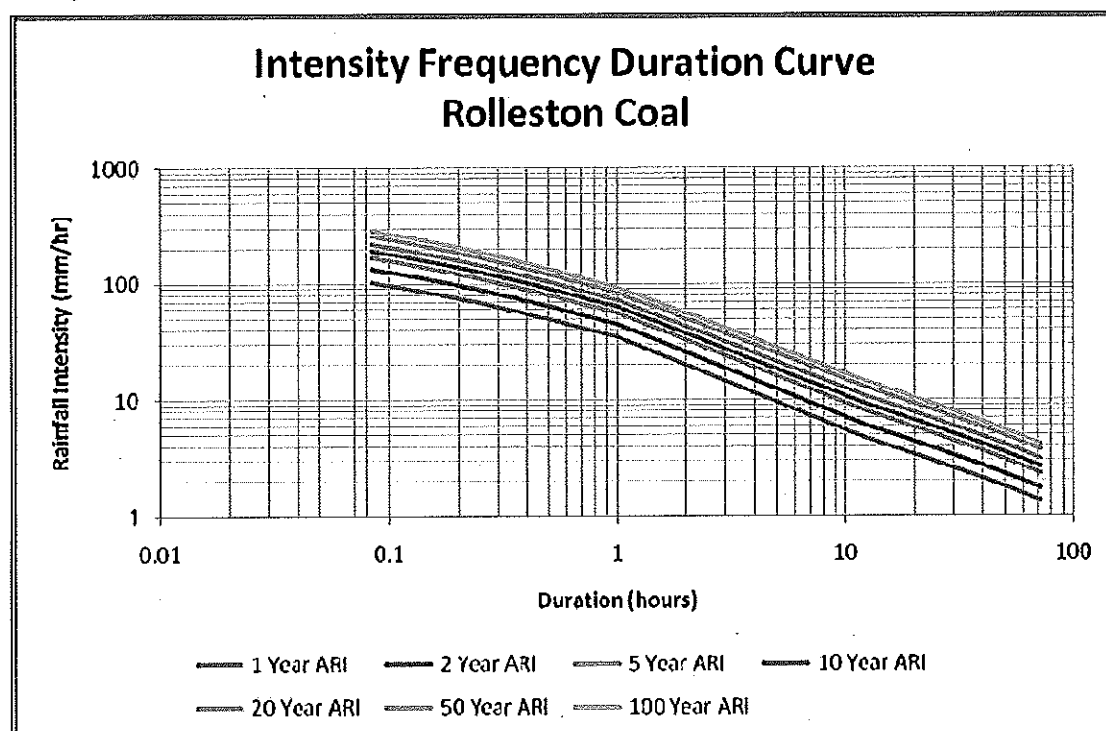


Figure 2 Intensity Frequency Duration Curve

### 2.2.3 Data Drill

Data Drill is a service provided by DERM. Data Drill creates a synthetic rainfall series by accessing grids of data interpolated from point observations by the Bureau of Meteorology. As the BOM Rainfall Station contained only 80 years of non-continuous historical data due to gaps during times when the gauge was not operational, Data Drill rainfall data for 100 years was used as an input to the AWBM and GoldSim models to generate the runoff sequence.

## 2.3 Stream Gauging Data

Historical stream gauging data from DERM was obtained to calibrate and verify models and determine the timing and quantity of mine water releases. The stream gauging stations are shown in Table 4.

Table 4 Stream Gauging Station

Station No.	Station Name	Latitude	Longitude	Opening Year	Closing Year
130503A	Carnarvon Creek at Wyseby Station	-24.9684	148.5272	1966	1992
130505A	Humboldt Creek at Sunlight	-24.2806	148.7861	1971	1988
130508A	Meteor Creek at Springwood	-24.5698	148.2831	1972	1988
130509A	Carnarvon Creek at Rewan	-24.9775	148.3881	1985	-

## 2.4 Flood Models

A flood model of Bootes Creek has been created for the design of flood protection works in the areas around Spring Creek Pit. These include:

- Spring Creek Temporary Diversion;
- Spring Creek Pit Temporary Diversion; and
- Spring Creek Pit Long Term Diversion.

The details of the model are included in Appendix H.

## 2.5 Hydraulics

*MIKE11* models were created of the watercourses and branches to simulate the flows in the creeks to size levees to protect the pits from flooding. The *MIKE11* models were used to determine the maximum flood levels and velocities around the levees for the design storm duration.

Sizing of minor dirty water drains was undertaken using Manning's equation to determine flows and velocities.

The calculations of the various drain and levee designs can be found in Appendix B.

## 2.6 Geotechnical Data

Field soil testing was completed by Roadtest in the area of Bootes West on behalf of AECOM Australia in December 2009. The samples were analysed by Australian Geochemical Laboratories Pty Ltd and included Emerson Aggregate Tests and Particle Size Distributions. The PSD curve is only representative of the top 3 - 4m of finer surface soils which will most likely be used in the rehabilitation areas as topsoil application.

Currently, sediment dams that have unrehabilitated spoil in their catchments are smaller than the dams being proposed for this water management system, and the water quality observed shows that the system is successful in removing sediments, so it is proposed to continue in accordance with the practise currently being employed.

The method of calculation requires an estimate of the particle size corresponding to a specific percentage on the soil grading curve. Because this percentage is smaller than the finest sieve used (0.075 mm), the grading curve had to be extrapolated. In the absence of any hydrometer data or more extensive data, the extrapolated PSD curve is the most appropriate means of designing the sediment dams which will remove the finer materials in the rehabilitation sediment system and can also be expected to adequately remove the larger particles from the runoff from the spoil dumps.

The Particle Size Distribution test results were used in the design of the sediment dams. The test results can be found in Appendix D, and the percentage removal rates adopted in Table 5.

Table 5 Percentage removal rates

Particle Size (mm)	Adopted Percentage Removal Curves (%)
0.05	45
0.02	60
0.01	70
0.005	80

## 2.7 Site Data

Data collected on site of the following was provided by Rolleston Coal on 27 July 2010. The data included:

- water quality monitoring data, including field and laboratory results, taken at the pit water dams and during releases (2005 – 2010); and
- historical dam level observations (2004 –2010) and;
- additional flow gauging data from 2004 to present for Bootes Creek and Meteor Creek from the monitoring stations was provided by Rolleston Coal on 14 October 2010.

The water quality data from the pit water dams was used to assess whether the quality of the pit water meets the criteria as laid out in the EA for release when compared to background water quality data and whether it is fit for use in stock watering and irrigation. The dam level observations were used in the water balance model for setting starting pit water dam levels. The data obtained from the flow gauges and automated samplers on site were used in the water quality assessments for determining release opportunities.

## 2.8 Topographical Data

### 2.8.1 Survey Data

Survey data was provided by Rolleston Coal in July 2010. The survey is LIDAR data flown in July 2010 and based on MGA55 (GDA94) and the datum is site datum which is based on AHD. The level of vertical accuracy is  $\pm 150\text{mm}$  (clear ground) and is suitable for use for the purposes of this study.

### 2.8.2 Mining Plan

The life of mine block sequence was provided by Rolleston Coal on 10 August 2010. The life of mine block shows the layout of the pits and the years by when certain blocks will be mined, and it was used to determine the position of the pits in the various mine plans. From this it was possible to limit the catchments draining to the pits and place the appropriate levees and drains to convey clean water runoff around the mining operations and protect the pits from flooding.

### 3.0 Methodology

The following methodology was used to complete the Water Management Plan.

#### Water Management System

- The guideline *Preparation of a water management plan for mining activities* (2009) was used to compile the water management plan and to ensure that the issues outlined in the guideline were addressed.
- Discharge and water reuse criteria and trigger levels were set based on the requirements stipulated in the sites Environmental Authority, to ensure compliance with any of the regulatory requirements for the handling of pit water and the overall monitoring of the system.
- Relevant legislation pertaining to hazardous dams was reviewed, hazardous dams were identified and Design Storage Allowance and Mandatory Reporting Levels calculated for those dams.
- The current water management system was reviewed and concepts for the future water management system were discussed with Rolleston Coal.
- The mining sequence provided by Rolleston Coal was used to determine the pit extents for the selected mine plans to be represent short, medium and long term mine development.
- Once the clean water, pit water and sediment catchments had been defined, the necessary diversion works were identified to:
  - divert runoff from undisturbed areas around the operational areas of the mine and prevent it from discharging into the pit water catchments;
  - transfer runoff from pit water catchments, that had been limited as far as possible, to the pit water dams; and
  - collect runoff from rehabilitated areas into sediment dams.
- The pipeline arrangements connecting the pits and pit water storage dams were determined.
- Location and sizes of additional pit water storage dams were identified.

#### Environmental Values

The Fitzroy ROP and DERM guidelines on Environmental Values were reviewed to determine the downstream uses in the Comet River and its tributaries.

Background water quality of the receiving waters was assessed to determine the impacts of mine water releases. The water quality of the release dams was also compared to the criteria in the Environmental Authority to ensure compliance with the discharge criteria.

#### Site Water Balance

- Available information on rainfall, evaporation, stream gauging data, on-site water usage and groundwater infiltration was collected and reviewed.
- An Australian Water Balance Model (AWBM) was calibrated and verified and used to determine runoff based on historical rainfall, stream gauge and evaporation data.
- A GoldSim water balance model was created for three mine plans (2012, 2016 and 2021, based on inflow volumes, outflow volumes and internal flows.
- The site water balance model was used to assess release opportunities, volumes and the timing thereof and the handling of pit water in the pit water dams during different seasonal events.
- A statistical analysis of the system reliability was performed to determine if any additional pit water storage is required on site. Using a range of additional storage and external usage volumes for each mine plan, the number of years that the pits could not be dewatered was determined for each mine plan analysed.

#### Contaminant Source Study

The site has been reviewed to determine the origin and chemical composition of possible water contamination sources with the aim of reducing water contamination. The precincts identified are the:

- Rail loop siding;
- Coal Handling Facility (CHF);
- Administration offices and Workshops;

- Pits, and
- Spoil dumps.

During the EIS studies, the contaminants that can be expected in the various precincts were identified. There are currently mitigation works in place at the rail loop, CHF, administration offices and workshops in the forms of containment bunds and collection points for contaminated water such as the CHF dam. Water that may become contaminated in these areas is contained on site and does not get released to the environment.

It was identified in the EIS that spoil is a large contributor to the pit water system. Numerous investigations have been undertaken by Rolleston Coal on the overburden qualities. A Cover Material Guideline was compiled based on these studies. The guideline identifies the spoil attributes and describes procedures for the identification of problematic spoil materials.

#### **Emergency and Contingency Planning**

The current *Emergency Management Guidelines*, *Emergency Management Plan* and *Emergency Response Procedures* provided by Rolleston Coal were reviewed to check their suitability under a range of emergency scenarios and applicability to this water management plan. These guidelines and procedures need to be updated by undertaking a thorough risk review workshop of all the new infrastructure and the risks associated with their individual failure, and the appropriate responses defined and laid out in the guidelines and procedures. This is to be undertaken in November 2010 and a report compiled as an addendum to this water management plan.

#### **Responsibilities, Monitoring and Review**

- The person/s responsible for the implementation this Water Management Plan have been identified by Rolleston Coal and procedures put in place for the necessary actions and notifications of stakeholders.
- Current compliance monitoring procedures have been reviewed and any additional items have been addressed.
- Necessary review procedures of the Water Management Plan were outlined.

## 4.0 Design Criteria

This section outlines the criteria used to design elements of the water management system.

The water management system comprises three separate, but linked, site water management systems, which are:

- clean water systems;
- pit water systems; and
- sediment systems

Each of these systems comprise numerous structures which include water storages, flood diversions, creek diversions, diversion levees, drains and pipelines. The design criteria for these elements are based on relevant guidelines.

Through an internal risk review process conducted by Rolleston Coal, it was determined that flood levees are to be designed for the higher 1000 year ARI flood to provide Rolleston with an acceptable level of risk protection to mining operations.

### 4.1 Clean Water System

The purpose of the clean water system is to limit surface runoff from undisturbed land entering the pit water system by diverting the runoff around the operational and mine areas using diversion drains and levees. There are two types of clean water systems:

- flood diversions; and
- clean water levees and drains.

To ensure the safety of the structures during mining operations, a blast standoff distance of 150 m from the pit floor has been maintained.

#### 4.1.1 Flood Diversion Levees and Drains

Flood diversion levees are sized for the 1000 year ARI flow with 1.0m freeboard.

Flood diversion drains are sized for the 100 year ARI flow with 0.5m freeboard. Where velocities exceed 1.5m/s, erosion and scour protection in the form of rock rip rap protection is provided.

#### 4.1.2 Clean Water Levees and Drains

Clean water levees diverting smaller clean catchments around mining operations are sized for the 100 year ARI with 0.5 m freeboard (minimum 1 m high).

Clean water drains are sized for the 100 year ARI with 0.3 m freeboard (minimum 0.5 m depth). Where velocities exceed 1.5m/s, erosion and scour protection is provided.

### 4.2 Pit Water System

The pit water system includes:

- pit catchments comprising the pits, spoil dumps, pre-strip and catchments above the highwall that drain naturally towards the pit and cannot be diverted elsewhere;
- drains and levees;
- pit water storage dams;
- pipelines connecting pits and pit water dams; and
- release structures.

#### 4.2.1 Pit Water Diversion Levees and Drains

The purpose of the diversion levees and drains is to collect runoff from the pit water catchment within the mine and operational areas, and convey the flow to holding areas or sumps, where it is then pumped into the pit water dams. They are used to prevent discharge of pit water off site except under controlled conditions, and at designated points in accordance with the licence conditions laid out in the EA.

Diversion levees are sized for the 100 year ARI with 0.5 m freeboard (minimum 1 m high) and diversion drains are sized for the 10 year ARI with 0.3 m freeboard (minimum depth 0.5 m). Where velocities exceed 1.5 m/s, scour and erosion protection is provided.

#### 4.2.2 Spoil Sediment Dams

Runoff from the unrehabilitated spoil dumps is controlled and treated through a series of sediment dams to remove the larger particles and minimise the sediment discharging to the pit water drainage system. As the spoil piles are based on site specific dumping plans, the sediment dams will be designed on site. Collection drains will limit and minimise runoff and erosion. Any surplus water will then be transferred via pump to the pit water dams. The sediment dams are sized for a 10 year ARI 24 hour storm.

The removal rates and design chart for the sediment dams based on *Technical Guidelines for Environmental Management of Exploration and Mining in Queensland* (1995) and *Erosion and Sediment Control Guidelines* (1996) is shown on drawing 60103576/562 in Appendix L and the design charts for the design of drains in Figures C1, C2 and C3 in Appendix C.

#### 4.2.3 Hazardous Dams

Pit water dams on the Rolleston mine are all contained within the catchment of the mine and only the release dams have the facility to discharge directly to the environment. For this reason, the release dams will have to meet the Hazardous Dams requirements of Design Storage Allowance (DSA), Mandatory Reporting Levels (MRL) and spillways sized for major Annual Exceedance Probability (AEP) events.

As a consequence of this, Rolleston will be required to operate these dams in accordance with the guideline, ensuring that as of the 1 November every year, the DSA is available in the dams to minimise the likelihood of overtopping and discharge to the environment. Rolleston mine will also have to monitor water levels and notify DERM as soon as MRL levels have been reached and take action to avoid an uncontrolled discharge by pumping water to another storage dam or pit void.

##### *Design Storage Allowance*

DSA is the storage required at November 1 each year that will be filled by process inflows and runoff from the critical wet period, if it should occur. The following guidelines were used to determine the DSA requirement for release dams within the Rolleston Coal mining lease:

- *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams, Version 1.1*; and
- *Technical Guidelines for Environmental Management of Exploration and Mining in Queensland*.

Using the *Technical Guidelines for Environmental Management of Exploration and Mining in Queensland*, the critical wet period for Rolleston was determined to be 3 months.

The contaminant concentrations for the existing dams at Rolleston Coal were checked against the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams, Version 1.1* to establish if the water quality in the dams have exceeded the permissible concentration values for each contaminant, in which case they will have to be assessed as regulated dams. The recorded contaminant values for the respective dams are included in Appendix A.

The assessment concluded that all contaminant concentrations in the mining lease were within the acceptable ranges and, as such, the dams are considered as having non-toxic waste.

Field observations have indicated that sensitive ecology was found within a 5 km radius of the mining lease. This constituted a significant hazard category for which an annual exceedance probability (AEP) of 0.02 (50 Year ARI) was assigned based on the *Technical Guidelines for Environmental Management of Exploration and Mining in Queensland*.

The required DSA is therefore that of a 50 year ARI 3 month wet season.

Log-normal plots using the Weibull (1999) from *Australian Rainfall and Runoff (ARR)* and Gumbel methods were developed for the 3 month wet season rainfall from 1887 till 2009 for Rolleston (see Appendix B). Among the three methods analysed, the Gumbel method showed the highest reciprocity to the rainfall data. The 50 year ARI 3 month wet season DSA depth was determined to be 0.694 m. The required DSA volume can be obtained by multiplying the calculated DSA depth with the catchment area of the dam.

#### *Mandatory Reporting Level*

The MRL is determined as the volume below the spillway crest, equivalent to the lower of the AEP (design risk) 72 hour storm. The 50 year ARI storm determined from the DSA analysis was adopted as the design storm. The 50 year ARI 72 hour storm depth, determined from the IFD for Rolleston, is 0.301m. The required MRL volume can be obtained by multiplying the calculated MRL depth with the catchment area of the dam. The MRL calculations are included in Appendix B.

### **4.3 Sediment System**

The sediment system is designed to capture and treat runoff from the rehabilitated spoil landforms where it has been demonstrated that the water quality meets the criteria as stipulated in the Environmental Authority and can be discharged to the environment. Sediment dams capture and minimise the release of sediment to the environment and contamination of stormwater. Current practise at Rolleston Coal is that 7 years is the timeframe taken to rehabilitate spoil dumps.

#### **4.3.1 Sediment Dams**

Runoff from the rehabilitated spoil landforms is controlled and treated prior to discharging to the receiving environment through a series of sediment dams to minimise the sediment in the discharge waters. Collection drains will limit and minimise runoff and erosion. Sediment dams will be sized for a 10 year ARI 24 hour storm.

The removal rates and design chart for the sediment dams based on *Technical Guidelines for Environmental Management of Exploration and Mining in Queensland* (1995) and *Erosion and Sediment Control Guidelines* (1996) is shown on drawing 60103576/562 in Appendix L and the design charts for the design of drains in Figures C1, C2 and C3 in Appendix C.

Where unrehabilitated spoil areas are converted to rehabilitated areas and it has been demonstrated that runoff from these areas meet the EA criteria, the existing sediment dams and drains within these areas will be diverted away from the pit water system and made to form part of the sediment system.

## 5.0 Water Quality Assessment

### 5.1 Receiving Environment

Rolleston mine is situated within the catchments of Bootes, Meteor and Sandy Creeks. Bootes Creek and Sandy Creek rise in the mountainous area approximately 20km west (upstream) of the site and fall rapidly prior to entering a relatively unconfined floodplain section approximately 10 km upstream of the site. Meteor Creek has a large catchment upstream of the mine site with the creek generally confined to a valley between 0.5 and 2 km wide for the majority this catchment upstream of the site. A number of steep tributary streams enter Meteor Creek along this stretch. The creek enters a broad floodplain reach and becomes laterally mobile approximately 10 km upstream of the mine site. Gibbs Gully and Spring Creek are two smaller tributaries which form within the floodplain of Bootes Creek and flow into the Creek prior to its confluence with Meteor Creek approximately 5km downstream of the minesite. The predominate landuse within the upstream catchments of the creeks is livestock grazing in the floodplain area (from the minesite to approximately 10km west and south west of the minesite) and conservation in the steeper remainder of the catchments.

Meteor Creek, downstream of the minesite passes through a number of livestock grazing enterprises and Albinia National Park before entering the Comet River approximately 12km downstream of the mine site. Each of the creeks passing through the minesite and the Comet River are ephemeral streams. Water quality for the aquatic ecosystem is of primary importance as the pools within the creek system sustain aquatic life during periods of low to no flow.

There are two permanent waterholes on the Comet River (Turkeynest waterhole / Kilmain waterhole) approximately 20km downstream of the confluence with Meteor Creek, which are used for human recreation and also contribute significantly to aquatic habitat.

### 5.2 Environmental Values and Beneficial Uses

The environmental values (draft) for the western tributaries of Comet River determined by the Fitzroy Basin Association in consultation with the community are listed below.

- Aquatic Ecosystems.
- Irrigation.
- Farm use.
- Stock watering.
- Human consumption
- Primary recreation.
- Secondary recreation.
- Visual appreciation.
- Drinking water.
- Industrial use.
- Cultural and spiritual values.

Of these values, farm use, stock watering and aquatic ecosystem protection are considered to be the values of the Meteor Creek catchment (Meteor Creek upstream of the confluence with the Comet River).

Irrigation using surface water does not appear to be a major use in the Meteor Creek catchment, but is still considered to be a beneficial use in the catchment. Irrigation of groundwater occurs at Springwood station, and is therefore considered a beneficial use for groundwater.

There is potential for recreational fishing in Meteor Creek and/or Comet River, particularly during periods of permanent flows, and therefore human consumption could be considered as an environmental value.

Turkeynest and Kilmain waterholes are the most likely place for Primary and Secondary recreation along Comet River. Similarly, any industrial uses are expected to occur on the Comet River downstream of the confluence with Meteor Creek. However, given the dilution effects for any discharges from the mine and the distance downstream, these environmental values are not considered relevant to mining activities. Visual Appreciation and

Cultural and Spiritual Values are both considered an environmental value of concern, particularly in the Comet River.

The water quality assessment presented below has therefore focussed on stock watering, ecosystem protection and irrigation as the environmental values of concern in relation to mining activities.

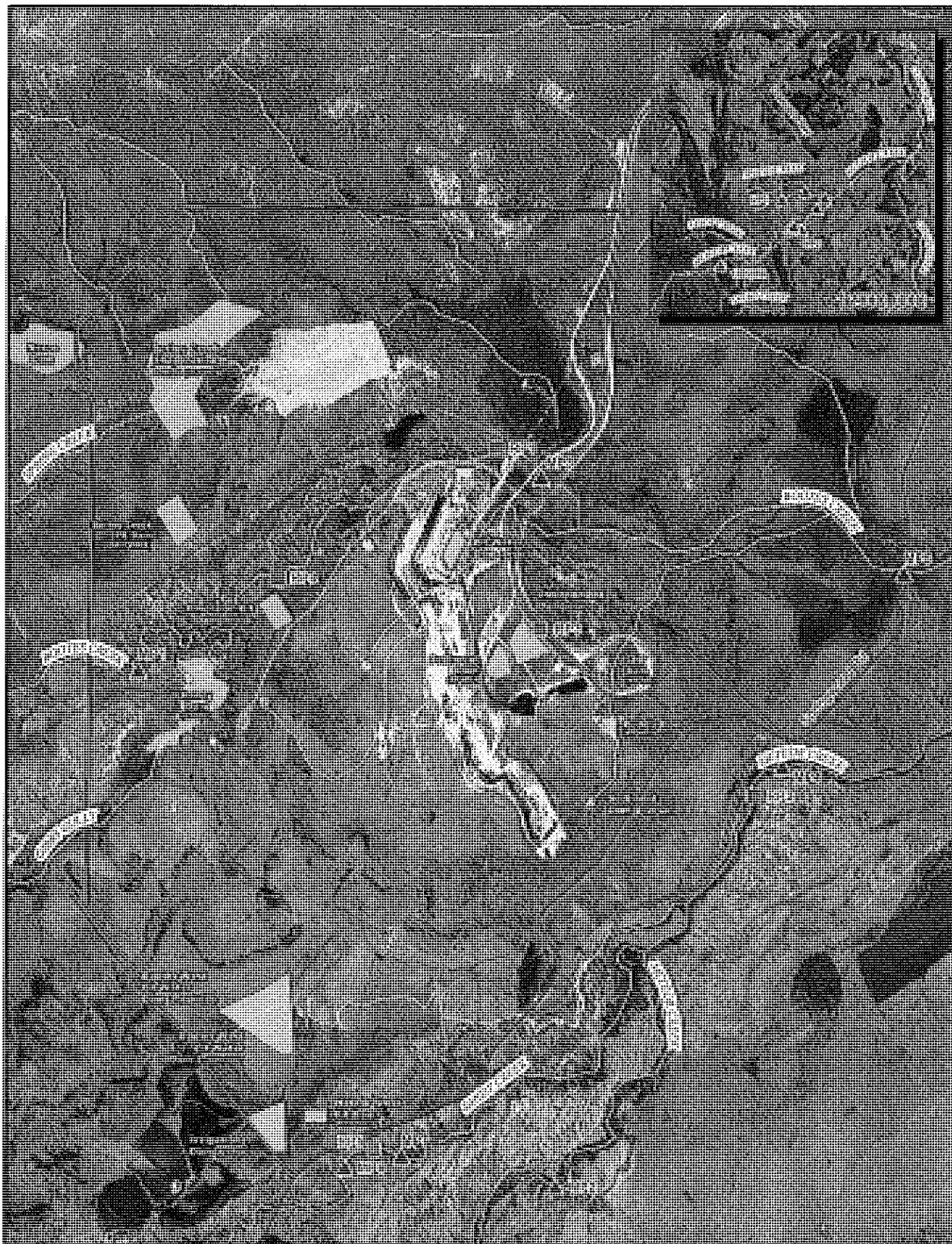
### 5.3 Background Water Quality – Surface Water

A range of physical and chemical water quality parameters have been monitored in existing waterways upstream of the Rolleston Mine. Data from 2005 to present is available for Bootes Creek (one gauge) and from 1973 to present for Meteor Creek (at two gauges, one immediately upstream of the minesite and the DERM gauge at Springwood approximately 8km upstream of the mine site. Water quality data represented a range of flows from low flow to flood conditions. Figure 3 shows the location of the gauges used for this assessment.

Appendix E provides a summary of the water quality data collected for the three gauges and compares the data to the appropriate water quality guidelines and interim guideline values set in the current Environmental Management Plan for Rolleston Coal and the proposed (draft) Environmental Authority permit number MIN101140410. Table 6 provides a summary of the results presented in Appendix E for the water quality parameters relevant to discharges from Rolleston Coal.

The following key points relate to the background water quality at the mine site:

- Many of the parameters exceed the guideline values for ecosystem protection (ANZECC, 2000 and Queensland Water Quality Guidelines – DERM(2009)) for slightly to moderately disturbed systems.
- pH typically exceeds upper guideline values for ecosystem protection. This is most likely due to the high alkalinity of the soils in the study area.
- Electrical conductivity (EC), or salinity typically exceeds the guideline value for aquatic ecosystem protection. This is probably due to the high sodicity of the catchment soils.
- Total metal concentrations generally exceed guideline values for aquatic ecosystem protection.
- Dissolved metal concentrations for aluminium, copper and zinc consistently exceed guideline values for aquatic ecosystem protection. These levels tend to be independent of streamflow, suggesting that contaminants originate from diffuse catchment sources. It is likely that the geology of the catchments contributes to these elevated levels.
- Suspended sediment levels are highly variable and quite elevated. Load tends to increase with flow, as would be expected from runoff from the highly dispersive soils in the catchments.
- Turbidity levels (a surrogate for suspended sediment) consistently exceed guideline values for ecosystem protection, which is expected given the highly dispersive soils comprising the catchment.
- Ammonia levels exceed guideline values for aquatic ecosystem protection. These levels are likely influenced by the agriculture in the area.
- All other parameters shown in Appendix E are below the relevant guideline values.



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0 250 500 1,000 Metres

#### Legend

- Contaminant Release Points
- Downstream Monitoring Points
- Upstream Background Monitoring Points
- Rolleston Lease Boundary
- Watercourse
- Dams

#### ROLLESTON COAL MINE Background Surface Water Monitoring points

Figure 3

Table 6 Stream Gauging Station

Variable	Units	20 <sup>th</sup> %	50 <sup>th</sup> %	80 <sup>th</sup> %	Range	ANZECC 2000 / Queensland Water Quality 2010 Guideline limits <sup>1</sup>			Draft EA <sup>2</sup>
						Ecosystem Protection	Stock Watering	Irrig.	
Site 130508A Meteor Ck at Springwood									
Electrical Conductivity @ 25C	uS/cm	499	635	716	160-810	250	5970	1900	715 (500)
pH		8.1	8.3	8.5	7.4-8.8	6.5-7.5	6.0-9.0	6.0-9.0	(6.5-9)
Total Dissolved Solids	mg/L	298	370	410.8	99-485		4000	2500	
Total Suspended Solids	mg/L	5	10	57.4	1-300	-			(1170)
Nitrate as NO3	mg/L	0.5	0.75	1	0.4-2.9	0.7	400	400	
Iron (soluble)	mg/L	0.02	0.0	0.2	0.01-0.7	0.3	-	0.2	0.52
Manganese (soluble)	mg/L	-	-	-	0.01-0.02	1.7		0.2	
Sulphate as SO4	mg/L	3.7	6.35	11	1-27.5		1000		1000(250)
331903 Meteor Creek Upstream									
Electrical Conductivity	uS/cm	169.66	336	510	91-693	250	5970	1900	715 (500)
pH		7.276	7.94	8.292	6.94-8.58	6.5-7.5	6.0-9.0	6.0-9.0	(6.5-9)
Suspended solids	mg/l	114.8	707	1482	53-1630				(1170)
Sulphate (SO <sub>4</sub> <sup>2-</sup> )	mg/L	0.9	1.5	2	0.5-4		1000		1000(250)
Ammonia		0.02	0.04	0.16	0.005-0.17	0.01	-	-	
Nitrate		0.08	0.13	0.15	0.04-0.18	0.7	400	-	
Petroleum hydrocarbons (C6-C9)	mg/L	0.01	0.01	0.01	0.01	-	-	-	0.02
Petrol. hydrocarbons (C10-C36)	mg/L	0.025	0.025	0.025	0.025	-	-	-	0.1
Aluminium (soluble)	mg/L	0.112	0.195	0.302	0.01-0.59	0.055	5	20	0.65
Copper (soluble)	mg/L	0.001	0.002	0.0038	0.005-0.018	0.0014	1	5	0.013
Iron (soluble)	mg/L	0.16	0.26	0.33	0.07-0.65	0.3	n/a low risk	10	0.52
Zinc (soluble)	mg/L	0.0025	0.089	0.1022	0.002-0.121	0.008	20	5	0.008
Aluminium (Total)	mg/L	1.526	5.49	18.14	0.79-34.6	0.055	5	20	0.65
Copper (Total)	mg/L	0.0046	0.0105	0.0294	0.002-0.047	0.0014	1	5	0.013
Iron (Total)	mg/L	6.19	12.2	36.3	2.69-50.4	0.3	n/a low risk	10	0.52
Zinc (Total)	mg/L	0.0096	0.0195	0.069	0.007-0.12	0.008	20	5	0.008
331901 Bootes Ck U/S									
Electrical Conductivity	uS/cm	118.8	259	410.8	68-1280	250	5970	1900	200(315)
pH		7.1708	7.61	8.166	6.39-8.73	6.5-7.5	6.0-9.0	6.0-9.0	(6.5-9)
Suspended solids	mg/l	51	383	1460	6-17500			-	(1170)
Sulphate (SO <sub>4</sub> <sup>2-</sup> )	mg/L	1	2	3	0-2390		1000	-	1000(250)
Ammonia	mg/L	0.02	0.03	0.114	0-0.61	0.01	-	-	
Nitrate	mg/L	0.02	0.03	0.06	0-0.16	0.7	400	-	
Petroleum	mg/L	0	0	0	0	-	-	-	0.02

Variable	Units	20 <sup>th</sup> %	50 <sup>th</sup> %	80 <sup>th</sup> %	Range	ANZECC 2000 / Queensland Water Quality 2010 Guideline Limits <sup>1</sup>			Draft EA <sup>2</sup>
hydrocarbons (C6-C9)									
Petrol. hydrocarbons (C10-C36)	mg/L	0	0	0.1	0-0.18	-	-	-	0.1
Aluminium (soluble)	mg/L	<b>0.06</b>	<b>0.14</b>	<b>0.288</b>	<b>0-0.63</b>	0.055	5	20	0.65
Copper (soluble)	mg/L	0.0001	0.002	0.004	0-0.013	0.0014	1	5	0.013
Iron (soluble)	mg/L	0.025	0.125	0.28	0-0.66	0.3	n/a low risk	10	0.52
Zinc (soluble)	mg/L	0	0.005	<b>0.046</b>	0-0.133	0.008	20	5	0.008
Aluminium (Total)	mg/L	<b>1.2</b>	<b>3.4</b>	<b>31.86</b>	<b>1.2-293</b>	0.055	5	20	0.65
Copper (Total)	mg/L	0.0012	<b>0.005</b>	<b>0.018</b>	0.001- <b>0.076</b>	0.0014	1	5	0.013
Iron (Total)	mg/L	<b>1.39</b>	<b>4.31</b>	<b>40.28</b>	<b>1.39-508</b>	0.3	n/a low risk	10	0.52
Zinc (Total)	mg/L	<b>0.0025</b>	<b>0.008</b>	<b>0.0308</b>	<b>0.0025-2</b>	0.008	20	5	0.008

- Guideline values for EC, pH, Total Suspended Solids, and ammonia are derived from the Queensland Water Quality Guidelines (2009), with the balance of guideline values derived from the ANZECC guidelines (2000).
- Values from (draft) Environmental Authority permit number MIN101140410 are in brackets
- Exceedences in guideline values are in bold.

## 5.4 Background Water Quality – Groundwater

There are three groundwater aquifer types in the vicinity of the mine.

- Alluvium.
- Tertiary Basalt.
- Permian Sedimentary Rock and Coal.

An alluvium aquifer is present at both Meteor Creek (south western corner of the existing mine lease) and at Bootes Creek (at the centre of the existing mine lease). The alluvium mostly comprises interbedded sands and clays, and bores are frequently used to supply water for livestock.

Underlying the alluvium, a tertiary basalt aquifer covers the majority of the site. The basalt is characterised by a network of cooling fractures that are discontinuous.

Underlying the tertiary basalt aquifer is Permian Sedimentary rock and coal, which outcrops near the southern boundary of the existing mine lease. The layer consists of majority sandstone, shale and coal.

The groundwater quality is currently observed in ten groundwater monitoring bores in and around the current Rolleston mining lease and are shown in Figure 4. Data collected from May and June 2010 from these bores has been used in the analysis. Two additional groundwater quality samples were taken and analysed from a single bore on the Springwood property (near Springwood surface water gauge) in 2009. The results from these bores are consistent with those obtained from the bores around the mine site.

The groundwater water quality testing results for the bores in and around the mine site are shown in Appendix F. Table 7 shows a summary of the water quality parameters likely to be impacted by Rolleston Coal operations compared to guideline values for irrigation (the major beneficial use of groundwater in the region).

The results show that:

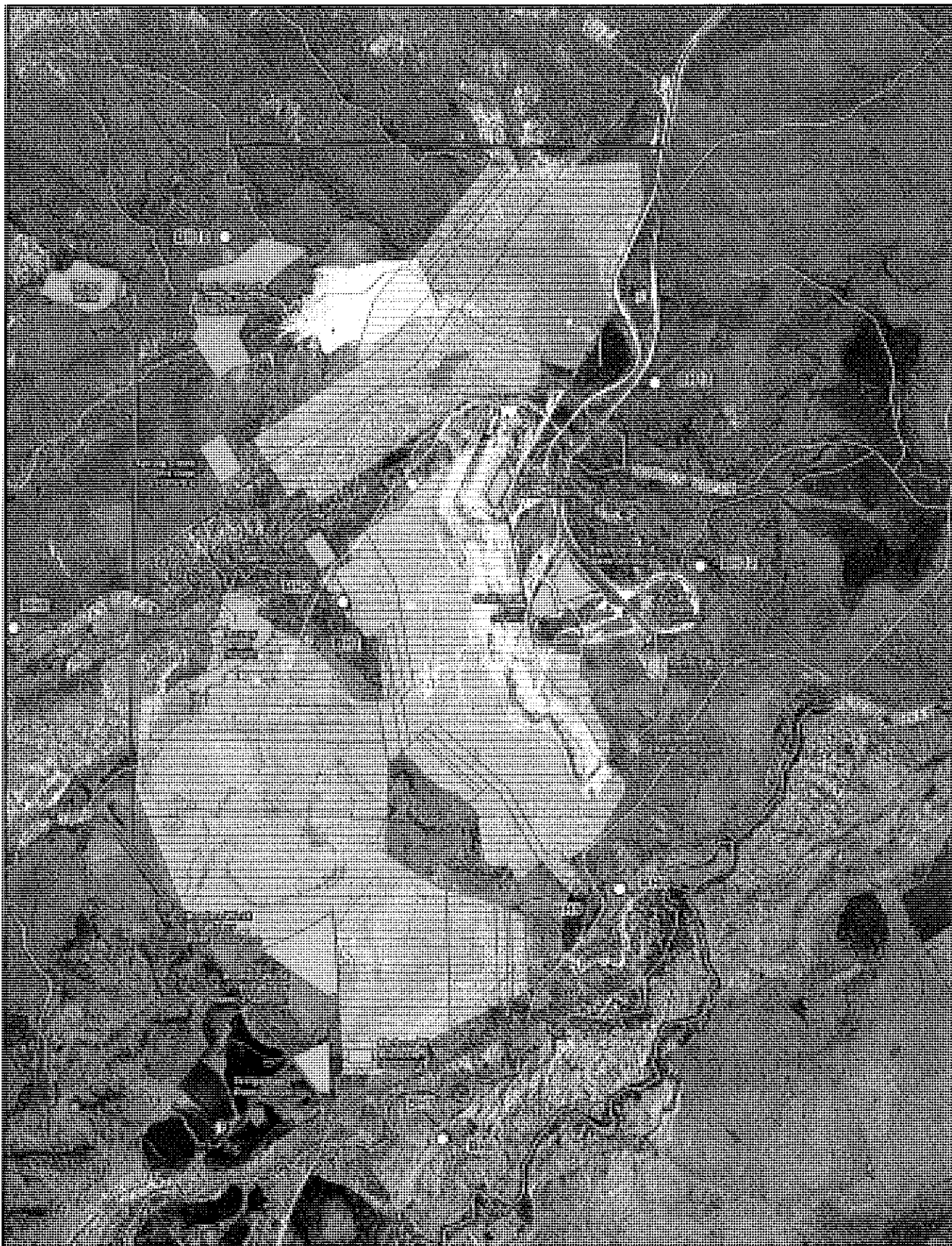
- pH ranges from neutral to slightly basic.
- The water is slightly brackish, but relatively low in salinity compared to typical salinity levels elsewhere within the Bowen Basin.
- Nitrate levels tend to be higher at bore holes, BH9, BH8, BH7, BH6 and BH5 relative to the rest of the boreholes. These boreholes are situated in the agricultural region outside of the mine lease, and possible reflect an impact from fertilizer use. This result is consistent with that observed from the two Springwood bore observations in August 2009.

- One site (BH2) has shown elevated levels of hydrocarbons (two samples) in early May 2010. This result was not replicated in the adjacent BH1 and the cause of the elevated levels is not clear. It is possible that some type of contamination occurred in the vicinity of this site at the time of sampling (early May 2009). The levels had decreased substantially by the next sample in late May, indicating a potential point source pollutant load in the initial sample.
- Total metal concentrations of iron typically exceed guideline values, although soluble levels are below guideline values.

Table 7 Ground water quality parameters

Analyte grouping/Analyte	Min	20th	50th	80th	Max	Guideline value (irrig) <sup>1</sup>
EA005:pH Value pH Unit	7.14	7.484	7.98	8.21	8.5	6-9
EA010-P:Electrical Conductivity @ 25°C µS/cm	302	798	1180	1610	1860	-
EA015H:Total Dissolved Solids @180°C mg/L	205	553	680	1058	1220	-
ED040F:Sulfate as SO4 2- mg/L	3	7	17	24.6	40	-
EK058G:Nitrate as N mg/L	0.08	0.4	0.5	1.05	2.04	5
<b>EG020F: Dissolved Metals by ICP-MS</b>						
EG020A-F:Aluminium mg/L	0	<0.01	<0.01	<0.01	<0.01	5
EG020A-F:Copper mg/L	0.002	0.003	0.005	0.011	0.016	0.2
EG020A-F:Iron mg/L	0.05	0.05	0.05	0.07	0.12	0.2
EG020A-F:Zinc mg/L	0.005	0.021	0.049	0.174	0.285	2
<b>EG020T: Total Metals by ICP-MS</b>						
EG020A-T:Aluminium mg/L	0.03	0.09	0.16	0.94	259	5
EG020A-T:Copper mg/L	0.006	0.009	0.016	0.023	0.79	0.2
EG020A-T:Iron mg/L	0.08	0.16	0.48	2.04	603	0.2
EG020A-T:Zinc mg/L	0.016	0.047	0.065	0.18	2.61	2
<b>EP080/071: Total Petroleum Hydrocarbons</b>						
EP080:C6 - C9 Fraction µg/L	0	<20	<20	<20	<20	-
EP071:C10 - C14 Fraction µg/L	50	50	50	50	130	-
EP071:C10 - C36 Fraction (sum) µg/L	50	50	50	284	11500	-
EP071:C15 - C28 Fraction µg/L	100	100	100	148	4760	-
EP071:C29 - C36 Fraction µg/L	50	50	50	106	6600	-

- Guideline values for irrigation beneficial use (identified as the only beneficial use for the connected groundwater aquifers.) are based on ANZECC long-term trigger values which are the maximum concentration (mg/L) or contaminant in the irrigation water which can be tolerated assuming 100 yrs of irrigation.
- Exceedences to guideline values are bolded.



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0 250 500 1,000 Metres

**Legend**

- Ground Water Monitoring Point
- Watercourse
- Rolleston Lease Boundary
- Dams
- Disturbed Catchment Area

**ROLLESTON COAL MINE**  
**Ground Water Monitoring Points**

Figure 4

## **5.5 Environmental Impacts**

### **5.5.1 Impacts of Discharged Waters**

Groundwater will typically mix with surface water in the pits. Releases from the pit water dams will be necessitated periodically, thereby discharging this mixture into the adjacent waterways. The quality of water released from the pit water dams to the receiving water will be dependent on the relative contribution of surface water and groundwater. A review of pit water quality has indicated that the concentrations of all contaminants, with the exception of salinity on rare occasions are less than the 80<sup>th</sup> percentile of background values in the receiving waters (Bootes and Meteor Creeks).

The current EA specifies that discharged waters from the mine are to be at a maximum salinity of 1500  $\mu\text{S}/\text{cm}$  and form a maximum of 20% of the flow for the release creek (i.e. 1:5 dilution ratio). With this level of dilution, the trigger value for the receiving waters (500  $\mu\text{S}/\text{cm}$ ) will not be exceeded and environmental values are unlikely to be impacted.

The aesthetic environmental values such as Visual Appreciation and Cultural and Spiritual values will not be affected as the discharged water is not likely to have any surface films or discolouration.

The impacts of discharged waters on the environmental values associated with Comet River are likely to be low due to the distance from the mine site and the absence of toxins that are likely to bio-accumulate.

### **5.5.2 Groundwater Contamination and Drawdown**

There is some potential for exchange between the groundwater aquifers and pit water dams as these dams were constructed in existing gullies where there would typically some seepage. However any interactions would be confined to a relatively small area (the groundwater / surface water interaction zone (gully floor)) and the limited exchange of waters would not be expected to affect the water quality within the groundwater aquifer.

There is some potential for groundwater drawdown, as the pits where mining activities are occurring are dewatered. However, as the rate of dewatering is equal to the rate of inflow of groundwater into the pits, drawdown of the aquifers is not expected to impact on adjacent landowners.

### **5.5.3 Accumulation of Salts and Metals**

The accumulation of salts and metals in waterways would be expected to adversely affect the aquatic biota. Dissolved metals and salts would tend to be flushed through the system in times of continuous flow, whereas metals and salts bound to sediments could accumulate on the bed of the waterway for considerable periods of time. These bound contaminants could be either flushed through the waterway with high flows or become re-entrained in the water column either in particulate or dissolved form. Re-entrainment in the water column will increase the exposure of contaminants to aquatic biota and increase the total concentration of contaminant in the water column. If the total concentration (comprising re-entrained material and new contaminants) exceeds the threshold values derived for each contaminant then there is potential for environmental harm. A sediment sampling program is recommended to assess the potential for accumulation of contaminants in the sediments.

Metals can also accumulate in aquatic biota until they become toxic to that organism. The guideline values for metals have taken the potential for such accumulation into account, where it is considered a considerable risk, by recommending the adoption of a higher level of protection for the ecosystem (99% for slightly or moderately disturbed ecosystems, rather than the 95% generally adopted).

Given that the prescribed releases from Rolleston Mine, as specified in the current Environmental Management Plan, are below the background concentrations of contaminants in the receiving environment, the accumulation of contaminants in the receiving environment as a result of mine activities is considered to be insignificant.

### **5.5.4 Cumulative Effects of Other Industries Discharging into the Waterways**

There are no other industries in the Meteor Creek catchment which discharge into the receiving environment. Adjacent grazing enterprises will impact on the quality of the receiving environment, but will affect different water quality parameters to the mine.

## 6.0 Contaminant Source Study

Under the Environmental Authority, Rolleston Coal is required to complete a Contaminant Source Study that identifies the origin and chemical composition of the different types of water.

The site has been reviewed to determine the possible contamination sources and likely contaminants, and these are:

- rail loop (hydrocarbons from fuel spillage, fine sediment from coal handling);
- coal handling facility (CHF) (ph, salinity, fine sediment);
- administration offices and Workshops (hydrocarbons from fuel spillage, sewage);
- sewerage treatment plant (sewage);
- spoil dumps (pH, salinity from leaching of salts, sediment); and
- pits (pH, salinity, sediments, ammonium nitrate and fuel oil from explosives spillage).

Hydrocarbon fuel tanks at the ballast siding are contained within a bunded area and the CHF sediment dam has been constructed to capture any spills from the ballast siding and runoff from the CHF.

A package treatment system for the site sewage has been installed with treated effluent from the system draining to the Environmental Dam. This water is used for haul road dust suppression, and is not discharged to any water ways.

A geotechnical assessment of overburden was conducted for the EIS in March 2002 by EGI using 80 drill-core samples, and ongoing monitoring is conducted during resource definition and production drilling. A comprehensive coverage of spoil quality data was assessed to identify contaminant sources. Major spoil attributes with relevance to rehabilitation and water quality were assessed including:

- Electrical Conductivity;
- pH;
- Acid Base Analysis to determine the maximum potential acidity;
- Net Acid Generation; and
- Exchangeable Sodium Percentage (ESP) to determine soil sodicity.

The results of the assessments have found the following:

- Electrical Conductivity is in the range of non saline to slightly saline;
- spoil exhibits moderate to high sodicity and dispersive qualities making them susceptible to erosion and hardpan development; and
- spoil is moderately alkaline and combined with typically low pyritic content is mostly Non Acid Forming, so exhibits a low risk of acid mine drainage.

Spoil dumps are leveed off to prevent runoff from discharging to the surrounding environment. The flow off the spoil is either directed to the pits or collected in sediment dams and used for haul road dust suppression and any surplus water pumped to the pit water dams. The sediment dams capture sediment to reduce sediment transfer to the pit water system and ultimately to the release dams which can discharge to the environment under controlled releases.

Details of the assessment are presented in Appendix I, Rolleston Coal - Cover Material Management Guideline.

## 7.0 Water Balance Model

### 7.1 AWBM Model

#### 7.1.1 Overview

Australian Water Balance Model (AWBM) is a catchment water balance model that determines catchment runoff based on rainfall and evapotranspiration data. The model uses three independent surface stores to simulate partial areas of runoff. At each timestep, rainfall and evaporation depths are applied to the three surface stores. If the depth of rainfall exceeds the depth of evapotranspiration and storage capacity, the excess depth becomes runoff. AWBM is a part the Rainfall Runoff Library, distributed by CRC for Catchment Hydrology.

Once calibrated and verified, the AWBM model is used to generate daily runoff depths based on historical rainfall, evapotranspiration and calibrated soil storage parameters. The runoff sequence is used as an input to the site water balance model in order to quantify runoff from the mine catchment, extend the stream flow record and determine when releases can occur.

#### 7.1.2 Model Setup

The following steps were followed to assess the most appropriate weather stations for calibration.

- Soil types on the mine site are typically alluvial black clays. Rainfall and stream gauge positions were overlaid on soil type maps so that gauges selected were from areas with similar soil types to ensure the best correlation between rainfall and runoff. This yielded the best representation of runoff that can be expected from these soil types.
- From this comparison, it was determined that stream gauge stations 130509A (Carnarvon Creek at Rewan) and 130503A (Carnarvon Creek at Wyseby Station) were closest to the soil type at Rolleston.
- Monthly comparison between rainfall stations in Table 3 and stream gauge stations 130509A and 130503A was undertaken to determine the best correlations between rainfall and runoff.
- Catchment yields were assessed based on the catchment areas, rainfall and runoff during calibration and verification and a suitable yield determined for the AWBM.

Rainfall station number 35004 (Babbiloora Station) and stream gauge station 130509A were found to have the best correlation between rainfall and runoff. The rainfall and stream gauge data was input into AWBM along with evapotranspiration data derived from PAN evaporation data from weather station number 35147 (Emerald DPI Field Station). The conversion factor from PAN evaporation to evapotranspiration used are 0.67 for summer and 0.65 for all other seasons, based on comparison of the site climatic conditions and those values published in *Hydrological Recipes* (CRC for Catchment Hydrology).

#### 7.1.3 Calibration

The AWBM model used rainfall station number 35004 and was calibrated against observed streamflow from stream gauge station number 130509A. The period of calibration was 9 September 1985 to 30 June 1993. The results for calibration in AWBM showed a correlation coefficient of 0.501 and a relative difference of -8.9% (-46.467mm). Relative difference is the difference between the observed runoff and the runoff calculated in AWBM. The calibrated soil storage parameters are shown in Table 8.

Table 8 Calibrated Soil Storage Parameters

Parameter	Value	Description
A1	0.196	Partial areas represented by surface storages
A2	0.195	
A3	0.609	
BF1	0.380	Baseflow Index
C1	8.627	Surface storage capacities
C2	191.373	
C3	466.667	
K <sub>BASE</sub>	0.208	Daily baseflow recession constant
K <sub>SURF</sub>	0.651	

Figure 5 shows the recorded and calculated annual runoff depths for the calibration period.

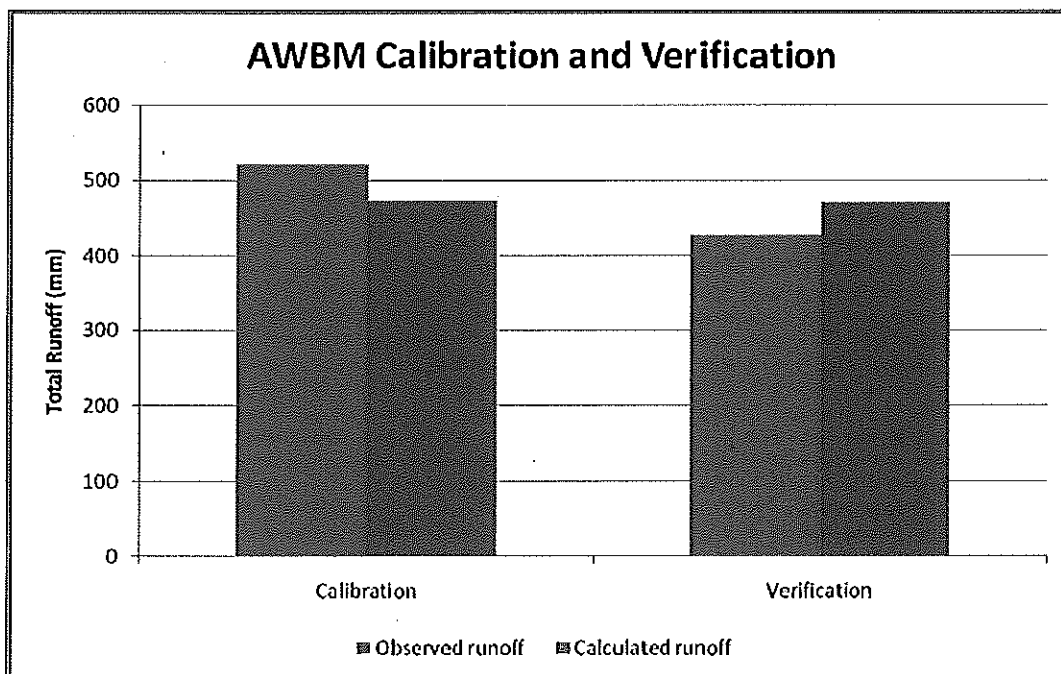


Figure 5 AWBM Calibration and Verification Results

#### 7.1.4 Verification

The soil storage parameters determined in the calibration were verified using the same rainfall, evapotranspiration and stream gauge stations for the period from 9 October 1993 to 17 March 2001. Figure 5 shows the recorded and calculated annual runoff depths for the verification period.

The results for the verification showed a correlation coefficient of 0.414 and a relative difference of 10.4% (44.4 mm) and therefore the calibrated soil storage parameters are suitable for predicting runoff and extending stream flow records in the vicinity of Rolleston Coal.

### 7.1.5 Historical Runoff Sequence

The AWBM model was used to generate runoff based on the total historical period of rainfall for weather station number 35004. The weather station had a total of 80 years of data with several years of missing data when the gauge was not operational. It was therefore determined that data drill is more appropriate to used to generate the runoff sequence. Table 10 shows the rainfall and runoff sequences adopted. The average annual rainfall is 642mm.

Table 9 Rainfall and runoff sequence

Percentile Rainfall Years	Rainfall Depth (mm)	Runoff Depth (mm)
10%	410	37
20%	492	27
30%	541	56
40%	590	42
50%	614	48
60%	648	51
70%	712	53
80%	775	67
90%	926	94

The AWBM model was run using data drill rainfall information for the Rolleston Coal site and the calibrated soil storage parameters. Figure 6 shows the historical rainfall and runoff for the AWBM model. These results were used as an input to the GoldSim model.

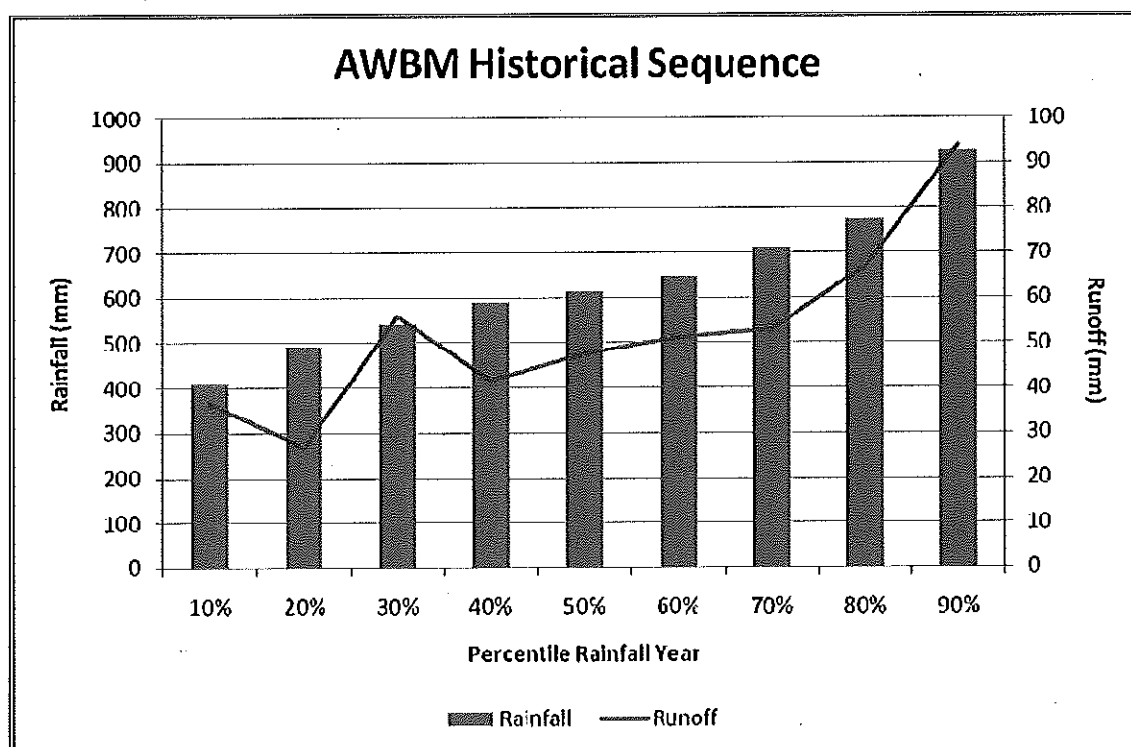


Figure 6 AWBM Historical Results

### 7.1.6 Yield Analysis

Table 10 shows the yield over the calibration, verification and historical periods. The results vary marginally between 10 and 11 percent, and the yields calculated for the verification and historical rainfall periods returned the same result so the overall yield for natural surface at Rolleston used in the GoldSim water balance model is 10%.

Table 10 Yield Analysis

	Rainfall (mm)	Runoff (mm)	Yield (%)
Calibration Period	4565	523	11
Verification Period	5185	522	10
Historical Sequence	71260	7176	10

## 7.2 GoldSim Water Balance Model

### 7.2.1 Overview

GoldSim was used to create a site water balance model for Rolleston Coal. GoldSim is an object-oriented computer programme used to model dynamic, probabilistic simulations. Each element within the model represents the operations of the site water management system and in so doing accounts for all the site water and representative water quality on a daily time step basis.

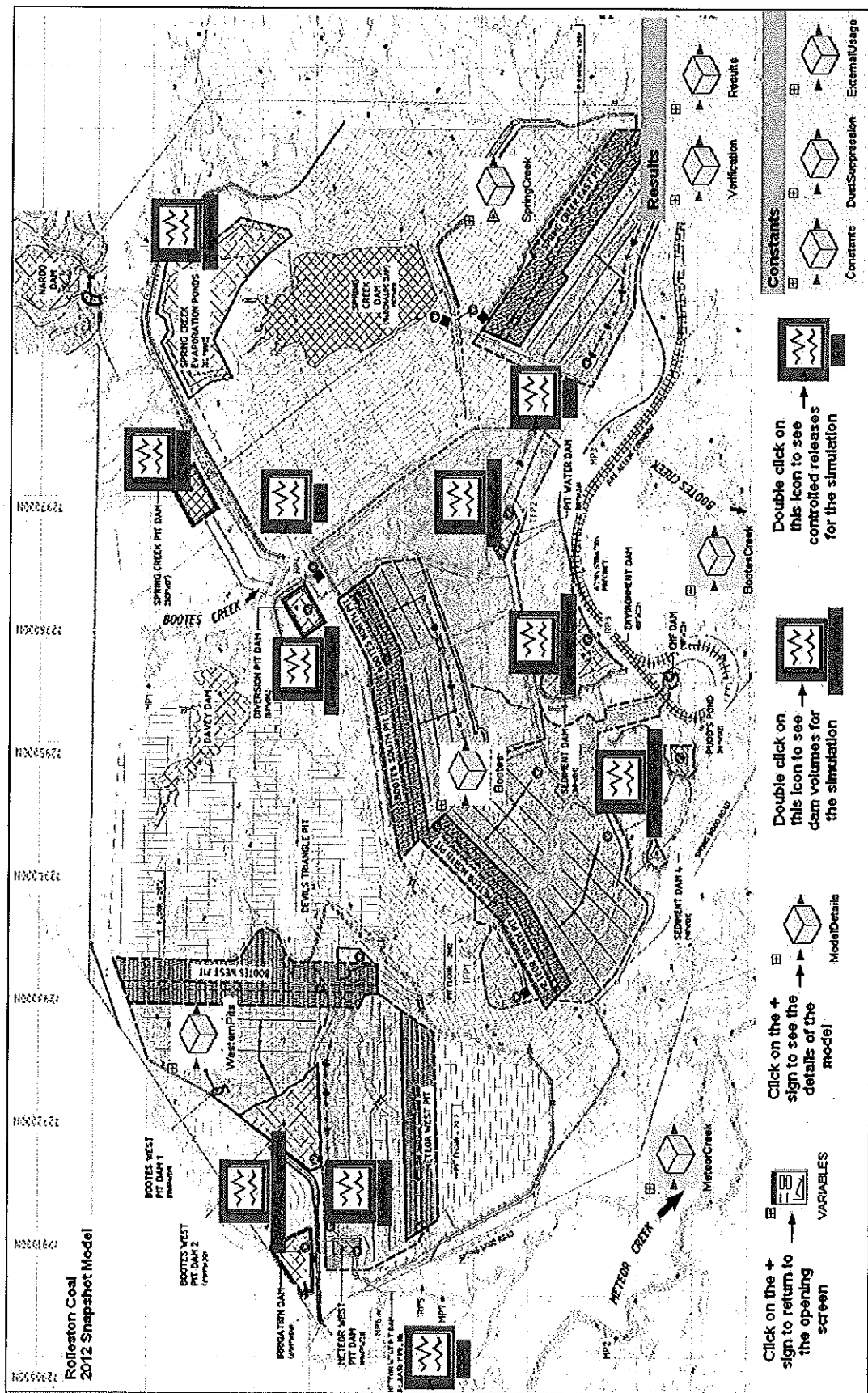
The objectives of the water balance model are to:

- identify the quantity of contaminated waters produced and used on the site;
- inform an operational plan for separation, storage and handling of clean and pit water under different seasonal events;
- determine any additional onsite pit water storage requirements; and
- determine the requirements and volumes of offsite supply of pit water such as releases.

The model has been designed to simulate the operation of the major components of the water management system at Rolleston Coal and include the following:

- pit water catchment and collection including rainfall, runoff and groundwater infiltration;
- pit dewatering;
- pump and gravity transfers between pit water dams;
- on site water usage such as haul road dust suppression and irrigation;
- water storage dams including losses such as evaporation and seepage; and
- controlled releases.

Figure 7 below illustrates the model representation of the site water management system.



### 7.2.2 Model Setup

Separate water balance models were created for the 2012, 2016 and 2021 mine plans. The models were run for a 100 year sequence with a daily time step. A 100 year duration was chosen as the time period as it allows for sufficient representation of climatic variations.

Figures 8, 9 and 10 show the system schematics for the 2012, 2016 and 2021 mine plans respectively.

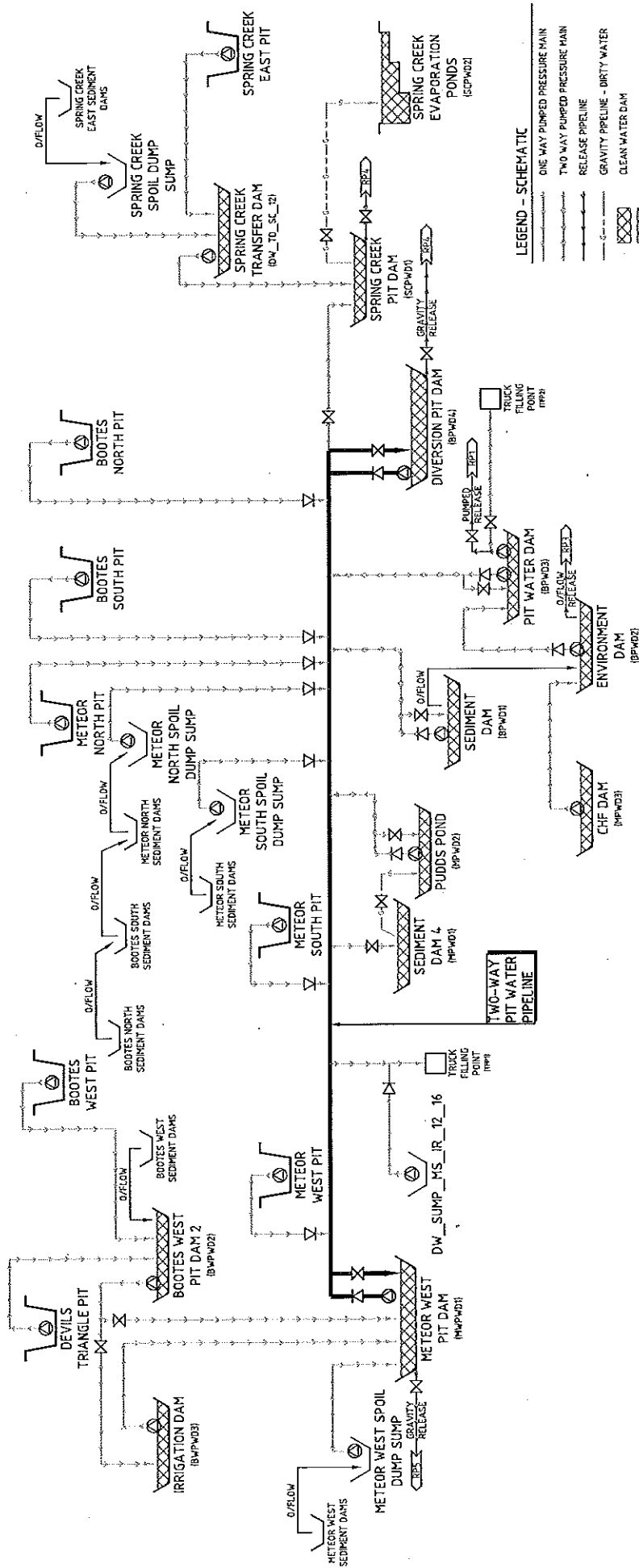
### 7.2.3 Storages

The pit water dams were input into GoldSim using area-storage curves provided by Rolleston Coal for the existing dams and 12D design models for Irrigation, Bootes West 1 & 2 and Meteor West Pit dams that were designed by AECOM in 2009. The total proposed pit water storage volume is 4550 ML.

Details of the pit water dams are detailed in Table 11.

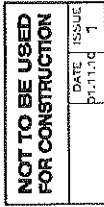
Table 11 Schedule of Dams

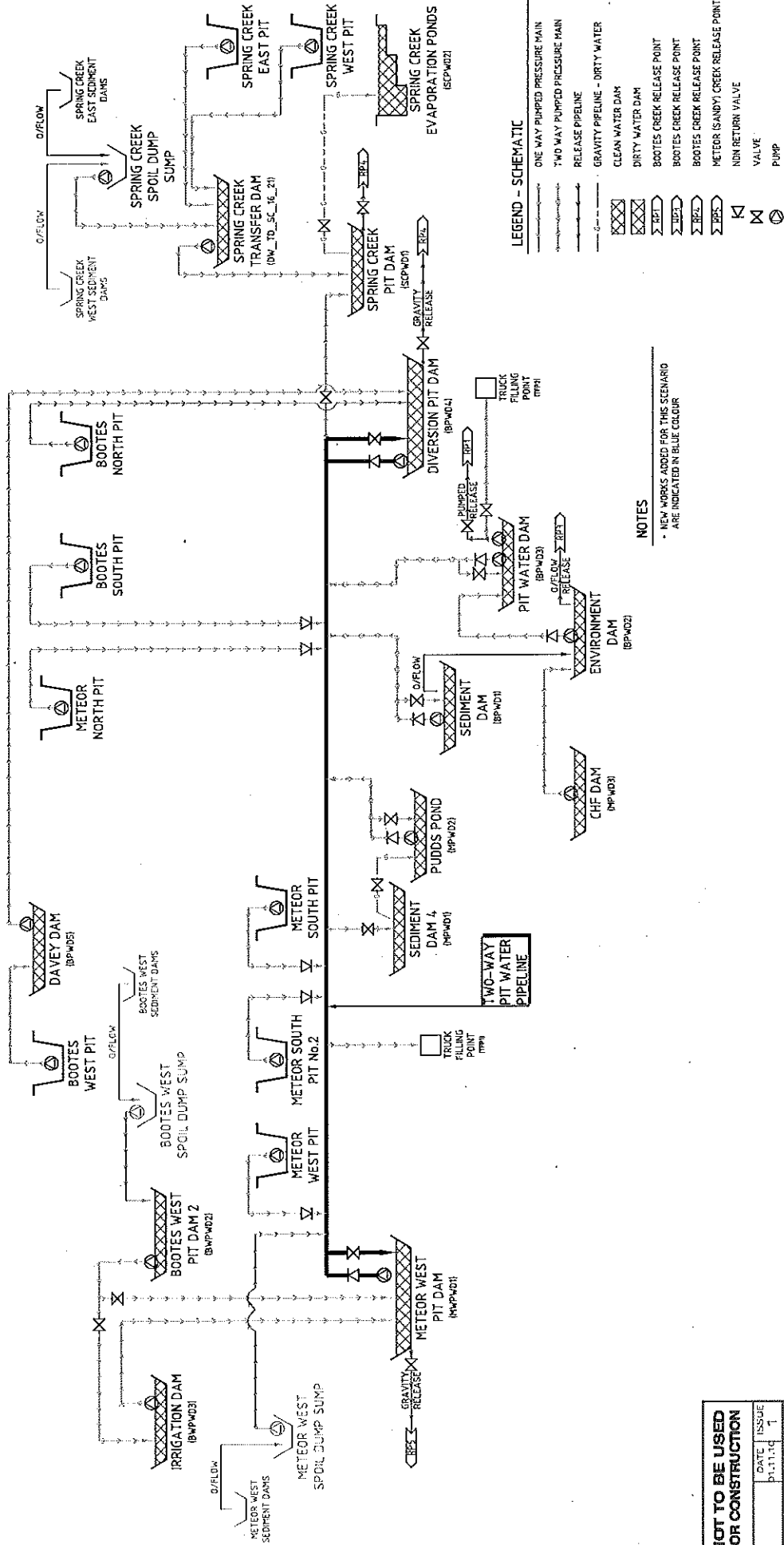
Name	ID	Dam Classification	Base water level (RL)	Spillway Level (RL)	Volume to spillway (ML)	Mine Plan
<b>Existing Dams</b>						
Pit Water Dam	BPWD3	Pit Water Dam / Release Dam (hazardous)	227.3	235.8	357	All
Environment Dam	BPWD2	Pit Water Dam / Release Dam (hazardous)	226.5	231.4	128	All
Sediment Dam (MIA Dam)	BPWD1	Pit Water Dam	230.0	235.7	155	All
Pudd's Pond (Sediment Dam 6)	MPWD2	Pit Water Dam	232.6	238.5	121	All
Sediment Dam 4	MPWD1	Pit Water Dam	250.3	254.1	26	All
CHF Dam	MPWD3	Pit Water Dam	228.3	230.8	21	All
Meteor West Pit Water Dam	MWPWD 1	Pit Water Dam / Release Dam (hazardous)	234.0	242.9	170	All
Bootes West Pit Water Dam 1	BWPWD1	Pit Water Dam	234.0	247.5	11	All
Bootes West Pit Water Dam 2	BWPWD2	Pit Water Dam	236.0	241.5	804	All
Irrigation Dam	BWPWD3	Pit Water Dam	239.0	245.2	693	All
Davey Dam (Gibbs Gully Dam)	BPWD5	Pit Water Dam	236.7	241.4	690	2016, 2021
<b>Proposed Dams</b>						
Diversion Dam	BPWD4	Pit Water Dam / Release Dam (hazardous)	-	-	300	All
Spring Creek Pit Water Dam	SCPWD1	Pit Water Dam / Release Dam (hazardous)	-	-	300	All
Evaporation Ponds	SCPWD2	Pit Water Dam	-	-	776	All



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LEGEND - SCHEMATIC

- ONE WAY PUMPED PRESSURE MAIN
- TWO WAY PUMPED PRESSURE MAIN
- RELEASE PIPELINE
- GRAVITY PIPELINE - DIRTY WATER
- CLEAN WATER DAM
- DIRTY WATER DAM
- BOOTES CREEK RELEASE POINT
- BOOTES CREEK RELEASE POINT
- BOOTES CREEK RELEASE POINT
- BOOTES CREEK RELEASE POINT
- METEOR (SANDY) CREEK RELEASE POINT
- NON RETURN VALVE
- VALVE
- PUMP

NOTES

- NEW WORKS ADDED FOR THIS SCENARIO ARE INDICATED IN BLUE COLOUR

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11.11.14	1	

#### 7.2.4 Groundwater Inflow

Groundwater inflows to the pit for the first three years of mining at the Meteor West boxcut were simulated by AGE. The simulation period was from 2010 to 2012. The predicted inflows stabilize at about 0.65ML/day.

For the purposes of the water balance model, the groundwater inflows have been assumed to be similar across the site and the long term inflows of 0.65ML/day which equates to 0.2 ML/day/km of pit strikeface have been adopted for all pits over the life of the mine. Table 12 shows the groundwater infiltration for each pit for each of the three water management plans.

Table 12 Groundwater Infiltration Into Pits

Pit	2012	2016	2021
	GW (ML/day)	GW (ML/day)	GW (ML/day)
Meteor West	0.34	0.25	0.20
Bootes West	0.46	0.49	0.47
Devils Triangle	0.22	0.00	0.00
Meteor South	0.16	0.16	0.16
Meteor South No. 2	-	0.03	0.03
Meteor North	0.20	0.20	0.20
Bootes South	0.28	0.29	0.25
Bootes North	0.15	0.15	0.08
Spring Creek South	0.00	0.52	0.49
Spring Creek North	0.43	0.33	0.29
<b>Total</b>	<b>2.25</b>	<b>2.44</b>	<b>2.17</b>

#### 7.2.5 Losses

##### Evaporation

Evaporation depths for the dams on site were based on a Lake evaporation PAN factor multiplied by PAN evaporation data from BoM weather station number 35147 Emerald DPI Field Station. The PAN evaporation depth was then converted to dam evaporation by multiplying by a pan factor of 0.7. The pan factor is based on the average between Lake evaporation PAN factors for Biloela and Theodore, from the *Technical Guidelines for Environmental Management of Exploration and Mining in Queensland* (1995).

Table 13 shows the dam evaporation depths for each month. The GoldSim model removes evaporation depths daily over the surface area of the dams.

Table 13 Evaporation Depths

Month	Dam Evaporation (mm/day)
Jan	6
Feb	5
March	5
Apr	4
May	3
June	3
July	3
Aug	4
Sept	5
Oct	6
Nov	6
Dec	6

##### Seepage

Seepage rates were based on a hydraulic conductivity of  $10^{-9}$  m/s which is the saturated hydraulic conductivity of well compacted clay used in the construction of dams. This level of conductivity should be achievable in clay

used in a dam constructed to engineering standards. The hydraulic conductivity was applied daily over the floor area of the dams.

### 7.2.6 Demands

#### Coal Handling Facility (CHF)

The current average demand for water in the CHF was calculated based on consumption figures provided by Rolleston Coal on 27 July 2010. This figure was scaled up proportionally to the projected increase in coal production, from a current production of 8 Mtpa to a projected 9.5 Mtpa over the next 20 years. Table 14 shows the water demand at the CHF for the 2012, 2016 and 2021 water management plans.

#### Haul Roads

On 23 August 2010, Rolleston Coal advised that their current minimum dust suppression rate for the mine site was one 80 kL cart running 2 carts per hour for 12 hours a day, the total consumption of this being 1.92 ML/day, or 2.3 ML/month/km of haul road. This haul road dust suppression rate was used, scaled up proportionally to the length of haul roads in the 2012, 2016 and 2021 mine plans. These usage rates are shown in Table 14.

Table 14 Water Demands

Water Management Plan	CHF Demand (ML/day)	Haul Road Demand (ML/day)	Total Demand (ML/day)
2012	0.14	2.00	2.14
2016	0.17	2.21	2.38
2021	0.20	2.25	2.45

#### Irrigation

Investigation into the irrigation uses suitable for Rolleston are:

- crops for cattle feed (off-site Lucerne paddocks); and/or
- turf (rehabilitation areas on site).

Irrigation rates are based on a daily moisture deficit derived from the BoM climate data. The irrigation rate is determined by the following equation:

$$\text{Irrigation rate} = \text{Evapotranspiration} \times \text{Crop Coefficient} - \text{Rainfall (mm/day)}$$

The Penman - Monteith evapotranspiration ( $ET_0$ ) is estimated using Class A pan evaporation. The equation for the evapotranspiration is as follows:

$$ET_0 = G(\text{PAN})$$

Where PAN is Class A Pan Data taken from the BoM station #035147- Emerald DPI; and

G is the gradient of the ET-0-PAN regression line.

G is taken as 0.67 for December through February, and 0.65 for March through November. This is based on data for comparative climates to Rolleston. On days where the rainfall exceeds the Turf evapotranspiration depth, there is no irrigation of the crop.

Although crop coefficients were available for other regions, none could be sourced for Central Queensland. The other regions do not exhibit similar climatic conditions or soil types to the Rolleston region, however Rolleston Coal has reserved the open escarpments in front of the Meteor West pit, all the area around the Spring Creek pit that are not being mined, and all the rehabilitation areas for irrigation. The total area designated for irrigation far exceeds the 21 ha of turf calculated to irrigate 250 ML/yr based on the crop coefficients for some of the other regions.

### 7.2.7 Controlled Releases

The controlled releases were modelled at the release dams according to the following conditions, based on the Environmental Authority:

- flow triggers are exceeded in the receiving creeks; i.e. 0.75m<sup>3</sup>/s in Bootes Creek and 2.5m<sup>3</sup>/s in Sandy Creek (Meteor);
- electrical conductivity concentrations are below the trigger concentration of 1000 uS/cm; and
- release flow rate is capped at 1000 L/s (based on the design of the Meteor West discharge pipeline).

The runoff sequence was applied over the catchment area for Bootes Creek and Meteor Creek to determine the stream flows through the creeks at each discharge point. Releases from the release dams occur in a staged process when the stream flows are above the trigger flows in the creeks, the electrical conductivity at the release dams is below the trigger concentrations and the volumes of the release dams are as follows:

- release dam level is above 80% capacity, release equivalent of 20% of the stream flow but capped at 1000L/s;
- release dam level is between 50% and 80% capacity, release equivalent of 10% of the stream flow but capped at 1000L/s; and
- release dam level is below 50% capacity, no release.

#### 7.2.8 Water Balance Results

The results in Table 15 show the performance of the three water management plans under a range of different seasonal events. The 20<sup>th</sup> percentile year represents a dry year, the 50<sup>th</sup> an average year and the 80<sup>th</sup> a wet year. The 95<sup>th</sup> percentile year is where Rolleston aim to achieve system reliability to prevent water accumulating in the pits. To maximise the on site reuse of pit water, an averaged demand of 250ML/year has been applied for the irrigation to the designated irrigation areas of rehab and escarpments not being mined as set aside by Rolleston Coal.

For the 95<sup>th</sup> percentile year, the overall balance is a surplus of pit water. Through the 100 year sequence that was modelled, the number of years in which the pits could not be dewatered are:

- 2012 – 6 yrs;
- 2016 – 5 yrs; and
- 2021 – 1 yr

This can be catered for operationally by pumping to the pit voids. Up to the end of 2012 Devils Triangle pit void will be used and thereafter Bootes North Pit void.

Any deficits or shortages in the system can be managed by reducing the haul road dust suppression, and using water from the sediment dams as a first recourse, and finally if required, raw water from Naroo Dam and Davey Dam while it is still a raw water dam.

Table 15 GoldSim Model Results

	20th percentile	50th percentile	80th percentile	95th percentile
<b>2012 Water Management Plan</b>				
<i>Inflows</i>				
Rainfall (ML/yr)	498	651	810	1228
Runoff (ML/yr)	896	2075	2224	4649
Groundwater (ML/yr)	818	820	818	818
<i>Outflows and losses</i>				
Evaporation (ML/yr)	1610	1692	1664	2012
Seepage (ML/yr)	32	34	34	40
Haul Road Dust Suppression (ML/yr)	791	793	791	791
Releases (ML/yr)	61	955	1256	2012
External Usages (ML/yr) - Irrigation	0	70	100	250
Balance (ML/yr)	- 282	2	6	1,590
<b>2016 Water Management Plan</b>				
<i>Inflows</i>				
Rainfall (ML/yr)	336	576	700	1420
Runoff (ML/yr)	948	2182	2338	4830
Groundwater (ML/yr)	872	875	872	872
<i>Outflows and losses</i>				

	20th percentile	50th percentile	80th percentile	95th percentile
Evaporation (ML/yr)	1090	1433	1389	2209
Seepage (ML/yr)	22	30	30	46
Haul Road Dust Suppression (ML/yr)	868	871	868	868
Releases (ML/yr)	51	1044	1363	2563
External Usages (ML/yr) - Irrigation	130	250	250	278
Balance (ML/yr)	- 6	5	11	1,158
<b>2021 Water Management Plan</b>				
<i>Inflows</i>				
Rainfall (ML/yr)	416	591	784	1342
Runoff (ML/yr)	745	1718	1838	3802
Groundwater (ML/yr)	781	783	781	781
<i>Outflows and losses</i>				
Evaporation (ML/yr)	1332	1448	1547	2077
Seepage (ML/yr)	27	30	33	44
Haul Road Dust Suppression (ML/yr)	882	885	882	882
Releases (ML/yr)	0	750	797	2514
External Usages (ML/yr) - Irrigation	0	0	120	320
Balance (ML/yr)	- 299	- 21	24	87

## 8.0 Water Management System

### 8.1 Objectives

The objective of the water management system is to:

- isolate clean water, pit water and sediment catchments;
- minimise the pit water catchment and the resulting storage required;
- optimise the reuse of pit water on site; and
- protect pits and infrastructure from flooding.

### 8.2 Existing Mine Water Management System

#### 8.2.1 Existing Pits

The following pits are currently being mined:

- Devils Triangle Pit;
- Meteor West Pit;
- Meteor South Pit;
- Meteor North Pit;
- Bootes South Pit
- Bootes North Pit; and
- Spring Creek East Pit.

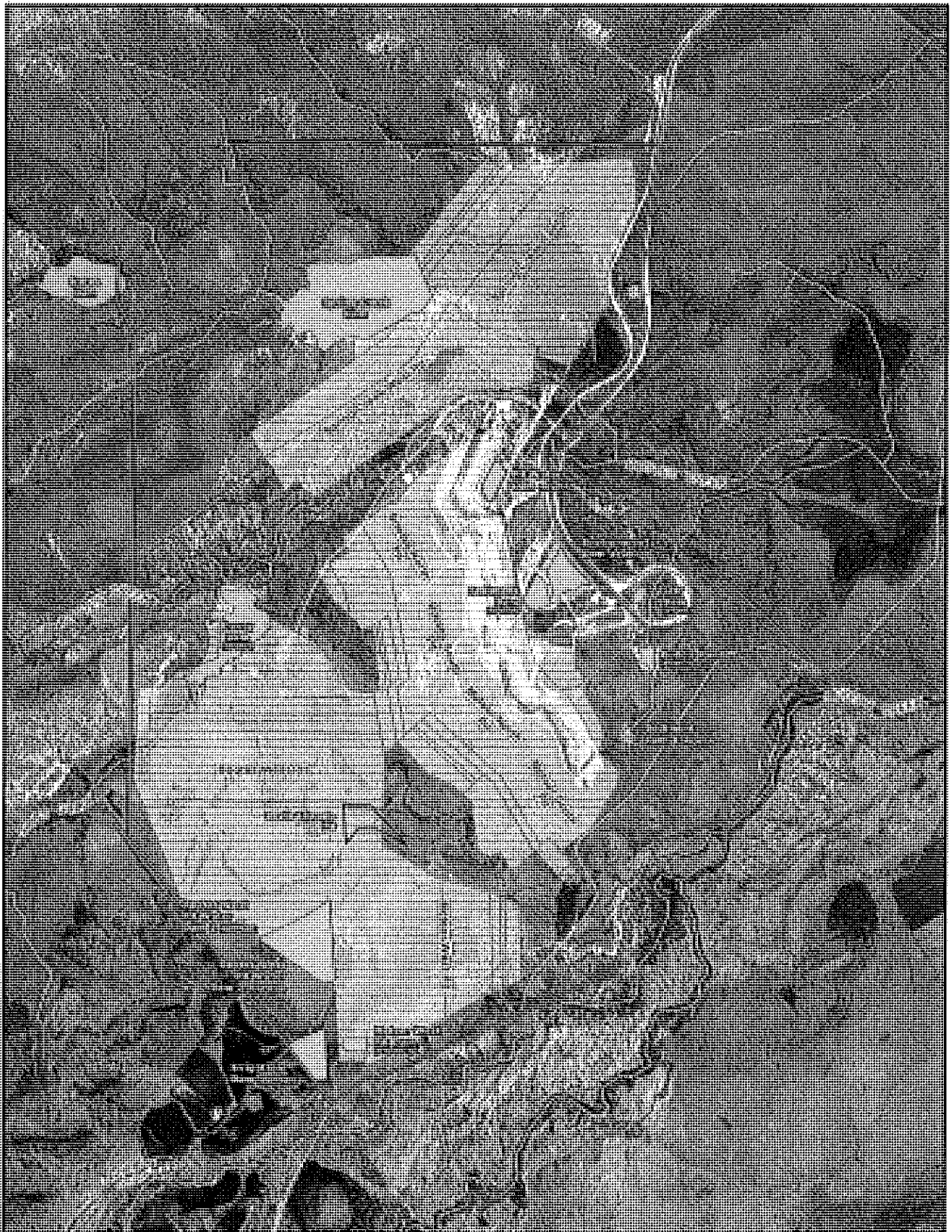
#### 8.2.2 Existing Pit Water Storage

A summary of the existing pit water storage dams are shown in Table 16. Currently, Sediment Dam 4 overflows to Pudd's Pond and the Sediment Dam overflows to the Environment Dam.

Table 16 Schedule of Existing Dams

Name	ID	Spillway Level (RL)	Volume to spillway (ML)
Pit Water Dam	BPWD3	235.8	357
Environment Dam	BPWD2	231.4	128
Sediment Dam (MIA Dam)	BPWD1	235.7	155
Pudd's Pond (Sediment Dam 6)	MPWD2	238.5	121
Sediment Dam 4	MPWD1	254.1	26
CHF Dam	MPWD3	230.8	21
Meteor West Pit Water Dam	MWPWD1	242.9	170
Bootes West Pit Water Dam 1	BWPWD1	247.5	11
Bootes West Pit Water Dam 2	BWPWD2	241.5	804
Irrigation Dam	BWPWD3	245.2	693

The pits and dams are shown on Figure 11.



PROJECT ID 60103978  
 LAST MODIFIED CFS 28-Oct-2013

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0 250 500 1,000 Metres

#### Legend

- Watercourse
- Rolleston Lease Boundary
- Dams
- Disturbed Catchment Area

**ROLLESTON COAL MINE**  
 Existing Dam and Pit Locations

Figure 11

### 8.2.3 Existing Pumps and Pipelines

A preliminary inventory of mine water pumping capability at Rolleston Coal was collated from site visits and information obtained from Rolleston Coal personnel. This inventory is summarised below:

Table 17 Schedule of pumps and pipelines

From	To	Nominal Capacity (l/s)	Nom Pipe Dia (mm)	Pump Type
Devils Triangle Pit	Bootes West Pit Water Dam 2	80	200	MultiFlow 380 trailer/skid pump
Meteor West Pit	Meteor West Pit Water Dam	100	200	Legra HW6000 Highwall pump
Meteor South Pit	Sediment Dam 4	80	200	MultiFlow 380 trailer/skid pump
Meteor North Pit	Sediment Dam	80	200	MultiFlow 380 trailer/skid pump
Bootes South Pit	Pit Water Dam	75	200	MultiFlow 340 trailer/skid pump
Bootes North Pit	Pit Water Dam	75	200	MultiFlow 340 trailer/skid pump
Sed Dam	Environment Dam	75	200	MultiFlow 340 trailer/skid pump
Environment Dam	Pit Water Dam	38	200	Flygt pump
Pit Water Dam	Release Point 1	130	200	Super Titan 45KW
Pit Water Dam	Truck Fill Point	130	-	Fed off Pit Water Dam release pump (Super Titan 45KW)

Rolleston Coal has additional portable skid pumps on site that can be moved to wherever additional pumping capacity is required.

### 8.2.4 Operation of Existing Infrastructure

The existing infrastructure is not interconnected and is operated as separate systems. Diversion of flow from a pit to an alternative dam would require relocation or extension of the pipeline and moving around of the portable skid and trailer pumps. Transfers between dams cannot occur without additional pumps and pipelines.

## 8.3 Clean Water Management System

### 8.3.1 Overview

The objective of the water management system for clean water catchment is to prevent runoff from these areas discharging into a pit water catchment or directly into the pits. This is achieved through a series flood diversions and minor diversion works.

Within the current Rolleston mining lease there are two raw water storage facilities – Naroo Dam and Davey Dam. These raw water storages may supply water for mining operations during dry periods. See Figures 8, 9 and 10 in Section 8.6 detailing the water management infrastructure for the 3 mine plans.

### 8.3.2 Raw Water Storages

#### Naroo Dam

Naroo Dam is a 745 ML raw water dam that is used for the supply of water to the Rolleston mining village. Early in 2010, a piping failure occurred in the Naroo Dam embankment and emergency works were designed by AECOM and implemented by Rolleston Coal to reinstate the dam to its previous condition.

#### Davey Dam

Davey Dam is an existing 690 ML raw water dam to the west of the Bootes North Pit. As mining progresses in Bootes West Pit, the catchment to Davey Dam will become a pit water catchment as a result of high wall pumping out of the Bootes West pit and the dam will be converted to a pit water dam. This is expected to occur in 2016.

### 8.3.3 Flood Diversions

#### Existing Spring Creek Temporary Diversion

To prevent flood flows from Spring Creek from discharging into the Spring Creek Pit, the Spring Creek Temporary Diversion has been constructed upstream of the Spring Creek Dam. A secondary benefit of the Spring Creek Temporary Diversion is it allows the decommissioning of Spring Creek Dam, which is proposed to be empty by mid 2014. The levee has been designed for the 1000 year ARI design flow of 653m<sup>3</sup>/s

#### Spring Creek Pit Temporary Diversion

The proposed temporary Spring Creek Pit Diversion is required to protect the eastern portion of the Spring Creek Pit from overland flood flows, and diverts these flows around the pit to Bootes Creek. The 100 year ARI design flow in the channel is 67 m<sup>3</sup>/s and the levee is designed for the 1000 year ARI design flow of 140 m<sup>3</sup>/s. The diversion drain ranges from 10 m to 60 m base width at a depth of approximately 2.0 m, while the height of the levee varies, with a maximum height of approximately 4.0 m.

#### Permanent Spring Creek Pit Diversion

The Permanent Spring Creek Pit Diversion is positioned to the north of the temporary Spring Creek Pit Diversion and diverts overland flows away from the Spring Creek Pit as the mining footprint progresses through the interim diversion.

The channel is designed for the 100 year ARI design flow of 50 m<sup>3</sup>/s and the levee is designed for the 1000 year ARI design flow of 78 m<sup>3</sup>/s. Preliminary sizing of the diversion drain indicates the base width of the drain ranges from 10 m to 20 m and the depth varies from 2m to 3m, with a levee 1 m high.

#### Davey Dam Diversion

Once Davey Dam is converted to a pit water dam, a flood diversion is required upstream to limit the catchment area to the dam. This diversion will have a secondary benefit of protecting Bootes West Pit from overland flood flows as mining progresses into low lying areas bordering Gibb's Gully and Bootes Creek.

The channel is designed for the 100 year ARI design flow of 80 m<sup>3</sup>/s and the levee is designed for the 1000 year ARI design flow of 184 m<sup>3</sup>/s. Preliminary sizing of the diversion drain is a 65 m base width, 1.5 m deep drain with 1 in 3 batter side slopes at a longitudinal slope of 0.1%. The levee is 2.7 m high and the drain outlets to Bootes Creek.

Due to stand off distance requirements, the alignment of the Davey Dam Diversion is within the proposed mining lease for the Rolleston West expansion. The mining plan for the Rolleston West expansion area will need to take this under consideration when determining mining sequences into the future.

### 8.3.4 Clean Water Diversions

A series of clean water diversions are proposed to ensure runoff from the undisturbed catchments do not flow into the disturbed catchments. Clean water diversions are also proposed to limit clean water runoff discharging into the following existing pit water dams:

- Sediment Dam 4;
- Pudd's Pond;
- Sediment Dam;
- Environment Dam; and

- Pit Water Dam.

## 8.4 Pit Water Management System

### 8.4.1 Overview

The objectives of the water management system for the pit water catchment are to:

- separate the pit water catchments from the clean water catchments;
- limit catchment runoff to the pits;
- reduce the volume of water that cannot be released off site and needs to be stored in the pit water dams; and
- connect release dams with a two-way spine pipe line to facilitate transfers of pit water to ensure that release opportunities can be maximised.

### 8.4.2 Pit Water Storage

There are ten pit water storage dams with a total storage volume of 2.5 GL on Rolleston Mine – see Table 16. Three additional pit water storages are proposed with an additional storage volume of 1.4 GL. These are:

- Spring Creek Pit Water Dam;
- Spring Creek Evaporation Ponds; and
- Diversion Pit Dam

In 2016, once Davey Dam is converted to a pit water dam, the total pit water storage on site becomes 4.6 GL in a total of 14 pit water dams.

### 8.4.3 Pit water transfers

Pit dewatering and pit water dam transfers are facilitated by a network of pipelines. A 10km, 400mm dia. two way spine pipeline connects the Meteor West Pit Dam to the Pit Water Dam and proposed Diversion Pit Dam. The pipeline can be operated at a flow rate 500L/s with pumps in the order of 200kW rating. The following pipes will be connected to the spine pipeline with non return valves at the pipeline to prevent any flow back to the pits and reduce possibility of operator error:

- Meteor West Pit (pump capacity of 115L/s, 200mm dia. pipe);
- Meteor South Pit (pump capacity of 75L/s, 200mm dia. pipe);
- Meteor North Pit (pump capacity of 75L/s, 200mm dia. pipe);
- Bootes South Pit (pump capacity of 75L/s, 200mm dia. pipe); and
- Bootes North Pit (pump capacity of 75L/s, 200mm dia. pipe).

Valved outlets from the spine pipeline will be provided to:

- Sediment Dam 4 (200mm dia);
- Pudd's Pond (200mm dia);
- Sediment Dam (200mm dia);
- Pit Water Dam (200mm dia), and
- Spring Creek Pit Dam (200mm dia).

Pumps for transfer of water between dams using the Two-Way Pit Water Pipeline are provided in:

- Pudd's Pond (75L/s, 200mm dia); and
- Sediment Dam (75L/s, 200mm dia).

Other pump and pipeline systems to be installed for the transfer of mine water between storages are:

- Bootes West Pit Water Dam 2 to Irrigation Dam and Meteor West Pit Dam (100L/s, 200mm dia);
- Irrigation Dam to Meteor West Pit Dam (100L/s, 200mm dia);
- Spring Creek East Pit to Spring Creek Transfer Dam (110L/s, 200mm dia);
- Spring Creek West Pit to Spring Creek Transfer Dam (150L/s, 200mm dia);
- Spring Creek Transfer Dam to Spring Creek Pit Water Dam (170L/s, 200mm dia); and

- Spring Creek Pit Water Dam to Spring Creek Evaporation Ponds (75L/s, 200mm dia).

Gravity release pipelines and outlet structures are required at:

- Meteor West Pit Dam to RP5 on Sandy Creek (1000L/s, 2x600mm dia);
- Diversion Pit Dam to RP4 on Bootes Creek (1000L/s, 2x600mm dia); and
- Spring Creek Pit Dam to RP4 on Bootes Creek (1000L/s, 2x600mm dia).

Truck fill points for water carts are supplied at:

- Vehicle pad above Meteor South Pit from Meteor West Pit Dam (TFP1); and
- Pitwater Dam (TFP2).

#### **8.4.4 Operation of Mine Water Releases**

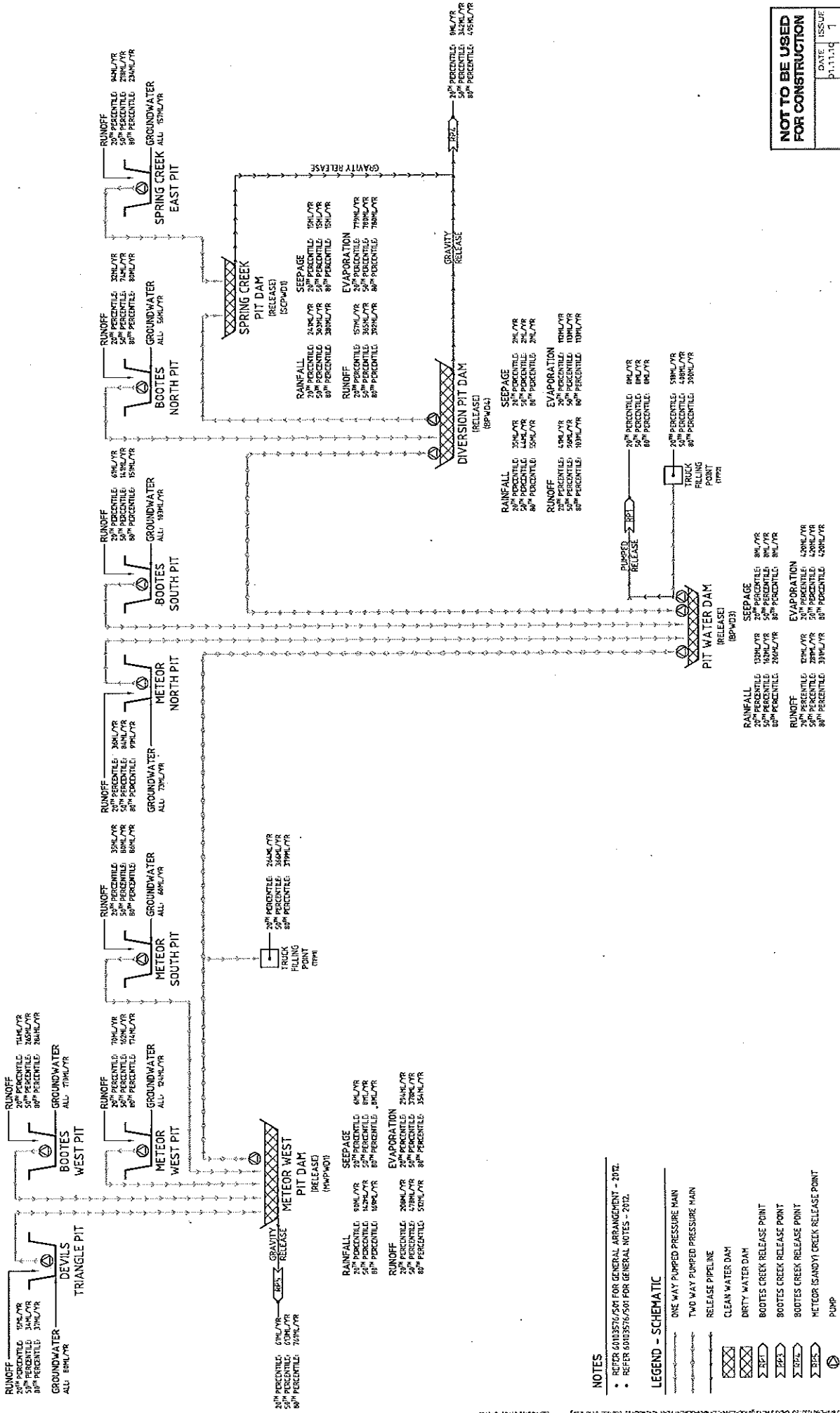
Release of mine water to Bootes Creek and Sandy Creek (Meteor) are permitted when the flow in the streams are a minimum of 0.75m<sup>3</sup>/s and 2.5m<sup>3</sup>/s respectively. Release flows may not exceed 20% of the receiving water flow.

Releases from the Pit Water Dam are pumped while releases at Meteor West Pit Water Dam, Diversion Pit Dam and Spring Creek Pit Dam operate under gravity.

Pumped releases and gravity releases operate at the maximum flow rate when the water level in the dam is highest and the water level at the discharge point is lowest. Pumps will increase the flow rates during releases compared to gravity release.

Maximum water levels in the dams will generally occur on the rising leg of the flood hydrograph at the commencement of the release opportunity therefore maximum advantage should be taken of this release opportunity. Transfers within the pit water system to the three release dams would be maximised to maintain the dams below the Mandatory Reporting Level so that the most can be made of release opportunities.

The mine plan water usage schematics show the 20<sup>th</sup>, 50<sup>th</sup> and 80<sup>th</sup> percentile water balance for the pits and the release dams that the pits transfer to. The schematics for the 3 mine plans can be seen in Figure 12, Figure 13 and Figure 14.

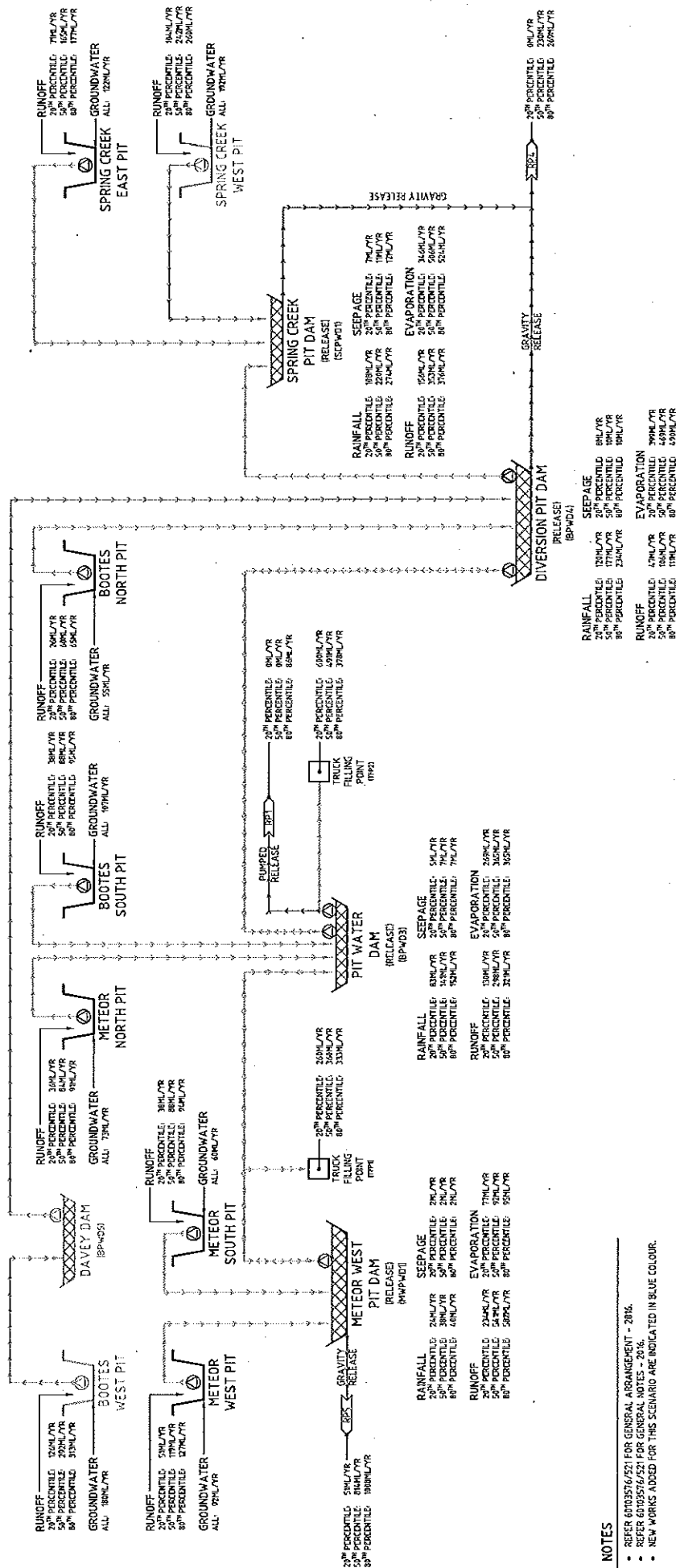


**NOTES**

- REFER 60103576/SK FOR GENERAL ARRANGEMENT - 2012.
- REFER 60103576/S01 FOR GENERAL NOTES - 2012.

**LEGEND - SCHEMATIC**

- ONE WAY PUMPED PRESSURE MAIN
- TWO WAY PUMPED PRESSURE MAIN
- RELEASE PIPELINE
- CLEAN WATER DAM
- DIRTY WATER DAM
- BOOTES CREEK RELEASE POINT
- BOOTES CREEK RELEASE POINT
- BOOTES CREEK RELEASE POINT
- METEOR (SANDY) CREEK RELEASE POINT
- PUMP



**NOTES**

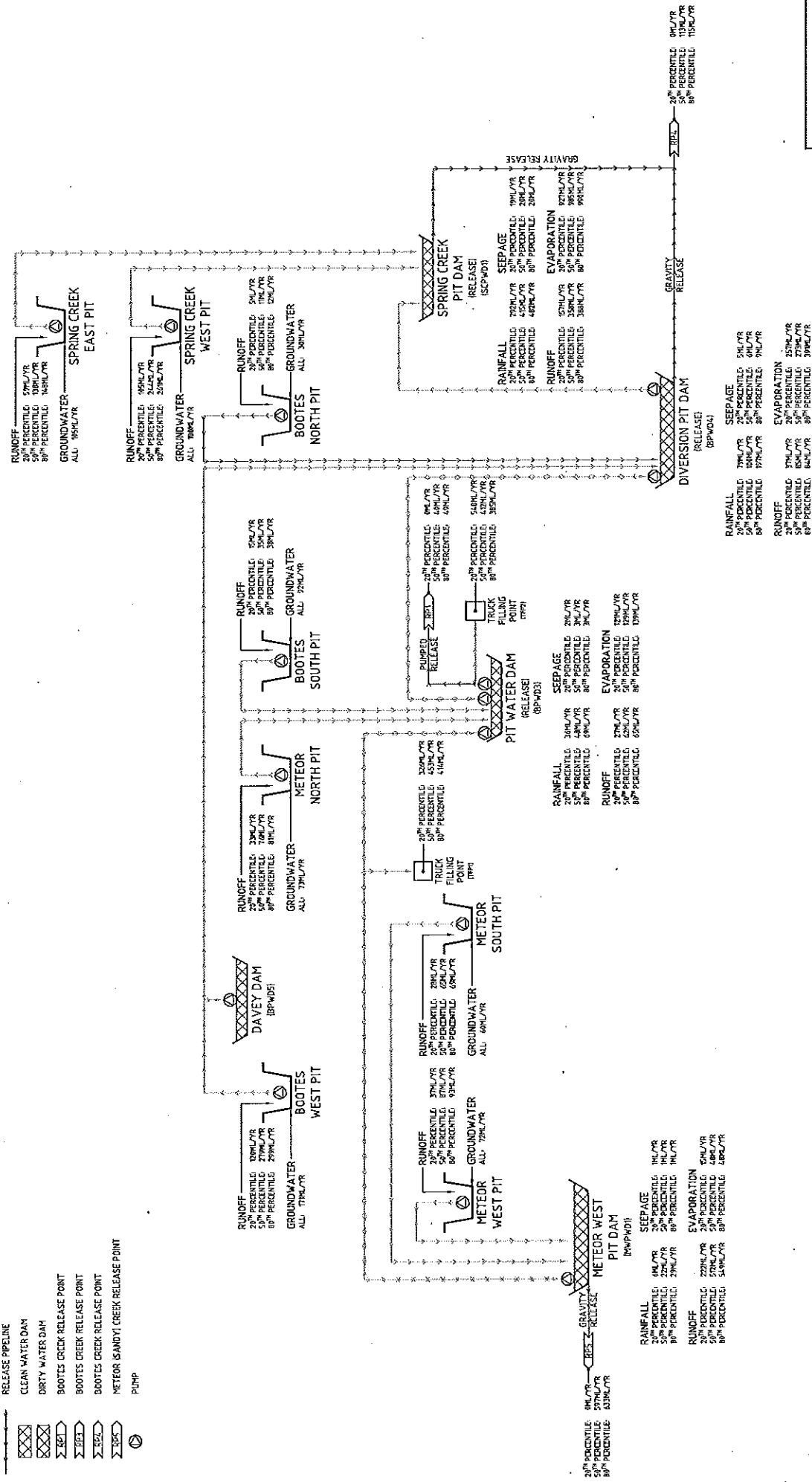
- REFER 60103576/521 FOR GENERAL ARRANGEMENT - 2016.
- REFER 60103576/522 FOR GENERAL NOTES - 2016.
- NEW WORKS ADDED FOR THIS SCENARIO ARE INDICATED IN BLUE COLOUR.

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2016.11.14	1

## NOTES

- REFER 60103576/541 FOR GENERAL ARRANGEMENT - 2021,
- REFER 60103576/541 FOR GENERAL NOTES - 2021.
- NEW WORKS ADDED FOR THIS SCENARIO ARE INDICATED IN BLUE COLOUR.



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MINE PLAN 2021

## WATER USAGE SCHEMATIC

60103576-FIG14

#### **8.4.5 Sediment Dams**

The purpose of the sediment dams is to collect runoff from the unrehabilitated spoil behind the pit progression to prevent it from being released to the environment and to remove a percentage of the total suspended solids prior to the runoff entering the pit water system. The sediments settle in the sediment dams, and the water is transferred to a pit water dam.

The sediment dams can be sized by Rolleston Coal personnel based on catchment area vs. surface area graphs as well as typical design details for the dams on Drawing No. 60103576-562 in Appendix L.

Collection drains will be used to convey peak catchment flows for the critical duration 10 year ARI rainfall event. The sizing of these drains is dependent on catchment area and drain length. The design charts C1, C2 and C3 in Appendix C may be used to size drains based on the peak catchment flow. All sediment dams in the pit water catchment are located with the levees sized for a minimum of 1 in 100 year ARI storm.

#### **8.4.6 Diversions**

A diversion is required to the west of Meteor South Pit to divert runoff from the pit water catchment above the high wall into a sump. The sump will be pumped into the pipeline running between the spine pipeline and Truck Fill Point No. 1.

### **8.5 Sediment Water Management System**

The sediment system is designed to capture and treat runoff from the rehabilitated spoil where it has been demonstrated that the water quality meets the criteria in the Environmental Authority and can be discharged to the environment. Sediment dams capture and minimise the release of sediment to the environment.

Currently at Rolleston Coal it is taking 7 years to rehabilitate spoil dumps. For the purposes of defining catchment areas for the mine plans, the existing rehabilitated spoil was used for the 2012 mine plan and Rolleston mine advised that there would be no further rehabilitation areas available by 2016, however by 2021, a large proportion of the spoil in the five spoil zones (Meteor, Bootes, Meteor West, Bootes West and Spring Creek) will have been rehabilitated.

As the topography of the rehabilitated areas is dependent on the site defined landforms, the sediment dams can be sized by Rolleston Coal personnel based on catchment area vs. surface area graphs as well as typical design details for the dams on Drawing No. 60103576-562 in Appendix L.

Collection drains will be used to convey peak catchment flows for the critical duration 10 year ARI rainfall event. The sizing of these drains is dependent on catchment area and drain length. The design charts in Appendix C may be used to size drains based on the peak catchment flow.

## 8.6 Water Management Plans

### 8.6.1 Overview

Three mine plan years were selected for analysis of the infrastructure required for an effective WMP. 2012 was selected as the short term plan that could be implemented upon approval of the WMP, and then two further step change snapshots were selected by Rolleston Coal to provide longer term planning and integration of the systems. The draft Environmental Management Plan states that the life of mine is until 2033, and Rolleston Coal will undertake further assessment of snapshots and the WMP after 2016 to cater for the remaining years after 2021 to rehabilitation and decommissioning.

The water management systems developed here for the three mine plans have the following functions:

- The water management plan has been developed in accordance with the guideline *Preparation of a water management plan for mining activities* (2009).
- All collected pit water is contained within the pit water dam system, and if not used for onsite usage such as haul road dust suppressions or irrigation of rehabilitation areas, is sent to one of the four release dams at Meteor West Pit Dam (RP5), Pit Water Dam (RP1), Diversion Dam or Spring Creek Pit Dam (RP4) for holding and release when the opportunity arises.
- No other external discharges occur from any point within the system.
- Releases are controlled via flow meters and gauging to ensure that they meet the EA requirements.
- Water monitoring takes place in accordance with the EA at the release points and at the upstream and downstream monitoring points, both during releases and on an ongoing basis.
- Releases are measured and reported to DERM in accordance with the requirements of C12 of the EA.
- Pit water is used as a preferred source for onsite usage before the clean water or town water supply is used.
- Pit water meets the EA criteria for irrigation and stock watering limits.
- All surplus volumes of pit water that cannot be catered for in the pit water dams can be stored in pit voids, so no off site usage or storage is required, and no uncontrolled releases will be required.

Where any changes to infrastructure licences are required to be reflected in the EA, amendments to the EA will be sought to ensure that Rolleston Coal continue to operate lawfully.

### 8.6.2 2012 Water Management Plan

The 2012 water management plan is shown in Figure 15 and Drawing No. 60103576-501 to 60103576-512 in Appendix L. The drawings show the conceptual layout (general arrangement and detailed plans), system schematics and pipeline arrangement.

#### 8.6.2.1 Water Management Infrastructure

The 2012 water management plan will require the following clean water diversions to be constructed:

- Temporary Spring Creek Pit Diversion;
- diversions to limit the catchment areas of existing dams (Sediment Dam 4, Pudd's Pond, Environment Dam, Sediment Dam and Pit Water Dam);
- diversions to prevent runoff into the Bootes South Pit, Meteor North Pit, Spring Creek East Pit and the Bootes West Pit; and
- diversion drains along the toe of the levee at Meteor West Pit to divert flows to a culvert that discharges to Meteor Creek. This culvert will require a flood flap to ensure that flood waters from Meteor Creek are contained by the levee.

The 2012 water management plan has a total pit water catchment of 1215 ha. Three additional pit water dams will be required:

- Spring Creek Pit Water Dam;
- Diversion Dam; and
- Spring Creek Evaporation Ponds.

The two-way pipeline (referred to as the spine pipeline) linking the Meteor West Pit Water Dam, Pit Water Dam and Diversion Dam will be operational.

The pit water catchment management system includes a series of collection drains and sediment dams leading to at Meteor West, Meteor South, Meteor North and Spring Creek. The sediment dams at Bootes West will discharge directly into Bootes West Pit Dam 1 and Bootes West Pit Dam 2.

The rehabilitated area, which totals 239 ha, includes the areas to the west of the Sediment Dam, the catchment which previously drained to the Pit Water Dam and the Diversion Channel. The diversion channel and previous catchment of the pit water dam will drain to a culvert which discharges into Bootes Creek. The area to the west of the Sediment Dam will drain to an existing culvert under the main haul road and discharge to diversion drains which will divert the flow to the south of the Sediment Dam and the Environment Dam.

A schedule of the required infrastructure for 2012 water management plan is shown in Appendix G.

The results of the water balance model show that the average annual release from the system over the 100 year historical sequence analysed is 950 ML, two thirds of which is released into Meteor Creek and the remainder into Bootes Creek. There were also 6 years that the pit water storage dams were at capacity. In these instances pit voids will be utilised so that operations can continue in other areas.

The final void of Devils Triangle will be left as additional pit water storage and emergency storage until the end of 2012, after which the Bootes North Pit void will be used. Both voids are in excess of 600 ML.

#### 8.6.2.2 Operation of Water Management Infrastructure

The objective for the operation of the mine water infrastructure will be to transfer the pit water from the pit to the nearest dam with available capacity and a release point to minimise the operating costs by pumping against the lowest head and reduce the necessity for transfers between dams. Pit dewatering would be diverted to a dam with capacity available to reduce the need to transfer between dams. This will also maximise the opportunities for high release flows. Other sources such as the low lying sediment dams in the spoil would be pumped to dams equipped with pumping systems connected to the Two-Way Pit Water Pipeline.

Transfers between dams would occur from pit water dams to pit water release dams to maximise flows during releases. Transfers between dams would also be necessary to prevent exceedance of the Design Storage Allowance (DSA) and Mandatory Reporting Levels (MRL).

On this basis the following operating system is recommended:

- Sources and dams not connected to the Two-Way Pit Water Pipeline would operate continuously:
  - Devils Triangle Pit to Bootes West Pit Dam 2 (pumped);
  - Bootes West Pit to Bootes West Pit Dam 2 (pumped);
  - Bootes West Sediment Dams to Bootes West Pit Dam 2 (overflow);
  - CHF Dam to Environment Dam (pumped);
  - Spring Creek East Pit to Spring Creek Transfer Dam (pumped);
  - Spring Creek Transfer Dam to Spring Creek Pit Dam (pumped); and
  - Spring Creek Pit Dam to Spring Creek Evaporation Ponds (gravity).
- Sources and dams utilising the Two-Way Pit Water Pipeline that would operate continuously:
  - Meteor West Pit to Meteor West Pit Dam;
  - Meteor South Pit to Pudd's Pond;
  - Meteor North Pit and Bootes South Pit to Pit Water Dam; and
  - Bootes North Pit to Diversion Pit Dam.
- Direct transfers to release dams not utilising Two – Way Pit Water Pipeline:
  - Bootes West Pit Dam 2 to Meteor West Pit Dam (pumped);
  - Irrigation Dam to Meteor West Pit Dam (pumped);
  - Sediment Dam 4 to Pudd's Pond (gravity);
  - Sediment Dam to Environment Dam (overflow); and
  - Environment Dam to Pit Water Dam (pumped).

- Transfers for release utilising the Two – Way Pit Water Pipeline:
  - Pudd's Pond to Meteor West Pit Dam, Pit Water Dam or Diversion Dam; and
  - Sediment Dam to Meteor West Pit Dam, Pit Water Dam or Diversion Dam.
- Transfers to prevent exceedance of the DSA or MRL at release dams would be to a dam with available capacity.



### 8.6.3 2016 Water Management Plan

The 2016 water management plan is shown in Figure 16 and Drawing Nos. 60103576-521 to 60103576-532 in Appendix L. The drawings show the conceptual layout (general arrangement and detailed plans), the system schematics and the pipeline arrangement.

#### 8.6.3.1 Water Management Infrastructure

In the 2016 water management plan, the only raw water storage is Naroo Dam. As Davey Dam will be converted to a pit water dam by 2016 due to high wall pumping from the Bootes West pit, the following clean water diversions will be required:

- Davey Dam diversion; and
- diversions to the east and west of the dam to limit the catchment to the dam and divert clean water around the dam to Bootes Creek.

The Permanent Spring Creek Pit Diversion must be constructed by 2016 as sections of the Interim Spring Creek Pit Diversion will have been mined through.

Due to the natural topography in the vicinity of the drained Spring Creek Dam, the clean water catchment within the Permanent Spring Creek Pit Diversion and the Spring Creek Temporary Diversion requires a series of drains to divert the runoff to three low points before pumping to the free draining Spring Creek Temporary Diversion. The area has been divided into three areas to reduce the size and volume of single storages above the Spring Creek pit high wall.

The Spring Creek East and West pits are pumped to a transfer dam above the high wall before being transferred to the Spring Creek Pit Water Dam. Due to the topography, the transfer dam will also collect runoff from a small catchment.

Clean water diversions to the west of the Bootes South, Bootes North Pits and at Spring Creek are detailed in the list of infrastructure in Appendix G. These diversions have been relocated from the 2012 water management plan as the mining footprint progresses.

The 2016 water management plan has a total pit water catchment of 1448 ha, the largest catchment of the three water management plans reviewed due to the rate of rehabilitation. The addition of Davey Dam to the pit water system increases the total pit water storage to 4.6 GL.

The natural topography at the western end of Bootes West Pit naturally drains towards the north and into the pit. To avoid increasing the pit water catchment, a drain and levee will be required to divert the flow along the western edge of the pit and into Davey Dam.

In 2016, the rehabilitated catchment area is reduced to 117 ha due to the opening of the Bootes Creek Permanent Diversion.

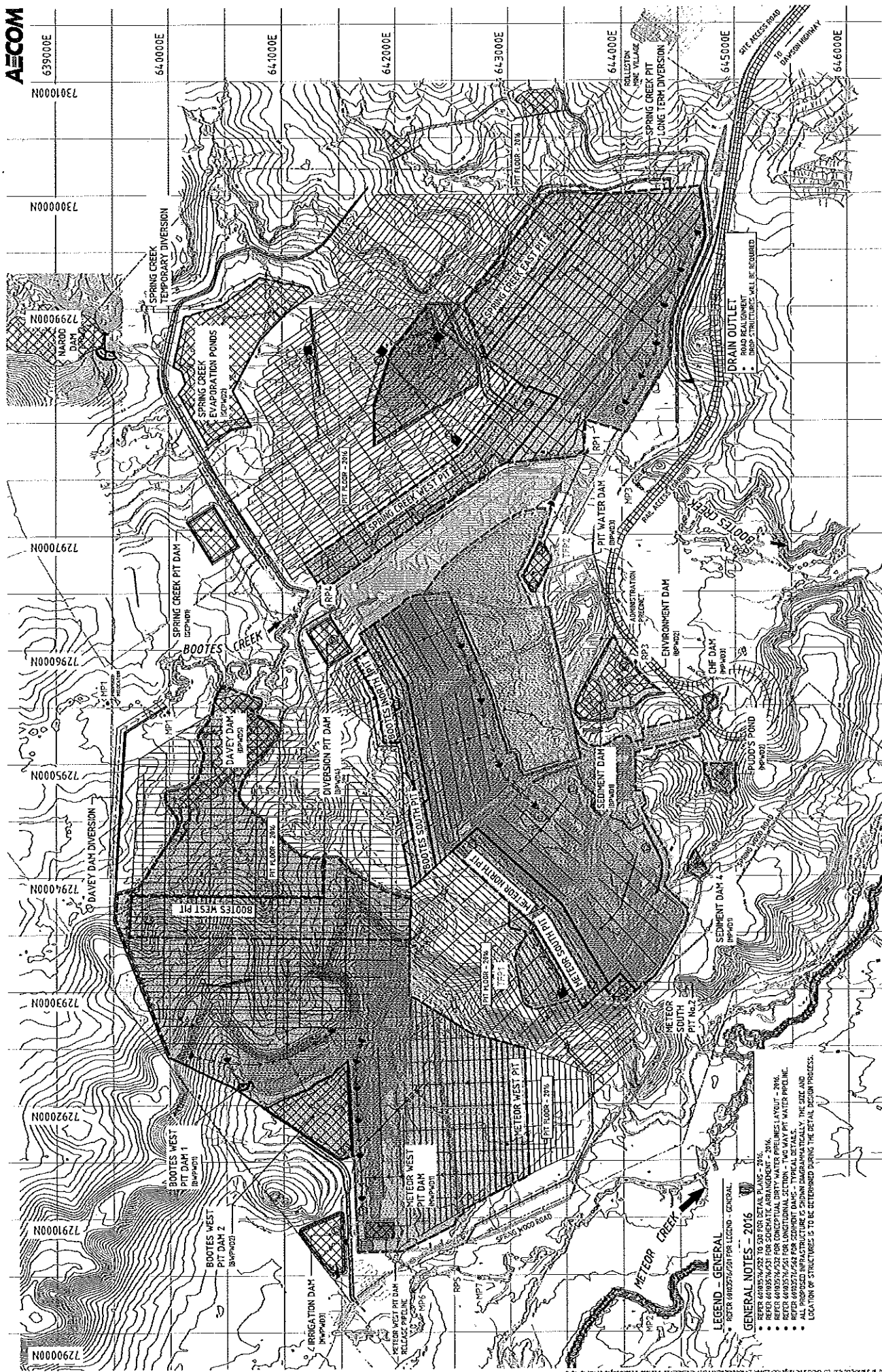
The results of the water balance model show that the average annual releases from the system over the 100 year historical sequence analysed is 950 ML, two thirds of which is released into Meteor Creek and the remainder into Bootes Creek. There were also 5 years that the pit water storage dams could not take any more pit water. In these instances pit voids will be utilised so that operations can continue in other areas.

The final void of Bootes North Pit will be left as additional pit water storage and emergency storage. The void is in excess of 600 ML.

### 8.6.3.2 Operation of Water Management Infrastructure

The following operating system is recommended:

- Sources and dams not connected to Two-Way Pit Water Pipeline would operate continuously:
  - Bootes West Pit to Davey Dam (pumped);
  - Bootes West Sediment Dams to Bootes West Pit Dam 2 (overflow);
  - CHF Dam to Environment Dam (pumped);
  - Spring Creek East Pit to Spring Creek Transfer Dam (pumped);
  - Spring Creek West Pit to Spring Creek Transfer Dam (pumped);
  - Spring Creek Transfer Dam to Spring Creek Pit Dam (pumped); and
  - Spring Creek Pit Dam to Spring Creek Evaporation Ponds (gravity).
- Sources and dams utilising the Two-Way Pit Water Pipeline would operate continuously:
  - Meteor West Pit to Meteor West Pit Dam;
  - Meteor South Pit and Meteor South Pit No 2 to Pudd's Pond;
  - Meteor North Pit and Bootes South Pit to Pit Water Dam; and
  - Bootes North Pit to Diversion Pit Dam.
- Transfers to release dams not utilising Two – Way Pit Water Pipeline:
  - Bootes West Pit Dam 2 to Meteor West Pit Dam (pumped);
  - Irrigation Dam to Meteor West Pit Dam (pumped);
  - Sediment Dam 4 to Pudd's Pond (gravity);
  - Sediment Dam to Environment Dam (overflow);
  - Environment Dam to Pit Water Dam (pumped); and
  - Davey Dam to Diversion Pit Dam (pumped).
- Transfers to release dams utilising the Two – Way Pit Water Pipeline:
  - Pudd's Pond to Meteor West Pit Dam, Pit Water Dam or Diversion Dam; and
  - Sediment Dam to Meteor West Pit Dam, Pit Water Dam or Diversion Dam.
- Transfers to prevent exceedance of the DSA or MRL would be to a dam with available capacity.



CONCEPTUAL LAYOUT - 2016  
GENERAL ARRANGEMENT

FIGURE 16

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DATE	ISSUE
01.11.19	7

EXSTRATA ROLLESTON MINE

#### **8.6.4 2021 Water Management Plan**

The 2021 water management plan is shown in Figure 17 and Drawing No. 60103576-541 to 60103576-552 in Appendix L. The drawings show the conceptual layout (general arrangement and detailed plans), the system schematics and the pipeline arrangement.

##### **8.6.4.1 Water Management Infrastructure**

In the 2021 water management plan, the clean water diversions at Bootes South Pit, Bootes North Pit and at Spring Creek Pit have been relocated from the 2016 water management plan as the mining footprint progresses. The additional drains are detailed in the list of infrastructure in Appendix G.

In 2021, the pit water catchment has reduced to 1178 ha due to the increased rehabilitation area. The pit water storage remains at 4.6 GL.

The dirty water diversion which conveys runoff from the spoil in the western section of Bootes West spoil is continued in 2021. As the rehabilitation footprint increases behind the spoil, a clean water diversion will divert runoff into the Davey Dam Diversion.

As the rehabilitation footprint increases, the sediment system at Bootes West increases and requires the addition of a pumped transfer to Bootes West Pit Water Dam 2.

The total area of rehabilitation in 2021 increases to 993 ha. Sediment systems for the rehabilitation areas are required, with a series of collection drains, chutes and sediment dams which discharge to the environment, either through a culvert (as required at Bootes West, Meteor West, Meteor North/South, Bootes North/South Pits), or via pumping (Spring Creek Pit).

The results of the water balance model show that the average annual release from the system over the 100 year historical sequence analysed is 1450 ML, two thirds of which is released into Meteor Creek and the remainder into Bootes Creek. The increase in release opportunities between the 2012 and 2016 mine plans and the 2021 mine plan is due to increased water quality in the release dams in 2021. There are two reasons the water quality is predicted to improve in the release dams for 2021:

1. At Spring Creek Release Dam: An increase in spoil area (of higher quality runoff) dilutes the water quality coming from Spring Creek Pit (of lower quality groundwater inflow); and
2. At Meteor Creek Release Dam: An improved dilution ratio resulting from a relative decrease in groundwater inflow (of lower quality) and an increase in spoil runoff (of higher quality).

There was also only 1 year that the pit water storage dams were full. In these instances pit voids will be utilised so that operations can continue in other areas. The final void of Bootes North Pit will be left as additional pit water storage and emergency storage. The void is in excess of 600 ML.

#### 8.6.4.2 Operation of Water Management Infrastructure

The following operating system is recommended:

- Sources and dams not connected to Two-Way Pit Water Pipeline would operate continuously:
  - Bootes West Pit to Davey Dam (pumped);
  - CHF Dam to Environment Dam (pumped);
  - Spring Creek East Pit to Spring Creek Transfer Dam (pumped);
  - Spring Creek West Pit to Spring Creek Transfer Dam (pumped);
  - Spring Creek Transfer Dam to Spring Creek Pit Dam (pumped);
  - Spring Creek Pit Dam to Spring Creek Evaporation Ponds (gravity); and
  - Bootes North Pit to Diversion Pit Dam.
- Sources and dams utilising the Two-Way Pit Water Pipeline would operate continuously:
  - Meteor West Pit to Meteor West Pit Dam;
  - Meteor South Pit and Meteor South Pit No 2 to Pudd's Pond; and
  - Meteor North Pit and Bootes South Pit to Pit Water Dam.
- Transfers for release not utilising Two – Way Pit Water Pipeline:
  - Bootes West Pit Dam 2 to Meteor West Pit Dam (pumped);
  - Irrigation Dam to Meteor West Pit Dam (pumped);
  - Sediment Dam 4 to Pudd's Pond (gravity);
  - Sediment Dam to Environment Dam (overflow);
  - Environment Dam to Pit Water Dam (pumped); and
  - Davey Dam to Diversion Pit Dam (pumped).
- Transfers for release utilising the Two – Way Pit Water Pipeline:
  - Pudd's Pond to Meteor West Pit Dam, Pit Water Dam or Diversion Dam; and
  - Sediment Dam to Meteor West Pit Dam, Pit Water Dam or Diversion Dam.
- Transfers to prevent overflow or exceedance of the DSA would be to a dam with available capacity.

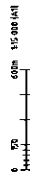


CONCEPTUAL LAYOUT - 2021  
GENERAL ARRANGEMENT

XSTRATA ROLLESTON MINE

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DATE	ISSUE
01.11.10	7



## 8.7 Emergency and Contingency Planning

The current Emergency and Contingency Planning Procedure for Rolleston Coal under a range of potential emergency scenarios is detailed below. Refer to Appendix J for the Rolleston Coal *Emergency Management Guidelines and Emergency Response Procedures*.

A detailed Risk Analysis will be undertaken on site with all operational managers to review the new infrastructure incorporated in this Water Management Plan. A detailed revision of the Emergency and Contingency Planning Report, incorporating *Emergency Management Guidelines* and *Emergency Response Procedure*, will be submitted to DERM as an addendum. The following items will be addressed:

- design and certification of new structures by an RPEQ to ensure adherence to engineering designs;
- annual inspections of levees and dams by an RPEQ in terms of the Hazardous Dams guidelines; and
- ongoing inspection and maintenance of critical infrastructure.

The following items are addressed as identified in the guideline:

- *Exceedance of rainfall characteristics (intensity and duration) used in design of water management structures.*

In the event of an exceedance of the rainfall intensity and duration used to design the water management structures is experienced, the worst case scenario would be failure or overtopping of the structures and the inability to dewater the pits. These structures include pit water dams, flood diversions, clean water diversions, pit water diversions, collection drains, chutes and outlet structures.

Failure of collection drains, chutes and outlet structures within the spoil dumps would result in runoff either being collected downstream in the spoil. Should the downstream storage area capacities be exceeded, this will result in the storage backing up into the spoil. No water will be transferred to the pit water dams. Any failed structures would need to be repaired in dry weather.

Under these conditions, failure and/or overtopping of minor clean water diversions, pit water diversions and flood diversion may result in flooding of the pits over the highwall. In this event, a serious risk is present to any personnel working in the pits. Any pits at risk of this occurring would need to be evacuated and vital equipment removed from the area. Section 5.13 and Section 5.14 of the *Emergency Management Guidelines* details the Evacuation of Part or Whole of the Mine and Removal and Protection of Vital Equipment and Materials (refer Appendix J).

All diversion levees are designed to a minimum 1000 year ARI design storm. Based on previous experience at Rolleston, it is likely that any weather event in exceedance would result in closure of mine before structure failure occurs.

- *Failure of Containment Structures*

The failure of containment structures, including pit water dams, release (hazardous) dams and raw water storages may, in the worst case, result in flooding of the pits over the highwall. In this event, a serious risk is present to any personnel working in the pits. Any pits at risk of this occurring would need to be evacuated and vital equipment removed from the area. Section 5.13 and Section 5.14 of the *Emergency Management Guidelines* detail the Evacuation of Part or Whole of the Mine and Removal and Protection of Vital Equipment and Materials (refer Appendix J).

Based on previous experience at Rolleston, it is likely that any weather event significant enough to cause dam failure would result in abandonment of mine prior to dam failure.

- *Loss of electrical supply*

Loss of electrical supply would impact the pumped controlled discharge from the Pit Water Dam. Releases would still occur from Spring Creek Pit Water Dam, Diversion Dam and Meteor West Pit Water Dam as the releases are gravity fed. Currently, internal dam transfer and pit dewatering is undertaken using diesel pumps and won't be affected by a loss of electrical supply.

The Pit Water Dam is accessible via haul road up to a 1000 year ARI flood. A portable diesel pump can be temporarily installed to operate releases from the dam should the site lose electrical supply.

- *Inability to obtain critical equipment / spare parts*

Backup portable diesel pumps are available if critical pumps are not operational. This would ensure pit dewatering, connectivity of dams and maintain releases from the Pit Water Dam.

- *Inability to access control and monitoring points in all weather conditions.*

Rolleston Coal have a TARP which outlines access to the mine site via haul roads and access roads under flooding conditions (refer Appendix J).

A 4WD pump fuel tractor is retained on site for the purpose of accessing all control and monitoring points during large flood events. Currently, internal dam transfer and pit dewatering is undertaken using diesel pumps.

Rolleston Coal have proposed a telemetry system to be installed to operate the gravity fed systems for the three release dams (Spring Creek Pit Water Dam, Diversion Dam and Meteor West Pit Water Dam) which would maintain control under flood isolation.

As a last option, a helicopter will be used to transfer people to control and monitoring points that are isolated by flood waters.

## 8.8 Responsibilities, Monitoring and Review

### 8.8.1 Responsibilities

It is the responsibility of the Operations Manager of Rolleston Coal to ensure all elements of the Water Management Plans are implemented.

Table 18 shows the responsibilities, delegated by the Operations Manager, for the Senior Site Executive (possibly Operations Manager), Environment and Community Manager and Environment and Community Senior Advisor in the event of a controlled release, emergency release, groundwater drawdown exceedance or another incident causing environmental harm (i.e. uncontrolled overflow). Ongoing monitoring of the water management infrastructure is required as well as review of the water management plan and updates to the water balance model. The required notifications as stipulated in the Environmental Authority are included in this list.

Where DERM is required to be notified, the manager and project manager of the local Emerald office will be the first point of contact.

Table 18 Responsibilities

Event	Responsibility of Senior Site Executive	Responsibility of Environment and Community Manager and/or Senior Advisor
Controlled Release	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Authorise release (Manager only)</li> <li>Notify DERM in writing as soon as practicable, no later than 6 hours after commencement, of commencement of release of mine affected water to environment. Notification must include:               <ol style="list-style-type: none"> <li>release commencement date/time;</li> <li>expected release cessation date/time;</li> <li>release point/s;</li> <li>release volume (estimated);</li> <li>receiving water/s including the natural flow rate; and</li> <li>any details (including available data) regarding likely impacts on the receiving water(s).</li> </ol> </li> <li>Notify DERM in writing as soon as practicable, nominally within 24 hours of cessation, of cessation of release. Within 28 days of cessation of release, provided DERM with written notification of:               <ol style="list-style-type: none"> <li>release cessation date/time;</li> <li>natural flow volume in receiving water;</li> <li>volume of water released;</li> <li>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);</li> <li>all in-situ water quality monitoring results; and</li> <li>any other matters pertinent to the water release event.</li> </ol> </li> <li>Measuring and recording of daily quantity of contaminants released.</li> <li>In the event of an exceedance of contaminant trigger levels in the release waters, a comparison to downstream results must be made and if downstream contaminant trigger levels are exceeded:               <ul style="list-style-type: none"> <li>DERM must be notified within 14 days of receiving result; and</li> <li>Complete an investigation, in accordance with ANZECC &amp; ARMCANZ 2000 methodology, into</li> </ul> </li> </ul>

Event	Responsibility of Senior Site Executive	Responsibility of Environment and Community Manager and/or Senior Advisor
		<p>potential for environmental harm and provide DERM with a written report in the next annual return outlining:</p> <ul style="list-style-type: none"> <li>▪ details of the investigation carried out; and</li> <li>▪ actions taken to prevent environmental harm.</li> </ul> <ul style="list-style-type: none"> <li>• In the event of an exceedance of contaminant trigger levels at downstream monitoring points during a release, a comparison to upstream monitoring results must be made and if downstream results exceed upstream results, an investigation must be completed in accordance with ANZECC &amp; ARMCANZ 2000 methodology, into potential for environmental harm. A written report must be provided to DERM in the next annual return outlining: <ul style="list-style-type: none"> <li>- details of the investigation carried out; and</li> <li>- actions taken to prevent environmental harm.</li> </ul> </li> <li>• Inspects creek bed / banks near release points for erosion due to release waters (if required)</li> </ul>
Notification of Release Event Exceedance	<ul style="list-style-type: none"> <li>• N/A</li> </ul>	<ul style="list-style-type: none"> <li>• If release water exceeds the contaminant release trigger values, DERM must be notified in writing within 24 hours of receiving results.</li> <li>• Within 28 days of a release exceeding contaminant trigger levels, a report must be provided to DERM detailing: <ol style="list-style-type: none"> <li>a) the reason for the release;</li> <li>b) the location of the release;</li> <li>c) all water quality monitoring results;</li> <li>d) any general observations;</li> <li>e) all calculations; and</li> <li>f) any other matters pertinent to the water release event.</li> </ol> </li> </ul>
Emergency Release	<ul style="list-style-type: none"> <li>• Request authorisation of emergency release from DERM</li> </ul>	<ul style="list-style-type: none"> <li>• Notifies DERM of commencement and cessation of controlled release</li> <li>• Measuring and recording of daily quantity of contaminants released</li> <li>• Investigates exceedances of contaminant trigger levels in release waters and notifies DERM of results</li> <li>• Investigates exceedances in contaminant trigger levels at D/S monitoring points and notifies DERM of results</li> <li>• Inspects creek bed / banks near release points for erosion due to release waters (if required)</li> </ul>
Groundwater Drawdown	<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• If groundwater drawdown fluctuations exceed 2 m/yr, not resulting from the pumping of licensed bores, DERM must be notified within 7 days of the completion of monitoring</li> <li>• A groundwater monitoring programme must be submitted to DERM by 30 April 2011. The report must present sufficient information to allow DERM to develop suitable groundwater monitoring conditions, and must include: <ul style="list-style-type: none"> <li>- groundwater quality investigation trigger limits;</li> <li>- review of groundwater levels;</li> <li>- review of groundwater quality data; and</li> <li>- review of suitability of groundwater monitoring program</li> </ul> </li> </ul>

Event	Responsibility of Senior Site Executive	Responsibility of Environment and Community Manager and/or Senior Advisor
Other incident causing environmental harm		<ul style="list-style-type: none"> <li>Initial notification to DERM, in writing, as soon as practicable after becoming aware of emergency, incident or circumstances resulting in environmental harm.</li> <li>As soon as practicable, not more than 10 days following incident, notify DERM of:               <ol style="list-style-type: none"> <li>proposed actions to prevent a recurrence of the emergency or incident;</li> <li>the outcomes of actions taken at the time to prevent or minimise environmental harm; and</li> <li>proposed actions to respond to the information about circumstances which result or may result in environmental harm.</li> </ol> </li> <li>As soon as practicable, not more than 6 weeks following initial notification, environmental monitoring must be performed and written advice must be provided of the results of any such monitoring performed to the administering authority.</li> </ul>
Dams and levees		<ul style="list-style-type: none"> <li>Dam embankments and levees must be inspected on a monthly basis by a knowledgeable Rolleston employee to check for breaches, erosion scour or damage to any of the embankments requiring maintenance.</li> <li>All outlet structures must be inspected to ensure proper operation and the absence of blockages.</li> <li>Inspection reports must be maintained on site for review.</li> <li>Dam embankments and levees must be inspected annually by an RPEQ registered engineer familiar with dams and a report complying with DERMS hazardous dams guidelines must be prepared and submitted to DERM by the 1<sup>st</sup> of December each year.</li> </ul>
Updating of the Water Balance Model		<ul style="list-style-type: none"> <li>The Water Balance Model must be reviewed annually to ensure that the items incorporated function as designed. The WBM will also be updated to incorporate site collected data to make it more site specific.</li> <li>The updates will be performed every two years in conjunction with updates to the water management plans by an AECOM engineer on site and the necessary updates explained to Rolleston operational personnel.</li> </ul>

### 8.8.2 Compliance Water Monitoring

Rolleston Coal is required to perform water monitoring to comply with the (DRAFT) Environmental Authority Permit Number MIN101140410 (refer Appendix K). It is the responsibility of the Environment and Community Senior Advisor to undertake the testing and ensure the results are recorded, compiled and kept for a minimum of five years.

In the event that water quality in the water storages on site exceeds the water quality parameters in Table 6 of Appendix K, it is the responsibility of the Environment and Community Senior Advisor to limit access of livestock to site.

To comply with the Environmental Authority, Rolleston Coal has installed stream flow gauging stations upstream and downstream of the operational release points (at MP1, MP2, MP3, MP4, MP5 - refer Table 4 of Appendix K) and propose to install a gauging station both upstream and downstream of RP5 (at MP6 and MP7).

All existing and proposed gauging stations continuously monitor flow. The existing MP 1 and MP3 have automatic water quality samplers, as will the proposed MP6 and MP7. Manual samples are taken at MP2, MP4 and MP5. It is the responsibility of the Environment and Community Senior Advisor to ensure the operation and maintenance of the stream flow gauging stations.

The water quality monitoring shown in Table 19 is required by Rolleston Coal to comply with the Environmental Authority. The table shows the frequency of the monitoring required as well as the current frequency at which Rolleston Coal monitors. In all cases, Rolleston Coal complies with the Environmental Authority. Samples are currently sent to ALS Laboratories in Brisbane.

Table 19 Required Water Quality Monitoring

Type of monitoring	Monitoring Location	Contaminants Monitored	Required Frequency	Current Frequency
Groundwater – Boreholes	Table 12	Table 13	6 monthly	3 monthly
Release waters - Release Points	Table 1	Table 2, Table 3	Daily during release (within 2 hours of release commencing)	Daily during release (within 2 hours of release commencing)
Surface water - water storages	Table 5	Table 6	Quarterly	For dams that could potentially release: Field Tests – Weekly; Laboratory Tests – Monthly For other dams (i.e. raw water) - Quarterly
Surface waters - U/S and D/S monitoring locations	Table 8	Table 7	Daily during release	Daily during release

Refer to Appendix K for Tables.

Field tests include pH, temperature, EC and turbidity.

### 8.8.3 Recommendations for Additional Water Monitoring

The water monitoring practices shown in Table 20 are recommended for Rolleston Coal. The purpose of this water monitoring is to ensure that future hydrological and hydraulic models can be calibrated to site data. Improving the correlation of these models to actual site data allows them to be developed as decision making tools in the future and therefore improve risk management on site.

Table 20 Recommended Water Monitoring

Type of monitoring	Location	Required Frequency	Description
Peak Flood Heights	Waterways surrounding the site, including Bootes, Sandy and Meteor Creeks	All flow events	<ul style="list-style-type: none"> <li>Flooding experienced on site can be measure by placing stakes with markers to mark peak flood levels. These are later surveyed.</li> <li>Flows and volumes in the creeks are measured by the installed meters at the monitoring points.</li> </ul>
Water storage volume monitoring (automated or physical),	All pit water dams	Daily	<ul style="list-style-type: none"> <li>Storage volumes enable Rolleston personnel to update the WBM and simulate various scenarios based on dam water level volumes</li> <li>Detailed volume and level data also enable a better understanding of water consumption</li> </ul>
Mag Flow Meters	All major pipelines, including spine pipe, pit dewatering pipes, release pipes, truck fill pipes, etc.	Continuous, minimum daily volumes	<ul style="list-style-type: none"> <li>Ongoing readings of pit dewatering rates and dam transfers allow for incorporating actual rates into the WBM.</li> </ul>
Pressure in spine pipeline	At the connection to dam outlets	Ongoing	<ul style="list-style-type: none"> <li>Pressure senses on the spine pipeline will enable Rolleston to monitor the discharges to the dams.</li> </ul>
Inspections	All dams and levees	Ongoing	<ul style="list-style-type: none"> <li>Monthly inspections by Rolleston personnel to detect if there are any areas of concern.</li> <li>Annual inspection of the same by registered RPEQ Engineer</li> </ul>
Maintenance	All dams and levees Pipelines Pumps	Ongoing	<ul style="list-style-type: none"> <li>Ongoing maintenance of all pumps and pipelines will reduce the incidents of downtime.</li> <li>Maintenance on dams and levees identified during inspections should be routinely undertaken to limit any problem areas increasing</li> </ul>

#### 8.8.4 Review Procedures

To comply with the Environmental Authority, a review of this Water Management Plan will be completed annually prior to the end of September. The plan should be reviewed to determine its currency and adequacy. The review should consider any changes to the mining schedule, operations, or anything that could potentially affect the effectiveness of the Water Management Plan.

The water management plan must also be reviewed after any uncontrolled release of water to the environment, to determine whether any parts need to be revised based on any new information.

An annual return must be submitted to the DERM which includes the following information in relation to all water monitoring required under the environmental authority:

- the date on which the sample was taken;
- the time at which the sample was taken;
- the monitoring point at which the sample was taken;
- the measured or estimated daily quantity of the contaminants released from all release points;
- the release flow rate at the time of sampling for each release point;
- the results of all monitoring and details of any exceedances with the conditions of this environmental authority;

- g) water quality monitoring data must be provided to the administering authority in the specified electronic format upon request; and
- h) Annual inspections of hazardous dams must be undertaken and registers of maintenance conducted on major infrastructure such as dam embankments, levees and the spine pipeline should be maintained for inspection or reporting to DERM.

## 9.0 Conclusions and Recommendations

### 9.1 Conclusions

#### *Environmental Values and Water Quality Objectives*

The leading environmental values associated with the western tributaries of the Comet River are farm use, stock watering and aquatic ecosystem protection. Many of the parameters of the background water exceed the guideline values for ecosystem protection (ANZECC (2000) and Queensland Water Quality Guidelines (2009) DERM) for slightly to moderately disturbed systems.

The prescribed releases values from Rolleston Mine specified in the Environmental Authority are below the background concentrations of contaminants in the receiving environment and the water quality of the pitwater dams is within the EA limits for controlled discharge as well as for stock watering and irrigation. The accumulation of contaminants in the receiving environment as a result of mine activities is considered to be insignificant.

The releases in this water balance have been based on the current EA contaminant release limits. Any trigger levels that may be applied in future as a result of the higher background levels experienced would serve to improve the overall performance but is not critical to the operation of the system.

#### *Contaminant Sources*

The different precincts on the site were reviewed for potential sources of contamination. It was determined that the spoil is the major contributor to water quality values.

No bio-accumulating contaminants have been found in the overburden, so no potential risk is presented.

Testing of spoil shows that it tends to be non saline to slightly saline. The spoil exhibits high sodicity making them dispersive and susceptible to erosion. Spoil piles do not discharge runoff to the environment but it is collected in a series of sediment dams to remove sediments, and then becomes part of the pit water system.

The spoil is non acid forming and exhibits a low risk of acid mine drainage.

#### *Site Water Balance*

The site water balance takes maximum advantage of release opportunities based on trigger values of flows in the receiving creeks and electrical conductivity trigger concentrations as stipulated in the EA, and the release flow is limited to 1000L/s based on the design of the new Meteor West discharge pipeline. These discharges do not reach the EA prescribed limit of 20% of the flow in the receiving waters.

Advantage is taken of the fact that the water quality in the pits meets the EA water release limits for reuse for stock watering and irrigation, and as a result all excess water is used on site and except for controlled releases, no water is sent off site.

The 95<sup>th</sup> percentile year is where Rolleston aim to achieve system reliability to prevent water accumulating in the pits and taking an averaged demand of 250ML/year for irrigation use, the overall balance is a surplus of pit water. Through the 100 year sequence that was modelled, the number of years in which the pits could not be dewatered are:

- 2012 – 6 yrs;
- 2016 – 5 yrs; and
- 2021 – 1 yr.

This can be catered for operationally by pumping to the Devils Triangle and Bootes North Pit voids.

#### *Impacts of Mining Activities*

The main water quality characteristics of the pit water on the Rolleston mine are pH and Electrical Conductivity, which are influenced by groundwater and the spoil runoff as a result of the geological composition of the soils. The runoff from the spoil is not particularly saline, and overall the pit water meets the guideline water quality criteria as stipulated in the Environmental Authority for Stock Water Releases. Accumulation of contaminants in the receiving environment is expected to be minor due to the long reaches for dilution in Meteor Creek and the values are below background concentration levels.

Rolleston Coal do not actively draw down the groundwater aquifer except for the groundwater inflow that enters the pits, however the pits are dewatered at the same rate as the rate of inflow so drawdown as a result of this is unlikely.

There are no other industries discharging in the Meteor Creek catchment discharging to the receiving environment.

#### *Water Management Infrastructure*

Major infrastructure is required for this water management plan comprising:

- flood levees and drains;
- clean water and pit water catchment diversion drains and levees;
- sediment dams within the pit water and sediment catchments; and
- pit water dams (hazardous dams).

These have been proposed in the most proficient way to maximise the re-utilization through the mine progression either by extending or shortening and where unavoidable, relocation.

Pumps and pipelines required are:

- a 400mm diameter two way spine pipe line operating at 500L/s is proposed between the pit water release dams;
- pumps and pipelines from the pits and other storage facilities connecting into the spine line or direct to pit water storages; and
- release pumps and pipelines from Meteor West, Diversion Pit, Spring Creek and Pit Water Dam release dams.

Release dams are operated as hazardous dams and have Design Storage Allowances and Mandatory Reporting levels. By the start of the wet season, all release dams water levels must be below the DSA and if the levels reach the MRL, DERM are to be notified and Rolleston to take action to pump water to storages with spare capacity, either other pit water dams or pit voids.

No water treatment is required for any of the pit water storages on Rolleston mine.

#### *Water Management System*

In early 2010, Rolleston mine experienced floods that to date was already the equivalent of a 95<sup>th</sup> percentile year, where the Naroo and Spring Creek Dam's failed and the pits were flooded. Implementing these water management plans will:

- protect the pits from flooding with the flood levees and drains;
- create sufficient on site pit water storage such that external discharge will not be required;
- result in no uncontrolled releases;
- enable Rolleston mine to maximise pit water transfers to take full advantage of release opportunities;
- enable Rolleston mine to contain all pit water reuse on the site;
- minimise accumulation of large volumes of pit water due to preferential usage of pit water for operational use such as haul road dust suppression and irrigation;
- protect groundwater resources from contamination as no recharging of aquifers occur;
- minimise the impact of contaminant release as in accordance with the Environmental Authority, pit water is only discharged to Bootes and Sandy Creeks when prescribed minimum flows are reached in the creeks, and then discharge flows can only be to a maximum of 20% of the stream flow volume; and
- progressively reduce the pit water catchment through conversion of the rehabilitated spoil areas to sediment catchments and thereby reduce the volume of contaminated water that has to be managed.

#### *Emergency and Contingency Planning*

Current emergency and contingency plans are mostly adequate however a detailed Risk Analysis will be undertaken on site with all operational managers to review the new infrastructure incorporated in this Water Management Plan. A detailed revision of the Emergency and Contingency Planning Report, incorporating *Emergency Management Guidelines* and *Emergency Response Procedure*, will be submitted to DERM as an

addendum. The plans will also include for the design and certification of new structures and annual inspections of critical infrastructure by an RPEQ.

#### *Communication and Responsibilities*

Responsibilities have been assigned to Rolleston mine managers to comply with the monitoring and reporting requirements of the EA. Where DERM are required to be notified, this has been included in the schedule of responsibilities with details of the information to be reported on and the frequency. The main items that need to be monitored and communicated to DERM include:

- controlled releases;
- notification of release events;
- emergency releases;
- groundwater drawdowns;
- incidents causing environmental harm; and
- inspections of dams and levees.

Compliance monitoring is currently undertaken at the required frequencies or more frequently by Rolleston Coal personnel. Monitoring is undertaken at the prescribed monitoring points as per the EA.

#### *Currency and Adequacy*

The water management plans will be reviewed after any incidents or uncontrolled releases. The water balance model will be updated every two years to ensure that it is kept up to date with changes on site, and to incorporate any site data collected in the preceding years.

## **9.2 Recommendations**

Operationally, the pit water dams need to be actively managed and releases from the release dams need to occur at preset water levels. Emergency storages for times of high floods or water volumes will be catered for in the pit voids. Progressive rehabilitation is critical to managing contaminated water volumes that report to the pits and have to be catered for in the pit water system, and increasing the area available for irrigation which further increases the usage of pit water from the pit water dams within the site.

The GoldSim water balance model of the mine plans will be made available for use by Rolleston mine personnel. This will facilitate active management of the pit water dams and it is proposed that AECOM will visit site every two years to update the water balance model and extend it for the next mine plan. In order for this to be effective, additional site data should be collected that can be incorporated into the model to make it more effective as a site management tool. These include:

- survey of flood levels experienced during floods;
- installing gauge boards in all dams for weekly water level measurements, or installing automated water level loggers to take daily readings; and
- installation of Mag flow meters on all pipelines from pits, pit water dams and release arrangements so that actual water transfer rates can be determined and incorporated into the model.

## 10.0 References

- Australia and New Zealand Guidelines for Fresh and Marine Water Quality* (2000) Australia and New Zealand Environment Conservation Council
- Australian Rainfall and Runoff Volume 1* (1987) Institution of Engineers Australia
- Bootes Creek Temporary Diversion* (2008) Water Solutions Pty Ltd
- Curragh Open Cut Coal Mine Water Management Study Draft* (2000) Environmental Resources Management Australia
- Emergency Management Guidelines* (2009) Rolleston Coal
- Emergency Management Plan* (2008) Rolleston Coal
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- Environmental Authority (Mining Activities) Permit Number MIN101140410 – Rolleston Coal Mine (DRAFT)* Department of Environment and Resource Management
- Environmental Impact Statement* (2002) Environmental Resources Management Australia
- Evaluation Report on the Environmental Impact Statement of Rolleston Coal Project* (2003) Coordinator General
- GoldSim User's Guide: Volumes 1 and 2* (2009) GoldSim Technology Group
- Guidelines on Acceptable Flood Capacity for Dams* (2007) Australian National Committee on Large Dams
- Hydrological Recipes: Estimation Techniques in Australian Hydrology* (2004) CRC for Catchment Hydrology Australia
- Manual for Assessing Hazard Categories and Hydraulic Performance of Dams, Version 1.1* (2009) Department of Environment and Resource Management
- Queensland Water Quality Guidelines Version 3* (2009) Department of Environment and Resource Management
- Rolleston Coal Mine – Meteor West Boxcut / Mine Groundwater Inflow and Dewatering Assessment* (2009) Australians Groundwater and Environmental Consultants Pty Ltd
- Rolleston West Mine Expansion Stream Diversion Strategy* (2009) AECOM Australia Pty Ltd
- Spring Creek Diversion Design Report* (2010) AECOM Australia Pty Ltd
- Surface Water Management Review* (2010) AECOM Australia Pty Ltd
- TARP – Mine and Access Flooding* (2008) Rolleston Coal
- TARP – Wet Weather Road Network - Minesite* (2008) Rolleston Coal
- Technical Guidelines for Environmental Management of Exploration and Mining in Queensland* (1995) Department of Mining and Energy
- Water Supply Management & Optimisation – OPSIM Water Management* (2007) Water Solutions Pty Ltd
- Water Act* (2000) Office of the Queensland Parliamentary Counsel

## Appendix A

# Storage Contaminant Levels

## Appendix B

# Hazardous Dam Calculations

## Appendix C

# Civil Design

## Appendix D

# Particle Size Distribution



## Appendix E

# Water Quality Parameters

## Appendix F

# Groundwater Quality Parameters

## Appendix G

# Schedule of Infrastructure

## Appendix H

# Hydrology

## Appendix I

# Contaminant Source Study

## Appendix J

# Emergency and Contingency Guidelines

## Appendix K

# Environmental Authority

## Appendix L

# Water Management Plans

**B6** If the administering authority determines the odour released to constitute an environmental nuisance, then the environmental authority holder must:

- a) address the complaint including the use of appropriate dispute resolution if required; and
- b) immediately implement odour abatement measures so that emissions of odour from the activity do not result in further environmental nuisance.

**Department Interest: Water**

**C1 Contaminant Release**

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.

**C2** The release of contaminants to waters must only occur from the release points specified in Table 1 (Contaminant release points, sources and receiving waters) and depicted in Appendix 1 (Release points (RP) and monitoring points (MP) for Rolleston Coal Mine) of this environmental authority.



Table 1 (Contaminant release points, sources and receiving waters)

Release Point (RP)	Easting (GDAS4)	Northing (GDAS4)	Contaminant Source and Location	Monitoring Point	Receiving waters description
RP 1	643688	7297724	Bootes Creek Discharge Point 1	End of pipe	Bootes Creek
RP 2	646373	7294170	Meteor Creek	End of pipe	Meteor Creek
RP 3	644115	7295882	Environment Dam	End of pipe	Bootes Creek
RP 4	641432	7296357	Diversion Pit Dam	End of pipe	Bootes Creek
RP 5	642533	7290554	Meteor Creek via Sandy Creek	End of pipe	Meteor Creek (via Sandy Creek)

- C3 The release of contaminants to waters must not exceed the release limits stated in Table 2 (Contaminant release limits) when measured at the monitoring points specified in Table 1 (Contaminant release points, sources and receiving waters) for each quality characteristic.

Table 2 (Contaminant release limits)

Quality Characteristic	Interim Release Limits until 30 NOV-2011	Future Release Limits from 1 DEC-2011	Monitoring frequency
Electrical conductivity (uS/cm)	1500	1000	Daily during release (the first sample must be taken within 2 hours of commencement of release)
pH (pH Unit)	6.5 (minimum) 9.0 (maximum)	6.5 (minimum) 9.0 (maximum)	Daily during release (the first sample must be taken within 2 hours of commencement of release)
Turbidity (NTU)	NA*	NA*	Daily during release* (first sample within 2 hours of commencement of release)
Suspended Solids (mg/L)	1200	Limit to be determined based on receiving water reference data and achievable best practice sedimentation control and treatment	Daily during release* (first sample within 2 hours of commencement of release)
Sulphate (SO <sub>4</sub> <sup>2-</sup> ) (mg/L)	1000	1000	Daily during release* (first sample within 2 hours of commencement of release)

Note: NA – not available, \* local trigger values need to be developed

- C4** The release of contaminants to waters from the release points must be monitored at the locations specified in Table 1 (Contaminant release points, sources and receiving waters) for each quality characteristics and at the frequency specified in Table 2 (Contaminant release limits) and Table 3 (Release contaminant trigger investigation levels).

Table 3 (Release contaminant trigger investigation levels)

Quality Characteristic	Trigger Levels (ng/L)	Monitoring Frequency
Aluminium	650	Within 2 hours of commencement of release and there after weekly during release
Arsenic	13	
Cadmium	0.2	
Chromium	3	
Copper	13	
Iron	520	
Lead	10	
Mercury	0.2	
Nickel	11	
Boron	370	
Cobalt	90	
Molybdenum	34	
Selenium	10	
Silver	1	
Uranium	1	
Vanadium	10	
Ammonia	900	
Nitrate	1100	
Petroleum hydrocarbons (C6-C9)	20	
Petroleum hydrocarbons (C10-C36)	100	
Zinc	8	

Notes: 1. All metals and metalloids must be measured as total (unfiltered) and dissolved (filtered). Trigger levels for metals/metalloids apply if dissolved results exceed trigger.

2. The list of quality characteristics required to be monitored as per Table 3 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 it is determined that there is no need to monitor for certain individual quality characteristics these can be removed from Table 3.

3. SMD – slightly/moderately disturbed level of protection, guideline refers ANZECC & ARMCANZ (2000).

4. LOR – typical reporting for method stated. ICPMS/GV FIMS – analytical method required to achieve LOR.

- C5** If quality characteristics of the release exceed any of the trigger levels specified in Table 3 (Release contaminant trigger investigation levels) during a release event, the environmental authority holder must compare the downstream results in the receiving waters to the trigger values specified in Table 3 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 in Table 3 for any quality characteristic, compare the results of the downstream site to the data from background monitoring sites and;
    - (a) If the result is less than the background monitoring site data, then no action is to be taken; or
    - (b) if the result is greater than the background monitoring site data, complete an investigation in accordance with the ANZECC & ARMCANZ 2000 methodology, into the potential for environmental harm and provide a written report to the administering authority in the next annual return, outlining:
      - (i) details of the investigations carried out; and
      - (ii) actions taken to prevent environmental harm.

*NOTE: Where an exceedence of a trigger level has occurred and is being investigated, in accordance with C5 2(b)(ii) of this condition, no further reporting is required for subsequent trigger events for that quality characteristic.*

- C6** If an exceedence in accordance with condition C5 2(b) is identified, the holder of the authority must notify the administering authority within fourteen (14) days of receiving the result.
- C7** **Contaminant Release Events**  
The holder must install, operate and maintain a stream flow gauging station to determine and record stream flows at the locations upstream of each Release Point as specified in Table 4 (Contaminant release during flow events) for any receiving water into which a release occurs.
- C8** Notwithstanding any other condition of this environmental authority, the release of contaminants to waters must only take place during periods of natural flow events specified as minimum flow in Table 4 (Contaminant release during flow events) for the contaminant release point(s) specified in Table 1 (Contaminant release points, sources and receiving waters).

Table 4 (Contaminant release during flow events)

Receiving water description	Release Point	Gauging station description	Easting (GDA94)	Northing (GDA94)	Minimum Flow in Receiving Water Required for a Release Event	Flow recording Frequency
Bootes Creek	RP 1	Bootes Creek Discharge Point 1	643688	7297724	0.75m <sup>3</sup> /s (750L/s)	Continuous (minimum daily)
Bootes Creek	RP 3	Environment Dam	644115	7295882		
Bootes Creek	RP 4	Diversion Pit Dam	641432	7296357		
Meteor Creek	RP 2	Meteor Creek	646373	7294170	2.5m <sup>3</sup> /s (2500L/s)	
Meteor Creek (via Sandy Creek)	RP 5	Meteor Creek	643665	7290040	2.5m <sup>3</sup> /s (2500L/s)*	

\*As measured at Meteor Creek (MP2) for release at Sandy Creek (RP5).

- C9** Contaminant release flow rate must not exceed 20% of receiving water flow rate.
- C10** The daily quantity of contaminants released from each release point must be measured and recorded at the monitoring points in Table 1 (Contaminant release points, sources and receiving waters).
- C11** 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.
- C12 Notification of Release Event**  
 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:
- release commencement date/time;
  - expected release cessation date/time;
  - release point/s;
  - release volume (estimated);
  - receiving water/s including the natural flow rate; and
  - 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 ([Manager.MiningCWR@derm.qld.gov.au](mailto:Manager.MiningCWR@derm.qld.gov.au)) or facsimile.

- C13** The authority holder must notify the administering authority as soon as practicable, (nominally within twenty-four (24) hours of cessation of a release) of the cessation of a release notified under condition C12 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.
- C14 Notification of Release Event Exceedence**
- If the release limits defined in Table 2 (Contaminant release limits) are exceeded, the holder of the environmental authority must notify the administering authority within twenty-four (24) hours of receiving the results.
- C15** 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.
- C16 Monitoring of Water Storage Quality**
- Water storages stated in Table 5 (Water storage monitoring) which are associated with the release points must be monitored for the water quality characteristics specified in Table 6 (Onsite water storage contaminant limits) at the monitoring locations and at the monitoring frequency specified in Table 5 (Water storage monitoring).



**Table 5 (Water storage monitoring)**

Water Storage Description	Easting (GDAC)	Northing (GDAC)	Monitoring Location	Frequency of Monitoring
Environment Dam	643833	7295779	Embankment	Quarterly
Pit Water Dam	643253	7296718	Embankment	
Sediment Dam 5	644993	7294574	Embankment	
Sediment Dam 6	644857	7284123	Embankment	
Meteor West PWD	641839	7290888	Embankment	
Diverslon Pit Dam	641415	7296375	Embankment	
Spring Creek PWD	643999	7298059	Embankment	
Spring Creek Dam	614887	7298607	Embankment	

- C17** In the event that waters storages defined in Table 5 (Water storage monitoring) exceed the contaminant limits defined in Table 6 (Onsite water storage contaminant limits), the holder of the environmental authority must implement measures, where practicable, to prevent access to waters by all livestock.

Table 6 (Onsite water storage contaminant limits)

Quality Characteristic	Test Value	Contaminant Limit
pH (pH unit)	Range	Greater than 4, less than 9.5 <sup>2</sup>
EC (µS/cm)	Maximum	5970 <sup>1</sup>
Sulphate (mg/L)	Maximum	1000 <sup>1</sup>
Aluminium (mg/L)	Maximum	5 <sup>1</sup>
Arsenic (mg/L)	Maximum	0.5 <sup>1</sup>
Cadmium (mg/L)	Maximum	0.01 <sup>1</sup>
Cobalt (mg/L)	Maximum	1 <sup>1</sup>
Copper (mg/L)	Maximum	1 <sup>1</sup>
Lead (mg/L)	Maximum	0.1 <sup>1</sup>
Nickel (mg/L)	Maximum	1 <sup>1</sup>
Zinc (mg/L)	Maximum	20 <sup>1</sup>

Note:

<sup>1</sup> Contaminant limit based on ANZECC & ARMCANZ (2000) stock water quality guidelines.

<sup>2</sup> 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. Soils at Rolleston are particularly alkaline sometimes producing run-off above pH 9.

#### Receiving Environment Monitoring and Contaminant Trigger Levels

**C18** The quality of the receiving waters must be monitored at the locations specified in Table 8 (Receiving water upstream background sites and downstream monitoring points) and shown in Appendix 1 (Release points (RP) and monitoring points (MP) at Rolleston Coal Mine) for each quality characteristic and at the monitoring frequency stated in Table 7 (Receiving waters contaminant trigger levels).

Table 7 (Receiving waters contaminant trigger levels)

Quality Characteristic	Trigger Level	Monitoring Frequency
pH	6.5 – 9.0	Daily during the release
Electrical Conductivity ( $\mu\text{S}/\text{cm}$ )	315 (Booles Creek) 500 (Meteor Creek)	
Suspended Solids ( $\text{mg}/\text{L}$ )	1170	
Sulphate ( $\text{SO}_4^{2-}$ ) ( $\text{mg}/\text{L}$ )	250	

Table 8 (Receiving water upstream background sites and down stream monitoring points)

Monitoring Point (MP)	Receiving Waters Location Description	Easting (GDA94)	Northing (GDA94)
Upstream Background Monitoring Points			
MP 1	Booles Creek Upstream	639993	7295456
MP 6	Sandy Creek Upstream	632457	7290517
Downstream Monitoring Points			
MP 3	Booles Creek Downstream	644141	7297437
MP 4	Meteor Creek Downstream	646677	7294504
MP 5	Booles Creek Downstream	647881	7296451
MP 7	Sandy Creek Downstream	642720	7280478

## Notes:

1. The upstream monitoring point should be within 9km from the release point;
2. the downstream point should not be greater than 6km from the release point;
3. The data from background monitoring points must not be used where they are affected by releases from other mines.

**C19** If quality characteristics of the receiving water at the downstream monitoring points exceed any of the trigger levels specified in Table 7 (Receiving waters contaminant trigger levels) during a release event, the environmental authority holder must compare the downstream results to the upstream results in the receiving waters and:

1. 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
2. where the downstream results exceed the upstream results, complete an investigation in accordance with the ANZECC & ARMCANZ 2000 methodology, into the potential for environmental harm and provide a written report to the administering authority in the next annual return, outlining:
  - i. details of the investigations carried out; and
  - ii. actions taken to prevent environmental harm.

*NOTE: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with C19 2(ii) of this condition, no further reporting is required for subsequent trigger events for that quality characteristic.*

**C20 Receiving Environment Monitoring Program (REMP)**

A REMP must be developed and implemented by 1 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 Meteor and Bootes Creeks and connected waterways within 10km downstream of the release.

- C21 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 2009*);
  - c) Any relevant reports prepared by other governmental or professional research organisations that relate to the receiving environment within which the REMP is proposed;
  - d) Water quality targets within the receiving environment to be achieved, and clarification of contaminant concentrations or levels indicating adverse environmental impacts during the REMP;
  - e) Monitoring for any potential adverse environmental impacts caused by the release;
  - f) Monitoring of stream flow and hydrology;
  - g) Monitoring of toxicants should consider the indicators specified in Table 3 (Release contaminant trigger investigation levels) to assess the extent of the compliance of concentrations with water quality objectives and/or the ANZECC & ARMCANZ 2000 guidelines for slightly to moderately disturbed ecosystems;
  - h) Monitoring of physical chemical parameters as a minimum those specified in Table 2 (Contaminant release limits) (in addition to dissolved oxygen saturation and temperature);
  - i) Monitoring biological indicators (for macroinvertebrates in accordance with the AusRivas methodology) and metals/metalloids in sediments (in accordance with ANZECC & ARMCANZ 2000, BATLEY and/or the most recent version of AS5667.1 *Guidance on Sampling of Bottom Sediments*) for permanent, semi-permanent water holes and water storages;
  - j) The locations of monitoring points (including the locations specified in Table 8 (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 2008*. 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.

**C22** A report outlining the findings of the REMP, including all monitoring results and interpretations in accordance with conditions C20 and C21 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.

**C23 Water Reuse**

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

**Table 9 (Stock water release limits)**

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

**C24** Water contaminated by mining activity may be piped or trucked or transferred by some other means that does not contravene the conditions of this authority for the purpose of supplying irrigation water to properties directly adjoining properties owned by the environmental authority holder or a third party and subject to compliance with quality release limits in Table 10 (Irrigation water release limits).

**Table 10 (Irrigation water release limits)**

Quality characteristic	Units	Minimum	Maximum
pH	pH units	6.5	8.5
Electrical Conductivity	µS/cm	N/A	Site specific value to be determined in accordance with ANZECC & ARMCANZ (2000) Irrigation Guidelines and provided through an amendment process

**C25** Water contaminated by mining activity may be piped or trucked off the mining lease for the purpose of supplying water to a third party for the purpose of construction and/or road maintenance in accordance with the conditions of this environmental authority.

- C26** Water contaminated by mining activity may be piped or trucked for the purpose of supplying water to an adjoining mine in accordance with the conditions of this environmental authority. The volume, pH and electrical conductivity of water transferred to an adjoining mine must be monitored and recorded.
- C27** If the responsibility of water contaminated by mining activities (the water) is given or transferred to another person in accordance with conditions C23, C24, C25 or C26:
- the responsibility of the water must only be given or transferred in accordance with a written agreement (the third party agreement); and
  - include in the third party agreement a commitment from the person utilising the water to use water in such a way as to prevent environmental harm or public health incidences and specifically make the persons aware of the General Environmental Duty (GED) under section 319 of the *Environmental Protection Act 1994*, environmental sustainability of the water disposal and protection of environmental values of waters.

**Water General**

- C28** All determinations of water quality must be:
- performed by a person or body possessing appropriate experience and qualifications to perform the required measurements;
  - made in accordance with methods prescribed in the latest edition of the administering authority's Water Quality Sampling Manual;
  - collected from the monitoring locations identified within this environmental authority, within two (2) hours of each other where possible; and
  - carried out on representative samples.
  - laboratory testing must be undertaken using a laboratory accredited (e.g. NATA) method of analysis.

*NOTE: Condition C28 (b) 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.*

- C29** The release of contaminants directly or indirectly to waters must not:
- produce any visible discolouration of receiving waters; nor
  - 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.

**C30 Annual Water Monitoring Reporting**

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

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

**C31 Temporary Interference with waterways**

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

**C32 Water Management Plan**

A Water Management Plan must be developed and implemented by 1 November 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.

**C33** The Water Management Plan must be developed in accordance with the administering authority's *Guideline for Preparing a Water Management Plan 2009* 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.

- C34** 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.
- C35** 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.
- C36** **Stormwater and Water sediment controls**  
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.
- C37** 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.
- C38** 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.



**C39 Fitzroy River Basin Study**

The administering authority and the holder of this environmental authority both acknowledge that the conditions for release of contaminants to Meteor and Bootes Creeks 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.

**C40 Sewage effluent**

All effluent released from the treatment plant must be monitored at the frequency and for the parameters specified in Table 11 (Sewage effluent quality targets for dust suppression and irrigation).

**Table 11 (Sewage effluent quality targets for dust suppression and irrigation)**

Quality characteristic	Release limit	Units	Limit type	Monitoring frequency
5-day Biochemical Oxygen Demand (uninhibited)	50	mg/l	max	Monthly
pH	6.0-9.5		range	Monthly
Free Chlorine Residual	3	mg/l	max	Monthly
Faecal Coliforms, based on the average of a minimum of five samples collected	1000	Colonies per 100 millilitres	max	Monthly

**C41** Sewage effluent used for dust suppression or irrigation must not exceed sewage effluent release limits defined in Table 11 (Sewage effluent quality targets for dust suppression and irrigation).

- C42** Sewage effluent used for dust suppression or irrigation must not cause spray drift or over spray to any sensitive place.
- C43** Sewage effluent from sewage treatment facilities not directly used for dust suppression or irrigation must be discharged into Pit Water Dam for future use.
- C44** When conditions prevent the irrigation of treated effluent to land (such as during or following rain events), the contaminants must be directed to Pit Water Dam or alternative measures must be taken to store/lawfully dispose of effluent.
- C45** Water or stormwater contaminated by sewage treatment activities must not be released to any waters or the bed and banks of any waters other than as allowed by conditions in Department Interest – Water, of this environmental authority.
- C46** The irrigation of effluent must be carried out in a manner such that:
- a) vegetation is not damaged;
  - b) soil erosion and soil structure damage is avoided;
  - c) there is no surface ponding of effluent;
  - d) percolation of effluent beyond the plant root zone is minimised;
  - e) the capacity of the land to assimilate nitrogen, phosphorus, salts, organic matter as measured by oxygen demand and water is not exceeded; and
  - f) the quality of groundwater is not adversely affected.
- C47** All effluent storage facilities and disposal areas must be clearly identified.

**C48 Groundwater**

Groundwater levels must be monitored at the locations and frequencies defined in Table 12 (Groundwater levels).

**Table 12 (Groundwater levels)**

Monitoring Point (Bore Holes)	Easting	Northing	Monitoring frequency
BH1	641654	7295517	6 Monthly
BH2	641646	7295546	6 Monthly
BH5	644475	7292616	6 Monthly
BH6	644507	7292607	6 Monthly
BH7	642691	7290062	6 Monthly
BH8	642688	7290050	6 Monthly
BH9	638269	7295276	6 Monthly
BH10	640425	7299263	6 Monthly
BH11	644863	7297781	6 Monthly
BH12	645327	7295906	6 Monthly

**C49** Groundwater drawdown fluctuations in excess of 2m per year, not resulting from the pumping of licensed bores, must be notified within seven (7) days to the administering authority following completion of monitoring.

- C50** Groundwater quality must be monitored at the locations defined in Table 12 (Groundwater levels) for the parameters listed and at the frequency stated in Table 13 (Groundwater quality investigation trigger limits).

**Table 13 (Groundwater quality investigation trigger limits)**

Parameter	Limit/Range	Frequency
pH	TBA	Monthly
EC	TBA	Monthly
Total Dissolved Solids	TBA	Monthly
Calcium	TBA	Monthly
Magnesium	TBA	Monthly
Sodium	TBA	Monthly
Potassium	TBA	Monthly
Chloride	TBA	Monthly
SO <sub>4</sub>	TBA	Monthly
CaCO <sub>3</sub>	TBA	Monthly
HCO <sub>3</sub>	TBA	Monthly
Iron	TBA	Monthly
Aluminium	TBA	Monthly
Silver	TBA	Monthly
Arsenic	TBA	Monthly
Mercury	TBA	Monthly
Antimony	TBA	Monthly
Molybdenum	TBA	Monthly
Selenium	TBA	Monthly
Total Petroleum Hydrocarbons	TBA	Monthly

Notes: 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.

- C51** By 30 April 2011 the environmental authority holder must submit a report to the administering authority proposing a groundwater monitoring program including groundwater quality investigation trigger limits as per table 13. The report must also include a review of the groundwater levels, quality data and the

suitability of the monitoring program. The report must include sufficient information to allow the administering authority to develop suitable groundwater monitoring conditions.

- C52** The method of water sampling required by this environmental authority must comply with that set out in the latest edition of the administering authority's Water Quality Sampling Manual or an alternative method as agreed to in writing by the administering authority.

**Department Interest: Noise and vibration**

**D1 Noise nuisance**

Noise from activities must not cause an environmental nuisance at any sensitive place other than that which is authorised in the conditions below.

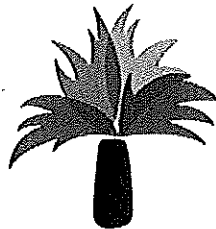
- D2** All noise from activities must not exceed the levels specified in Table 14 (Noise Limits) at any sensitive place.

**D3 Noise monitoring**

When requested by the administering authority, noise monitoring must be undertaken to investigate any complaint of noise nuisance, and the results notified within fourteen (14) days to the administering authority. Monitoring must include:

- a)  $L_{eq 1 Hr}$
- b) the level and frequency of occurrence of impulsive or tonal noise;
- c) atmospheric conditions including wind speed and direction;
- d) effects due to extraneous factors such as traffic noise; and
- e) location date and time of recording.

- D4** Noise is not considered to be a nuisance under condition D1 if monitoring shows that noise does not exceed the following levels in the time periods specified in Table 14 (Noise Limits).



ROLLESTON  
COAL

# Rolleston Coal Mine

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*Transitional Environmental Program (TEP)*

## **SPRING CREEK DAM WATER RELEASE INTO BOOTES CREEK**

October 2010



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Spring Creek Dam

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## Table of Contents

1. Introduction .....	4
2. Environmental Authority .....	6
3. Submission .....	6
4. Authorisation .....	6
5. Program .....	7
5.1. Design of Spring Creek Dam .....	7
5.2. Water Transfer.....	7
5.3. Program Objectives .....	7
5.4. Water Quality.....	7
5.5. Volume of water discharged .....	10
5.6. Rate of water discharge .....	10
5.7. Risk of Environmental Harm.....	10
5.8. Notification and Reporting.....	11
5.9. Action Plan .....	11
6. Term of the Transitional Environmental Program .....	14
7. Transition to Compliance .....	14
Appendix A Design Plans Spring Creek Dam .....	15
Appendix B Spring Creek Dam discharge & release point 1.....	17
Appendix C Discharge rating curves for Spring Creek Dam spillway.....	18
Appendix D Water quality In Spring Creek Dam.....	19
Appendix E Laboratory analysis of Spring Creek Dam water.....	20
Appendix F Water release contaminant trigger investigation levels In EA .	24
Appendix G Water contaminant release limits In EA.....	25
Appendix H Completion Report – Proposed Contents .....	26

## 1. Introduction

This Transitional Environmental Program (TEP) describes the proposed actions to release up to 4GL of water from Spring Creek Dam into Bootes Creek outside of Rolleston Coal's Environmental Authority (EA) MIM800090802 flow conditions for the relevant release point outlined in Table 1 below.

**Table 1 Contaminant release during flow events**

Receiving water description	Release Point	Gauging station description	Easting (GDA94)	Northing (GDA94)	Minimum Flow In Receiving Water Required for a Release Event	Flow recording Frequency
Bootes Creek	RP 1	Bootes Creek Discharge Point 1	643688	7297724	0.75m <sup>3</sup> /s (750L/s)	Continuous (minimum daily)

Spring Creek Dam is a water storage which may contain water which has been in contact with mining areas. This is in accordance with approved TEP MAN10239. As such the quality of any water stored in Spring Creek Dam must be monitored quarterly for a wide range of potential contaminants. Water analysis is also required during any controlled releases from the storage.

District flooding resulting from exceptional rainfall between December 2009 and March 2010<sup>1</sup> resulted in the failure of Naroo Dam (a pastoral dam) and a subsequent overtopping release from Spring Creek Dam. The resultant surge of surface water flows resulted in Spring Creek Mining Pit being inundated. Subsequently Spring Creek Pit was used to moderate the flow of water, and minimize off-site release where possible. The majority of this water (in excess of 4GL) from Spring Creek Pit has now been pumped into Spring Creek Dam (in accordance with the approved TEP MAN10239).

Despite being in contact with mining areas, the quality of the water moved into Spring Creek Dam was good from the perspectives of human and stock consumption and in comparison with local streams. Water quality was monitored as it was pumped from Spring Creek Pit back into Spring Creek Dam (see Appendices D & E). At no stage were EA contamination release limits or Investigation trigger levels exceeded during the transfer (see Appendices F & G).

Though the water quality in Spring Creek Dam remains good, the Dam's present capacity to account for heavy rainfall in the impending "wet season" is reduced. Rolleston Coal considers that the controlled release of 4GL now (thereby increasing available storage capacity) will minimise the risk of potential future environmental

<sup>1</sup> On top of the exceptionally high rainfall that Rolleston Coal Mine experienced over January, February and March 2010, August and in particular September rainfall has exceed all records since rainfall recording commenced in the late 1800's. 1036mm of rain has been recorded for the nine months YTD with 199mm falling in September.

## Spring Creek Dam

issues that might arise in the event of an uncontrolled discharge. As at Tuesday 13<sup>th</sup> October 2010 Spring Creek Dam had a remaining storage capacity of approximately 800ML.

Spring Creek Pit is now estimated to contain around 450ML following repeated inflows in September from localised gullies draining into the pit. As a result of protracted rainfall impeding access, Rolleston Coal was unable to complete prior to these rain events the installation of a diversion structure to protect the pit from localised inflows and inflows from the Albinia National Park. The diversion structures were completed in early October thereby preventing any further inflows.

Since major flooding in the first quarter of 2010 and prior to August and September rainfall, construction of additional flood mitigation infrastructure was complete, that is all major storages, levees and diversions. This infrastructure will be detailed in Rolleston Coal's amended Water Management Plan due for submission to DERM by November 1<sup>st</sup> 2010 as required under the approved TEP MAN10239.

To ensure that Spring Creek Dam will not receive any overland flows from Spring Creek, a diversion bank has been constructed to prevent inflows. Despite this, water levels in Spring Creek Dam rose in September due to runoff from residual catchment areas not affected by the diversion bank, rain falling directly into the storage as well as groundwater suspected to be seeping from basalt outcrops.

The traditional "wet season" for Central Queensland is from December through to March. Rolleston Coal needs to maintain sufficient storage capacity in the water impoundments prior to the commencement of the wet season, in order to avoid uncontrolled discharges. The unseasonal, protracted and record-breaking rainfall in recent months has significantly impacted Rolleston Coal's water storage balance on site.

Rolleston Coal voluntarily submits this TEP to seek authorisation by the administering authority under the *Environmental Protection Act 1994* to discharge 4.0GL of water from Spring Creek Dam into Bootes Creek at the rate of approximately 100ML per day irrespective of water flow in Bootes Creek, provided water quality complies with the criteria stipulated by this TEP.

This TEP proposes the implementation of an Action Plan showing how the objectives of this TEP are to be achieved and the timetable in which they are to be achieved. Rolleston Coal will implement the Action Plan in addition to continued compliance with its existing obligations under EA MIM800090802.

Furthermore Rolleston Coal believes that by implementing this TEP and having sufficient capacity in Spring Creek Dam at the commencement of the "wet season" the potential risk of environmental harm is minimized as the likelihood of any uncontrolled discharges is significantly reduced.

## 2. Environmental Authority

Xstrata Coal Queensland Pty Ltd, ICRA Rolleston Pty Ltd and Sumisho Coal Australia Pty Limited (*Rolleston Coal*) hold Environmental Authority MIM800090802 to carry out mining activities on ML70307 and MDL227, issued on 30 November 2009.

## 3. Submission

This Transitional Environmental Program (TEP) 2010/03 is voluntarily submitted on behalf of Xstrata Coal Queensland Pty Ltd, ICRA Rolleston Pty Ltd and Sumisho Coal Australia Pty Limited by Bill McKinstrey, General Manager, Southern Region, Xstrata Coal Queensland.



Signed

18/10/10  
Date

## 4. Authorisation

When approved, this TEP will authorise the controlled release of up to 4.0GL of mine affected water from Spring Creek Dam into Bootes Creek at a discharge rate of up to 100ML per day, provided water quality complies with the criteria stipulated by this TEP. Spring Creek Dam water storage can discharge water to Release Point 1 (RP1) as identified in EA MIM800090802. Monitoring of discharge water will be undertaken in accordance with the conditions and requirements of this TEP. Ongoing water management will be in accordance with Rolleston Coal's Water Management Plan which is currently being updated for submission to DERM by 1 November 2010 in accordance with TEP MAN10239.

To the extent there are any inconsistencies between this TEP and EA MIM800090802 and any other operational documents, this TEP prevails.

## 5. Program

### 5.1. Design of Spring Creek Dam

Appendix A contains design drawings for the Spring Creek Dam, the construction of which has been monitored by appropriately skilled engineers. "As built" plans have been provided to DERM.

### 5.2. Water Transfer

It is proposed to undertake a controlled release of up to 4.0GL from Spring Creek Dam into Bootes Creek at the rate of up to 100ML per day.

### 5.3. Program Objectives

**Objective 1:** Prior to discharge commencing Rolleston Coal will continue to operate the site in accordance with conditions of EA MIM800090802 and TEP MAN10239.

**Objective 2:** Present DERM with the results from water quality testing of water from Spring Creek Dam, for the water quality characteristics specified Appendices F & G.

**Objective 3:** Discharge water from Spring Creek Dam via Release Point 1 as identified in EA MIM800090802 in accordance with the commitments set out in Section 5 of this TEP.

**Objective 4:** Rolleston Coal will complete and lodge with DERM a Completion Report outlining actions undertaken under this TEP and summarising compliance against this TEP, and the results of the Spring Creek Dam discharge water sampling, within 40 business days of the completion of the controlled release of water from Spring Creek Dam.

### 5.4. Water Quality

The quality of the water in Spring Creek Dam has been closely scrutinized in line with approved TEP MAN10239. Detailed results have been provided in Appendices D & E. Table 2 provides a comparison of average water quality (50<sup>th</sup> percentile) relative to EA discharge contaminant limits. Analyses of results indicate consistently high water quality.

Spring Creek Dam

**Table 2: Spring Creek Dam water quality relative to EA discharge limits**

Water quality characteristic	EA discharge limit	Spring Creek Dam level (50 <sup>th</sup> percentile)
Electrical Conductivity (µS/cm)	1500	326
pH	6.5 – 9.0	8.4
Turbidity (ntu)	n/a	33
Suspended solids (mg/L)	1200	44
Sulphate (mg/L)	1000	2.2
Aluminium (µg/L)	650	18
Arsenic (µg/L)	13	<1
Cadmium (µg/L)	0.2	<0.1
Chromium (µg/L)	3	<1
Copper (µg/L)	13	1.8
Iron (µg/L)	520	50
Lead (µg/L)	10	<1
Mercury (µg/L)	0.2	<0.1
Nickel (µg/L)	11	3
Boron (µg/L)	370	50
Cobalt (µg/L)	90	0.8
Molybdenum (µg/L)	34	2.4
Selenium (µg/L)	10	4.5
Silver (µg/L)	1	<1
Uranium (µg/L)	1	<1
Vanadium (µg/L)	10	10
Ammonia (µg/L)	900	82
Nitrate (µg/L)	1100	52
Petroleum hydrocarbons (C6-C9) (µg/L)	20	<20
Petroleum hydrocarbons (C10-C36) (µg/L)	100	<50
Zinc (µg/L)	8	3.75

## Spring Creek Dam

### Monitoring discharges in this TEP will be conducted as follows:

- Sampling of water being discharged from Spring Creek Dam will be undertaken at the location and frequency specified in Table 3 below;
- Sampling of water discharged from Spring Creek Dam will be undertaken using calibrated field equipment for the parameters outlined in Table 4;
- Monthly analysis for the parameters outlined in Appendix F will be conducted by NATA certified laboratories;
- In the event that water analysis results exceed the defined contaminant limits (as outlined in Table 4) Rolleston Coal will cease discharging;
- In the event that water analysis results exceed the defined contaminant limits (as outlined in Appendix F) Rolleston Coal will investigate the reason for the exceedence in accordance with the procedures in Condition W5 of the EA.

**Table 3: Discharge water monitoring location**

Water storage description	Easting +/- 50m	Northing +/- 50m	Monitoring Location	Frequency of Monitoring
Spring Creek Dam	642472	7298442	Spring Creek dam spillway (which drains to RP1 in EA)	Daily during discharge for the parameters listed in Table 4. Monthly during discharge for the parameters listed in Appendix F.

**Table 4: Water sampling parameters and upper limits**

Parameter	Units	Maximum	Notes
Electrical Conductivity (EC)	µS/cm	483	90 <sup>th</sup> percentile of Bootes Creek upstream monitoring*
pH	n/a	9.0	In accord with EA conditions
Turbidity	NTU	290	80 <sup>th</sup> percentile of Bootes Creek upstream monitoring*
Volume released	Megalitres/ day	100	

\*Taken from 56 samples from Bootes Creek upstream water monitoring station in February and March 2010, the timeframe when the flooding of Spring Creek Pit occurred. Data has been supplied to DERM.

5.5. Volume of water discharged

In addition to daily calculations of volumes released, weekly estimates of water volume remaining in Spring Creek Dam will be undertaken, by survey pickup of the RL on water during the period in which water is released.

5.6. Rate of water discharge

In order to calculate discharge rates, the consultancy firm AECOM have prepared discharge curves (Appendix C) using a broad crested weir design which will enable variation to flow rates by adjusting either the height or width of the spillway..

5.7. Risk of Environmental Harm

Water Quality

Rolleston Coal is confident that the program will not significantly increase the potential for environmental harm in the area. Weekly water quality sampling in Spring Creek Dam over the last 3 months has met all criteria specified in Tables 2 and 3 of Rolleston Coal's EA (see Appendices D & E). Rolleston Coal also proposes additional sampling of the water before it is discharged and will discharge only if the water is within acceptable levels, as stipulated by this TEP. During release water will be subject to monitoring at the dam spillway.

Furthermore Rolleston Coal believes that by implementing this TEP and having sufficient capacity in Spring Creek Dam at the commencement of the "wet season" the potential risk of environmental harm is minimized as the likelihood of uncontrolled discharges is reduced.

The proposed monitoring regime will assess water quality throughout the discharge event. Discharge will cease if water quality parameters stipulated by this TEP were exceeded.

Though this TEP seeks the controlled discharge of water irrespective of minimum flow conditions outlined in the EA, it is anticipated that there will be times when Bootes Creek will be flowing. During September there have been five flow events in Bootes Creek where the minimum flow requirement in the receiving water (Bootes Creek) has provided opportunity for controlled discharge. Current weather forecasts suggest strong "La Nina" conditions with well above average rainfall. Any natural flows in Bootes Creek will have a dilution effect thereby further reducing potential downstream impact.

Impacts on Downstream Landholders

Rolleston Coal does not predict any impact to downstream users as this discharge will be managed so as to comply with the water quality parameters outlined in Table 4. There are existing monitoring stations (pH, EC, temperature and flow height) located upstream and downstream of Release Point 1 where this discharge will occur (refer to Appendix B). These established automated monitoring stations will continue to operate in accordance with applicable requirements under EA MIM80009080.

## Spring Creek Dam

Rolleston Coal predicts that the impact on stock watering will be negligible as water quality parameters documented in the EA are consistent with those listed in ANZECC guidelines for stock water.

Rolleston Coal is confident that the rate of water released from Spring Creek Dam will not incur any increase in downstream flood levels as the creek system capacity is sufficient to accommodate very large volumes of water. Rolleston Coal will consult with the Ranger in Charge of the Albinia National Park as well as the adjacent landholder in relation to likely impacts on the usability of Springwood road.

### Erosion Potential

Rolleston Coal is also confident that the rate of water released from Spring Creek Dam will not result in downstream erosion as the creek system has sufficient capacity to accommodate very large volumes of water. Additionally the water being released has to traverse large areas of swamp prior to reaching Meteor Creek. Rolleston Coal will undertake weekly visual inspections of the riparian area immediately downstream of Spring Creek Dam. If erosion is evident a reduced discharge rate will be adopted to ensure maintenance of stream bank integrity.

## 5.8. Notification and Reporting

Rolleston Coal will:

1. Notify DERM of commencement of discharge from Spring Creek Dam into Bootes Creek within 2 business days of commencement;
2. Notify DERM, within 21 days of completion of discharge from Spring Creek Dam into Bootes Creek, the following:
  - a. controlled release completion date;
  - b. raw results on water quality testing under this TEP; and
  - c. volume of water transferred released from Spring Creek Dam into Bootes Creek; and
3. Complete and lodge with DERM a completion report outlining actions taken under this TEP within 40 business days of completion of discharging of water from Spring Creek Dam into Bootes Creek summarising sampling, results, observations, and other relevant details. A proposed format (TOC) for the completion report is provided in Appendix E

## 5.9. Action Plan

The key actions planned and scheduled are set out below in Table 5.

Table 5: Action Plan

Action Plan item	Objective No.	Performance Indicator	Completion date	Responsibility
AP - 1. Monitor in accordance with TEP and EA MIM800090802 prior to pumping	1	Sampling of Spring Creek Dam completed	Prior to commencement of discharge	Environmental Manager
AP - 2. Collate the sampling results of Spring Creek Dam and provide to DERM with and in support of this TEP	2	Data provided to DERM	Upon approval of this TEP	Environmental Manager
AP - 3. Commence discharging water from Spring Creek Dam into Bootes Creek via Release Point 1	3	Controlled discharging occurring	As soon as practicable after completion of AP-2 above	Operations Manager in conjunction with Environmental Manager
AP - 4. Notify DERM of commencement of discharging from Spring Creek Dam into Bootes Creek via Release Point 1	3	DERM notified of commencement of discharge	Within 2 business days of commencing pumping	Environmental Manager
AP - 5. Monitor in accordance with TEP and EA MIM800090802 during discharge	3	Sampling of Spring Creek Dam water Visually monitor the impact of erosion downstream of RP1 on a weekly basis during discharge and take remedial action as required	Prior to cessation of pumping Upon cessation of pumping	Environmental Manager

Spring Creek Dam

Action Plan item	Objective No.	Performance Indicator	Completion date	Responsibility
		Visually monitor the condition of roads downstream of RP1 on a weekly basis during discharge, and liaise with landholders as required	Upon cessation of pumping	
AP - 6. Cease discharging from Spring Creek Dam	3	Pumping ceases	Final discharging to cease when 4.0GL has been released or by 1 March 2011, whichever is the sooner.	Operations Manager
AP - 7. Notify DERM of the following under this TEP; <ul style="list-style-type: none"> <li>Controlled release completion date</li> <li>Raw results on water quality testing under this TEP; and</li> <li>Volume of water released from Spring Creek dam into Bootes Creek</li> </ul>	3	Notification to DERM occurs	Within 21 business days of cessation of pumping of water from Spring Creek Dam into Bootes Creek via Release Point 1	Environmental Manager
AP - 8. Submit completion report to DERM.	3	Report submitted to DERM in a form consistent with that outlined in Appendix H	Within 40 business days after cessation of discharging from Spring Creek Dam into Bootes Creek via Release Point 1 under this TEP	Environmental Manager

## **6. Term of the Transitional Environmental Program**

This TEP will be current until 1 March 2011.

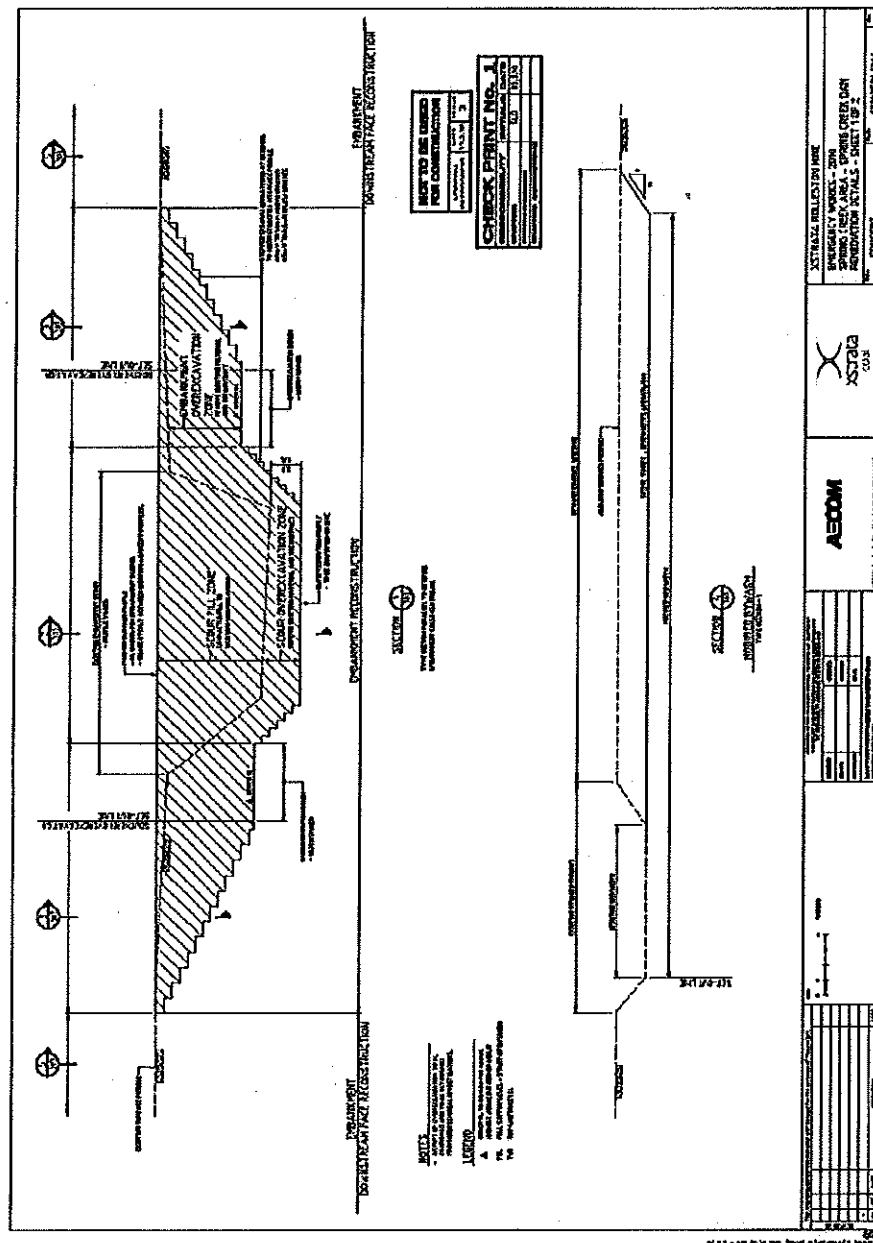
## **7. Transition to Compliance**

The outcome of this TEP is considered integral to the site's "transition" to compliance which will be reflected by the:

- Updated Water Management Plan (which is to be completed by 1 November 2010 in accordance with TEP MAN10239)



## Design Plans Spring Creek Dam



**Rolleston Coal Pty Ltd ABN 73 106 690 037**

Dawson Highway, Via Rolleston, PO Box 11, Springsure QLD 4722

Tolsonhno 07 1022 0100 Esrimila 07 1000 0101 Tolonhnohno 07 1000 0101

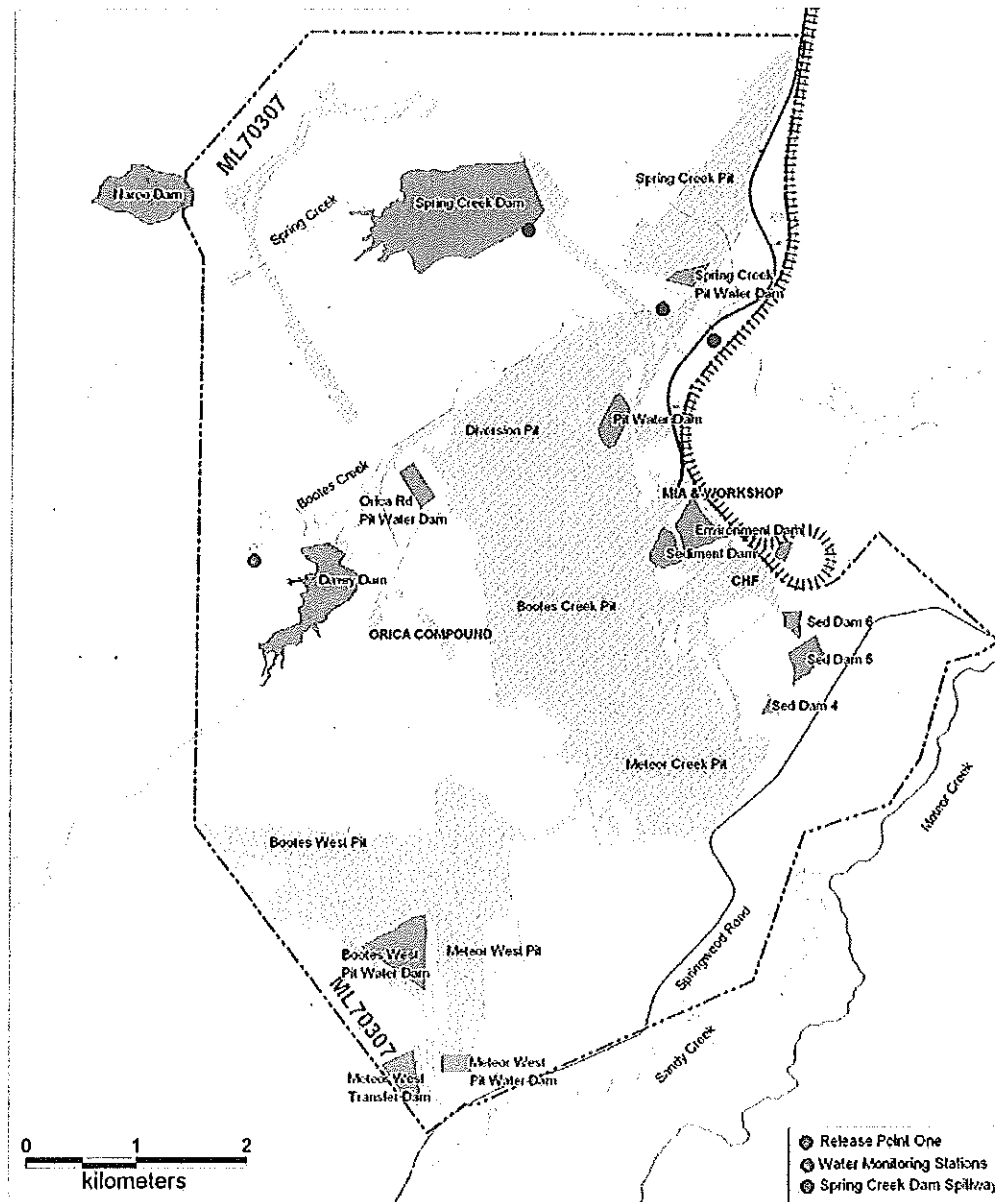


## Appendix B

## Spring Creek Dam discharge & release point 1



### Rolleston Coal Spring Creek Dam Discharge and Release Points

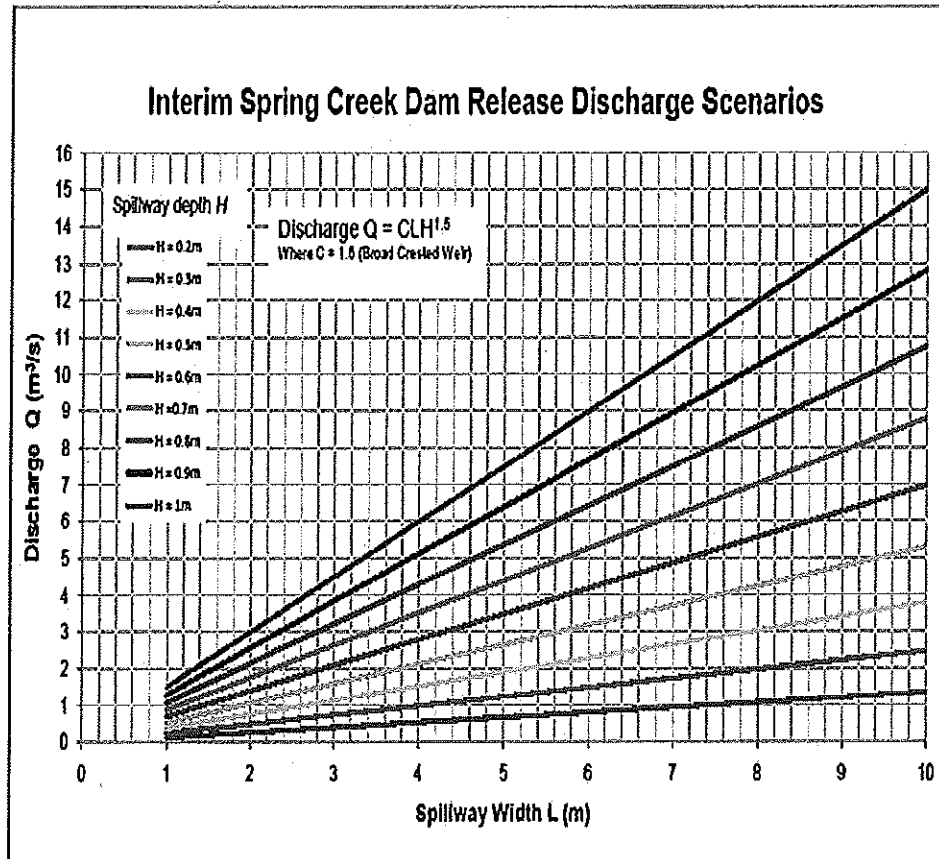


Rolleston Coal Pty Ltd ABN 73 106 690 037

Dawson Highway, Via Rolleston, PO Box 11, Springsure QLD 4722

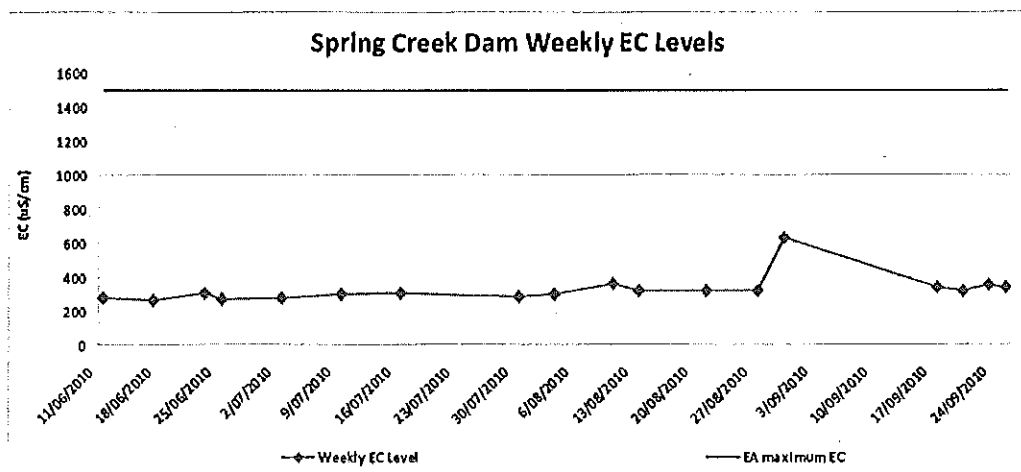
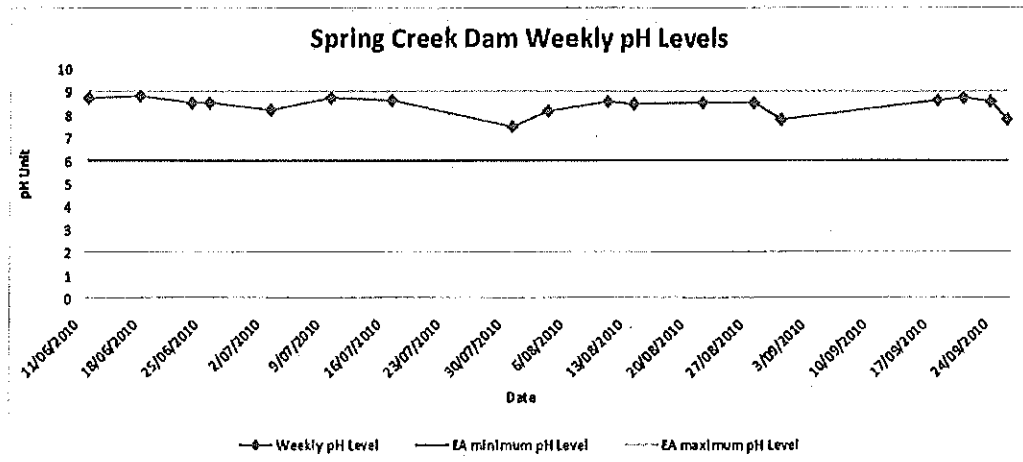
Telephone 07 4988 9100 Facsimile 07 4988 9151 Internet [www.xstrata.com](http://www.xstrata.com)

**Appendix C**      *Discharge rating curves for Spring Creek Dam spillway*



## Spring Creek Dam

### Appendix D Water quality in Spring Creek Dam



**Appendix E**     *Laboratory analysis of Spring Creek Dam water*

Sample Date:

04/08/2010

**Analyte grouping/Analyte****EA005P: pH by PC Titrator**

pH Value

8.05

**EA010P: Conductivity by PC Titrator  
(µs/cm)**

Electrical Conductivity @ 25°C

310

**EA015: Total Dissolved Solids (mg/L)**

Total Dissolved Solids @180°C

201

**EA025: Suspended Solids (mg/L)**

Suspended Solids (SS)

5

**EA045: Turbidity**

Turbidity

**ED037P: Alkalinity by PC Titrator (mg/L)**Hydroxide Alkalinity as CaCO<sub>3</sub>

&lt;1

Carbonate Alkalinity as CaCO<sub>3</sub>

&lt;1

Bicarbonate Alkalinity as CaCO<sub>3</sub>

150

Total Alkalinity as CaCO<sub>3</sub>

150

**ED040F: Dissolved Major Anions (mg/L)**Sulphate as SO<sub>4</sub> 2-

2

**ED040T: Total Major Anions**Sulphate as SO<sub>4</sub> 2-**ED045G: Chloride Discrete analyser (mg/L)**

Chloride

12

**ED045P: Chloride by PC Titrator**

Chloride

**ED093F: Dissolved Major Cations (mg/L)**

Spring Creek Dam

Calcium	17
Magnesium	12
Sodium	35
Potassium	2

**EG005F: Dissolved Metals by ICP-AES**

Iron

**EG005T: Total Metals by ICP-AES**

Iron

**EG020F: Dissolved Metals by ICP-MS  
(mg/L)**

Aluminium	0.01
Arsenic	<0.001
Cadmium	<0.0001
Chromium	<0.001
Cobalt	<0.001
Copper	0.003
Lead	<0.001
Manganese	0.005
Molybdenum	<0.001
Nickel	0.004
Selenium	<0.01
Silver	<0.001
Uranium	<0.001
Vanadium	0.01
Zinc	<0.005
Boron	0.1
Iron	<0.05

**EG020T: Total Metals by ICP-MS (mg/L)**

Aluminium	0.42
Arsenic	0.001
Cadmium	<0.0001
Chromium	<0.001
Cobalt	<0.001
Copper	0.003
Lead	<0.001
Manganese	0.026
Molybdenum	<0.001
Nickel	0.005
Selenium	<0.01
Silver	<0.001

Spring Creek Dam

Uranium	<0.001
Vanadium	0.02
Zinc	<0.005
Boron	0.15
Iron	0.4
<b>EK040P: Fluoride by PC Titrator (mg/L)</b>	
Fluoride	0.2
<b>EN055: Ionic Balance (meq/L)</b>	
Total Anions	3.37
Total Cations	3.48
Ionic Balance (%)	1.57
<b>ED093T: Total Major Cations (mg/L)</b>	
Calcium	
Magnesium	
Sodium	
Potassium	
<b>EK055G: Ammonia as N by Discrete Analyser (mg/L)</b>	
Ammonia as N	0.14
<b>EK057G: Nitrite as N by Discrete Analyser (mg/L)</b>	
Nitrite as N	<0.01
<b>EK058G: Nitrate as N by Discrete Analyser (mg/L)</b>	
Nitrate as N	0.02
<b>EK059G: NOX as N by Discrete Analyse (mg/L)r</b>	
Nitrite + Nitrate as N	0.02
<b>EP080/071: Total Petroleum Hydrocarbons (µg/L)</b>	
C6 - C9 Fraction	<20
C10 - C14 Fraction	<50
C15 - C28 Fraction	<100
C29 - C36 Fraction	<50
C10 - C36 Fraction (sum)	<50
<b>EP080S: TPH(V)/BTEX Surrogates (%)</b>	
1,2-Dichloroethane-D4	133

Spring Creek Dam

Toluene-D8

110

4-Bromofluorobenzene

102

**EG035T: Total Recoverable Mercury by  
FIMS (mg/L)**

Mercury

<0.0001

**EG035F: Dissolved Mercury by FIMS (mg/L)**

Mercury

<0.0001

**Appendix F**

*Water release contaminant trigger  
investigation levels in EA*

Quality Characteristic	Trigger Levels (µg/L)
Aluminium	650
Arsenic	13
Cadmium	0.2
Chromium	3
Copper	13
Iron	520
Lead	10
Mercury	0.2
Nickel	11
Boron	370
Cobalt	90
Molybdenum	34
Selenium	10
Silver	1
Uranium	1
Vanadium	10
Ammonia	900
Nitrate	1100
Petroleum hydrocarbons (C6-C9)	20
Petroleum hydrocarbons (C10-C36)	100
Zinc	8

**Appendix G**

*Water contaminant release limits in EA*

Quality Characteristic	Interim Release Limits until 30-NOV-2011
Electrical conductivity (uS/cm)	1500
pH (pH Unit)	6.5 (minimum) 9.0 (maximum)
Turbidity (NTU)	NA*
Suspended Solids (mg/L)	1200
Sulphate (SO <sub>4</sub> <sup>2-</sup> ) (mg/L)	1000

**Appendix H**

*Completion Report – Proposed Contents*

**Completion Report**

**Transitional Environmental Program Spring Creek Dam Water Release**

1. Covering Letter
2. Summary Table of Program Statistics
  - a. Volume of water discharged from Spring Creek Dam
  - b. Days of pumping, Pumping rate averages
  - c. Other relevant Data
3. Summary Tables of Sample results
  - a. Spring Creek Dam water quality
  - b. Other results and Observations
4. Conclusions
  - a. Overall water quality status in discharged water.
  - b. Compliance with Transitional Environmental Program
5. APPENDICES

Request for Statutory Approval

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

**CLIENT:** Xstrata Coal Queensland Pty Ltd (t/a Rolleston Coal Pty Ltd)  
**REGISTERED OFFICE ADDRESS:** Level 10 Riverside Centre  
123 Eagle Street  
Brisbane QLD 4000  
**TENEMENT:** ML70307, MDL227  
**ENV AUTHORITY NO.:** MIM800090802  
**FILE NO.:** EMD866  
**PROGRAM NOTICE/REQUIRED:** N/A Voluntary Submission  
**REASON FOR TEP:** Water Management  
**DATE SUBMITTED:** 30 September 2010  
**DECISION DUE DATE:** 28 October 2010  
(if approval required)  
**TIME SPENT:** 32 hours

**1.0 SUMMARY**

The draft Transitional Environmental Program (TEP) MAN10919 was originally, voluntarily submitted on 30 September 2010, with an updated version received electronically on 18 October 2010. It addresses earlier site inundation and water management issues at Rolleston Coal Mine (Rolleston), and is related to the earlier TEP (stage one of their dewatering plan) MAN10239 approved in June 2010. A statutory declaration was received with the submission and it is considered a proper submission.

TEP (MAN10239) allowed Rolleston to dewater Spring Creek pit by pumping the water into Spring Creek dam. Since June 2010, mine affected water in the Spring Creek pit has been pumped into Spring Creek Dam, under this TEP.

Draft TEP (MAN10919) is stage two of Rolleston Mine's Dewatering Plan following the, "catastrophic overland flow that inundated Spring Creek pit and Spring Creek Dam in the 2009-2010 wet season. The dam and mine pit inundation that occurred during Jan - March 2010 was caused by the highest rainfall in the area since 1954. Failures in another dam and the water management systems on site caused a large volume of water to accumulate on site in pits and water storages" (Rolleston draft TEP Sept 2010).

Rolleston has stated that they, "need to release this water in order to maintain sufficient storage capacity in the water impoundments prior to the commencement of the wet season, in order to avoid later uncontrolled discharges. The unseasonal, protracted and record-breaking rainfall in recent months has also significantly impacted on Rolleston Coal's water storage balance on site" (Rolleston draft TEP Sept 2010).

Rolleston has identified that the release of significant quantities of water from Spring Creek dam is not possible under the conditions of Environmental Authority (EA) MIM800090802. Chiefly due to the natural flows in Bootes Creek being too brief, and the volume too small, to be able to discharge the volume of water required to significantly lower the water level in Spring Creek dam before the wet season begins.

Draft TEP (MAN10919) proposes the release of 4 GL of Spring Creek Dam water, which is now a mixture of mine affected and natural water, into Bootes Creek at a maximum rate of 100 ML per day (which equates to a minimum of 40 days of discharge), irrespective of the natural flow rate of Bootes Creek. This action is outside one of Rolleston's existing EA and TEP conditions, where the flow rate required in Bootes Creek for an authorised discharge be at least 0.75 m<sup>3</sup>/s. Over the last five years Bootes creek has had a maximum flow rate averaging 278 m<sup>3</sup>/s during natural flow events (Ken Dixon, email, 15/10/2010). The discharge rate proposed in this draft TEP equates to a flow or discharge rate of approximately 1.16 m<sup>3</sup>/sec, which is insignificant in relation to the flow rate during natural flow events. Rolleston stated in the draft TEP that they

will consult with the Ranger in Charge of the Albinia National Park as well as the adjacent landholder in relation to likely impacts on the usability of Springwood road.

Spring Creek Dam has a capacity of 5 GL (Ken Dixon, pers. comm., 20/10/2010). As of 13 September 2010, 0.8 GL of storage space (16%) remains in Spring Creek Dam. A diversion bank has just recently been completed that now prevents significant overland flows entering Spring Creek Dam from Spring Creek. This diversion bank was outlined in the PoO, and was fast-tracked due to the recent significant rainfall and the fast approaching wet season.

Spring Creek dam was not originally authorised for use as a mine affected water (regulated) dam in EA MIM800090802, as it was a raw water dam usually collecting overland flow for potable, dust suppression and other uses. The previous TEP authorised its use for the dewatering of the Spring Creek pit.

On 30 September, technical advice was sought and Ian Ramsay (Chief Scientist – Freshwater and Marine Services). His response was received on the 12 October 2010, and is below:

"These are my conclusions based on the information provided:

- I can not comment in detail for the justification for the release or management alternative (this is ultimately up to you guys) but the argument put forward appears sound.
- In terms of the potential for environmental harm, the water quality results (note one sample only) for Spring Creek Dam indicate good quality and therefore a low risk of harm in terms of water quality impacts. The low sulphate, EC, SS values indicate pretty good water quality and limited mine influence. Having said that, there is a risk that the dam water quality will get worse with time or the sample result is not representative of the whole depth of the dam. If the mine could clarify this issue – would be good.
- It is proposed that the release occurs during times when there may not be flow in Bootes Creek. This potentially increases the risk if the limits for the TEP release are adopted straight from the EA (which are designed for event-based release plus 4 fold dilution). I recommend that more stringent limits closer to ambient WQO are imposed if the TEP is approved but still allows this "good" quality water to be released. For example, the pH could be 8.5 max, EC may be 340 to 510 uS/cm max (75<sup>th</sup> to 90<sup>th</sup> percentile guideline), suspended solids could be 10-20mg/L (or perhaps turbidity of 50 ntu could be used), sulphate limit could be much lower (this would be have to be a guess as no actual aquatic ecosystem guideline at present).
- I think there is a bit of an error with the units in Appendix E for metals and fluoride. It lists them as ug/ but they appear to be mg/L – probably worth clarifying with the clients. Nonetheless, the metals don't appear to be of major concern if this is the case. I wouldn't propose limits if the more stringent limits for the above are imposed.
- The release would occur for at least 40 days if a maximum of 100ML per day is used to discharge 4GL. The hydrographs don't indicate this to be that high and therefore is probably a relatively low risk. Keep in mind we are not experts in hydrology though."

Rolleston met and discussed the draft TEP with departmental representatives on-site on 8 October 2010. On-site observations of Spring Creek Dam have revealed that it is currently very full, with very little excess storage capacity remaining. An email of the department's comments on the draft TEP submission was sent to Rolleston on 12 October 2010, and was used in the development of the final TEP submission (submitted on 18 October 2010).

Draft TEP MAN10919 was resubmitted electronically by the applicant and received by the department on the 18 October 2010. On 20 October 2010, Bob Packet's (DERM, Rockhampton) advice was sought and he recommended that potential stratification of pH and EC within the dam water should be analysed. On 20 October 2010, Rolleston was asked to provide these data which were received on 25 October 2010. Mary-Anne Jones (Principal Environment Officer, DERM, Rockhampton) also provided technical advice regarding water quality data.

## Summary and assessment of available data and information

Table 1: Water quality data from local streams and Rolleston's Spring Creek dam (data from various sources).

SITE	pH	EC (µS/cm)	Suspended Solids (mg/L)	Turbidity (NTU)	Sulphate (mg/L)
Bootes Creek Upstream (average)	8.0	272	548	192	2
Meteor Creek Upstream (average)	7.8	190	1033	488	2
Spring Creek Dam water (May to September 2010) (50 <sup>th</sup> percentile)	8.39	326	44	33	2.2
Spring Creek Dam water (22 October 2010) (average - 18 samples)	8.66	336	--	--	--
Rolleston's TEP proposed upper parameter limits	9.0*	483	--	290	--
Draft Water Quality Guidelines Fitzroy Basin: Phase 1	6.5 - 8.5	388 (for Comet R.)	25 (for Comet R.)	--	5 (for Comet R.)
Rolleston Mine EA discharge limits	6.5 - 9.0	1500	1200	--	1000

A water parameter value of concern to some technical experts (Ian Ramsay and Bob Packet, DERM Officers) is Rolleston's TEP proposed upper pH limit of 9.0 (\* Table 1). The draft "Developing Water Quality Guidelines for the Protection of the Freshwater Aquatic Ecosystems in the Fitzroy Basin: Phase 1" (p. 19) indicates that water pH for low-flow conditions, ideally remain between 6.5 and 8.5 in lowland streams in the Fitzroy Basin for the protection of freshwater ecosystems.

Changes in pH can lead to indirect toxic effects on aquatic biota through changes to the toxicity of several contaminants. For example, increased pH increases the toxicity of ammonia (ANZECC 1992). The first downstream neighbour affected by the proposed discharge is Albinia National Park.

Other factors to consider are:

- Bootes Creek has been receiving regular natural flow events in recent months,
- The Bureau of Meteorology has predicted wetter than normal conditions in the near future,
- The wet season is about to start (1 November),
- Nearby streams can have a natural water pH of 8.8 (Mary-Anne Jones, pers. comm., 5/10/2010),
- Native fish in these streams may suffer very minor adverse effects from due to the pH level of this discharge (Mary-Anne Jones, pers. comm., 25/10/2010),
- Almost all water quality guidelines around the world (e.g. (ANZECC 1992, CCREM 1991, Alabaster & Lloyd 1982, USEPA 1986b) recommend that pH should be maintained in the range 6.5 to 9.0 to protect freshwater aquatic organisms,
- For this dam to become compliant with good site water management principles, its DSA needs to be increased as soon as possible, and
- Decreasing the water volume in Spring Creek dam will decrease the probability of an uncontrolled discharge occurring during the upcoming wet season.

Considering the aspects above, the following new conditions are proposed for draft TEP MAN10919:

1. Water discharged from Spring Creek Dam under MAN10919 must:
  - a) remain under a five-day rolling median pH of 8.75; and
  - b) immediately cease if the discharged water has a pH of 9.0 or above on any given day.
2. The discharge volume from Spring Creek dam under MAN10919 must be reduced gradually at the end of the discharge period in the following manner:
  - a) three days out from end of the discharge period, daily discharge volume must be reduced to 50 ML or less;
  - b) two days out from end of the discharge period, discharge volume must be reduced to 25 ML or less; and
  - c) on the last day of the planned discharge, discharge volume must be reduced to 10 ML or less.

3. If on the last day of the proposed TEP MAN10919 water discharge:
  - a) Bootes creek does not have a natural water flow occurring where water discharged from Spring Creek dam enters Bootes Creek; and
  - b) the water quality in Davey's Dam is of significantly better quality than water in Spring Creek Dam, as it was recorded in September and October 2010 in the "Rolleston Coal Mine: Spring Creek Dam and Spring Creek Pit Water Quality Results; May – September 2010" document; Rolleston Coal Mine will immediately release 25 ML of natural (mine-unaffected) water from Davey's Dam into Bootes creek, at a rate of 5 ML per day, over a period of five days.
4. Rolleston Coal Mine 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) natural flow rate in receiving water; and
  - c) any other matters that are pertinent to the water release event.
5. The authority holder must notify the administering authority as soon as practicable, (nominally within twenty-four (24) hours of cessation of a release) of the cessation of a release. Notification must include the submission of written verification to the administering authority of the following information:
  - a) release cessation date/time;
  - b) natural flow rate in receiving water; and
  - c) any other matters that are pertinent to the water release event.
6. Rolleston Coal Mine will notify the Ranger-in-Charge of the Albinia National Park, Central Highlands Regional Council and any other relevant/potentially effected users/landholders downstream of the discharge under TEP MAN10919, prior to the discharge taking place. The notification process must be documented and include:
  - written documentation of notification including dates, contact persons and any pertinent comments
  - details of discharge information provided to stakeholders
 A report detailing this notification process must be submitted to the Department of Environment and Resource Management prior to initial discharge commencing.

Other key points that Rolleston has committed to in draft TEP MAN10919 and TEP MAN10239 are:

- Review and update of key site documentation including Water Management Plans, Plan of Operations and Environmental Management Plans;
- Monitoring of Spring Creek Dam discharge water quality and quantity at release point 1;
- Daily notification to DERM of this discharge water quality (several main parameters only) and the volume released at release point 1;
- Monthly reporting to DERM of this discharge water quality (all parameters in EA) and volume released at release point 1;
- Lodgement of a completion report outlining the actions undertaken under this draft TEP; and
- The draft TEP will cease on 1 March 2011.

A fee of \$5625.90 has been included with the approval to grant a TEP which is based on the operational policy – TEP Fees and 30 hours of work after an initial 2 hours work. Specifically, this amount was calculated as \$351.90 for the first two hours + 30 hours at \$175.80 per hour. The guideline will be sent to the client with the approval documentation.

It is recommended that the administering authority approve draft TEP MAN10919 and issue the attached certificate of approval and TEP approval notice.

<b>Has the TEP been entered in EcoTrack:</b>	<b>Yes</b>
<b>EcoTrack Compliance Reference (If applicable): -</b>	<b>CA21505</b>
<b>EcoTrack TEP Reference Number: -</b>	<b>MAN10919</b>

***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.

This draft TEP will allow the Rolleston to:

- move closer towards becoming more compliant with good on-site water management principles, and
- reduce potential environmental harm in the near future by diminishing the probability of an uncontrolled discharge occurring from Spring Creek dam during the coming wet season.

**337 Administering authority to consider draft programs**

***(1) The administering authority must decide whether to approve a draft transitional environmental program submitted to it within 20 business days after the application date.***

The draft Transitional Environmental Program (TEP) MAN10919 was originally, voluntarily submitted on 30 September 2010, with an updated version received electronically on 18 October 2010. The decision date is 28 October 2010, within the 20 BD timeframe.

***(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.***

A public notice is not a requisite for this submission.

**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***

There are no applicable regulatory requirements that would prevent details of the TEP being actioned as a result of approving the TEP.

**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***

Considered.

***s52 Conditions to be considered for environmental management decisions***

Considered.

***s53 Matters to be considered for decisions imposing monitoring conditions***

Considered.

**Part 3 Additional regulatory requirements for particular environmental management decisions**

***s55 Release of water or waste to land***

N/A

***s56 Release of water, other than stormwater, to surface water***

Considered.

***s57 Release of stormwater***

N:\Mines\Tenure\Coal\Mining Lease\_ML's\Rolleston\Compliance\2010\100930 vol TEP Release water from Spring Creek Dam into Bootes Creek\Approval Docs for TEP release of water from Spring Creek Dam

Considered.

**s58 Release of water or waste to particular wetlands for treatment**  
N/A

**s59 Activity involving berthing, docking or mooring a boat**  
N/A

**s60 Activity involving storing or moving bulk material**  
N/A

**s61 Activity involving acid sulphate soil**  
N/A

**s62 Activity involving acid-producing rock**  
N/A

**s63 Activity involving direct release of waste to groundwater**  
N/A

**s64 Activity involving indirect release of contaminants to groundwater**  
N/A

**(b) subject to paragraph (a), must also consider the following—**  
**(i) the standard criteria;**

- *The principles of ecological sustainable development as set out in the 'National Strategy for Ecologically Sustainable Development'.*  
Intergenerational equity has been considered. The precautionary principle has been applied and the department has ensured the site commits to sufficient water quality monitoring (via the additional draft TEP conditions) and routine reporting throughout the draft TEP process. The principle of conservation of biological diversity and ecological integrity have been considered. The need to develop a strong, growing and diversified economy that can enhance the capacity for environmental protection has been recognized.
- *Any applicable environmental protection policy.*  
EPP Water considered.
- *Any applicable Commonwealth, State or local government plans, standards, agreements or requirements.*  
N/A
- *Any applicable environmental impact study, assessment or report.*  
Information supplied by DERM officers [REDACTED]
- *The character, resilience and values of the receiving environment.*  
Considered.
- *All submissions made by the applicant and submitters.*  
All relevant information considered.
- *The best practice environmental management for activities under any relevant instrument, or proposed instrument, as follows – a transitional environmental program.*  
Considered.

**s21 of the Environmental Protection Act 1994 - Best practice environmental management**

(1) *The best practice environmental management of an activity is the management of the activity to achieve an ongoing minimisation of the activity's environmental harm through cost-effective measures assessed against the measures currently used nationally and internationally for the activity.*

(2) *In deciding the best practice environmental management of an activity, regard must be had to the following measures—*

(a) *strategic planning by the person carrying out, or proposing to carry out, the activity;*

(b) *administrative systems put into effect by the person, including staff training and monitoring and review of the systems;*

(c) *public consultation carried out by the person;*

(d) *product and process design;*

(e) *waste prevention, treatment and disposal.*

(3) *Subsection (2) does not limit the measures to which regard may be had in deciding the best practice environmental management of an activity.*

- *The financial implications of the requirements under an instrument, or proposed instrument, mentioned in paragraph (g) (above) as they would relate to the type of activity or industry carried out, or proposed to be carried out, under the instrument.*

The new FA directive impacted Rolleston in the previous TEP MAN10239 (June 2010).

- *The public interest.*

Downstream land managers will be contacted by Rolleston prior to any discharge under this draft TEP.

- *Any applicable site management plan.*

Considered.

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

Considered.

- *Any other matter prescribed under a regulation.*

Considered

*(ii) additional information given in relation to the draft program;*

Maps and background information were 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.*

N/A

**331 Content of program**

*A transitional environmental program must—*

(a) *state the objectives to be achieved and maintained under the program for an activity; and*

Yes

(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*

Yes

(ii) *the risks of environmental harm being caused by the activity; and*

Yes. Risks are being managed through monitoring and reporting and the commitment from the mine to adopt 'no release' approach if water quality parameters exceed set limits.

*(c) state appropriate performance indicators at intervals of not more than 6 months; and*  
Yes

*(d) make provision for monitoring and reporting compliance with the program.*  
Yes – see earlier sections.

**343 Failure to approve draft program taken to be refusal**  
Decision to approve was made within the 20 BD timeframe.


### **3.0 RECOMMENDATION**

Considering the information provided from technical experts within DERM, draft TEP MAN10919 poses a low risk of causing environmental harm. It is recommended that this draft TEP be approved with conditions, and the attached notice and certificate sent to the client advising of the decision.

  
Senior Environment Officer (Environmental Services – Mining)

Signed –

Date -

Reviewed & Endorsed By	
Reviewer	Delegate
	
A/Principal Environmental Officer	A/Manager
Signed –	Signed –
Date	Date:

# Notice

## Environmental Protection Act

### Transitional environmental program certificate of approval number MAN10919

*This certificate of approval is issued by the administering authority pursuant to section 339 of the Environmental Protection Act 1994. An transitional environmental program is a specific program that, when approved, achieves compliance with the Environmental Protection Act 1994 for the matters dealt with by the program by reducing environmental harm, or detailing the transition to an environmental standard.*

Under the provisions of the *Environmental Protection Act 1994*, this certificate of approval is hereby granted to:

Xstrata Coal Queensland Pty Ltd  
Level 10 Riverside Centre  
123 Eagle Street  
Brisbane Qld 4000

ICRA Rolleston Pty Ltd  
Level 15 Commonwealth Bank Building of Australia  
240 Queen St  
Brisbane Qld 4000

Sumisho Coal Australia Pty Ltd  
Level 34 Central Plaza One  
Brisbane Qld 4000

approving the draft transitional environmental program; titled Rolleston Coal Mine – Spring Creek Dam Water Release into Bootes Creek, with conditions.

The draft transitional environmental program, dated September 2010, was received by this office on 30 September 2010. Transitional environment program (TEP) MAN 10919 is approved, subject to the following conditions:

1. Water discharged from Spring Creek Dam under MAN10919 must:
  - a) remain under a five-day rolling median pH of 8.75; and
  - b) immediately cease if the discharged water has a pH of 9.0 or above on any given day.
2. The discharge volume from Spring Creek dam under MAN10919 must be reduced gradually at the end of the discharge period in the following manner:
  - a) three days out from end of the discharge period, daily discharge volume must be reduced to 50 ML or less;
  - b) two days out from end of the discharge period, discharge volume must be reduced to 25 ML or less; and
  - c) on the last day of the planned discharge, discharge volume must be reduced to 10 ML or less.
3. Rolleston Coal Mine will immediately release 25 ML of natural (mine-unaaffected) water from Davey's Dam into Bootes creek, at a rate of 5 ML per day, over a period of five days, if on the last day of the proposed TEP MAN10919 water discharge:
  - a) Bootes creek does not have a natural water flow occurring where water discharged from Spring Creek dam enters Bootes Creek; and
  - b) the water quality in Davey's Dam is of significantly better quality than water in Spring Creek Dam, as it was recorded in September and October 2010 in the "Rolleston Coal Mine: Spring Creek Dam and Spring Creek Pit Water Quality Results; May – September 2010" document.

**Transitional environmental program certificate of approval**

4. Rolleston Coal Mine 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) natural flow rate in receiving water; and
  - c) any other matters that are pertinent to the water release event.
5. The authority holder must notify the administering authority as soon as practicable, (nominally within twenty-four (24) hours of cessation of a release) of the cessation of a release. Notification must include the submission of written verification to the administering authority of the following information:
  - a) release cessation date/time;
  - b) natural flow rate in receiving water; and
  - c) any other matters that are pertinent to the water release event.
6. Rolleston Coal Mine will notify the Ranger-in-Charge of the Albinia National Park, Central Highlands Regional Council and any other relevant/potentially effected users/landholders downstream of the discharge into Bootes Creek, under TEP MAN10919, prior to the discharge taking place. The notification process must be documented and include:
  - written documentation of notification including dates, contacted persons and any pertinent comments; and
  - details of discharge information provided to the stakeholders.

A report detailing this notification process must be submitted to the Department of Environment and Resource Management prior to initial discharge commencing.

The transitional environmental program remains in force until **1 March 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 on telephone [redacted] would be happy to assist you.

--	--	--

SIGNATURE

28 October 2010
-----------------

DATE

[redacted]  
 Delegate  
 Manager Environmental Services - Mining  
 Central West Region

**Enquiries:**  
 Department of Environment and Resource  
 Management  
 PO Box 19  
 Emerald Qld 4720  
 99 Hospital Road  
 Emerald Qld 4720  
 Phone: 4980 6200  
 Fax: 4982 2568

# Notice

## Environmental Protection Act

### Decision to grant an approval for a draft transitional environmental program

*This statutory notice is issued by the administering authority pursuant to section 339 of the Environmental Protection Act 1994, to advise you of a decision or action.*

Your reference : MAN10919  
Our reference : EMD866

Mr Glenn Burlinson  
Senior Site Manager and SSE  
Rolleston Coal Mine  
PO Box 11  
Springsure Qld 4722

Cc: [REDACTED]  
Environment and Community Manager  
Xstrata Coal QLD  
PO Box 11  
Springsure Qld 4722

[REDACTED]  
Environment and Community Manager  
Xstrata Coal QLD  
PO Box 2245  
North Mackay Qld 4740

Attention: [REDACTED] (Environment and Community Manager),

**Re: Application for an approval for a transitional environmental program for Spring Creek Dam Water Release into Bootes Creek at Rolleston Coal Mine .**

Thank you for your application for an approval for a transitional environmental program. This application has been issued the certificate of approval number MAN10919.

Your application, which was received by this office on 30 September 2010, has been approved with conditions.

A copy of the certificate of approval, which includes the schedule of conditions, is attached.

The reasons for the decision are:

This Transitional Environmental Program adequately addresses strategies to minimise and reduce the risk of environmental harm and achieve a safe water balance at Rolleston Coal Mine. By reducing the water volume in Rolleston Coal Mine's Spring Creek dam, the probability of an uncontrolled discharge occurring during the upcoming wet season is decreased.

## Decision notice regarding a transitional environmental program

Fees apply for the assessment of a draft transitional environmental program and any subsequent annual returns. The fees are outlined in the attached operational policy *Transitional Environmental Program (TEP) fees*. A fee of \$5 625.90 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 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] Principal Environmental Officer, of the Department of Environment and Resource Management on telephone [REDACTED] would be happy to assist you.

[REDACTED]

SIGNATURE

28 October 2010

DATE

[REDACTED]  
Manager Environmental Services - Mining  
Central West Region  
Delegate

*Environmental Protection Act 1994*

**Enquiries:**

Department of Environment and Resource  
Management  
PO Box 19  
Emerald Qld 4720  
99 Hospital Road  
Emerald Qld 4720  
Phone: 4980 6200  
Fax: 4982 2568



ROLLESTON  
COAL

## Rolleston Coal Mine

### **AMENDMENT APPLICATION FOR APPROVED TRANSITIONAL ENVIRONMENTAL PROGRAM (TEP):**

### **SPRING CREEK DAM WATER RELEASE INTO BOOTES CREEK**

**TEP REFERENCE: MAN10919**

November 2010



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## **Table of Contents**

1. Introduction .....	4
2. Current condition of approval.....	4
4. Proposed change to approval condition.....	5
5. Environmental Authority .....	6
6. Submission .....	6
7. Authorisation .....	6
8. Appendix A: pH recordings for Bootes Creek downstream monitoring points MP3 and MP5 .....	7

## **1. Introduction**

This amendment application relates to approved **Transitional Environmental Program (TEP)** MAN10919, which authorises the discharge of up to 4GL of mine affected water from Spring Creek Dam into Bootes Creek at a discharge rate of up to 100ML per day, provided water quality complies with the criteria stipulated by the TEP and the approval conditions stated by DERM on 28 October 2010.

TEP MAN10919 is required to ensure that Rolleston Coal's water storage at Spring Creek Dam has sufficient capacity at the commencement of the "wet season" so as to reduce the potential for uncontrolled discharges as a result of heavy rain, thereby reducing the potential risk of causing environmental harm.

## **2. Current condition of approval**

TEP MAN10919 was approved by DERM on 28 October 2010, subject to six conditions.

Condition 1 imposed by DERM states:

Water discharged from Spring Creek Dam under MAN10919 must:

- a) remain under a five-day rolling median pH of 8.75; and
- b) immediately cease if the discharged water has a pH of 9.0 or above on any given day.

This condition has been interpreted by Rolleston Coal as being measured at the spillway to the dam.

Condition 1 is the subject of this amendment application.

## **3. Discharge Monitoring Data**

### Monitoring at the Spillway

Rolleston Coal commenced discharging in accordance with TEP MAN10919 on 30 October 2010.

Given Rolleston Coal's understanding of the water quality within Spring Creek Dam, Rolleston Coal has concerns that it will not be able to continually comply with the five-day rolling median of pH 8.75 at the spillway.

Rolleston Coal ceased discharging on 11 November 2010 in order to approach DERM to discuss this amendment application.

It should be noted that monitoring has showed that discharged water has not exceeded a pH of 9.0 when measured on any given day at the spillway.

#### Monitoring Downstream

Additional monitoring to that required by TEP MAN10919 was conducted by Rolleston Coal at locations downstream of the Spring Creek Dam spillway. This monitoring was conducted to further assess the water quality released from Spring Creek Dam. These locations are known as:

- MP3 – located near RP1 (to where Spring Creek Dam is discharged to Bootes Creek) and approximately 150m from the mining lease boundary;
- MP5 which is located in the Albinia National Park and approximately 5km from the lease boundary; and

This monitoring showed that the discharged water does comply with the water quality standards stated in Rolleston Coal's EA at each location.

A summary of the monitoring data is shown in Appendix A.

#### **4. Proposed change to approval condition**

Rolleston Coal requests that Condition 1 imposed by DERM is amended to read:

Water discharged from Spring Creek Dam under MAN10919 must:

- a) remain under a five-day rolling mean pH of 8.5 (as measured at MP3); and
- b) immediately cease if the discharged water has a pH of 9.0 or above on any given day (as measured at the Spring Creek Dam spillway).

No changes are requested to the TEP MAN10919.

All other imposed conditions are intended to remain in place, including scaling back the discharge volumes towards the end of the discharge period as well as releasing mine-unaaffected water from Davey's Dam immediately following the cessation of discharge from Spring Creek Dam.

In considering this request to amend TEP MAN10919, Rolleston Coal notes:

- further discharge from Spring Creek Dam is required in order to reduce the potential for uncontrolled discharge from site during the upcoming wet season;
- continued discharge in accordance with TEP MAN10919 is considered unlikely to be possible unless this amendment application is granted;
- on site and off site monitoring of waters discharged to date in accordance with TEP MAN10919, show that the water quality parameters are consistent with Rolleston Coal's EA discharge limits and are not considered to result in a significant increase of environmental harm; and
- the proposed amendment will not require an extension to the approved TEP end date of 1 March 2010.

## 5. Environmental Authority

Xstrata Coal Queensland Pty Ltd, ICRA Rolleston Pty Ltd and Sumisho Coal Australia Pty Limited (*Rolleston Coal*) hold Environmental Authority MIM800090802 to carry out mining activities on ML70307 and MDL227, issued on 30 November 2009.

## 6. Submission

This request is to amend approval Condition 1 of Transitional Environmental Program (TEP) MAN10919. This amendment request is voluntarily submitted on behalf of Xstrata Coal Queensland Pty Ltd, ICRA Rolleston Pty Ltd and Sumisho Coal Australia Pty Limited by Glenn Burlinson, Senior Site Executive, Rolleston Coal, Xstrata Coal Queensland.



Signed/

18/11/2010

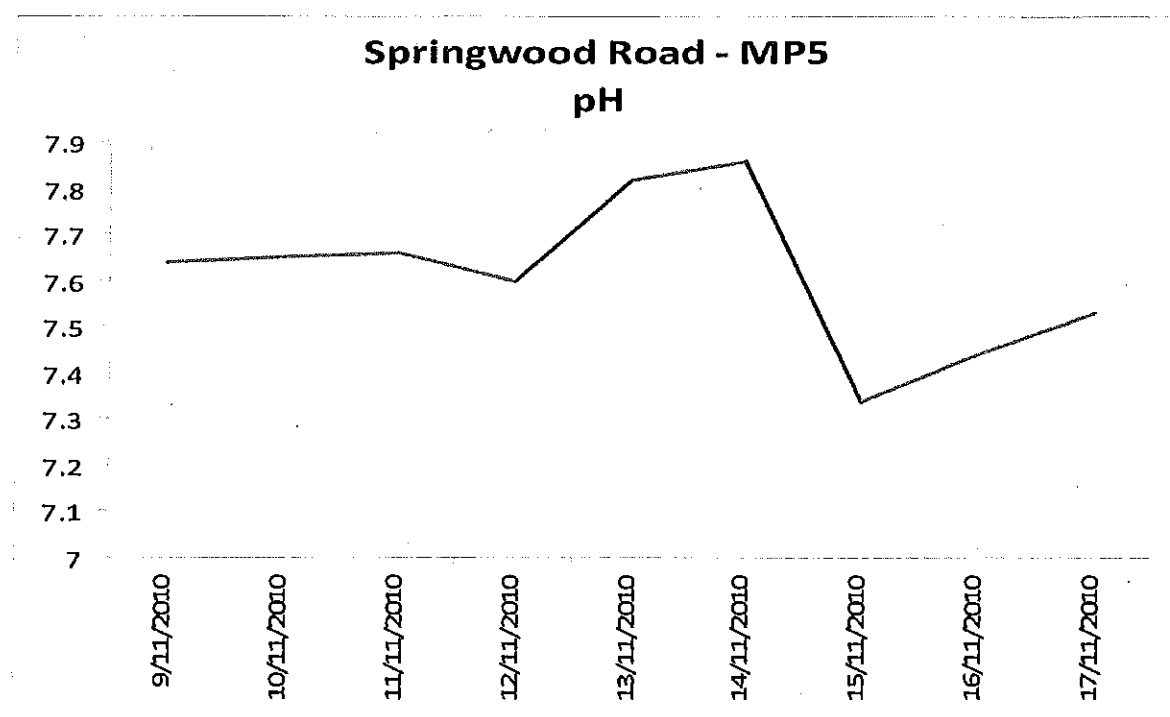
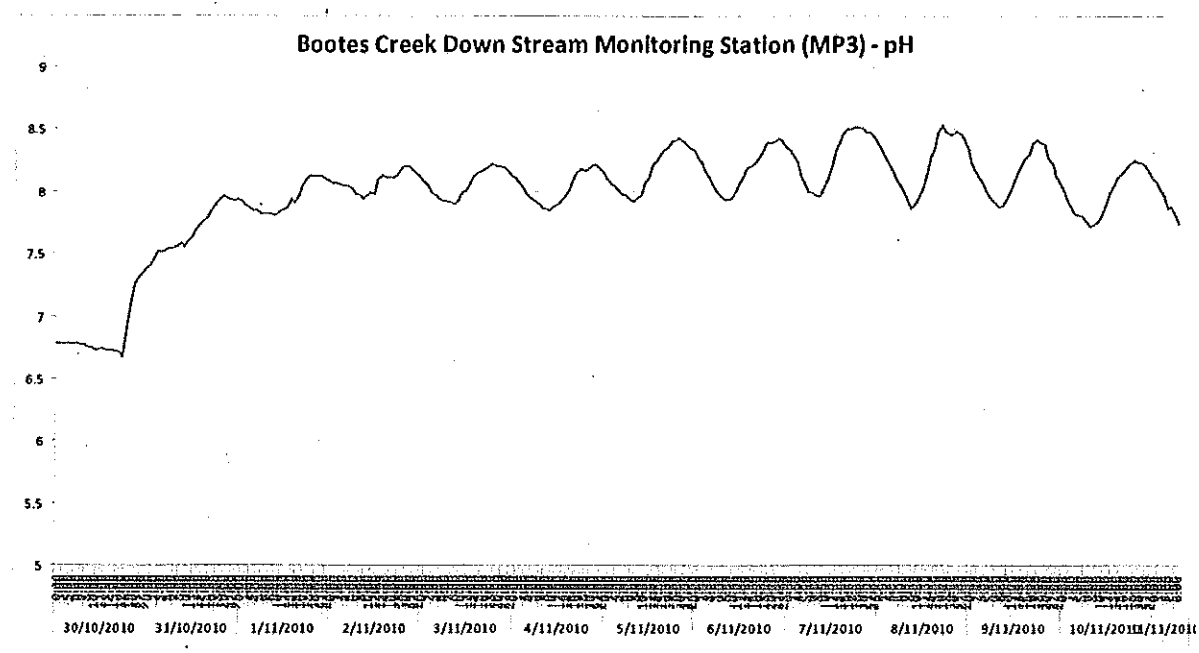
Date

## 7. Authorisation

When approved, this TEP amendment will amend imposed Condition 1 and authorise the continued controlled release of up to 4.0GL of mine affected water from Spring Creek Dam into Bootes Creek at a discharge rate of up to 100ML per day, provided water quality complies with the criteria stipulated in approved TEP MAN10919 and in any approval conditions. Spring Creek Dam water storage can discharge water to Release Point 1 (RP1) as identified in EA MIM800090802.

Monitoring of discharge water will be undertaken in accordance with the conditions and requirements of the TEP and any approval conditions. Ongoing water management will be in accordance with Rolleston Coal's Water Management Plan which is currently being finalised for submission to DERM by 1 December 2010.

8. Appendix A: pH recordings for Bootes Creek downstream monitoring points MP3 and MP5



Request for Statutory Approval

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

CLIENT: Xstrata Coal Queensland Pty Ltd (t/a Rolleston Coal Pty Ltd)  
REGISTERED OFFICE ADDRESS: Level 10 Riverside Centre  
123 Eagle Street  
Brisbane QLD 4000  
TENEMENT: ML70307, MDL227  
ENV AUTHORITY NO.: MIM800090802  
FILE NO.: EMD866  
PROGRAM NOTICE/REQUIRED: N/A Voluntary Submission  
REASON FOR TEP: Water Management  
DATE SUBMITTED: 18 November 2010  
DECISION DUE DATE: 16 December 2010  
(if approval required)  
TIME SPENT: 10 hours

1.0 SUMMARY

Xstrata Coal Queensland P/L submitted an amendment to existing Transitional Environmental Program (TEP) MAN10919 on 18 November 2010 on behalf of Rolleston Coal Mine.

TEP MAN10919 was originally submitted on 30 September 2010. It addressed earlier site inundation and water management issues at Rolleston Coal Mine (Rolleston) and is related to an earlier TEP MAN10239 approved in June 2010.

TEP MAN10919 authorised Rolleston to release up to 4GL of water stored on-site in the Spring Creek Dam subject to water quality and flow requirements. The TEP was submitted after Rolleston was inundated by a breached raw water dam that inundated the mine pit.

The amendment to TEP MAN10919 has generated a new approval number - now MAN11099.

Technical advice has been sought from Ian Ramsay (Chief Scientist - Freshwater and Marine Services) in consideration of this proposed amendment and previous TEP applications. Assessment of this amendment included previous applications and the potential for environmental harm as a result of the proposed changes.

This amendment proposes to change the certificate of approval conditions of TEP MAN10909. The following conditions are proposed to be amended or included for certificate of approval for TEP MAN11099:

From:

- MAN10909 [REDACTED]
1. Water discharged from Spring Creek Dam under MAN11099 must:
    - a) remain under a five-day rolling median pH of 8.75; and
    - b) immediately cease if the discharged water has a pH of 9.0 or above on any given day.

To:

- MAN11099 [REDACTED]
1. Water discharged from Spring Creek Dam under MAN11099 must:
    - a) cease if the pH measured at MP3 exceeds 8.5 for a duration period 12 hrs or on any given day; and
    - b) immediately cease if the discharged water has a pH of 9.0 or above on any given day (measured at Spring Creek Dam Spillway);

And include:

2. Discharge from Spring Creek Dam may recommence after 24 hours in accordance with approval condition 1.

The following conditions are proposed to remain unchanged (excepting the approval number) for certificate of approval for TEP MAN11099:

3. The discharge volume from Spring Creek dam under MAN11099 must be reduced gradually at the end of the discharge period in the following manner:
  - a) three days out from end of the discharge period, daily discharge volume must be reduced to 50 ML or less;
  - b) two days out from end of the discharge period, discharge volume must be reduced to 25 ML or less; and
  - c) on the last day of the planned discharge, discharge volume must be reduced to 10 ML or less.
4. If on the last day of the proposed TEP MAN11099 water discharge:
  - a) Bootes creek does not have a natural water flow occurring where water discharged from Spring Creek dam enters Bootes Creek; and
  - b) the water quality in Davey's Dam is of significantly better quality than water in Spring Creek Dam, as it was recorded in September and October 2010 in the "Rolleston Coal Mine: Spring Creek Dam and Spring Creek Pit Water Quality Results; May – September 2010" document;Rolleston Coal Mine will immediately release 25 ML of natural (mine-unaffected) water from Davey's Dam into Bootes creek, at a rate of 5 ML per day, over a period of five days.
5. Rolleston Coal Mine 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) natural flow rate in receiving water; and
  - c) any other matters that are pertinent to the water release event.
6. The authority holder must notify the administering authority as soon as practicable, (nominally within twenty-four (24) hours of cessation of a release) of the cessation of a release. Notification must include the submission of written verification to the administering authority of the following information:
  - a) release cessation date/time;
  - b) natural flow rate in receiving water; and
  - c) any other matters that are pertinent to the water release event.
7. Rolleston Coal Mine will notify the Ranger-In-Charge of the Albinia National Park, Central Highlands Regional Council and any other relevant/potentially effected users/landholders downstream of the discharge under TEP MAN10919, prior to the discharge taking place. The notification process must be documented and include:
  - written documentation of notification including dates, contact persons and any pertinent comments
  - details of discharge information provided to stakeholdersA report detailing this notification process must be submitted to the Department of Environment and Resource Management prior to initial discharge commencing.

The department's Operational Policy *Transitional Environmental Program (TEP) fees* state the fee for assessing an application to amend a TEP is \$180.40 (includes GST).

It is recommended that the administering authority approve the amendment to the Certificate of approval for TEP MAN10919 and issue the attached certificate of approval and TEP approval notice.

Has the TEP been entered in EcoTrack:	Yes
EcoTrack Compliance Reference (if applicable): -	CA21505
EcoTrack TEP Reference Number: -	MAN11099

*If Approving the TEP*

Has a notice approving the TEP been completed:	Yes
Has a certificate of approval been developed:	Yes
Were additional conditions set on the certificate of approval:	Yes

**2.0 STATUTORY REQUIREMENTS**

**330 What is a transitional environmental program**

A transitional environmental program is a specific program that, when approved, achieves compliance with this Act for the matters dealt with by the program by –

- (a) reducing environmental harm; or
- (b) detailing the transition to an environmental standard.

The amendment to TEP approval conditions will allow Rolleston to:

- reduce potential environmental harm by diminishing the probability of an uncontrolled discharge occurring from Spring Creek Dam during the coming wet season.

**337 Administering authority to consider draft programs**

*(1) The administering authority must decide whether to approve a draft transitional environmental program submitted to it within 20 business days after the application date.*

The amendment to TEP MAN10919 was submitted on 18 November 2010. The decision date for TEP MAN11099 is 16 December 2010.

*(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.*

A public notice is not a requisite for this submission.

**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*

Assessment of the TEP was conducted in accordance with the EP Act 1994 and its subordinate legislation.

**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**  
Considered.

**s52 Conditions to be considered for environmental management decisions**  
Considered.

**s53 Matters to be considered for decisions imposing monitoring conditions**  
Considered.

**Part 3 Additional regulatory requirements for particular environmental management decisions**

**s55 Release of water or waste to land**  
Considered

**s56 Release of water, other than stormwater, to surface water**  
Considered.

**s57 Release of stormwater**  
Considered.

N:\Mines\Tenure\Coal\Mining Lease\_MLs\Rolleston\Compliance\2010\2010 Oct voluntary TEP MAN10919 Release water from Spring Creek Dam into Bootes Creek\Amendment to TEP MAN10919\01126\_RSA Rolleston TEP.doc

**s58 Release of water or waste to particular wetlands for treatment**  
N/A

**s59 Activity involving berthing, docking or mooring a boat**  
N/A

**s60 Activity Involving storing or moving bulk material**  
N/A

**s61 Activity Involving acid sulphate soil**  
N/A

**s62 Activity Involving acid-producing rock**  
N/A

**s63 Activity involving direct release of waste to groundwater**  
N/A

**s64 Activity Involving Indirect release of contaminants to groundwater**  
N/A

**(b) subject to paragraph (a), must also consider the following—  
(i) the standard criteria;**

- **The principles of ecological sustainable development as set out in the 'National Strategy for Ecologically Sustainable Development'.**  
Intergenerational equity has been considered. The precautionary principle has been applied. The department has ensured the site commits to water quality monitoring (via the additional draft TEP approval conditions) and routine reporting throughout the TEP.
- **Any applicable environmental protection policy.**  
EPP Water considered.
- **Any applicable Commonwealth, State or local government plans, standards, agreements or requirements.**  
N/A
- **Any applicable environmental impact study, assessment or report.**  
Consultation was undertaken with [REDACTED] in considering department interest - Water.
- **The character, resilience and values of the receiving environment.**  
Considered.
- **All submissions made by the applicant and submitters.**  
No external submissions made. All information provided by applicant considered.
- **The best practice environmental management for activities under any relevant instrument, or proposed instrument, as follows – a transitional environmental program.**  
Previous TEP approvals have been considered.

**s21 of the Environmental Protection Act 1994 - Best practice environmental management**

(1) The best practice environmental management of an activity is the management of the activity to achieve an ongoing minimisation of the activity's environmental harm through cost-effective measures assessed against the measures currently used nationally and internationally for the activity.

(2) In deciding the best practice environmental management of an activity, regard must be had to the following measures—

- (a) strategic planning by the person carrying out, or proposing to carry out, the activity;
- (b) administrative systems put into effect by the person, including staff training and monitoring and review of the systems;
- (c) public consultation carried out by the person;
- (d) product and process design;
- (e) waste prevention, treatment and disposal.

(3) Subsection (2) does not limit the measures to which regard may be had in deciding the best practice environmental management of an activity.

The original TEP considers these matters. The amendment to the TEP approval conditions does not significantly alter BPBM.

- The financial implications of the requirements under an instrument, or proposed instrument, mentioned in paragraph (g) (above) as they would relate to the type of activity or industry carried out, or proposed to be carried out, under the instrument.

The approval of a TEP will impact Rolleston's ability to achieve FA discounts.

- The public interest.
- Downstream land managers will be contacted by Rolleston prior to any discharge under this draft TEP.

- Any applicable site management plan.
- Considered.

- Any relevant integrated environmental management system or proposed integrated environmental management system.
- Considered.

- Any other matter prescribed under a regulation.
- Considered

(ii) additional information given in relation to the draft program;

Information supplied to support the TEP amendment was 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.

N/A

**331 Content of program**

**A transitional environmental program must—**

(a) state the objectives to be achieved and maintained under the program for an activity; and

No changes to the TEP (proper) have been applied for or is to be approved. The amendment is pertaining to the certificate of approval.

(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

Yes

(II) the risks of environmental harm being caused by the activity; and

Risks are being managed through monitoring and reporting. The TEP approval conditions set water quality limits & requirements to cease discharge if these are reached.

(c) state appropriate performance indicators at intervals of not more than 6 months; and  
Yes

(d) make provision for monitoring and reporting compliance with the program.

Yes – see earlier sections.

343 Failure to approve draft program taken to be refusal

Decision to approve has been made within the 20 BD timeframe.

### 3.0 RECOMMENDATION

It is recommended that:

- the proposed amendment to the certificate of approval for TEP MAN11099 poses a low risk of causing environmental harm.
- the amendment application for TEP MAN11099 be approved and the attached notice and certificate of approval be sent to the client advising of the decision.

Glen Wright

Senior Environmental Officer

Signed --

Date -

29 Nov 2010

Reviewed & Endorsed By	
Reviewer	Delegate
Principal Environmental Officer	Chris Loveday
Signed --	Manager (Environmental Services - Mining)
Date	Signed --
29.11.2010	Date: 29/11/2010

## Environmental Services - Mining

### Transitional environmental program certificate of approval number MAN10919

*This certificate of approval is issued by the administering authority pursuant to section 339 of the Environmental Protection Act 1994. An transitional environmental program is a specific program that, when approved, achieves compliance with the Environmental Protection Act 1994 for the matters dealt with by the program by reducing environmental harm, or detailing the transition to an environmental standard.*

Under the provisions of the *Environmental Protection Act 1994*, this certificate of approval is hereby granted to:

Xstrata Coal Queensland Pty Ltd  
Level 10 Riverside Centre  
123 Eagle Street  
Brisbane Qld 4000

ICRA Rolleston Pty Ltd  
Level 15, Commonwealth Bank Building of Australia  
240 Queen St  
Brisbane Qld 4000

Sumisho Coal Australia Pty Ltd  
Level 34, Central Plaza One  
Brisbane Qld 4000

approving the amendment to transitional environmental program MAN10919; titled *Rolleston Coal Mine – Amendment Application for Approved Transitional Environmental Program (TEP): Spring Creek Dam Water Release Into Bootes Creek* (November 2010).

The application to amend transitional environmental program (TEP) MAN10919 was received by this office on 18 November 2010. The amendment to TEP MAN10919 is approved, subject to the following approval conditions. Please note the amendment has generated new TEP reference number (MAN11099) and is to be used in subsequent communications.

1. Water discharged from Spring Creek Dam under MAN11099 must:
  - a) cease if the pH measured at MP3 exceeds 8.5 for a duration period 12 hrs on any given day; and
  - b) immediately cease if the discharged water has a pH of 9.0 or above on any given day (measured at Spring Creek Dam Spillway);
2. Discharge from Spring Creek Dam may recommence after 24 hours in accordance with approval condition 1.
3. The discharge volume from Spring Creek dam under MAN11099 must be reduced gradually at the end of the discharge period in the following manner:
  - a) three days out from end of the discharge period, daily discharge volume must be reduced to 50 ML or less;
  - b) two days out from end of the discharge period, discharge volume must be reduced to 25 ML or less; and
  - c) on the last day of the planned discharge, discharge volume must be reduced to 10 ML or less.
4. If on the last day of the proposed TEP MAN11099 water discharge:

**Environmental management program certificate of approval**

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- a) Bootes creek does not have a natural water flow occurring where water discharged from Spring Creek dam enters Bootes Creek; and
- b) the water quality in Davey's Dam is of significantly better quality than water in Spring Creek Dam, as it was recorded in September and October 2010 in the "Rolleston Coal Mine: Spring Creek Dam and Spring Creek Pit Water Quality Results; May – September 2010" document;
- Rolleston Coal Mine will immediately release 25 ML of natural (mine-unaffected) water from Davey's Dam into Bootes creek, at a rate of 5 ML per day, over a period of five days.
5. Rolleston Coal Mine 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) natural flow rate in receiving water; and
- c) any other matters that are pertinent to the water release event.
6. The authority holder must notify the administering authority as soon as practicable, (nominally within twenty-four (24) hours of cessation of a release) of the cessation of a release. Notification must include the submission of written verification to the administering authority of the following information:
- a) release cessation date/time;
- b) natural flow rate in receiving water; and
- c) any other matters that are pertinent to the water release event.
7. Rolleston Coal Mine will notify the Ranger-in-Charge of the Albinia National Park, Central Highlands Regional Council and any other relevant/potentially effected users/landholders downstream of the discharge under TEP MAN10919, prior to the discharge taking place. The notification process must be documented and include:
- written documentation of notification including dates, contact persons and any pertinent comments
  - details of discharge information provided to stakeholders
- A report detailing this notification process must be submitted to the Department of Environment and Resource Management prior to initial discharge commencing.

This transitional environmental program remains in force until 1 March 2011.

In any case where conditions are imposed upon a certificate of approval, you may apply to the administering

**Transitional environmental program certificate of approval**

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 on telephone [REDACTED] would be happy to assist you.

[REDACTED]

SIGNATURE

29 November 2010

DATE

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


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

## Notice

### Environmental Services - Mining Decision to grant amendment of an approval of a 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.*

Mr Glenn Burlinson  
Senior Site Manager and SSE  
Rolleston Coal Mine  
PO Box 11  
Springsure Qld 4722

  
Xstrata Coal QLD  
PO Box 11  
Springsure Qld 4722

Your reference: Transitional Environmental Program (TEP) Rolleston Coal Mine MAN10919

Our reference : EMD866:MAN11099

Attention: Mr Glenn Burlinson,

**Re: Application for the amendment of an approval for a transitional environmental program for Rolleston Coal Mine – Amendment Application for Approved Transitional Environmental Program (TEP): Spring Creek Dam Water Release into Bootee Creek.**

Thank you for your application for an approval for a transitional environmental program. This application has been issued with the Certificate Approval number: MAN11099 (attached to this notice).

Your application, which was received by this office on 18 November 2010 has been approved with additional conditions as described in the Certificate of Approval MAN11099.

Fees apply for the assessment of a draft transitional environmental program (TEP), amendments to TEP's and any subsequent annual returns. The fees are outlined in the attached operational policy *Transitional Environmental Program (TEP) fees*.

A fee of \$180.40 is payable.

**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.

[REDACTED]

SIGNATURE

29 November 2010

DATE

Chris 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]



# Rolleston Coal Mine

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## **AMENDMENT APPLICATION FOR TRANSITIONAL ENVIRONMENTAL PROGRAM (TEP):**

### **WATER RELEASE INTO BOOTES CREEK VIA SPRING CREEK DAM**

**TEP REFERENCE: MAN11099**

January 2011



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## **Table of Contents**

1. Introduction .....	4
2. Current condition of approval .....	4
4. Proposed changes to TEP.....	5
5. Environmental Authority.....	6
6. Submission .....	6
7. Authorisation.....	6
8. Appendix A: In-situ water quality monitoring .....	7

## **1. Introduction**

This amendment application relates to **Transitional Environmental Program (TEP)** MAN11099 which authorises the discharge of up to 4GL of mine affected water from Spring Creek Dam into Bootes Creek at a discharge rate of up to 100ML per day, provided water quality complies with the criteria stipulated by the TEP and the approval conditions stated by DERM on 29 November 2010.

TEP MAN11099 is required to ensure that Rolleston Coal's water storage capacity is sufficient throughout the "wet season" so as to reduce the potential for uncontrolled discharges as a result of heavy rain, thereby reducing the risk of environmental harm.

## **2. Current condition of approval**

TEP MAN10919 approval is subject to a number of conditions outlined in both the TEP itself as well as the certificate of approval.

The primary subjects of this amendment application relate to the volumetric limit to the quantity of water that can be discharged as well as the completion date for the TEP.

## **3. Discharge Monitoring Data**

### Monitoring at the Spillway

Rolleston Coal commenced discharging in accordance with TEP MAN10919 on 30 October 2010 and from 30 November 2010 in accordance with TEP MAN11099.

Rolleston Coal has complied with the water quality monitoring conditions and is not proposing to alter the current requirements.

As required in the approval conditions, Rolleston Coal has had to cease discharging several times during November and December 2010 due to elevated pH levels.

As at January 16<sup>th</sup> 2010 Rolleston Coal has released approximately 3037ML at an average rate of 71ML per day of release.

### Monitoring Downstream

Downstream monitoring at MP3 has shown that water being discharged from ML 80090802 has not exceeded DERM's conditional approval whereby pH must not exceed 8.5 for a 12 hour duration on any given day.

Additional monitoring to that required by TEP MAN11099 has been conducted by Rolleston Coal downstream of the Mining Lease at MP5. This monitoring was conducted to further assess the downstream water quality impact of water released

from Spring Creek Dam. MP5 is located in the Albinia National Park approximately 5km from the lease boundary.

This monitoring has shown that the downstream water quality is well within the receiving water contaminant trigger levels outlined in Rolleston Coals Environmental Authority.

#### **4. Proposed changes to TEP**

Rolleston Coal requests that:

- the limit of 4000 ML of water that can be discharged be removed;
- the completion date (final date water can be released) of the TEP be changed to 30<sup>th</sup> June 2011 rather than 1<sup>st</sup> March 2011.

All other imposed conditions are intended to remain in place, including scaling back the discharge volumes towards the end of the discharge period and releasing mine-unaffected water from Davey Dam immediately following the cessation of discharge from Spring Creek Dam.

In considering this request to amend TEP MAN11099, Rolleston Coal notes:

- further discharge via Spring Creek Dam is required in order to reduce the potential for uncontrolled discharges from site during the remainder of the wet season;
- opportunity to discharge into Bootes Creek under conditions stipulated in EA 800090802 is considered insufficient to deal with both the current accumulated water on-site as well as the predicted future rainfall unless this amendment application is granted;
- over November and December 2010 Spring Creek Dam received approximately 1000ML of inflows due to rainfall;
- mine affected water from other storages identified in Rolleston Coal's water management plan may be pumped into Spring Creek Dam for blending with the existing water prior to being released via RP1. The most recent insitu water quality results as well as volumes of stored water from these additional storages has been included in Appendix A;
- downstream monitoring to date in accordance with TEP MAN11099, shows the water quality parameters of the receiving waters are within Rolleston Coal's EA contaminant trigger levels and are not considered to result in an increase in the potential for environmental harm.

## **5. Environmental Authority**

Xstrata Coal Queensland Pty Ltd, ICRA Rolleston Pty Ltd and Sumisho Coal Australia Pty Limited (***Rolleston Coal***) hold Environmental Authority MIM800090802 to carry out mining activities on ML70307 and MDL227, issued on 30 November 2009.

## **6. Submission**

This request is to amend TEP MAN11099 completion date as well as to remove the volumetric limit that can be released. This amendment request is voluntarily submitted on behalf of Xstrata Coal Queensland Pty Ltd, ICRA Rolleston Pty Ltd and Sumisho Coal Australia Pty Limited by Glenn Burlinson, Site Senior Executive, Rolleston Coal, Xstrata Coal Queensland.

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Signed

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Date

## **7. Authorisation**

When approved, this TEP amendment will remove the volumetric limit of discharge as well as extend the TEP completion date. It will authorise the continued controlled release of mine affected water via Spring Creek Dam into Bootes Creek at a discharge rate of up to 100ML per day, provided water quality complies with the criteria stipulated in approved TEP MAN11099 and in any approval conditions. Spring Creek Dam water storage can discharge water to Release Point 1 (RP1) as identified in EA MIM800090802.

Monitoring of discharge water will be undertaken in accordance with the conditions and requirements of the TEP and any approval conditions.

Ongoing water management will be in accordance with Rolleston Coals Water Management Plan which has been provided to DERM. Rolleston Coals Water Management Plan details water management in the Spring Creek Pit area including the:

- decommissioning of Spring Creek Dam;
- construction of evaporation dams with a total capacity of 770ML; and
- construction of a 300ML enclosed Pit Water Dam for Spring Creek Pit.

## 8. Appendix A: In-situ water quality monitoring

Water Storage	Date of last in-situ water quality sample	pH	Electrical Conductivity ( $\mu\text{s}/\text{cm}$ )	Turbidity (ntu)	Current volume reporting to storage (ML)
Environment Dam	11/1/11	8.5	726	167	90
Pit Water Dam	18/1/11	8.95	777	125	240
Sed Dam 6	11/1/11	8.78	448	42.4	420
Orica Rd PWD	11/1/11	8.23	338	101	580
Spring Creek10 Meg PWD	19/01/11	8.83	275	151	60
Bootes West PWD2	18/01/11	8.72	519	41.2	560
Spring Creek Dam	18/01/11	7.86	269	30.5	1650
MP5	11/1/11	7.84	310	46.4	n/a
<b>TOTAL</b>					<b>3600 ML</b>

Request for Statutory Approval

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

**CLIENT:** Xstrata Coal Queensland Pty Ltd (t/a Rolleston Coal Pty Ltd)  
**REGISTERED OFFICE ADDRESS:** Level 10 Riverside Centre  
123 Eagle Street  
Brisbane QLD 4000  
**TENEMENT:** ML70307, MDL227  
**ENV AUTHORITY NO.:** MIM800090802  
**FILE NO.:** EMD866  
**PROGRAM NOTICE/REQUIRED:** N/A Voluntary Submission  
**REASON FOR TEP:** Water Management  
**DATE SUBMITTED:** 19 January 2011  
**DECISION DUE DATE:** 16 February 2011  
(If approval required)  
**TIME SPENT:** 10 hours

**1.0 SUMMARY**

Xstrata Coal Queensland P/L submitted an amendment to existing Transitional Environmental Program (TEP) MAN11099 on 19 January 2010 on behalf of Rolleston Coal Mine.

The original TEP MAN10239 was approved in June 2010, and an amendment to this was submitted on 30 September 2010 TEP MAN11099.

The amendment to TEP MAN11099 has generated a new approval number - now MAN11779

Technical advice was sought from Ian Ramsay (Chief Scientist – Freshwater and Marine Services) in consideration of the previous amendment and previous TEP application. Assessment of this amendment included previous applications and the potential for environmental harm as a result of the proposed changes. This TEP amendment proposes to change the timeframes and to remove the proposed release limit of 4GL of water from Spring Creek Dam into Bootes Creek and to have no release limit.

All other information regarding contaminant release limits will remain the same.

1. Water discharged from Spring Creek Dam must:
  - a) cease if the pH measured at MP3 exceeds 8.5 for a duration period 12 hrs of on any given day; and
  - b) immediately cease if the discharged water has a pH of 9.0 or above on any given day (measured at Spring Creek Dam Spillway);
2. Discharge from Spring Creek Dam may recommence after 24 hours in accordance with approval condition 1.

The department asked Rolleston Coal to include conditions at the end of the document, to allow the administering authority to identify and audit conditions within the document. Conditions have been placed within the body of the TEP.

The department has also requested timeframes be changed:

- Notification of commencement of discharge from 2 business days to 12 hours as per the QRC Letter in November 2010.
- Notification of completion of discharge from 21 days to 24 hours.
- Lodgement of completion report from 40 business days after completion of discharge to 20 business days

Rolleston Coal accepted the changes in the timeframes, however, have not accepted the addition of the conditions at end of the document. The department has decided that all the conditions are to be included in the Certificate of Approval.

The department's Operational Policy *Transitional Environmental Program (TEP) fees* state the fee for assessing an application to amend a TEP is \$180.40 (includes GST).

It is recommended that the administering authority approve the amendment to the Certificate of approval for TEP MAN11099 and issue the attached certificate of approval and TEP approval notice.

Has the TEP been entered in EcoTrack:	Yes
EcoTrack Compliance Reference (if applicable): -	CA21505
EcoTrack TEP Reference Number: -	MAN11779

***If Approving the TEP***

Has a notice approving the TEP been completed:	Yes
Has a certificate of approval been developed:	Yes
Were additional conditions set on the certificate of approval:	Yes

**2.0 STATUTORY REQUIREMENTS**

**330 What is a transitional environmental program**

A transitional environmental program is a specific program that, when approved, achieves compliance with this Act for the matters dealt with by the program by –

- (a) reducing environmental harm; or
- (b) detailing the transition to an environmental standard.

The amendment to TEP approval conditions will allow Rolleston to:

- reduce potential environmental harm by diminishing the probability of an uncontrolled discharge occurring from Spring Creek Dam during the coming wet season.

**337 Administering authority to consider draft programs**

***(1) The administering authority must decide whether to approve a draft transitional environmental program submitted to it within 20 business days after the application date.***

The amendment to TEP MAN11099 was submitted on 19 January 2011. The decision date for TEP MAN11779 is 16 February 2011.

***(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.***

A public notice is not a requisite for this submission.

**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***

Assessment of the TEP was conducted in accordance with the EP Act 1994 and its subordinate legislation.

**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**  
Considered.

**s52 Conditions to be considered for environmental management decisions**  
Considered.

**s53 Matters to be considered for decisions imposing monitoring conditions**  
Considered.

**Part 3 Additional regulatory requirements for particular environmental management decisions**

**s55 Release of water or waste to land**  
Considered

**s56 Release of water, other than stormwater, to surface water**  
Considered.

**s57 Release of stormwater**  
Considered.

**s58 Release of water or waste to particular wetlands for treatment**  
N/A

**s59 Activity involving berthing, docking or mooring a boat**  
N/A

**s60 Activity involving storing or moving bulk material**  
N/A

**s61 Activity involving acid sulphate soil**  
N/A

**s62 Activity involving acid-producing rock**  
N/A

**s63 Activity involving direct release of waste to groundwater**  
N/A

**s64 Activity involving indirect release of contaminants to groundwater**  
N/A

**(b) subject to paragraph (a), must also consider the following—**  
**(i) the standard criteria;**

- *The principles of ecological sustainable development as set out in the 'National Strategy for Ecologically Sustainable Development'.*

Intergenerational equity has been considered. The precautionary principle has been applied. The department has ensured the site commits to water quality monitoring (via the additional draft TEP approval conditions) and routine reporting throughout the TEP.

- *Any applicable environmental protection policy.*  
EPP Water considered.
- *Any applicable Commonwealth, State or local government plans, standards, agreements or requirements.*  
N/A
- *Any applicable environmental impact study, assessment or report.*

Consultation was undertaken with Dr Ian Ramsay in considering department interest – Water in previous TEP amendments, as this TEP is only to change timeframes and the limit on the amount of water to be discharged, previous consultation with Dr Ian Ramsey has been considered.

- *The character, resilience and values of the receiving environment.*  
Considered.
- *All submissions made by the applicant and submitters.*  
No external submissions made. All information provided by applicant considered.
- *The best practice environmental management for activities under any relevant instrument, or proposed instrument, as follows – a transitional environmental program.*  
Previous 2 TEP approvals have been considered.

**s21 of the Environmental Protection Act 1994 - Best practice environmental management**

(1) *The best practice environmental management of an activity is the management of the activity to achieve an ongoing minimisation of the activity's environmental harm through cost-effective measures assessed against the measures currently used nationally and internationally for the activity.*

(2) *In deciding the best practice environmental management of an activity, regard must be had to the following measures—*

- (a) *strategic planning by the person carrying out, or proposing to carry out, the activity;*
- (b) *administrative systems put into effect by the person, including staff training and monitoring and review of the systems;*
- (c) *public consultation carried out by the person;*
- (d) *product and process design;*
- (e) *waste prevention, treatment and disposal.*

(3) *Subsection (2) does not limit the measures to which regard may be had in deciding the best practice environmental management of an activity.*

The original TEP considers these matters. The amendment to the TEP approval conditions does not significantly alter BPEM.

- *The financial implications of the requirements under an instrument, or proposed instrument, mentioned in paragraph (g) (above) as they would relate to the type of activity or industry carried out, or proposed to be carried out, under the instrument.*

The approval of a TEP will impact Rolleston's ability to achieve FA discounts.

- *The public interest.*  
Downstream land managers will be contacted by Rolleston prior to any discharge under this draft TEP.

- *Any applicable site management plan.*  
Considered.

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

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

(ii) *additional information given in relation to the draft program;*  
Information supplied to support the TEP amendment was 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.*

N/A

**331 Content of program**

***A transitional environmental program must—***

***(a) state the objectives to be achieved and maintained under the program for an activity; and***

No changes to the TEP (proper) have been applied for or is to be approved. The amendment is pertaining to the certificate of approval.

***(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***

Yes

***(ii) the risks of environmental harm being caused by the activity; and***

Risks are being managed through monitoring and reporting. The TEP approval conditions set water quality limits & requirements to cease discharge if these are reached.

***(c) state appropriate performance indicators at intervals of not more than 6 months; and***

Yes

***(d) make provision for monitoring and reporting compliance with the program.***

Yes – see earlier sections.

**343 Failure to approve draft program taken to be refusal**

Decision to approve has been made within the 20 BD timeframe.

**3.0 RECOMMENDATION**

It is recommended that:

- the proposed amendment to the certificate of approval for TEP MAN11779 poses a low risk of causing environmental harm.
- the amendment application for TEP MAN11779 be approved and the attached notice and certificate of approval be sent to the client advising of the decision.

Senior Environmental Officer

Signed –

Date – 31 January 2011

Reviewed & Endorsed By	
Reviewer	Delegate
Senior Environmental Officer	Chris Loveday
Signed –	Manager (Environmental Services - Mining)
Date	Signed –
	Date:

## Environmental Protection Act

### **Transitional environmental program certificate of approval number MAN11779**

*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 amended certificate of approval is hereby granted to:

Xstrata Coal Queensland Pty Ltd  
Level 10 Riverside Centre  
123 Eagle Street  
Brisbane Qld 4000

ICRA Rolleston Pty Ltd  
Level 15, Commonwealth Bank Building of Australia  
240 Queen St  
Brisbane Qld 4000

Sumisho Coal Australia Pty Ltd  
Level 34, Central Plaza One  
Brisbane Qld 4000

approving the draft transitional environmental program; titled Rolleston Coal Mine Transitional Environmental Program (TEP) Spring Creek Dam Water Release Into Bootes Creek Amended TEP MAN11779 for management of mine affected water at Rolleston Coal Mine.

The draft transitional environmental program, dated January 2010, was received by this office on 19 January 2011.

The draft transitional environmental program is approved subject to the following conditions:

In carrying out this Transitional Environmental Program, 'Rolleston Coal Pty Ltd' will undertake all activities in accordance with the following conditions.

1. The discharge volume from Spring Creek dam under this draft TEP MAN11779 must be reduced gradually at the end of the discharge period in the following manner:
  - a) three days out from end of the discharge period, daily discharge volume must be reduced to 50 ML or less;
  - b) two days out from end of the discharge period, discharge volume must be reduced to 25 ML or less; and
  - c) on the last day of the planned discharge, discharge volume must be reduced to 10 ML or less.
2. If on the last day of the proposed draft TEP MAN11779 water discharge:
  - a) Bootes creek does not have a natural water flow occurring where water discharged from Spring Creek dam enters Bootes Creek; and



## Transitional environmental program certificate of approval

- b) the water quality in Davey's Dam is of significantly better quality than water in Spring Creek Dam, as it was recorded in September and October 2010 in the "Rolleston Coal Mine: Spring Creek Dam and Spring Creek Pit Water Quality Results; May – September 2010" document;

Rolleston Coal Mine will immediately release 25 ML of natural (mine-unaffected) water from Davey's Dam into Bootes creek, at a rate of 5 ML per day, over a period of five days.

### Notification of Release Events

3. The Transitional Environmental Program holder must notify the administering authority within 12 hours of having commenced releasing mine-affected water to the receiving environment. Notification must include the submission of written verification to the administering authority (either by facsimile [REDACTED] of the following information:

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

4. The Transitional Environmental Program holder must notify the administering authority as soon as practicable, (nominally within twenty-four (24) hours of cessation of a release) of the cessation of a release. Notification must include the submission of written verification to the administering authority of the following information:

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

5. Rolleston Coal Mine will notify the Ranger-in-Charge of the Albinia National Park, Central Highlands Regional Council and any other relevant/potentially effected users/landholders downstream of the discharge under this draft TEP, prior to the discharge taking place. The notification process must be documented and include:

- written documentation of notification including dates, contact persons and any pertinent comments
- details of discharge information provided to stakeholders

## **Transitional environmental program certificate of approval**

A report detailing this notification process must be submitted to the Department of Environment and Resource Management prior to initial discharge commencing.

6. The Transitional Environmental Program holder must, within 28 days of a release that exceeds the conditions of this Transitional Environmental Program, must 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

### **Requirement to cease the release of mine affected water**

7. Water discharged from Spring Creek Dam under this draft TEP must:

- a. cease if the pH measured at MP3 exceeds 8.5 for a duration period 12 hrs on any given day; and
- b. immediately cease if the discharged water has a pH of 9.0 or above on any given day (measured at Spring Creek Dam Spillway);

8. Discharge from Spring Creek Dam may recommence after 24 hours in accordance with approval condition 9.

9. The release of mine affected waters must cease immediately if identified that 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

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

### **Monitoring requirements**

11. Sampling of water being discharged via Spring Creek Dam will be undertaken at the location and frequency specified in Table 4.

12. Sampling of water discharged will be undertaken using calibrated field equipment for the parameters outlined in Table 5.

## Transitional environmental program certificate of approval

13. Monthly analysis for the parameters outlined in Appendix F will be conducted by NATA certified laboratories;
14. In the event that water analysis results exceed the defined contaminant limits (as outlined in Table 5) Rolleston Coal will cease discharging
15. In the event that water analysis results exceed the defined contaminant limits (as outlined in Appendix F) Rolleston Coal will investigate the reason for the exceedence in accordance with the procedures in Condition W5 of the EA.
16. Where monitoring is a requirements of this Transitional Environmental Program, ensure that a competent person(s) conducts all monitoring.
17. All monitoring undertaken as a requirements of this Transitional Environmental Program must be undertaken in accordance with the administering authority's Water Sampling Manual

### Notification of Emergencies, Incidents and Exceptions

18. As soon as practicable after becoming aware of any emergency or incident which results in the release of contaminants not in accordance, or reasonably expected to be not in accordance with the conditions of this Transitional Environmental Program, the administering authority must be notified of the release by telephone ( [REDACTED] ) or email [REDACTED].
19. The notification of emergencies or incidents must include but not be limited to the following:
  - a) the holder of the Transitional Environmental Program
  - b) the location of the emergency or incident
  - c) the number of the Transitional Environmental Program
  - d) the name and telephone number of the designated contact person
  - e) the time of the release
  - f) the time the holder of the Transitional Environmental Program became aware of the release
  - g) the suspected cause of the release
  - h) the environmental harm caused, threatened, or suspected to be caused by the release; and
  - i) actions taken to prevent and further release and mitigate any environmental harm caused by the release..
20. 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:

# Transitional environmental program certificate of approval

- a) Proposed actions to prevent a recurrence of the emergency or incident; and
- b) Outcomes of actions taken at the time to prevent or minimize environmental harm.

The transitional environmental program remains in force until 29 August 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.

Signature

Signature \_\_\_\_\_

01 / 02 / 11

Date \_\_\_\_\_

Christopher Loveday  
Manager Environmental Services (Mining)  
Department of Environment and Resource Management

**Enquiries:**

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

# Notice

## Environmental Protection Act

### Decision to grant amendment of an approval of a 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.*

Your reference : MAN11099

Our reference : EMD886, MAN11779

Xstrata Coal Queensland Pty Ltd  
Level 10 Riverside Centre  
123 Eagle Street  
Brisbane Qld 4000

ICRA Rolleston Pty Ltd  
Level 15, Commonwealth Bank Building of Australia  
240 Queen St  
Brisbane Qld 4000

Sumisho Coal Australia Pty Ltd  
Level 34, Central Plaza One  
Brisbane Qld 4000

Attention: [REDACTED]

**Re: Application for the amendment of an approval for a transitional environmental program for Rolleston Coal Mine – Amendment Application for Approved Transitional Environmental Program (TEP): Spring Creek Dam Water Release Into Bootes Creek.**

Thank you for your application for the amendment of an approval for a transitional environmental program — certificate of approval number MAN11779.

Your application, which was received by this office on 19 January 2011, has been approved with conditions.

A copy of the amended certificate of approval, which includes the schedule of conditions, is attached.

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

A fee of \$185.80 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 with this notice. This information is intended as a guide only. You may have other legal rights and obligations

## Notice

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.

SIGNATURE

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

DATE

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

**Request for Statutory Approval**

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

**CLIENT:** Xstrata Coal Queensland Pty Ltd (t/a Rolleston Coal Pty Ltd)  
**REGISTERED OFFICE ADDRESS:** Level 10 Riverside Centre  
123 Eagle Street  
Brisbane QLD 4000  
**TENEMENT:** ML70307, MDL227  
**ENV AUTHORITY NO.:** MIM800090802  
**FILE NO.:** EMD866  
**PROGRAM NOTICE/REQUIRED:** N/A Voluntary Submission  
**REASON FOR TEP:** Water Management  
**DATE SUBMITTED:** 18 November 2010  
**DECISION DUE DATE:** 16 December 2010  
(If approval required)  
**TIME SPENT:** 10 hours

**1.0 SUMMARY**

Xstrata Coal Queensland P/L submitted an amendment to existing Transitional Environmental Program (TEP) MAN10919 on 18 November 2010 on behalf of Rolleston Coal Mine.

TEP MAN10919 was originally, submitted on 30 September 2010. It addressed earlier site inundation and water management issues at Rolleston Coal Mine (Rolleston) and is related to an earlier TEP MAN10239 approved in June 2010.

TEP MAN10919 authorised Rolleston to release up to 4GL of water stored on-site in the Spring Creek Dam subject to water quality and flow requirements. The TEP was submitted after Rolleston was inundated by a breached raw water dam that inundated the mine pit.

The amendment to TEP MAN10919 has generated a new approval number - now MAN11099.

Technical advice has been sought from Ian Ramsay (Chief Scientist – Freshwater and Marine Services) in consideration of this proposed amendment and previous TEP applications. Assessment of this amendment included previous applications and the potential for environmental harm as a result of the proposed changes.

This amendment proposes to change the certificate of approval conditions of TEP MAN10909. The following conditions are proposed to be amended or included for certificate of approval for TEP MAN11099:

From:

1. Water discharged from Spring Creek Dam under MAN11099 must:
  - a) remain under a five-day rolling median pH of 8.75; and
  - b) immediately cease if the discharged water has a pH of 9.0 or above on any given day.

To:

1. Water discharged from Spring Creek Dam under MAN11099 must:
  - a) cease if the pH measured at MP3 exceeds 8.5 for a duration period 12 hrs of on any given day; and
  - b) immediately cease if the discharged water has a pH of 9.0 or above on any given day (measured at Spring Creek Dam Spillway);

And include:

2. Discharge from Spring Creek Dam may recommence after 24 hours in accordance with approval condition 1.

The following conditions are proposed to remain unchanged (excepting the approval number) for certificate of approval for TEP MAN11099:

3. The discharge volume from Spring Creek dam under MAN11099 must be reduced gradually at the end of the discharge period in the following manner:
  - a) three days out from end of the discharge period, daily discharge volume must be reduced to 50 ML or less;
  - b) two days out from end of the discharge period, discharge volume must be reduced to 25 ML or less; and
  - c) on the last day of the planned discharge, discharge volume must be reduced to 10 ML or less.
4. If on the last day of the proposed TEP MAN11099 water discharge:
  - a) Bootes creek does not have a natural water flow occurring where water discharged from Spring Creek dam enters Bootes Creek; and
  - b) the water quality in Davey's Dam is of significantly better quality than water in Spring Creek Dam, as it was recorded in September and October 2010 in the "Rolleston Coal Mine: Spring Creek Dam and Spring Creek Pit Water Quality Results; May – September 2010" document; Rolleston Coal Mine will immediately release 25 ML of natural (mine-unaaffected) water from Davey's Dam into Bootes creek, at a rate of 5 ML per day, over a period of five days.
5. Rolleston Coal Mine 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) natural flow rate in receiving water; and
  - c) any other matters that are pertinent to the water release event.
6. The authority holder must notify the administering authority as soon as practicable, (nominally within twenty-four (24) hours of cessation of a release) of the cessation of a release. Notification must include the submission of written verification to the administering authority of the following information:
  - a) release cessation date/time;
  - b) natural flow rate in receiving water; and
  - c) any other matters that are pertinent to the water release event.
7. Rolleston Coal Mine will notify the Ranger-in-Charge of the Albinia National Park, Central Highlands Regional Council and any other relevant/potentially effected users/landholders downstream of the discharge under TEP MAN10919, prior to the discharge taking place. The notification process must be documented and include:
  - written documentation of notification including dates, contact persons and any pertinent comments
  - details of discharge information provided to stakeholdersA report detailing this notification process must be submitted to the Department of Environment and Resource Management prior to initial discharge commencing.

The department's Operational Policy *Transitional Environmental Program (TEP) fees* state the fee for assessing an application to amend a TEP is \$180.40 (includes GST).

It is recommended that the administering authority approve the amendment to the Certificate of approval for TEP MAN10919 and issue the attached certificate of approval and TEP approval notice.

Has the TEP been entered in EcoTrack:	Yes
EcoTrack Compliance Reference (if applicable): -	CA21505
EcoTrack TEP Reference Number: -	MAN11099

***If Approving the TEP***

Has a notice approving the TEP been completed:	Yes
Has a certificate of approval been developed:	Yes
Were additional conditions set on the certificate of approval:	Yes

**2.0 STATUTORY REQUIREMENTS**

**330 What is a transitional environmental program**

A transitional environmental program is a specific program that, when approved, achieves compliance with this Act for the matters dealt with by the program by –

- (a) reducing environmental harm; or
- (b) detailing the transition to an environmental standard.

The amendment to TEP approval conditions will allow Rolleston to:

- reduce potential environmental harm by diminishing the probability of an uncontrolled discharge occurring from Spring Creek Dam during the coming wet season.

**337 Administering authority to consider draft programs**

***(1) The administering authority must decide whether to approve a draft transitional environmental program submitted to it within 20 business days after the application date.***

The amendment to TEP MAN10919 was submitted on 18 November 2010. The decision date for TEP MAN11099 is 16 December 2010.

***(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.***

A public notice is not a requisite for this submission.

**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***

Assessment of the TEP was conducted in accordance with the EP Act 1994 and its subordinate legislation.

**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***  
Considered.

***s52 Conditions to be considered for environmental management decisions***  
Considered.

***s53 Matters to be considered for decisions imposing monitoring conditions***  
Considered.

**Part 3 Additional regulatory requirements for particular environmental management decisions**

***s55 Release of water or waste to land***  
Considered

***s56 Release of water, other than stormwater, to surface water***  
Considered.

***s57 Release of stormwater***  
Considered.

**s58 Release of water or waste to particular wetlands for treatment**

N/A

**s59 Activity involving berthing, docking or mooring a boat**

N/A

**s60 Activity involving storing or moving bulk material**

N/A

**s61 Activity involving acid sulphate soil**

N/A

**s62 Activity involving acid-producing rock**

N/A

**s63 Activity involving direct release of waste to groundwater**

N/A

**s64 Activity involving indirect release of contaminants to groundwater**

N/A

**(b) subject to paragraph (a), must also consider the following—**

**(i) the standard criteria;**

- *The principles of ecological sustainable development as set out in the 'National Strategy for Ecologically Sustainable Development'.*  
Intergenerational equity has been considered. The precautionary principle has been applied. The department has ensured the site commits to water quality monitoring (via the additional draft TEP approval conditions) and routine reporting throughout the TEP.
- *Any applicable environmental protection policy.*  
EPP Water considered.
- *Any applicable Commonwealth, State or local government plans, standards, agreements or requirements.*  
N/A
- *Any applicable environmental impact study, assessment or report.*  
Consultation was undertaken with Dr Ian Ramsay in considering department interest - Water.
- *The character, resilience and values of the receiving environment.*  
Considered.
- *All submissions made by the applicant and submitters.*  
No external submissions made. All information provided by applicant considered.
- *The best practice environmental management for activities under any relevant instrument, or proposed instrument, as follows – a transitional environmental program.*  
Previous TEP approvals have been considered.

**s21 of the Environmental Protection Act 1994 - Best practice environmental management**

**(1) The best practice environmental management of an activity is the management of the activity to achieve an ongoing minimisation of the activity's environmental harm through cost-effective measures assessed against the measures currently used nationally and internationally for the activity.**

**(2) In deciding the best practice environmental management of an activity, regard must be had to the following measures—**

**(a) strategic planning by the person carrying out, or proposing to carry out, the activity;**

**(b) administrative systems put into effect by the person, including staff training and monitoring and review of the systems;**

**(c) public consultation carried out by the person;**

**(d) product and process design;**

**(e) waste prevention, treatment and disposal.**

**(3) Subsection (2) does not limit the measures to which regard may be had in deciding the best practice environmental management of an activity.**

The original TEP considers these matters. The amendment to the TEP approval conditions does not significantly alter BPPEM.

- *The financial implications of the requirements under an instrument, or proposed instrument, mentioned in paragraph (g) (above) as they would relate to the type of activity or industry carried out, or proposed to be carried out, under the instrument.*

The approval of a TEP will impact Rolleston's ability to achieve FA discounts.

- *The public interest.*

Downstream land managers will be contacted by Rolleston prior to any discharge under this draft TEP.

- *Any applicable site management plan.*

Considered.

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

Considered.

- *Any other matter prescribed under a regulation.*

Considered

**(ii) additional information given in relation to the draft program;**

Information supplied to support the TEP amendment was 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.**

N/A

**331 Content of program**

**A transitional environmental program must—**

**(a) state the objectives to be achieved and maintained under the program for an activity; and**

No changes to the TEP (proper) have been applied for or is to be approved. The amendment is pertaining to the certificate of approval.

**(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**

Yes

**(ii) the risks of environmental harm being caused by the activity; and**

Risks are being managed through monitoring and reporting. The TEP approval conditions set water quality limits & requirements to cease discharge if these are reached.

**(c) state appropriate performance indicators at intervals of not more than 6 months; and**  
Yes

**(d) make provision for monitoring and reporting compliance with the program.**

Yes – see earlier sections.

**343 Failure to approve draft program taken to be refusal**

Decision to approve has been made within the 20 BD timeframe.

**3.0 RECOMMENDATION**


It is recommended that:

- the proposed amendment to the certificate of approval for TEP MAN11099 poses a low risk of causing environmental harm.
- the amendment application for TEP MAN11099 be approved and the attached notice and certificate of approval be sent to the client advising of the decision.

  
Senior Environmental Officer

Signed –

Date -

Reviewed & Endorsed By	
<b>Reviewer</b>  Principal Environmental Officer Signed – Date	<b>Delegate</b> Chris Loveday Manager (Environmental Services - Mining) Signed – Date:

## Environmental Services - Mining

**Transitional environmental program certificate of approval number MAN10919**

*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:

Xstrata Coal Queensland Pty Ltd  
Level 10 Riverside Centre  
123 Eagle Street  
Brisbane Qld 4000

ICRA Rolleston Pty Ltd  
Level 15, Commonwealth Bank Building of Australia  
240 Queen St  
Brisbane Qld 4000

Sumisho Coal Australia Pty Ltd  
Level 34, Central Plaza One  
Brisbane Qld 4000

approving the amendment to transitional environmental program MAN10919; titled *Rolleston Coal Mine – Amendment Application for Approved Transitional Environmental Program (TEP): Spring Creek Dam Water Release into Bootes Creek* (November 2010).

The application to amend transitional environmental program (TEP) MAN10919 was received by this office on 18 November 2010. The amendment to TEP MAN10919 is approved, subject to the following approval conditions. Please note the amendment has generated new TEP reference number (MAN11099) and is to be used in subsequent communications.

1. Water discharged from Spring Creek Dam under MAN11099 must:
  - a) cease if the pH measured at MP3 exceeds 8.5 for a duration period 12 hrs on any given day; and
  - b) immediately cease if the discharged water has a pH of 9.0 or above on any given day (measured at Spring Creek Dam Spillway);
2. Discharge from Spring Creek Dam may recommence after 24 hours in accordance with approval condition 1.
3. The discharge volume from Spring Creek dam under MAN11099 must be reduced gradually at the end of the discharge period in the following manner:
  - a) three days out from end of the discharge period, daily discharge volume must be reduced to 50 ML or less;
  - b) two days out from end of the discharge period, discharge volume must be reduced to 25 ML or less; and
  - c) on the last day of the planned discharge, discharge volume must be reduced to 10 ML or less.
4. If on the last day of the proposed TEP MAN11099 water discharge:

**Environmental management program certificate of approval**

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- a) Bootes creek does not have a natural water flow occurring where water discharged from Spring Creek dam enters Bootes Creek; and
  - b) the water quality in Davey's Dam is of significantly better quality than water in Spring Creek Dam, as it was recorded in September and October 2010 in the "Rolleston Coal Mine: Spring Creek Dam and Spring Creek Pit Water Quality Results; May – September 2010" document;  
Rolleston Coal Mine will immediately release 25 ML of natural (mine-unaffected) water from Davey's Dam into Bootes creek, at a rate of 5 ML per day, over a period of five days.
5. Rolleston Coal Mine 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) natural flow rate in receiving water; and
  - c) any other matters that are pertinent to the water release event.
6. The authority holder must notify the administering authority as soon as practicable, (nominally within twenty-four (24) hours of cessation of a release) of the cessation of a release. Notification must include the submission of written verification to the administering authority of the following information:
- a) release cessation date/time;
  - b) natural flow rate in receiving water; and
  - c) any other matters that are pertinent to the water release event.
7. Rolleston Coal Mine will notify the Ranger-in-Charge of the Albinia National Park, Central Highlands Regional Council and any other relevant/potentially effected users/landholders downstream of the discharge under TEP MAN10919, prior to the discharge taking place. The notification process must be documented and include:
- written documentation of notification including dates, contact persons and any pertinent comments
  - details of discharge information provided to stakeholders
- A report detailing this notification process must be submitted to the Department of Environment and Resource Management prior to initial discharge commencing.

This transitional environmental program remains in force until 1 March 2011.

In any case where conditions are imposed upon a certificate of approval, you may apply to the administering

**Transitional environmental program certificate of approval**

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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 on telephone [REDACTED] would be happy to assist you.

[REDACTED]

SIGNATURE

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

29 November 2010

DATE

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

## Notice

### Environmental Services - Mining Decision to grant amendment of an approval of a 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.*

Mr Glenn Burlinson  
Senior Site Manager and SSE  
Rolleston Coal Mine  
PO Box 11  
Springsure Qld 4722

[REDACTED]  
Xstrata Coal QLD  
PO Box 11  
Springsure Qld 4722

Your reference: Transitional Environmental Program (TEP) Rolleston Coal Mine MAN10919

Our reference : EMD866:MAN11099

Attention: Mr Glenn Burlinson,

**Re: Application for the amendment of an approval for a transitional environmental program for Rolleston Coal Mine – Amendment Application for Approved Transitional Environmental Program (TEP): Spring Creek Dam Water Release into Bootes Creek.**

Thank you for your application for an approval for a transitional environmental program. This application has been issued with the Certificate Approval number: MAN11099 (attached to this notice).

Your application, which was received by this office on 18 November 2010 has been approved with additional conditions as described in the Certificate of Approval MAN11099.

Fees apply for the assessment of a draft transitional environmental program (TEP), amendments to TEP's and any subsequent annual returns. The fees are outlined in the attached operational policy *Transitional Environmental Program (TEP) fees*.

A fee of \$180.40 is payable.

**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] [REDACTED] would be happy to assist you.

SIGNATURE

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

29 November 2010

DATE

**Enquiries:**  
Department of Environment and Resource  
Management  
PO Box 19  
EMERALD QLD 4720  
Phon [REDACTED]  
Fax: [REDACTED]

# ALS Water Resources Group Queensland

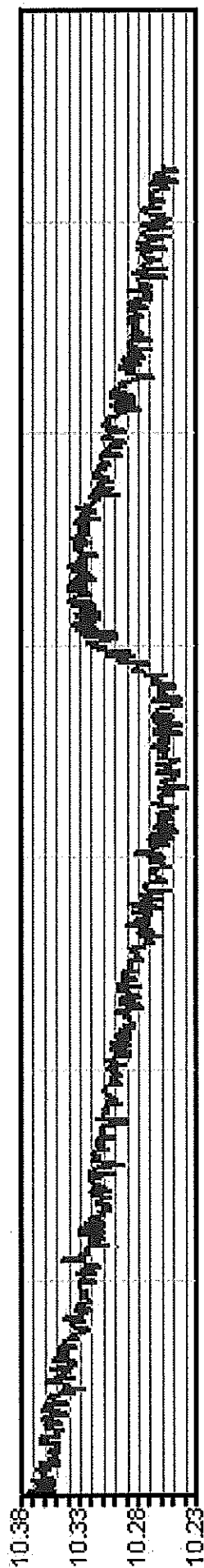
HYDROT 0132 Output 11/11/2010

Period 7 Day Plot Start 00:00\_05/11/2010

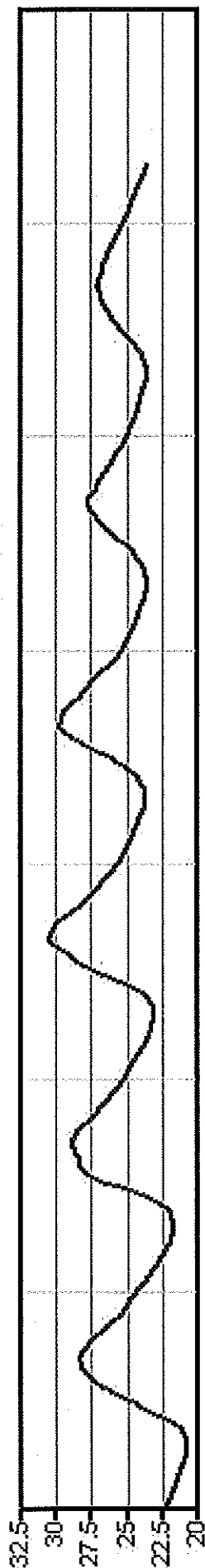
2010

Interval 15 Minute Plot End 00:00\_12/11/2010

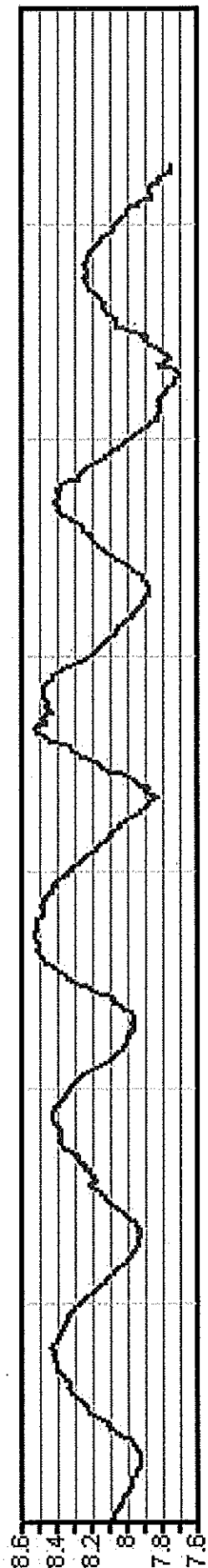
— 331900 D/S Boates Ck 100.00 Max & Min Level (Metres) J



— 331900 D/S Boates Ck 450.00 Max & Min WaterTemp(DegC) J



— 331900 D/S Boates Ck 804.00 Max & Min pH J



# 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	CA21505
Ecotrack number	MAN11779
Permit number	MIM800090802
File number	EMD866
Applicant name	Xstrata Coal Queensland Pty Ltd (t/a Rolleston Coal Pty Ltd)
Registered office or place of business	Level 10 Riverside Centre 123 Eagle Street Brisbane Qld 4000
Date draft TEP received.	19 January 2011 (20BD= 16 February 2011)  <i>Note: The department has 20 business days in which to make a decision in relation to the draft TEP.</i>

### 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.

Xstrata Coal Queensland P/L submitted an amendment to existing Transitional Environmental Program (TEP) MAN11099 on 19 January 2010 on behalf of Rolleston Coal Mine. The original TEP MAN10239 was approved in June 2010, and an amendment to this was submitted on 30 September 2010 TEP MAN11099. The amendment to TEP MAN11099 has generated a new approval number - now MAN11779.

The TEP proposes to release water from Spring Creek Dam into Bootes Creek outside of Rolleston Coal's EA MIM800098082 flow conditions. Spring Creek Dam is a water storage which may contain water which has been



in contact with mining areas. The discharge rate is proposed of up to 100ML per day, provided the water quality complies with the criteria stipulated in the TEP:

\*EC max 483 uS/cm

\*pH max 9.0 - 8.5 for a sustained 12 hour period.

Technical advice was sought from Ian Ramsay (Chief Scientist – Freshwater and Marine Services) for consideration of the previous amendment and previous TEP application. This TEP amendment proposes to change the timeframes and to remove the proposed release limit of 4GL of water from Spring Creek Dam into Bootes Creek and to have no release limit. The contaminant release upper limits are not changing from previously approved TEPs.

## 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 draft TEP will authorise Rolleston Coal to release water outside the conditions of EA MIM800090802 and will reduce the potential environmental harm by diminishing the probability of an uncontrolled discharge occurring from Spring Creek Dam during the coming wet season. The contaminant release limits in this TEP are below the maximum contaminant release limits listed in the EA.

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

☒ Yes.

☐ No.

Rolleston Coal has listed out four objectives in this draft TEP to release water and have committed to the release of water from Spring Creek Dam with the commitments set out in the TEP (water quality monitoring undertaken at regular intervals and discharge ceased if reaches discharge limits. An Action Plan table has been included with the action and completion date.

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.

Sufficient information has been provided in Table 6: Action Plan of the draft TEP.

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.

The draft TEP provides for release of mine affected water into Bootes Creek. The contaminant release limits are low and will be monitored at the release point and Downstream Bootes Creek to ensure compliance with this TEP. The discharge will cease if contaminant release limits are reached and release will not occur if water quality in Spring Creek dam does not meet the contaminant release limits set in this TEP.

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.

Water Quality: All water will meet release limit criteria specified in the draft TEP. Rolleston coal have proposed additional sampling prior to discharge and will only discharge if the water is within the acceptable limits outlined in the draft TEP.

Downstream landholders: Rolleston does not predict any impact as the releases will comply with the parameters set in draft TEP. Monitoring will occur at downstream monitoring stations. Should pH level greater than 8.5 be recorded over a sustained 12 hour period Rolleston will cease discharge. Rolleston Coal have noted that stock water quality impact is negligible.

Erosion Potential: Rolleston will undertake week visual inspections of the riparian area immediately downstream from Spring Creek Dam and if erosion is evident a reduced discharge rate will be adopted.

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.

The end date of the TEP is xxxx. Rolleston Coal will cease discharge of water 30 June 2011. Final report is due in xxxx.

Have appropriate performance indicators at intervals of not more than 6 months been included in the draft TEP?

☒ Yes.

☐ No.

Note: The performance indicators must be clearly defined and measurable and set out the date on which each indicator will be assessed.

Does the draft TEP provide for sufficient monitoring and reporting on compliance with the program?

☒ Yes.

☐ No.

Note: Specific details on the frequency and level of the monitoring and reporting must be provided e.g. what information should be given to the department and when.

Is the proposed monitoring sufficient to allow the company and DERM to assess progress with the TEP, and to assess compliance with the requirements of the TEP?

☒ Yes.

☐ No.

Is the draft TEP acceptable in terms of any relevant regulatory requirements?

☒ Yes.

☐ No.

Note: Regulatory requirements are set out in ss46-64 of the Environmental Protection Regulation 2008 and may also be contained in environmental protection policies.

If the answer is yes, provide brief details on which regulatory requirements were considered and why the draft TEP is acceptable how this will be achieved.

If the answer is no, provide brief details of which regulatory requirements were considered and why the draft TEP is not acceptable.

Please see the attached RSA detailing the statutory requirements considered during assessment of the TEP.

Is the draft TEP acceptable in terms of the standard criteria?

☒ Yes.

☐ No.

For each of the standard criteria, provide brief details of your assessment of the draft TEP. If a criterion is not applicable, write 'N/A'.

Standard criteria	Detailed comments
Ecologically sustainable	The TEP will allow for release of mine affected water

<b>development</b>	which has accumulated on the site due to higher than average rainfall events. Conditions placed on the TEP ensure minimal risk to the environment while allowing the mine to return to full operational capacity, and ensuring the risk of an uncontrolled release occurring is minimal.
<b>Environmental protection polices (EPPs)</b>	Requirements of the EPP (Water) were considered during the assessment of the TEP.
<b>Plans, standards or agreements</b>	N/A
<b>Environmental impact study, assessment or report</b>	N/A
<b>Receiving environment</b>	Previous TEP was reviewed by Water Quality and Aquatic Ecosystem Health and is considered to be relatively low risk to the receiving environment.
<b>Submissions made by the applicant and submitters</b>	TEP has previously been reviewed by Environmental Services - Mines and Water Quality and Aquatic Ecosystem Health staff. Current amendment wants to change timeframes and remove the 4GL limit set in previous approvals. There is no change for contaminant release limits. Further information was requested and received by SWCM. TEP submission provides adequate information to assess.
<b>Best practice environmental management</b>	Considered. The TEP is considered to be best practice environmental management to release mine affected water to reduce the risk of uncontrolled releases.
<b>Financial implications</b>	Considered. The TEP has been submitted voluntarily and no extra substantial operating or infrastructure changes are required to action the TEP. Monitoring equipment is already installed at proposed monitoring sites. As such the assessing officer does not hold concerns regarding the applicant's financial ability to meet TEP commitments
<b>Public interest</b>	Rolleston have given a commitment to notify downstream landholders of releases and ensure that the contaminant release limits set in the TEP are met.
<b>Site management plan</b>	N/A
<b>Environmental management systems (IEMS)</b>	N/A

Has all additional information given in relation to the draft TEP been considered?

☒ Yes.

- ☐ No.
- ☐ Not applicable.

If the answer is yes, provide brief notes on the information contained within the additional documents e.g. do they recommend further investigations or propose specific works that have been incorporated into the draft TEP.

If the answer is no, list reasons why.

If applicable, have any views expressed at a conference held in relation to the draft program been considered?

- ☐ Yes.
- ☐ No.
- ☒ Not applicable.

**Are you satisfied that the draft TEP meets all of the requirements of the Act and should be approved?**

If the answer to all of the above questions was "Yes" or "Not applicable", the draft TEP may be approved. If the answer to any question about was "No", the draft TEP may not be approved.

- ☒ Yes - Proceed to section 3.
- ☐ No - Proceed to section 4.

### 3. If you are satisfied with the draft TEP.

Prior to making a recommendation to issue a certificate of approval it is important to bear in mind that the Act stipulates that the draft TEP be a program that achieves compliance with the Act for the matters dealt within it.

If the draft TEP does **NOT** meet the requirements of the Act it must be refused. Whilst the Act does make provision for the approval to be subject to conditions, the conditions should address relatively minor issues only. Conditions on a certificate of approval must not be used to rectify significant issues with a draft TEP.

A certificate of approval must be issued within 8 business days of making the decision to approve the TEP. If the approval is subject to conditions, an information notice about the decision to impose conditions must also be provided.

#### Certificate of approval checklist.

- ☒ Does the certificate of approval identify the documents forming the approved TEP, including any amendments under s339(1)(a)?
- ☒ Does the certificate of approval specify any conditions imposed?
- ☒ Does the certificate of approval state the date the approval ends?
- ☒ If conditions have been added, has an information notice been drafted?

### 4. If administering authority is not satisfied with the draft TEP.

If a decision is made to refuse the draft TEP, an information notice must be given to the person or public authority that submitted the program. The information notice should include:

- ☐ the reasons for the decision.
- ☐ any available rights of internal and external review.

**5. Provide for natural justice.**

If you are making a decision that is not the decision requested by the person or company submitting the TEP (for example, to refuse to approve the draft TEP), summarise below any submissions put forward by the person or company in favour of the draft TEP and your response to those submissions.

<List any submissions made.>

N/A The TEP is approved as submitted.

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.

## 7. Endorsement

Recommending officer	Supervisory review
Print name: [REDACTED]	Print name: [REDACTED]
Date:	Date:

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

[REDACTED]  

---

**From:** [REDACTED]  
**Sent:** Friday, 28 January 2011 5:23 PM  
**To:** [REDACTED]  
**Cc:** Loveday Chris; Brier Andrew; [REDACTED]  
**Subject:** RE: TEP\_Rolleston\_ Amendment for review

Hi [REDACTED]

I have reviewed the amended Rolleston TEP. In general, the proposed water quality limits appear to be low risk even for a dry-weather discharge - the EC limit is very low and based on the 90th percentile of background data. The proposed flushing will minimise any potential lasting affects of other contaminants after the release of mine affected water ceases.

The major recommendation is to ensure it is clear in the Certificate of Approval or other documentation what the water quality limits are and where they are imposed. I found Table 5 a little confusing. Are the EC limits applied to the spillway and the downstream MP3? I thought MP3 should be specified in Table 4 if it was to be measured.

Let me know if you need more information.

Cheers

[REDACTED]  
Chief Scientist  
Water Quality & Aquatic Ecosystem Health  
[REDACTED] (w)  
[REDACTED] (m)

---

**From:** [REDACTED]  
**Sent:** Thursday, 27 January 2011 12:18 PM  
**To:** [REDACTED]  
**Subject:** TEP\_Rolleston\_ Amendment for review

Hi [REDACTED]

Please find attached an amendment to the draft TEP for Rolleston Coal.

I've also attached the previous Certificate of Approval from the previous TEP which has the conditions – these will be put into the amended TEP document.

If you can please send your response in relation to this TEP to me that would be great, if I need to send through a work request, can you please let me know.

Regards,  
[REDACTED]

<< File: 20110118\_Rolleston Coal\_amendedTEP\_water release via Spring Creek Dam\_(with tracked changes).doc >>

<< File: 101129 Cert of Approval.doc >>

---

[REDACTED] Senior Environmental Officer | Environmental Services (Mining)  
**P:** [REDACTED]  
**E:** [REDACTED] [www.derm.qld.gov.au](http://www.derm.qld.gov.au)  
DERM Department of Environment & Resource Management  
99 Hospital Road, Emerald QLD 4720 | PO Box 906, Emerald QLD 4720

[REDACTED]

---

**From:** [REDACTED]  
**Sent:** Friday, 28 January 2011 7:27 AM  
**To:** [REDACTED]  
**Cc:** [REDACTED]  
**Subject:** Rolleston\_TEP\_Comments

**Importance:** High

**Attachments:** 20110118\_Rolleston Coal\_amended\_DERM Comments.doc; TEP Template.DOC

Good Morning [REDACTED]

Please find attached the Rolleston TEP with my comments.

You will see I have added a conditions section at the end. I am trying to align this TEP with all others that have been approved recently, and I am aware that you have put conditions within the document itself, however, this will allow for the administering authority to easily identify the conditions and audit your TEP. Can you please double check these to make sure they are the same as the ones in the document. Also, I have altered timeframes to suit our requirements.

I have attached the template for TEPs for your information, which has the generic conditions.

I will be finishing at 1pm today. I am attempting to have this to someone else for review this afternoon - I just need it back from you as soon as possible. Thanks.

Regards,



20110118\_Rolleston Coal\_amended...



TEP Template.DOC

---

[REDACTED] Senior Environmental Officer | Environmental Services (Mining)

**P:** [REDACTED]  
**E:** [REDACTED] [www.derm.qld.gov.au](http://www.derm.qld.gov.au)  
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[REDACTED]

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<< File: 20110118\_Rolleston Coal\_amendedTEP\_water release via Spring Creek Dam\_(with tracked changes).doc >>

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99 Hospital Road, Emerald QLD 4720 | PO Box 906, Emerald QLD 4720

[REDACTED]

---

**From:** [REDACTED]  
**Sent:** Monday, 31 January 2011 9:19 AM  
**To:** [REDACTED]  
**Cc:** [REDACTED] Manager MiningCWR  
**Subject:** RE: rolleston Coal - amendment application of TEP MAN11099  
**Attachments:** TEP Template.DOC  
**Thanks** [REDACTED]

With regards to the conditions, I sent through the TEP template in previous email (and I have attached again for your information).

The template was developed to assist mines in developing their TEP. In the TEP there should be a separate section with the conditions outlined. The conditions make up part of the draft TEP.

The information you have provided with the current Rolleston TEP with regard to reporting is not adequate – please see conditions in template relating to notification of release events, release event exceedences and of emergencies, incidents and exceptions.

There is no note of a monthly progress report in this TEP – is Rolleston going to submit a monthly progress report describing activities and issues from previous month and proposed activities over the next month. This is also part of the template.

Regards,  
[REDACTED]

[REDACTED] Senior Environmental Officer | Environmental Services (Mining)  
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DERM Department of Environment & Resource Management  
99 Hospital Road, Emerald QLD 4720 | PO Box 906, Emerald QLD 4720

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**To:** [REDACTED] Manager MiningCWR  
**Subject:** rolleston Coal - amendment application of TEP MAN11099

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Additionally, the inclusion of an extra section in the TEP (Section 8: conditions) essentially prepared by DERM for assessment by DERM is now considered redundant as all of DERM's previous conditions of approval have been incorporated within the body of the TEP document.

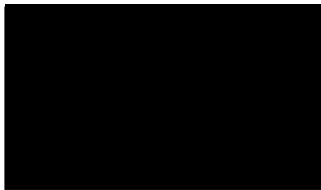
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Regards



Environment & Community Manager  
Rolleston Coal  
Xstrata Coal Queensland  
PO Box 11  
Springsure QLD 4722



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**P:** [REDACTED]  
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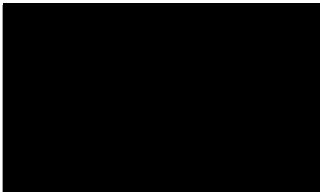
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Xstrata Coal Queensland  
PO Box 11  
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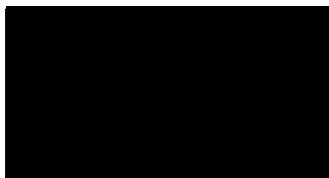
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Regards

[REDACTED]

Environment & Community Manager  
Rolleston Coal  
Xstrata Coal Queensland  
PO Box 11  
Springsure QLD 4722



TEP\_Sandy Creek

**From:** [REDACTED]  
**Sent:** Friday, 4 February 2011 10:57 AM  
**To:** [REDACTED]  
**Cc:** [REDACTED]  
**Subject:** RE: TEP\_Sandy Creek

**Attachments:** Rolleston TEP - Discharge to Meteor Creek via Sandy Creek 20110204.pdf  
 Sorry [REDACTED] I forgot to attach it.  
 Regards  
 [REDACTED]

---

**From:** [REDACTED]  
**Sent:** Friday, 4 February 2011 10:00 AM  
**To:** [REDACTED] (Rolleston - Coal)  
**Cc:** [REDACTED]  
**Subject:** RE: TEP\_Sandy Creek

Can you please send me through an amended TEP via email so it can continue to be assessed?

Regards,  
 [REDACTED]

---

**From:** [REDACTED]  
**Sent:** Friday, 4 February 2011 9:59 AM  
**To:** [REDACTED]  
**Cc:** [REDACTED]  
**Subject:** RE: TEP\_Sandy Creek

Hi [REDACTED]  
 Rather than withdraw the TEP application I have taken the liberty of changing a couple of words so that the TEP isn't made redundant the moment the new EA is authorised.  
 In the 2<sup>nd</sup> last paragraph at the bottom of page three and also in Section 7 on page 14.

The sole reason for needing to make these couple of minor changes is that whilst Rolleston Coal have the culverts and written permission from Council to install them as per the new EA, all of our civil construction machinery is off-site doing repair work for Queensland Rail on Rolleston Coal's badly damaged section of rail line. This may take 6-8 weeks. To avoid a gap in being able to discharge into Meteor Creek the TEP will still be required.

Please call me if this doesn't make sense.

Regards  
 [REDACTED]

---

**From:** [REDACTED]  
**Sent:** Thursday, 3 February 2011 3:15 PM  
**To:** [REDACTED] (Rolleston - Coal)  
**Cc:** [REDACTED]  
**Subject:** TEP\_Sandy Creek

Hi [REDACTED]

Further to our conversation this afternoon, can you please email [REDACTED] and I if you wish to withdraw the TEP application for Rolleston Coal Discharge into Meteor Creek via Sandy Creek.

Regards,



---

 Senior Environmental Officer | Environmental Services (Mining)

P: 

E:  [www.derm.qld.gov.au](http://www.derm.qld.gov.au)

DERM Department of Environment & Resource Management

99 Hospital Road, Emerald QLD 4720 | PO Box 906, Emerald QLD 4720

+-----+

Think B4U Print

1 ream of paper = 6% of a tree and 5.4kg CO2 in the atmosphere

3 sheets of A4 paper = 1 litre of water

+-----+

**From:** [REDACTED]  
**Sent:** Friday, 28 January 2011 2:11 PM  
**To:** [REDACTED] Manager MiningCWR  
**Subject:** rolleston Coal - amendment application of TEP MAN11099

**Attachments:** 20110128\_Rolleston Coal\_ammendedTEP\_water release via SCD.pdf

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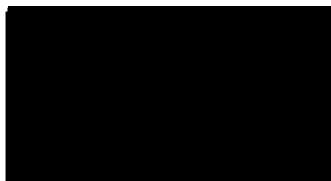
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[REDACTED]

Environment & Community Manager  
Rolleston Coal  
Xstrata Coal Queensland  
PO Box 11  
Springsure QLD 4722



**From:** [REDACTED]  
**Sent:** Friday, 28 January 2011 7:22 AM  
**To:** [REDACTED] Manager MiningCWR  
**Subject:** Rolleston Coal TEP - discharge into Meteor Ck via Sandy Creek

**Attachments:** 20110127\_Stat\_Dec\_signed.pdf; 20110128\_final.pdf

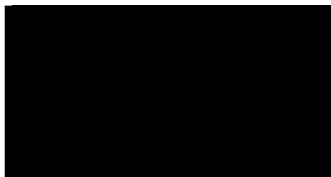
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[REDACTED]

Environment & Community Manager  
Rolleston Coal  
Xstrata Coal Queensland  
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TEP\_Sandy Creek

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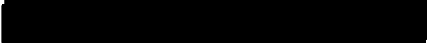
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 Senior Environmental Officer | Environmental Services (Mining)

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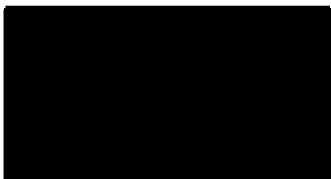
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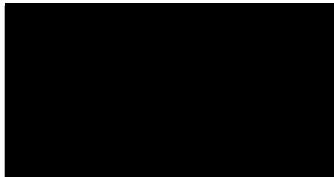
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PO Box 11  
Springsure QLD 4722



**Transitional environmental program certificate of approval**

4. Rolleston Coal Mine 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:
- release commencement date/time;
  - natural flow rate in receiving water; and
  - any other matters that are pertinent to the water release event.
5. The authority holder must notify the administering authority as soon as practicable, (nominally within twenty-four (24) hours of cessation of a release) of the cessation of a release. Notification must include the submission of written verification to the administering authority of the following information:
- release cessation date/time;
  - natural flow rate in receiving water; and
  - any other matters that are pertinent to the water release event.
6. Rolleston Coal Mine will notify the Ranger-in-Charge of the Albinia National Park, Central Highlands Regional Council and any other relevant/potentially effected users/landholders downstream of the discharge into Bootes Creek, under TEP MAN10919, prior to the discharge taking place. The notification process must be documented and include:
- written documentation of notification including dates, contacted persons and any pertinent comments; and
  - details of discharge information provided to the stakeholders.

A report detailing this notification process must be submitted to the Department of Environment and Resource Management prior to initial discharge commencing.

The transitional environmental program remains in force until **1 March 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 on telephone [REDACTED] would be happy to assist you.

[REDACTED]

SIGNATURE

28 October 2010

DATE

[REDACTED]  
Delegate  
Manager Environmental Services - Mining  
Central West Region

**Enquiries:**

Department of Environment and Resource  
Management  
PO Box 19  
Emerald Qld 4720  
99 Hospital Road  
Emerald Qld 4720  
Phone: [REDACTED]  
Fax: [REDACTED]

# Notice

## Environmental Protection Act

### Decision to grant an approval for a draft transitional environmental program

*This statutory notice is issued by the administering authority pursuant to section 339 of the Environmental Protection Act 1994, to advise you of a decision or action.*

Your reference : MAN10919  
Our reference : EMD866

██████████  
Senior Site Manager and SSE  
Rolleston Coal Mine  
PO Box 11  
Springsure Qld 4722

Cc: ██████████  
Environment and Community Manager  
Xstrata Coal QLD  
PO Box 11  
Springsure Qld 4722

██████████  
Environment and Community Manager  
Xstrata Coal QLD  
PO Box 2245  
North Mackay Qld 4740

Attention: ██████████ (Environment and Community Manager),

**Re: Application for an approval for a transitional environmental program for Spring Creek Dam Water Release into Bootes Creek at Rolleston Coal Mine .**

Thank you for your application for an approval for a transitional environmental program. This application has been issued the certificate of approval number MAN10919.

Your application, which was received by this office on 30 September 2010, has been approved with conditions.

A copy of the certificate of approval, which includes the schedule of conditions, is attached.

The reasons for the decision are:

This Transitional Environmental Program adequately addresses strategies to minimise and reduce the risk of environmental harm and achieve a safe water balance at Rolleston Coal Mine. By reducing the water volume in Rolleston Coal Mine's Spring Creek dam, the probability of an uncontrolled discharge occurring during the upcoming wet season is decreased.

## Decision notice regarding a transitional environmental program

Fees apply for the assessment of a draft transitional environmental program and any subsequent annual returns. The fees are outlined in the attached operational policy *Transitional Environmental Program (TEP) fees*. A fee of \$5 625.90 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 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] Principal Environmental Officer, of the Department of Environment and Resource Management on telephone [REDACTED] would be happy to assist you.

[REDACTED]

SIGNATURE

28 October 2010

DATE

[REDACTED]  
Manager Environmental Services - Mining  
Central West Region  
Delegate  
*Environmental Protection Act 1994*

**Enquiries:**

Department of Environment and Resource  
Management  
PO Box 19  
Emerald Qld 4720  
99 Hospital Road  
Emerald Qld 4720  
Phone: [REDACTED]  
Fax: [REDACTED]

Informal Comments from [REDACTED]

1. Both [REDACTED] want you to put the actual water data parameters, limits, locations, etc, throughout the TEP where required, rather than refer to the EA document. I have attached the EA document for you to cut and paste. This provides more clarity and puts everyone on the same page straight away.

For eg, pg 4, para 1: Put EA Table 4 in the TEP, or the relevant part, rather than refer to it.

2. Pg 4, Para 3: need an extra statement at end of paragraph to say how the release of 4 GL now, will prevent environmental harm, later.

3. Pg 4, para 4: installation of diversion structures are now complete, aren't they? (confirmed in earlier phone conversation?). Please update statement.

4. Pg 6, Para 1: Small change: "This TEP, when approved will authorise . . . ."

5. OBJECTIVES, Pg 6

These need to be clearly auditable (able to be checked off by us when completed. This usually requires some form of evidence). If you could reword them as such, that would be great.

6. Pg 6: Your first objective should be an overarching one. Something like, "to improve the overall water management system on site". Like Objective 4.

7. Pg 6, Objective 3. I am told 56 days is too long, and 40 business days is more appropriate.

8. Pg 7: Section 5.4: We desperately need a clear table of water data qualities in here in the TEP, describing exactly what the cutoffs are, at which the discharge water quality values are unacceptable for discharge, and the discharge will cease, or not take place. Today, I received some info from [REDACTED] on the TEP in regards to this part. See below.

"The low sulphate, EC, SS values indicate pretty good water quality and limited mine influence. Having said that, there is a risk that the dam water quality will get worse with time or the sample result is not representative of the whole depth of the dam. If the mine could clarify this issue – would be good.

I recommend that more stringent limits closer to ambient WQO are imposed if the TEP is approved but still allows this "good" quality water to be released. For example, the pH could be 8.5 max, EC may be 340 to 510 uS/cm max (75<sup>th</sup> to 90<sup>th</sup> percentile guideline), suspended solids could be 10-20mg/L (or perhaps turbidity of 50 ntu could be used), sulphate limit could be much lower (this would be have to be a guess as no actual aquatic ecosystem guideline at present).

I think there is a bit of an error with the units in Appendix E for metals and fluoride. It lists them as ug/ but they appear to be mg/L – probably worth clarifying with the clients. Nonetheless, the metals don't appear to be of major concern if this is the case. I wouldn't propose limits if the more stringent limits for the above are imposed."

9. Pg 8, Paragraph 2: This is your key paragraph. It needs to be repeated in page 5, end of section 1.
9. Pg 7, Section 5.7: Ed wants you to tell us how "good" the water is, that you want to release. I propose a table with a column of the water quality data from the dam lined up beside columns of your EA limits for those water parameters.
10. Pg 8; Can you please state in the TEP exactly how often you will sample the discharge. [REDACTED] suggests collect daily, AND report the main (EC, pH, TSS, T, volume) water parameters to us on a daily basis. [REDACTED] has also suggested that a monthly report on the water discharge quality and quantity be produced and sent to us during the life of this TEP.
11. Pg 9: Need to change the "56 days" bit again.
12. I have been asked by [REDACTED] to suggest to you to include a contingency plan, if for some unknown reason, you become unable to discharge water from this dam.
13. [REDACTED] would like a statement included about "checking for downstream erosion", and if found to be significant, what measures you will put in place to mitigate the harm. Maybe a regular visual check at different downstream places. If erosion does occur, you may want to state that you would consider a decreased volume per day
14. Page 11: Table two needs to be worded in such a way that what you are proposing to do will improve water management on the site in the long term.
15. Page 11 and 12: Apparently, the end date of a TEP is to be 1 month after all on-the-ground operations in the TEP have ceased and after the Final report has been submitted. You may want to change your end date.

One matter to correct from our visit on Friday. A statement was made that was not accurate. Please be aware that I do not make any decisions in regards to TEP approvals, only a recommendation, as I do not have the delegation authority. The delegate is currently [REDACTED] (A/Manager).

Regards,

[REDACTED]

Request for Statutory Approval

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

CLIENT: Xstrata Coal Queensland Pty Ltd (t/a Rolleston Coal Pty Ltd)  
REGISTERED OFFICE ADDRESS: Level 10 Riverside Centre  
123 Eagle Street  
Brisbane QLD 4000  
TENEMENT: ML70307, MDL227  
ENV AUTHORITY NO.: MIM800090802  
FILE NO.: EMD866  
PROGRAM NOTICE/REQUIRED: N/A Voluntary Submission  
REASON FOR TEP: Water Management  
DATE SUBMITTED: 30 September 2010  
DECISION DUE DATE: 28 October 2010  
(If approval required)  
TIME SPENT: 32 hours

1.0 SUMMARY

The draft Transitional Environmental Program (TEP) MAN10919 was originally, voluntarily submitted on 30 September 2010, with an updated version received electronically on 18 October 2010. It addresses earlier site inundation and water management issues at Rolleston Coal Mine (Rolleston), and is related to the earlier TEP (stage one of their dewatering plan) MAN10239 approved in June 2010. A statutory declaration was received with the submission and it is considered a proper submission.

TEP (MAN10239) allowed Rolleston to dewater Spring Creek pit by pumping the water into Spring Creek dam. Since June 2010, mine affected water in the Spring Creek pit has been pumped into Spring Creek Dam, under this TEP.

Draft TEP (MAN10919) is stage two of Rolleston Mine's Dewatering Plan following the, "catastrophic overland flow that inundated Spring Creek pit and Spring Creek Dam in the 2009-2010 wet season. The dam and mine pit inundation that occurred during Jan - March 2010 was caused by the highest rainfall in the area since 1954. Failures in another dam and the water management systems on site caused a large volume of water to accumulate on site in pits and water storages" (Rolleston draft TEP Sept 2010).

Rolleston has stated that they, "need to release this water in order to maintain sufficient storage capacity in the water impoundments prior to the commencement of the wet season, in order to avoid later uncontrolled discharges. The unseasonal, protracted and record-breaking rainfall in recent months has also significantly impacted on Rolleston Coal's water storage balance on site" (Rolleston draft TEP Sept 2010).

Rolleston has identified that the release of significant quantities of water from Spring Creek dam is not possible under the conditions of Environmental Authority (EA) MIM800090802. Chiefly due to the natural flows in Bootes Creek being too brief, and the volume too small, to be able to discharge the volume of water required to significantly lower the water level in Spring Creek dam before the wet season begins.

Draft TEP (MAN10919) proposes the release of 4 GL of Spring Creek Dam water, which is now a mixture of mine affected and natural water, into Bootes Creek at a maximum rate of 100 ML per day (which equates to a minimum of 40 days of discharge), irrespective of the natural flow rate of Bootes Creek. This action is outside one of Rolleston's existing EA and TEP conditions, where the flow rate required in Bootes Creek for an authorised discharge be at least 0.75 m<sup>3</sup>/s. Over the last five years Bootes creek has had a maximum flow rate averaging 278 m<sup>3</sup>/s during natural flow events (email, 15/10/2010). The discharge rate proposed in this draft TEP equates to a flow or discharge rate of approximately 1.16 m<sup>3</sup>/sec, which is insignificant in relation to the flow rate during natural flow events. Rolleston stated in the draft TEP that they

will consult with the Ranger in Charge of the Albinia National Park as well as the adjacent landholder in relation to likely impacts on the usability of Springwood road.

Spring Creek Dam has a capacity of 5 GL (Detection of an pers. comm., 20/10/2010). As of 13 September 2010, 0.8 GL of storage space (16%) remains in Spring Creek Dam. A diversion bank has just recently been completed that now prevents significant overland flows entering Spring Creek Dam from Spring Creek. This diversion bank was outlined in the PoO, and was fast-tracked due to the recent significant rainfall and the fast approaching wet season.

Spring Creek dam was not originally authorised for use as a mine affected water (regulated) dam in EA MIM800090802, as it was a raw water dam usually collecting overland flow for potable, dust suppression and other uses. The previous TEP authorised its use for the dewatering of the Spring Creek pit.

On 30 September, technical advice was sought and [REDACTED] (Chief Scientist – Freshwater and Marine Services). His response was received on the 12 October 2010, and is below:

"These are my conclusions based on the information provided:

- I can not comment in detail for the justification for the release or management alternative (this is ultimately up to you guys) but the argument put forward appears sound.
- In terms of the potential for environmental harm, the water quality results (note one sample only) for Spring Creek Dam indicate good quality and therefore a low risk of harm in terms of water quality impacts. The low sulphate, EC, SS values indicate pretty good water quality and limited mine influence. Having said that, there is a risk that the dam water quality will get worse with time or the sample result is not representative of the whole depth of the dam. If the mine could clarify this issue – would be good.
- It is proposed that the release occurs during times when there may not be flow in Bootes Creek. This potentially increases the risk if the limits for the TEP release are adopted straight from the EA (which are designed for event-based release plus 4 fold dilution). I recommend that more stringent limits closer to ambient WQO are imposed if the TEP is approved but still allows this "good" quality water to be released. For example, the pH could be 8.5 max, EC may be 340 to 510 uS/cm max (75<sup>th</sup> to 90<sup>th</sup> percentile guideline), suspended solids could be 10-20mg/L (or perhaps turbidity of 50 ntu could be used), sulphate limit could be much lower (this would be have to be a guess as no actual aquatic ecosystem guideline at present).
- I think there is a bit of an error with the units in Appendix E for metals and fluoride. It lists them as ug/ but they appear to be mg/L – probably worth clarifying with the clients. Nonetheless, the metals don't appear to be of major concern if this is the case. I wouldn't propose limits if the more stringent limits for the above are imposed.
- The release would occur for at least 40 days if a maximum of 100ML per day is used to discharge 4GL. The hydrographs don't indicate this to be that high and therefore is probably a relatively low risk. Keep in mind we are not experts in hydrology though."

Rolleston met and discussed the draft TEP with departmental representatives on-site on 8 October 2010. On-site observations of Spring Creek Dam have revealed that it is currently very full, with very little excess storage capacity remaining. An email of the department's comments on the draft TEP submission was sent to Rolleston on 12 October 2010, and was used in the development of the final TEP submission (submitted on 18 October 2010).

Draft TEP MAN10919 was resubmitted electronically by the applicant and received by the department on the 18 October 2010. On 20 October 2010, Bob Packet's (DERM, Rockhampton) advice was sought and he recommended that potential stratification of pH and EC within the dam water should be analysed. On 20 October 2010, Rolleston was asked to provide these data which were received on 25 October 2010. Mary-Anne Jones (Principal Environment Officer, DERM, Rockhampton) also provided technical advice regarding water quality data.

## Summary and assessment of available data and information

Table 1: Water quality data from local streams and Rolleston's Spring Creek dam (data from various sources).

SITE	pH	EC (µS/cm)	Suspended Solids (mg/L)	Turbidity (NTU)	Sulphate (mg/L)
Bootes Creek Upstream (average)	8.0	272	548	192	2
Meteor Creek Upstream (average)	7.8	190	1033	488	2
Spring Creek Dam water (May to September 2010) (50 <sup>th</sup> percentile)	8.39	326	44	33	2.2
Spring Creek Dam water (22 October 2010) (average - 18 samples)	8.66	336	--	--	--
Rolleston's TEP proposed upper parameter limits	9.0*	483	--	290	--
Draft Water Quality Guidelines Fitzroy Basin: Phase 1	6.5 - 8.5	388 (for Comet R.)	25 (for Comet R.)	--	5 (for Comet R.)
Rolleston Mine EA discharge limits	6.5 - 9.0	1500	1200	--	1000

A water parameter value of concern to some technical experts (DERM Officers) is Rolleston's TEP proposed upper pH limit of 9.0 (\* Table 1). The draft "Developing Water Quality Guidelines for the Protection of the Freshwater Aquatic Ecosystems in the Fitzroy Basin: Phase 1" (p. 19) indicates that water pH for low-flow conditions, ideally remain between 6.5 and 8.5 in lowland streams in the Fitzroy Basin for the protection of freshwater ecosystems.

Changes in pH can lead to indirect toxic effects on aquatic biota through changes to the toxicity of several contaminants. For example, increased pH increases the toxicity of ammonia (ANZECC 1992). The first downstream neighbour affected by the proposed discharge is Albinia National Park.

Other factors to consider are:

- Bootes Creek has been receiving regular natural flow events in recent months,
- The Bureau of Meteorology has predicted wetter than normal conditions in the near future,
- The wet season is about to start (1 November),
- Nearby streams can have a natural water pH of 8.8 (the protection of an Indiv pers. comm., 5/10/2010),
- Native fish in these streams may suffer very minor adverse effects from due to the pH level of this discharge (the protection of an Indiv pers. comm., 25/10/2010),
- Almost all water quality guidelines around the world (e.g. (ANZECC 1992, CCREM 1991, Alabaster & Lloyd 1982, USEPA 1986b) recommend that pH should be maintained in the range 6.5 to 9.0 to protect freshwater aquatic organisms,
- For this dam to become compliant with good site water management principles, its DSA needs to be increased as soon as possible, and
- Decreasing the water volume in Spring Creek dam will decrease the probability of an uncontrolled discharge occurring during the upcoming wet season.

Considering the aspects above, the following new conditions are proposed for draft TEP MAN10919:

1. Water discharged from Spring Creek Dam under MAN10919 must:
  - a) remain under a five-day rolling median pH of 8.75; and
  - b) immediately cease if the discharged water has a pH of 9.0 or above on any given day.
2. The discharge volume from Spring Creek dam under MAN10919 must be reduced gradually at the end of the discharge period in the following manner:
  - a) three days out from end of the discharge period, daily discharge volume must be reduced to 50 ML or less;
  - b) two days out from end of the discharge period, discharge volume must be reduced to 25 ML or less; and
  - c) on the last day of the planned discharge, discharge volume must be reduced to 10 ML or less.

3. If on the last day of the proposed TEP MAN10919 water discharge:
  - a) Bootes creek does not have a natural water flow occurring where water discharged from Spring Creek dam enters Bootes Creek; and
  - b) the water quality in Davey's Dam is of significantly better quality than water in Spring Creek Dam, as it was recorded in September and October 2010 in the "Rolleston Coal Mine: Spring Creek Dam and Spring Creek Pit Water Quality Results; May – September 2010" document; Rolleston Coal Mine will immediately release 25 ML of natural (mine-unaaffected) water from Davey's Dam into Bootes creek, at a rate of 5 ML per day, over a period of five days.
4. Rolleston Coal Mine 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) natural flow rate in receiving water; and
  - c) any other matters that are pertinent to the water release event.
5. The authority holder must notify the administering authority as soon as practicable, (nominally within twenty-four (24) hours of cessation of a release) of the cessation of a release. Notification must include the submission of written verification to the administering authority of the following information:
  - a) release cessation date/time;
  - b) natural flow rate in receiving water; and
  - c) any other matters that are pertinent to the water release event.
6. Rolleston Coal Mine will notify the Ranger-in-Charge of the Albinia National Park, Central Highlands Regional Council and any other relevant/potentially effected users/landholders downstream of the discharge under TEP MAN10919, prior to the discharge taking place. The notification process must be documented and include:
  - written documentation of notification including dates, contact persons and any pertinent comments
  - details of discharge information provided to stakeholders
 A report detailing this notification process must be submitted to the Department of Environment and Resource Management prior to initial discharge commencing.

Other key points that Rolleston has committed to in draft TEP MAN10919 and TEP MAN10239 are:

- Review and update of key site documentation including Water Management Plans, Plan of Operations and Environmental Management Plans;
- Monitoring of Spring Creek Dam discharge water quality and quantity at release point 1;
- Daily notification to DERM of this discharge water quality (several main parameters only) and the volume released at release point 1;
- Monthly reporting to DERM of this discharge water quality (all parameters in EA) and volume released at release point 1;
- Lodgement of a completion report outlining the actions undertaken under this draft TEP; and
- The draft TEP will cease on 1 March 2011.

A fee of \$5625.90 has been included with the approval to grant a TEP which is based on the operational policy – TEP Fees and 30 hours of work after an initial 2 hours work. Specifically, this amount was calculated as \$351.90 for the first two hours + 30 hours at \$175.80 per hour. The guideline will be sent to the client with the approval documentation.

It is recommended that the administering authority approve draft TEP MAN10919 and issue the attached certificate of approval and TEP approval notice.

<b>Has the TEP been entered in EcoTrack:</b>	<b>Yes</b>
<b>EcoTrack Compliance Reference (if applicable): -</b>	<b>CA21505</b>
<b>EcoTrack TEP Reference Number: -</b>	<b>MAN10919</b>

***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.

This draft TEP will allow the Rolleston to:

- move closer towards becoming more compliant with good on-site water management principles, and
- reduce potential environmental harm in the near future by diminishing the probability of an uncontrolled discharge occurring from Spring Creek dam during the coming wet season.

**337 Administering authority to consider draft programs**

***(1) The administering authority must decide whether to approve a draft transitional environmental program submitted to it within 20 business days after the application date.***

The draft Transitional Environmental Program (TEP) MAN10919 was originally, voluntarily submitted on 30 September 2010, with an updated version received electronically on 18 October 2010. The decision date is 28 October 2010, within the 20 BD timeframe.

***(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.***

A public notice is not a requisite for this submission.

**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***

There are no applicable regulatory requirements that would prevent details of the TEP being actioned as a result of approving the TEP.

**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***  
Considered.

***s52 Conditions to be considered for environmental management decisions***  
Considered.

***s53 Matters to be considered for decisions imposing monitoring conditions***  
Considered.

**Part 3 Additional regulatory requirements for particular environmental management decisions**

***s55 Release of water or waste to land***  
N/A

***s56 Release of water, other than stormwater, to surface water***  
Considered.

***s57 Release of stormwater***

N:\Mines\Tenure\Coal\Mining Lease\_ML's\Rolleston\Compliance\2010\100930 vol TEP Release water from Spring Creek Dam into Bootes Creek\Approval Docs for TEP release of water from Spring Creek Dam

Considered.

**s58 Release of water or waste to particular wetlands for treatment**  
N/A

**s59 Activity involving berthing, docking or mooring a boat**  
N/A

**s60 Activity involving storing or moving bulk material**  
N/A

**s61 Activity involving acid sulphate soil**  
N/A

**s62 Activity involving acid-producing rock**  
N/A

**s63 Activity involving direct release of waste to groundwater**  
N/A

**s64 Activity involving indirect release of contaminants to groundwater**  
N/A

**(b) subject to paragraph (a), must also consider the following—  
(1) the standard criteria;**

- **The principles of ecological sustainable development as set out in the 'National Strategy for Ecologically Sustainable Development'.**  
Intergenerational equity has been considered. The precautionary principle has been applied and the department has ensured the site commits to sufficient water quality monitoring (via the additional draft TEP conditions) and routine reporting throughout the draft TEP process. The principle of conservation of biological diversity and ecological integrity have been considered. The need to develop a strong, growing and diversified economy that can enhance the capacity for environmental protection has been recognized.
- **Any applicable environmental protection policy.**  
EPP Water considered.
- **Any applicable Commonwealth, State or local government plans, standards, agreements or requirements.**  
N/A
- **Any applicable environmental impact study, assessment or report.**  
Information supplied by DERM officers, [REDACTED]
- **The character, resilience and values of the receiving environment.**  
Considered.
- **All submissions made by the applicant and submitters.**  
All relevant information considered.
- **The best practice environmental management for activities under any relevant instrument, or proposed instrument, as follows – a transitional environmental program.**  
Considered.

**s21 of the Environmental Protection Act 1994 - Best practice environmental management**

*(1) The best practice environmental management of an activity is the management of the activity to achieve an ongoing minimisation of the activity's environmental harm through cost-effective measures assessed against the measures currently used nationally and internationally for the activity.*

*(2) In deciding the best practice environmental management of an activity, regard must be had to the following measures—*

*(a) strategic planning by the person carrying out, or proposing to carry out, the activity;*

*(b) administrative systems put into effect by the person, including staff training and monitoring and review of the systems;*

*(c) public consultation carried out by the person;*

*(d) product and process design;*

*(e) waste prevention, treatment and disposal.*

*(3) Subsection (2) does not limit the measures to which regard may be had in deciding the best practice environmental management of an activity.*

- *The financial implications of the requirements under an instrument, or proposed instrument, mentioned in paragraph (g) (above) as they would relate to the type of activity or industry carried out, or proposed to be carried out, under the instrument.*

The new FA directive impacted Rolleston in the previous TEP MAN10239 (June 2010).

- *The public interest.*

Downstream land managers will be contacted by Rolleston prior to any discharge under this draft TEP.

- *Any applicable site management plan.*

Considered.

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

Considered.

- *Any other matter prescribed under a regulation.*

Considered

*(II) additional information given in relation to the draft program;*

Maps and background information were 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.*

N/A

**331 Content of program**

*A transitional environmental program must—*

*(a) state the objectives to be achieved and maintained under the program for an activity; and*

Yes

*(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*

Yes

*(ii) the risks of environmental harm being caused by the activity; and*

Yes. Risks are being managed through monitoring and reporting and the commitment from the mine to adopt 'no release' approach if water quality parameters exceed set limits.

(c) state appropriate performance indicators at intervals of not more than 6 months; and  
Yes

(d) make provision for monitoring and reporting compliance with the program.  
Yes – see earlier sections.

343 Failure to approve draft program taken to be refusal  
Decision to approve was made within the 20 BD timeframe.

### 3.0 RECOMMENDATION

Considering the information provided from technical experts within DERM, draft TEP MAN10919 poses a low risk of causing environmental harm. It is recommended that this draft TEP be approved with conditions, and the attached notice and certificate sent to the client advising of the decision.

██████████  
Senior Environment Officer (Environmental Services – Mining)

Signed –

Date -

Reviewed & Endorsed By	
Reviewer	Delegate
██████████	██████████
A/Principal Environmental Officer	A/Manager
Signed –	Signed –
Date	Date:

Sample date: 1/02/2010 , 2/02/2010 , 02/02/2010 , 03/02/2010 , 03/02/2010 , 04/02/2010

EA005P: pH by PC Titrator	0.01	7.72	7.64	7.73	7.84	7.7	7.79
6.5-9.0							
EA010P: Conductivity by PC Titrator							
315	1	118	128	124	140	139	153
EA025: Suspended Solids							
1170	1	1240	2070	494	336	482	253
EA045: Turbidity							
	0.1	260	370	140	95	260	150
ED040F: Dissolved Major Anions							
250	1	1	1	1	2	2	2
Sulphate as SO4 2-							
EG020F: Dissolved Metals by ICP-MS							
0.65	0.01	0.16	0.24	0.34	0.32	0.38	0.37
Aluminium	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
0.013	0.001	<0.001	<0.001	0.0001	<0.001	<0.001	0.0001
Arsenic	0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0001
0.0002	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
0.003	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
0.09	0.001	0.003	0.003	0.003	0.003	0.003	0.003
Cobalt	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
0.013	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	0.001	0.004	0.002	0.006	0.004	0.004	0.007
0.01	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
0.034	0.001	0.003	0.003	0.003	0.003	0.003	0.003
Molybdenum	0.001	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
0.011	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
0.01	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Silver	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
0.001	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Uranium	0.01	0.069	0.066	0.133	0.037	0.046	0.051
Vanadium	0.005	0.05	0.06	0.05	<0.05	<0.05	<0.05
0.008	0.05	0.13	0.2	0.27	0.23	0.28	0.23
0.37	0.05						
0.52							
Iron							
EK055G: Ammonia as N by Discrete Analyser							
0.9	0.01	0.04	0.1	0.13	0.05	0.13	0.02
Ammonia as N							
EK058G: Nitrate as N by Discrete Analyser							
1.1	0.01	<0.01	0.02	0.04	<0.01	<0.01	<0.01
Nitrate as N							
EP080/071: Total Petroleum Hydrocarbons							
20	20	<20	<20	<20	<20	<20	<20
C6 - C9 Fraction							

	C10 - C14 Fraction	C15 - C28 Fraction	C29 - C36 Fraction	C10 - C36 Fraction (sum)	EG035F: Dissolved Mercury by FIMS	Mercury
100	<50 µg/L	50	<50	<50	<0.0001	<0.0001
100	<100 µg/L	100	<100	<100	<0.0001	<0.0001
100	<50 µg/L	50	<50	<50	<0.0001	<0.0001
100	<50 µg/L	50	<50	<50	<0.0001	<0.0001
0.0002						



Variable	Category	Frequency	Percentage	Mean	SD	Median	Mode	Skewness	Kurtosis	Significance
Age	<50	150	30.0%	45.0	10.0	40.0	40.0	-0.5	2.5	<0.0001
	50-100	100	20.0%	75.0	20.0	70.0	70.0	0.5	2.5	<0.0001
	100-150	80	16.0%	120.0	25.0	110.0	110.0	0.5	2.5	<0.0001
	>150	60	12.0%	180.0	30.0	170.0	170.0	0.5	2.5	<0.0001
Gender	Male	180	36.0%	45.0	10.0	40.0	40.0	-0.5	2.5	<0.0001
	Female	120	24.0%	75.0	20.0	70.0	70.0	0.5	2.5	<0.0001
	Other	80	16.0%	120.0	25.0	110.0	110.0	0.5	2.5	<0.0001
	Unknown	60	12.0%	180.0	30.0	170.0	170.0	0.5	2.5	<0.0001
Education	<High School	100	20.0%	45.0	10.0	40.0	40.0	-0.5	2.5	<0.0001
	High School	120	24.0%	75.0	20.0	70.0	70.0	0.5	2.5	<0.0001
	College	80	16.0%	120.0	25.0	110.0	110.0	0.5	2.5	<0.0001
	Postgraduate	60	12.0%	180.0	30.0	170.0	170.0	0.5	2.5	<0.0001
Income	<5000	150	30.0%	45.0	10.0	40.0	40.0	-0.5	2.5	<0.0001
	5000-10000	100	20.0%	75.0	20.0	70.0	70.0	0.5	2.5	<0.0001
	10000-15000	80	16.0%	120.0	25.0	110.0	110.0	0.5	2.5	<0.0001
	>15000	60	12.0%	180.0	30.0	170.0	170.0	0.5	2.5	<0.0001
Marital Status	Single	100	20.0%	45.0	10.0	40.0	40.0	-0.5	2.5	<0.0001
	Married	120	24.0%	75.0	20.0	70.0	70.0	0.5	2.5	<0.0001
	Divorced	80	16.0%	120.0	25.0	110.0	110.0	0.5	2.5	<0.0001
	Widowed	60	12.0%	180.0	30.0	170.0	170.0	0.5	2.5	<0.0001
Occupation	Unemployed	100	20.0%	45.0	10.0	40.0	40.0	-0.5	2.5	<0.0001
	Self-employed	120	24.0%	75.0	20.0	70.0	70.0	0.5	2.5	<0.0001
	Employed	80	16.0%	120.0	25.0	110.0	110.0	0.5	2.5	<0.0001
	Retired	60	12.0%	180.0	30.0	170.0	170.0	0.5	2.5	<0.0001
Health Status	Good	150	30.0%	45.0	10.0	40.0	40.0	-0.5	2.5	<0.0001
	Fair	100	20.0%	75.0	20.0	70.0	70.0	0.5	2.5	<0.0001
	Poor	80	16.0%	120.0	25.0	110.0	110.0	0.5	2.5	<0.0001
	Unknown	60	12.0%	180.0	30.0	170.0	170.0	0.5	2.5	<0.0001



[illegible]



Variable	Category	Count	Percentage	Mean	SD	Median	Mode	Skewness	Kurtosis	Shapiro-Wilk	Normality
Age	<50	120	30.0%	45.0	10.0	40.0	40.0	-0.5	2.0	0.95	<0.0001
	50-59	180	45.0%	55.0	12.0	50.0	50.0	-0.2	1.5	0.98	<0.0001
	60-69	150	37.5%	65.0	11.0	60.0	60.0	0.1	1.8	0.96	<0.0001
	≥70	100	25.0%	75.0	9.0	70.0	70.0	0.3	2.2	0.94	<0.0001
Gender	Male	200	50.0%	55.0	12.0	50.0	50.0	-0.1	1.6	0.97	<0.0001
	Female	200	50.0%	55.0	12.0	50.0	50.0	0.1	1.6	0.97	<0.0001
	Other	10	2.5%	55.0	12.0	50.0	50.0	0.0	1.5	0.98	<0.0001
	Unknown	10	2.5%	55.0	12.0	50.0	50.0	0.0	1.5	0.98	<0.0001
Education	<High School	100	25.0%	45.0	10.0	40.0	40.0	-0.3	2.5	0.92	<0.0001
	High School	150	37.5%	55.0	12.0	50.0	50.0	-0.1	1.8	0.96	<0.0001
	College	120	30.0%	65.0	11.0	60.0	60.0	0.1	1.9	0.95	<0.0001
	Postgraduate	80	20.0%	75.0	9.0	70.0	70.0	0.2	2.1	0.94	<0.0001
Income	<\$10,000	100	25.0%	45.0	10.0	40.0	40.0	-0.4	3.0	0.91	<0.0001
	\$10,000-\$20,000	150	37.5%	55.0	12.0	50.0	50.0	-0.2	2.0	0.95	<0.0001
	\$20,000-\$30,000	120	30.0%	65.0	11.0	60.0	60.0	0.1	1.9	0.95	<0.0001
	>\$30,000	80	20.0%	75.0	9.0	70.0	70.0	0.2	2.1	0.94	<0.0001
Marital Status	Single	100	25.0%	45.0	10.0	40.0	40.0	-0.3	2.5	0.92	<0.0001
	Married	150	37.5%	55.0	12.0	50.0	50.0	-0.1	1.8	0.96	<0.0001
	Divorced	120	30.0%	65.0	11.0	60.0	60.0	0.1	1.9	0.95	<0.0001
	Widowed	80	20.0%	75.0	9.0	70.0	70.0	0.2	2.1	0.94	<0.0001
Health Status	Excellent	100	25.0%	45.0	10.0	40.0	40.0	-0.3	2.5	0.92	<0.0001
	Good	150	37.5%	55.0	12.0	50.0	50.0	-0.1	1.8	0.96	<0.0001
	Fair	120	30.0%	65.0	11.0	60.0	60.0	0.1	1.9	0.95	<0.0001
	Poor	80	20.0%	75.0	9.0	70.0	70.0	0.2	2.1	0.94	<0.0001

16/03/201C-17/03/201C	18/03/201C	19/03/201C	20/03/201C	21/03/201C	22/03/201C	Mean	Median	50th	85th	90th	95th
8.38	8.26	8.42	8.55	8.56	8.48	8.29	8.0	8.0	8.3	8.4	8.4
500	525	538	565	573	569	433	272	242	242.0	420.7	547.5
<1	27	39	10	6	8	46	548	228	228.0	1105.0	2080.0
5.1	5.9	11	5.2	7.4	10	55	192	75	75.0	490.0	659.0
4	5	5	5	6	5	4	2	2	2.0	4.0	5.0
<0.01	<0.01	<0.01	0.01	<0.01	0.03	0.06	0	0	0.1	0.3	0.4
0.001	0.001	0.001	<0.001	0.001	0.001	<0.001	0	0	0.0	0.0	0.0
<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	0	0.0	0.0	0.0
0.002	0.002	0.002	<0.001	<0.001	<0.001	<0.001	0	0	0.0	0.0	0.0
<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0	0	0.0	0.0	0.0
0.001	0.001	<0.001	0.002	0.002	0.002	0.002	0	0	0.0	0.0	0.0
<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0	0	0.0	0.0	0.0
<0.001	<0.001	<0.001	<0.001	<0.001	0.002	0.003	0	0	0.0	0.0	0.0
<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0	0	0.0	0.0	0.0
0.002	0.002	0.002	0.002	0.001	0.002	0.002	0	0	0.0	0.0	0.0
<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					
<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001					
<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001					
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0	0	0.0	0.0	0.0
<0.005	<0.005	<0.005	<0.005	<0.005	0.006	<0.005	0	0	0.0	0.1	0.1
<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	0	0.1	0.1	0.1
<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	0	0.1	0.3	0.5
0.03	0.17	0.03	0.04	<0.01	<0.01	0.01	0	0	0.0	0.1	0.2
0.02	0.05	0.05	0.03	0.01	<0.01	0.02	0	0	0.0	0.1	0.1
<20	<20	<20	<20	<20	<20	<20					

<50	<50	<50	<50	<50	<50	<50	<50	80	80	80.0	80.0	80.0
<100	<100	<100	<100	<100	<100	<100	<100	120	120	120.0	120.0	120.0
<50	<50	<50	<50	<50	<50	<50	<50	80	80	80.0	105.0	107.5
<50	<50	<50	<50	<50	<50	<50	<50	104	100	100.0	127.5	159.0
<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	0	0.0	0.0	0.0

From: [REDACTED]  
Sent: Wednesday, 13 October 2010 10:11 AM  
To: [REDACTED]  
Subject: RE: TEP proposal comments

[REDACTED]  
As discussed, I'll incorporate all of your suggestions.

Turbidity data – yes we have a turbidity meter and happy to use that as a surrogate for TSS. You just have to be mindful that they don't always correlate well though having said that unpublished DERM data captured by Bill Wilkinson suggests that in catchments dominated by heavy clay soils, there is a general correlation that 1000ntu's is approximately 1g/L TSS.

Re Release Point 1: RP1 is where the water will enter Bootes Creek. All samples for all discharges occur at end of pipe, or in this case at the spillway/weir you and Ed looked at.

Cheers  
[REDACTED]

From: [REDACTED]  
Sent: Wednesday, 13 October 2010 9:47 AM  
To: [REDACTED]  
Subject: RE: TEP proposal comments

[REDACTED]  
Thanks for the feedback.

Can you please select limits that you think you can stay under at the designated monitoring location, if discharging from Spring Creek Dam?

pH top limit?  
pH bottom limit?  
EC limit?  
TSS limit?

TSS/T:  
Point number 9: [REDACTED] has just show me a recent discharge notification from Rolleston Mine with Turbidity data.

You don't have a TSS meter or Turbidity meter ? Can you acquire one? Borrow one?

How about just EC, pH, TSS or T, temperature, and volume?

Another discussion has just occurred in our office in regards to your sampling/monitoring location. In the TEP it is stated as Release Point 1 (correct?). On the map in the TEP it appears to be quite a distance from the dam (correct?). Do you think the water's journey from the dam to release point 1 is going to change the quality of the water for the better/worse/not at all? Particularly TSS/T?

If there is an undisturbed swamp in between the dam and the release point, it may improve the water quality coming out the bottom before release point 1. However, if the water is going to pass over disturbed soil between the dam and the monitoring point, the TSS and other parameters may change at the monitoring point.

Have you considered this aspect?

Cheers,

[REDACTED]

From: [REDACTED]  
Sent: Wednesday, 13 October 2010 7:17 AM  
To: [REDACTED]  
Cc: [REDACTED]  
Subject: RE: TEP proposal comments

[REDACTED]

Thanks for promptly getting back to us with feedback.

Before I start with making the suggested changes to the TEP I just need to question some of [REDACTED] recommendations. [REDACTED] recommends more stringent limits closer to ambient WQ. This is a fair call however some of the suggested limits are unrealistic and anything but close to the ambient WQ levels.

[REDACTED] recommends:

- EC limits 340-510  $\mu\text{S}/\text{cm}$  (75<sup>th</sup>-90<sup>th</sup> percentile). Quite reasonable.
- pH 8.5 max. This will often be difficult to achieve as the local environment is very alkaline with soil and water pH generally in excess of 8. The last water quality analysis of Spring Creek dam water (taken 29/09/10) had the pH at 8.71.
- suspended solids 10-20mg/L. This one may be considered unrealistic. The EA limit for discharge water is 1200mg/L. Upstream Bootes Creek water quality analysis has the background suspended load at 228mg/L for the 50<sup>th</sup> percentile and 1270mg/L for the 90<sup>th</sup> percentile. A limit of 10-20mg/L is completely unreasonable.
- Using ntu's as a surrogate to determine suspended loads is unreliable often with a poor and/or inconsistent correlation. To use ntu's is a high risk option as when lab analyses come back there is a reasonable probability that exceedences of suspended loads will occur. If you choose to go with ntu's you will need to be happy with field recordings and no lab analysis or TSS.

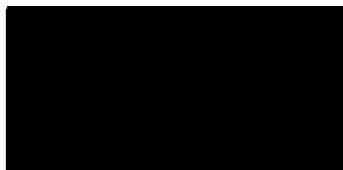
Point number 9 refers to page 8 and requests a statement in the TEP indicating sample frequency. [REDACTED] has suggested daily sampling AND report the main (EC, pH, TSS, T, volume) on a daily basis. Presumably T = turbidity. If so there is not much point if TSS is being reported. Also it is not possible to report TSS on a daily basis as it requires sending off for lab analysis. My suggestion is the do something similar to the previous TEP for pumping the water from Spring Creek Pit to Spring Creek dam where we sampled in-situ for EC, pH and temp. The first TEP had us doing this weekly though in this instance I would suggest we did it daily. Accompanying this we could take up [REDACTED] suggestion to undertake and report monthly on water discharge quality (all parameters) during the life of the TEP.

Thanks again for the feedback  
Regards

[REDACTED]

Environment & Community Manager  
Rolleston Coal  
Xstrata Coal Queensland  
PO Box 11

Springsure QLD 4722



From: [REDACTED]  
Sent: Tuesday, 12 October 2010 2:37 PM  
To: [REDACTED] (Rolleston - Coal)  
Subject: TEP proposal comments



Comments on the latest TEP proposal are attached.

Your EA is also attached for cut and pasting (see comments about that).

Please call me if any comments don't make sense.

Good luck with the edits.



+-----+  
Think B4U Print

1 ream of paper = 6% of a tree and 5.4kg CO2 in the atmosphere

3 sheets of A4 paper = 1 litre of water  
+-----+

\*\*\*\*\*  
This email and any files transmitted with it are confidential and intended solely for the use of the individual or entity to whom they are addressed. If you have received this email in error please notify the sender immediately.  
\*\*\*\*\*

**From:** [REDACTED]  
**Sent:** Wednesday, 13 October 2010 9:50 AM  
**To:** [REDACTED]  
**Subject:** FW: Rolleston TEP

**Importance:** High

**From:** [REDACTED]  
**Sent:** Wednesday, 13 October 2010 9:30 AM  
**To:** [REDACTED]  
**Cc:** [REDACTED]  
**Subject:** RE: Rolleston TEP  
**Importance:** High

Hi [REDACTED]

I am in meeting much of today but I had a quick look at the data you provided.

I think it would expedite things if you were able to propose/summarise the limits for the TEP that you desire to release the water and you believe won't cause any environmental harm. Given you want to discharge continuously I suggest the limits would be more stringent than the current EA. A summary of how these were derived would assist with the decision (you should also provide the raw data/calculations). I would focus mainly on the indicators that have limits in your current EA.

The reference based approach for environmental assessment is to derive the 80<sup>th</sup> percentile from the upstream sites (obviously you have to do the best with the data you have but you should state the date range and number of samples used) for all indicators except EC for which you use 75<sup>th</sup> percentile. You may suggest using a turbidity limit instead of SS limit for regulation for ease of assessment – I don't believe this will be a major problem for you in terms of compliance looking at the data. The pH may be more of an issue given the upstream site 80<sup>th</sup> percentile will probably be around 8. If you need a higher limit, you should look at a higher percentile to justify. Also please confirm that the upstream water is not mine affected.

I hope this assists. Please include [REDACTED] in any correspondence because ultimately it will be their decision to approve any TEP.

Cheers,

[REDACTED]

Chief Scientist  
Water Quality & Aquatic Ecosystem Health  
Department of Environment & Resource Management  
EPA Building, 80 Meiers Road  
Indooroopilly Q 4068

Phone [REDACTED]  
Mobile [REDACTED]  
Fax [REDACTED]

---

**From:** [REDACTED]  
**Sent:** Wednesday, 13 October 2010 8:18 AM  
**To:** [REDACTED]  
**Cc:** [REDACTED]  
**Subject:**

Hi [REDACTED]

By way of introduction, I am the Environment and Community Manager at Rolleston Coal.

I've read your comments on the TEP submitted to DERM's Emerald office seeking permission to release impounded water into Bootes Creek, a tributary to Meteor Creek and eventually the Comet River.

I am aware that your comments were based on just the one set of analytical data contained in the TEP application. Attached is a more complete set of data for both Spring Creek dam as well as Spring Creek Pit which is where the water in the dam has come from.

Also attached is all the ambient water quality data for Bootes and Meteor creeks taken in 2010. This should provide useful background information for making recommendations for release limits associated with the TEP. Given the suggestions you've already made were, I believe, in absence of the complete picture of ambient water quality I am requesting that you review your recommendations particularly in relation to suspended solids and pH.

This is a high priority issue for Rolleston Coal due to the high water levels in Spring Creek dam and the seasonal forecast for La Nina weather conditions.

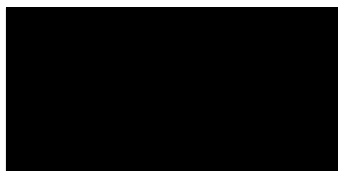
If required [REDACTED] and I could come and discuss this with you tomorrow or Friday.

Thanks for you time and consideration.

Regards

[REDACTED]

Environment & Community Manager  
Rolleston Coal  
Xstrata Coal Queensland  
PO Box 11  
Springsure QLD 4722



\*\*\*\*\*  
This email and any files transmitted with it are confidential and intended solely for the use of the individual or entity to whom they are addressed. If you have received this email in error please notify the sender immediately.  
\*\*\*\*\*

From: [REDACTED]  
Sent: Wednesday, 13 October 2010 10:01 AM  
To: [REDACTED]  
Subject: FW: Rolleston TEP  
Hi [REDACTED]

See email below.

Regards,  
[REDACTED]

---

From: [REDACTED]  
Sent: Wednesday, 13 October 2010 9:51 AM  
To: [REDACTED]  
Subject: FW: Rolleston TEP

[REDACTED] - Please advise [REDACTED] that all contact needs to be directed through you initially.

---

From: [REDACTED]  
Sent: Wednesday, 13 October 2010 9:36 AM  
To: [REDACTED]  
Cc: [REDACTED]  
Subject: RE: Rolleston TEP

Thanks [REDACTED]  
I'll do as you've suggested.  
Yes - the upstream data provided is not mine affected.  
Regards  
[REDACTED]

---

From: [REDACTED]  
Sent: Wednesday, 13 October 2010 9:30 AM  
To: [REDACTED] (Rolleston - Coal)  
Cc: [REDACTED]  
Subject: RE: Rolleston TEP  
Importance: High

Hi [REDACTED]

I am in meeting much of today but I had a quick look at the data you provided.

I think it would expedite things if you were able to propose/summarise the limits for the TEP that you desire to release the water and you believe won't cause any environmental harm. Given you want to discharge continuously I suggest the limits would be more stringent than the current EA. A summary of how these were derived would assist with the decision (you should also provide the raw data/calculations). I would focus mainly on the indicators that have limits in your current EA.

The reference based approach for environmental assessment is to derive the 80<sup>th</sup> percentile from the upstream sites (obviously you have to do the best with the data you have but you should state the date range and number of samples use) for all indicators except EC for which you use 75<sup>th</sup> percentile. You may suggest using a turbidity limit instead of SS limit for regulation for ease of assessment - I don't believe this will be a major problem for you in terms of compliance looking at the data. The pH may be more of an issue given the upstream site 80<sup>th</sup> percentile will probably be around 8. If you need a higher limit, you should look at a higher percentile to justify. Also please confirm that the upstream water is not mine affected.

I hope this assists. Please include [REDACTED] in any correspondence because ultimately it will be their

decision to approve any TEP.

Cheers,

[Redacted]

Chief Scientist  
Water Quality & Aquatic Ecosystem Health  
Department of Environment & Resource Management  
EPA Building, 80 Meiers Road  
Indooroopilly Q 4068

Phone [Redacted]

Mobile [Redacted]

Fax [Redacted]

of an Individual

From: [Redacted]  
Sent: Wednesday, 13 October 2010 8:18 AM  
To: [Redacted]  
Cc: [Redacted]  
Subject:

Hi [Redacted]

By way of introduction, I am the Environment and Community Manager at Rolleston Coal.

I've read your comments on the TEP submitted to DERM's Emerald office seeking permission to release impounded water into Bootes Creek, a tributary to Meteor Creek and eventually the Comet River.

I am aware that your comments were based on just the one set of analytical data contained in the TEP application. Attached is a more complete set of data for both Spring Creek dam as well as Spring Creek Pit which is where the water in the dam has come from.

Also attached is all the ambient water quality data for Bootes and Meteor creeks taken in 2010. This should provide useful background information for making recommendations for release limits associated with the TEP. Given the suggestions you've already made were, I believe, in absence of the complete picture of ambient water quality I am requesting that you review your recommendations particularly in relation to suspended solids and pH.

This is a high priority issue for Rolleston Coal due to the high water levels in Spring Creek dam and the seasonal forecast for La Nina weather conditions.

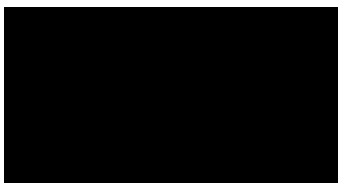
If required [Redacted] and I could come and discuss this with you tomorrow or Friday.

Thanks for your time and consideration.

Regards

[Redacted]

Environment & Community Manager  
Rolleston Coal  
Xstrata Coal Queensland  
PO Box 11  
Springsure QLD 4722



\*\*\*\*\*

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\*\*\*\*\*

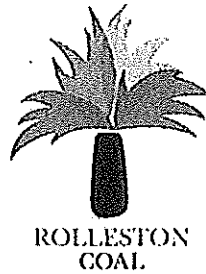
+-----+

Think B4U Print

1 ream of paper = 6% of a tree and 5.4kg CO2 in the atmosphere

3 sheets of A4 paper = 1 litre of water

+-----+



# Rolleston Coal Mine

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*Spring Creek Dam and Spring Creek Pit Water Quality Results*

May - September 2010

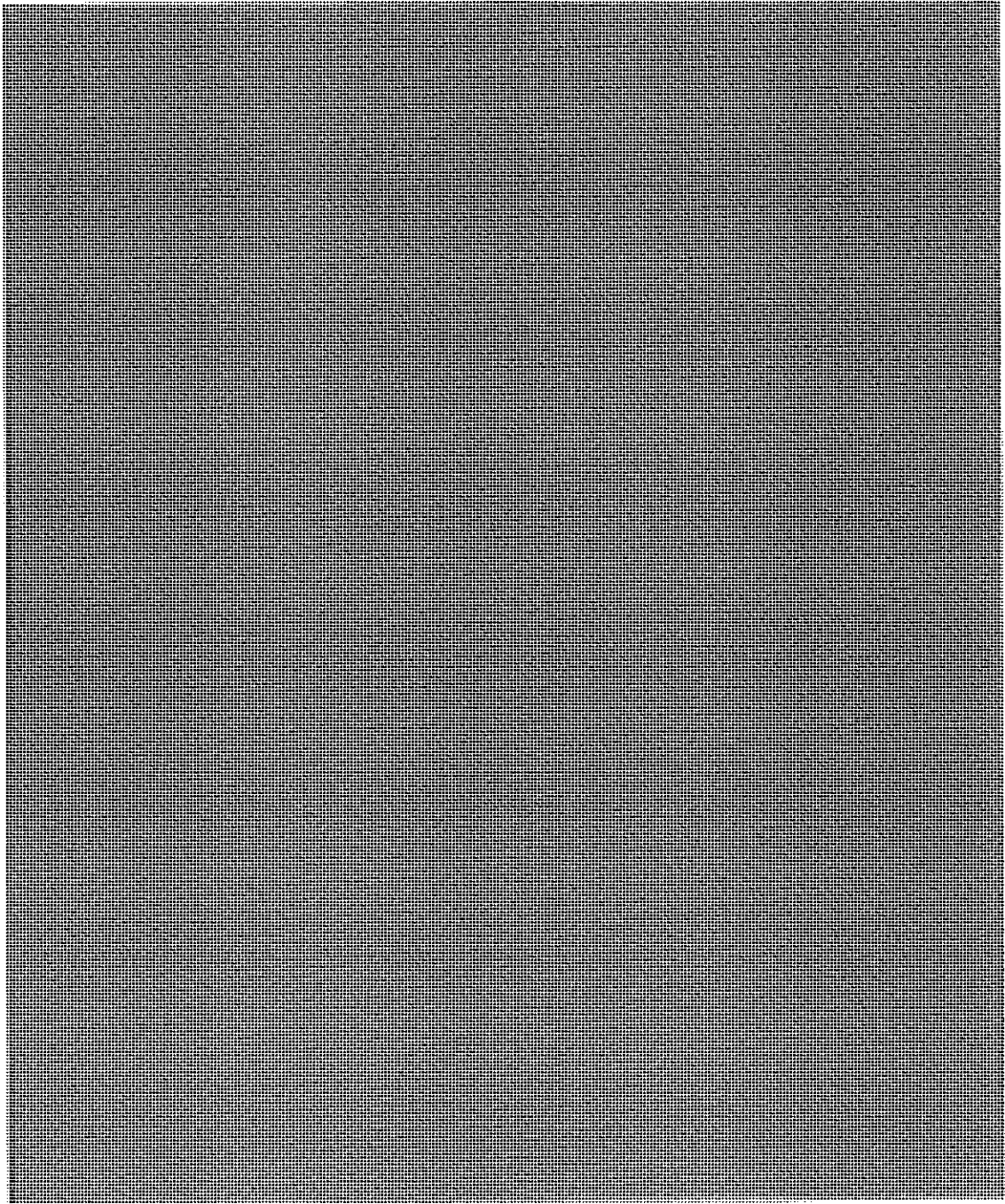


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## **Table of Contents**

1. Rolleston Coal EA Approved Monitoring and Release Points .....	4
2. Weekly Spring Creek Dam Water Quality Results .....	5
3. Spring Creek Dam Laboratory Results .....	9
4. Spring Creek Pit Weekly Water Quality Results.....	10
5. Spring Creek Pit Laboratory Results .....	14

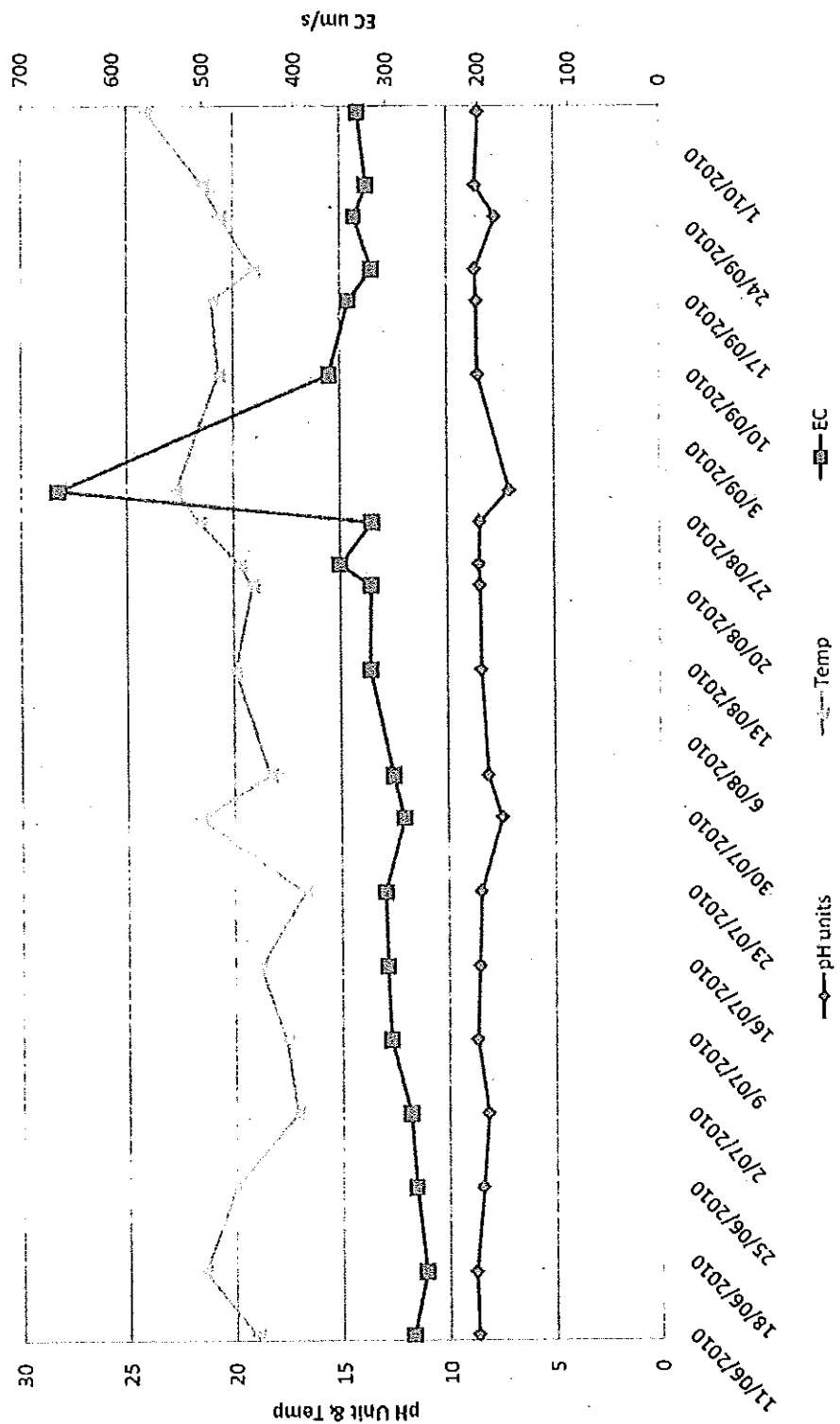
## **1. Reliance Coal EA Monitoring and Release Points**



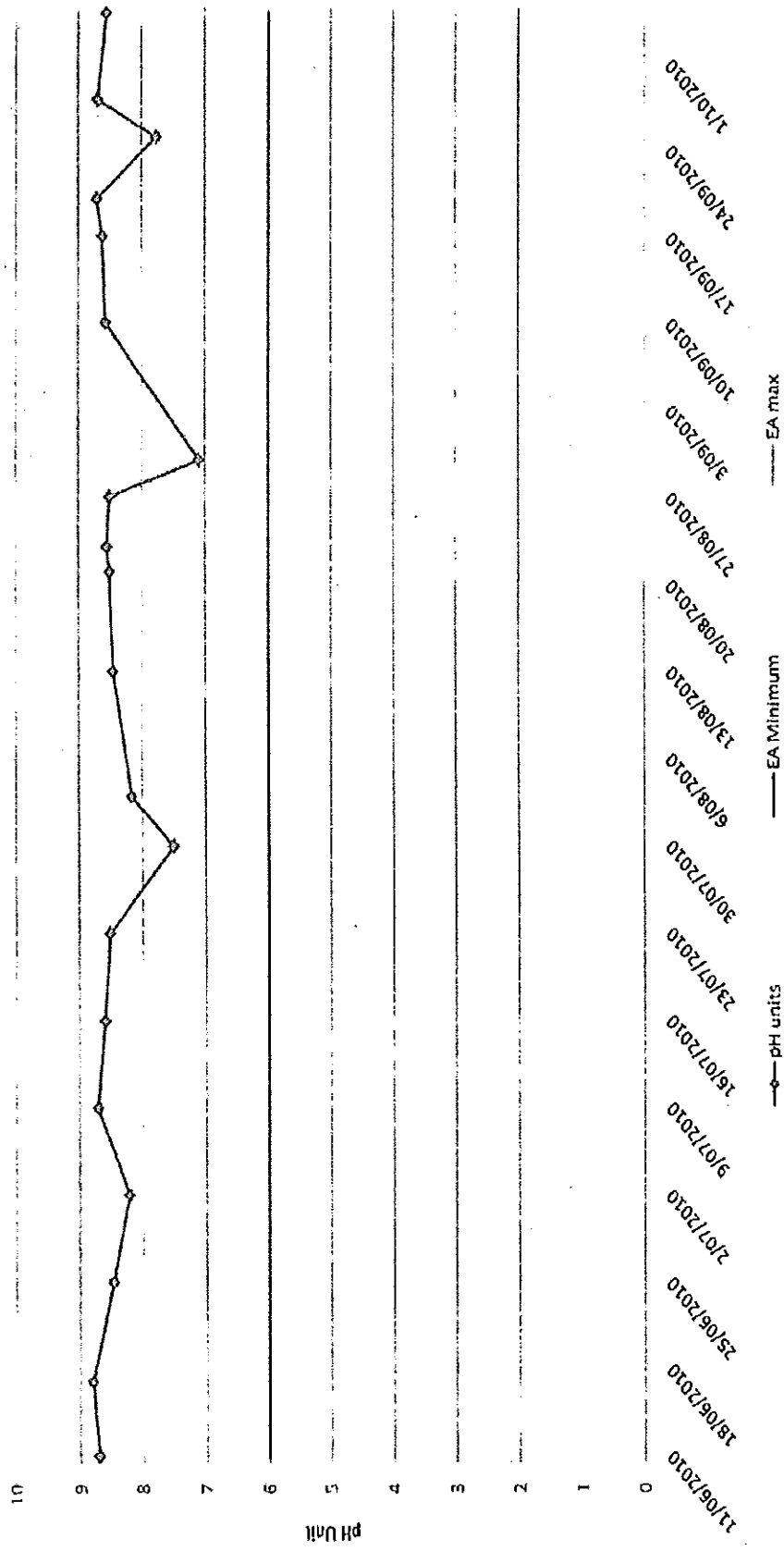
## 2. Weekly Spring Creek Dam Water Quality Results

Spring Creek Dam Water Quality				
	pH	EC	Temp	Turbidity
Date	pH units	uS/cm	°C	
11/06/2010	8.7	274	19	
17/06/2010	8.8	260	21.5	
25/06/2010	8.48	271	20	
2/07/2010	8.22	276	17.1	
9/07/2010	8.71	297	17.6	
16/07/2010	8.6	301	18.8	
23/07/2010	8.53	303	16.7	
30/07/2010	7.5	282	21.6	
3/08/2010	8.17	294	18.3	
13/08/2010	8.47	318	19.9	
21/08/2010	8.52	317	19.1	
27/08/2010	8.52	316	21.6	
30/08/2010	7.1	660	22.7	
10/09/2010	8.58	362	20.7	
17/09/2010	8.63	341	21	
20/09/2010	8.71	316	19	
23/09/2010	8.56	351	19.7	85.6
25/09/2010	7.77	335	20.6	60.7
28/09/2010	8.7	322	21.4	30.2
5/10/2010	8.57	331	24.14	14.5

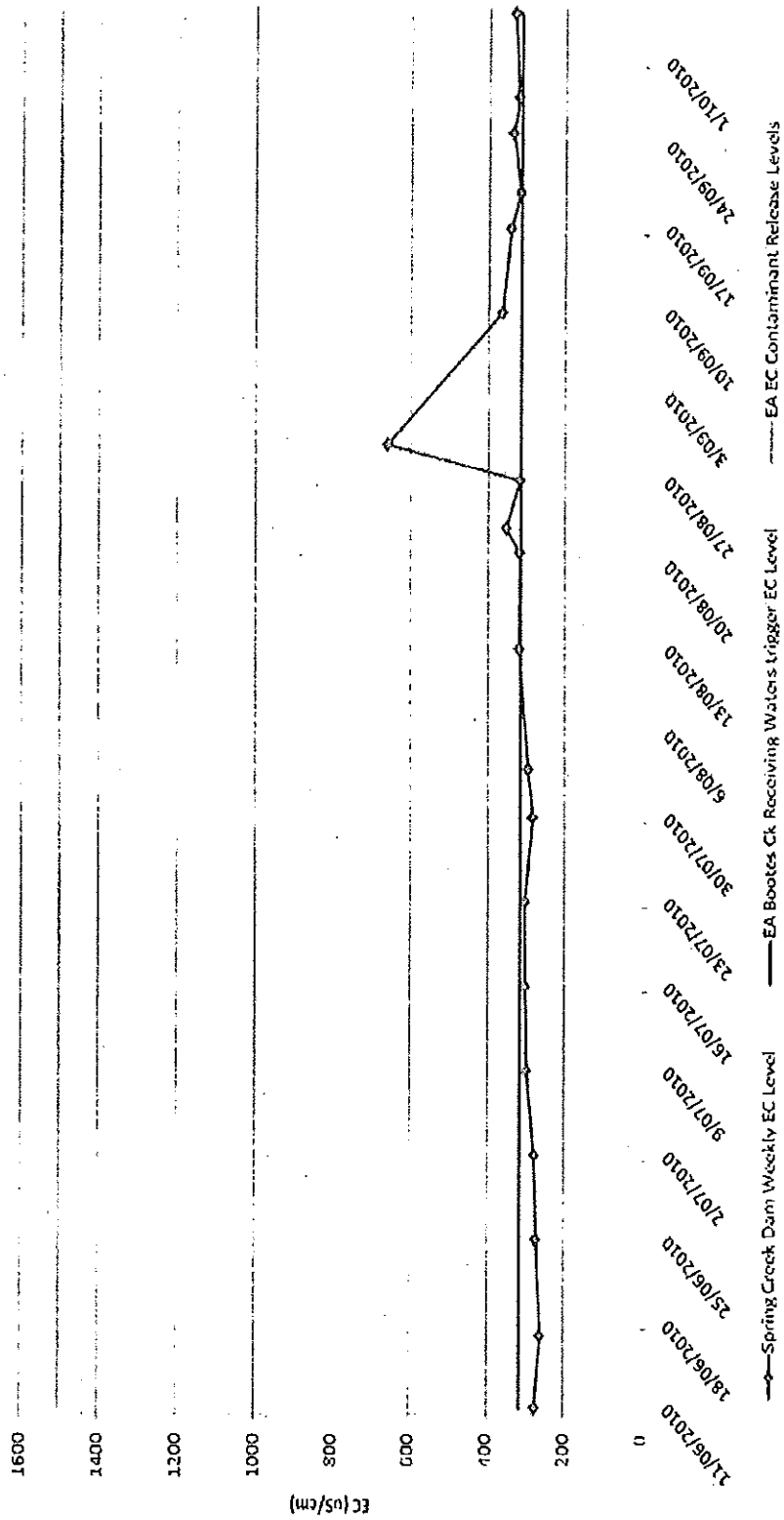
# Spring Creek Dam Water Quality



# Spring Creek Dam Weekly pH Levels vs EA Requirements



# Spring Creek Dam Weekly EC Levels vs EA Requirements



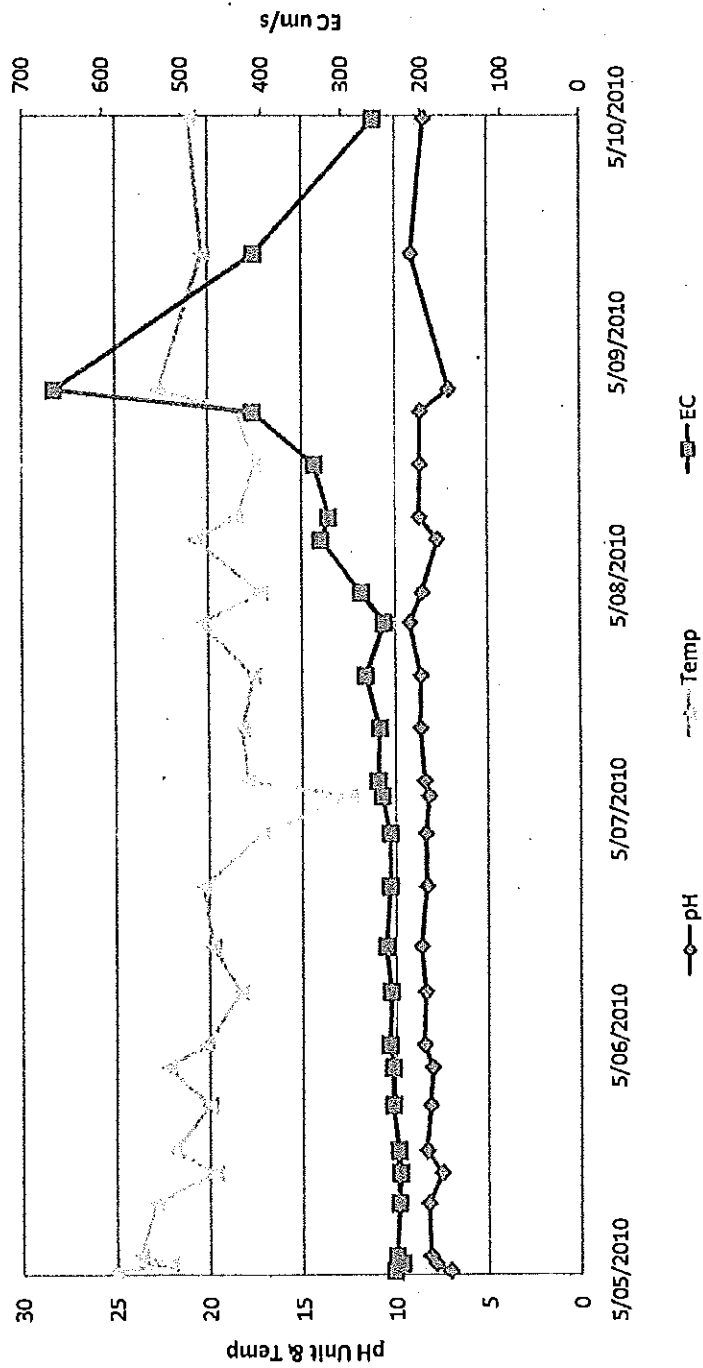
### 3. Spring Creek Dam Laboratory Results

Spring Creek Dam Lake McDonald				WORKGROUP		E8101M71_Q_XTAB.XLT	E8101S107_Q_XTAB.XLT	E8101S107_Q_XTAB.XLT	E8101S107_Q_XTAB.XLT	E8101S107_Q_XTAB.XLT	E8101S107_Q_XTAB.XLT	E8101S107_Q_XTAB.XLT
WATER						REG	REG	REG	REG	REG	REG	REG
Project name/number						E8101M71_Q_XTAB.XLT	E8101S107_Q_XTAB.XLT	E8101S107_Q_XTAB.XLT	E8101S107_Q_XTAB.XLT	E8101S107_Q_XTAB.XLT	E8101S107_Q_XTAB.XLT	E8101S107_Q_XTAB.XLT
						04/08/2010	14/08/2010	20/09/2010	23/09/2010	25/09/2010	26/09/2010	26/09/2010
						Spring Dam	SPRING DAM	Spring CA Dam End Ppt	Spring CA Dam End Ppt	Spring CA Dam	Spring CA Dam	Spring CA Dam
Analyte grouping/Analyte	CAS Number	Units	Units									
EA009F: pH by PC Titration		pH Unit	pH Unit			8.05	7.4	8.29	8.47	8.59	8.71	
EA110F: Conductivity by PC Titration		µS/cm	µS/cm			310	310	300	300	300	332	
EA111F: Total Dissolved Solids		mg/L	mg/L			201	207					
EA112F: Suspended Solids		mg/L	mg/L			5	44	24	144	20	25	
EA113F: Turbidity		NTU	NTU			0.4		21	100	21	19	
EA001F: Acidity by PC Titration	1400-210-021	mg/L	mg/L			<1	<1	<1	<1	<1	<1	
EA002F: Alkalinity as CaCO3	71-52-3	mg/L	mg/L			150	140	147	145	147	131	
EA003F: Total Alkalinity as CaCO3		mg/L	mg/L			150	131	151	148	150	140	
EA004F: Dissolved Major Anions		mg/L	mg/L			2	3	2	2	2	2	
EA005F: Total Major Anions		mg/L	mg/L									
EA006F: Chloride by PC Titration		mg/L	mg/L			12	24	19	17	16	16	
EA007F: Dissolved Major Cations		mg/L	mg/L			17	17	16	16	16	16	
EA008F: Calcium		mg/L	mg/L			12	11	12	11	12	12	
EA009F: Magnesium		mg/L	mg/L			35	45	36	40	37	35	
EA010F: Sodium		mg/L	mg/L			2	2	2	2	2	2	
EA011F: Potassium		mg/L	mg/L									
EA012F: Dissolved Metals by ICP-AES		mg/L	mg/L									
EA013F: Total Metals by ICP-AES		mg/L	mg/L									
EA014F: Dissolved Metals by ICP-AES		mg/L	mg/L									
EA015F: Aluminum		mg/L	mg/L			0.01	0.01	0.01	0.01	0.01	0.01	
EA016F: Arsenic		mg/L	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
EA017F: Cadmium		mg/L	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
EA018F: Chromium		mg/L	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
EA019F: Cobalt		mg/L	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
EA020F: Copper		mg/L	mg/L			0.001	0.001	0.001	0.001	0.001	0.001	
EA021F: Lead		mg/L	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
EA022F: Manganese		mg/L	mg/L			0.001	0.001	0.001	0.001	0.001	0.001	
EA023F: Molybdenum		mg/L	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
EA024F: Nickel		mg/L	mg/L			0.001	0.001	0.001	0.001	0.001	0.001	
EA025F: Selenium		mg/L	mg/L			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
EA026F: Silver		mg/L	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
EA027F: Uranium		mg/L	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
EA028F: Vanadium		mg/L	mg/L			0.01	0.01	0.01	0.01	0.01	0.01	
EA029F: Zinc		mg/L	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
EA030F: Boron		mg/L	mg/L			0.1	0.1	0.1	0.1	0.1	0.1	
EA031F: Iron		mg/L	mg/L			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
EA032F: Total Metals by ICP-AES		mg/L	mg/L									
EA033F: Aluminum		mg/L	mg/L			0.01	0.01	0.01	0.01	0.01	0.01	
EA034F: Arsenic		mg/L	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
EA035F: Cadmium		mg/L	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
EA036F: Chromium		mg/L	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
EA037F: Cobalt		mg/L	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
EA038F: Copper		mg/L	mg/L			0.001	0.001	0.001	0.001	0.001	0.001	
EA039F: Lead		mg/L	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
EA040F: Manganese		mg/L	mg/L			0.001	0.001	0.001	0.001	0.001	0.001	
EA041F: Molybdenum		mg/L	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
EA042F: Nickel		mg/L	mg/L			0.001	0.001	0.001	0.001	0.001	0.001	
EA043F: Selenium		mg/L	mg/L			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
EA044F: Silver		mg/L	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
EA045F: Uranium		mg/L	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
EA046F: Vanadium		mg/L	mg/L			0.01	0.01	0.01	0.01	0.01	0.01	
EA047F: Zinc		mg/L	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
EA048F: Boron		mg/L	mg/L			0.1	0.1	0.1	0.1	0.1	0.1	
EA049F: Iron		mg/L	mg/L			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
EA050F: Chloride by PC Titration		mg/L	mg/L			0.2	0.3	0.3	0.2	0.2	0.2	
EA051F: Ionic Balance		mg/L	mg/L									
EA052F: Total Anions		mg/L	mg/L			3.37	3.78	3.56	3.48	3.5	3.41	
EA053F: Total Cations		mg/L	mg/L			3.45	3.78	3.64	3.53	3.52	3.41	
EA054F: Ionic Balance		%	%			1.67	0.05	1.14	0.01	0.25	0.03	
EA055F: Total Major Cations		mg/L	mg/L									
EA056F: Calcium		mg/L	mg/L									
EA057F: Magnesium		mg/L	mg/L									
EA058F: Sodium		mg/L	mg/L									
EA059F: Potassium		mg/L	mg/L									
EA060F: Ammonia as N by Discrete Analyzer		mg/L	mg/L									
EA061F: Nitrite as N by Discrete Analyzer		mg/L	mg/L									
EA062F: Nitrate as N by Discrete Analyzer		mg/L	mg/L									
EA063F: Nitrate as N by Discrete Analyzer		mg/L	mg/L									
EA064F: Total Petroleum Hydrocarbons		µg/L	µg/L									
EA065F: C6 - C8 Fraction		µg/L	µg/L									
EA066F: C10 - C14 Fraction		µg/L	µg/L									
EA067F: C15 - C28 Fraction		µg/L	µg/L									
EA068F: C29 - C36 Fraction		µg/L	µg/L									
EA069F: C37 - C46 Fraction (µg/L)		µg/L	µg/L									
EA070F: TPH (µg/L) BTEX Surrogates		µg/L	µg/L									
EA071F: 1,2-Dichlorobenzene-D4		µg/L	µg/L									
EA072F: Toluene-D8		µg/L	µg/L									
EA073F: 4-Bromobenzonitrile		µg/L	µg/L									
EA074F: Total Recoverable Mercury by RMS		mg/L	mg/L									
EA075F: Dissolved Mercury by RMS		mg/L	mg/L									

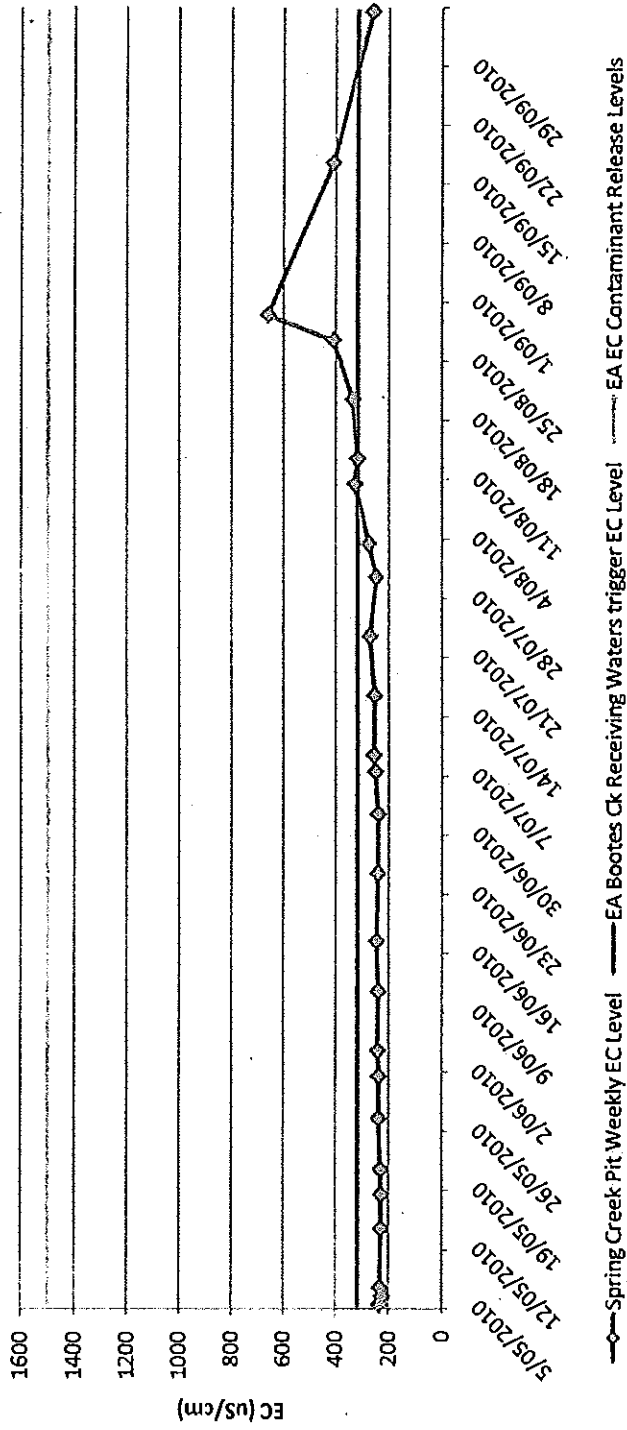
#### 4. Spring Creek Pit Weekly Water Quality Results

Spring Creek Pit Surface Water Quality				
	pH	EC	Temp	Turbidity
Date	pH units	uS/cm	°C	
5/05/2010	7.09	235	25.1	
6/05/2010	7.87	225	22.13	31.4
7/05/2010	8.14	233	23.7	
14/05/2010	8.24	229	22.9	
18/05/2010	7.51	228	19.7	
21/05/2010	8.34	230	21.9	
27/05/2010	8.14	237	20	
1/06/2010	8.03	237	22.23	20.6
4/06/2010	8.47	241	20.2	
11/06/2010	8.39	239	18.3	
17/06/2010	8.61	245	19.8	
25/06/2010	8.31	240	20.3	
2/07/2010	8.36	240	17.2	
7/07/2010	8.19	250	12.4	22
9/07/2010	8.41	255	17.9	
16/07/2010	8.63	253	18.2	
23/07/2010	8.6	270	17.6	
30/07/2010	9.18	247	20.4	
3/08/2010	8.53	275	17.2	
13/08/2010	8.67	316	18.5	
20/08/2010	8.62	334	17.5	
27/08/2010	8.62	411	18.5	
30/08/2010	7.1	660	22.7	
10/08/2010	7.72	326	20.7	
17/09/2010	9.1	410	20.3	
5/10/2010	8.41	260	21.01	651

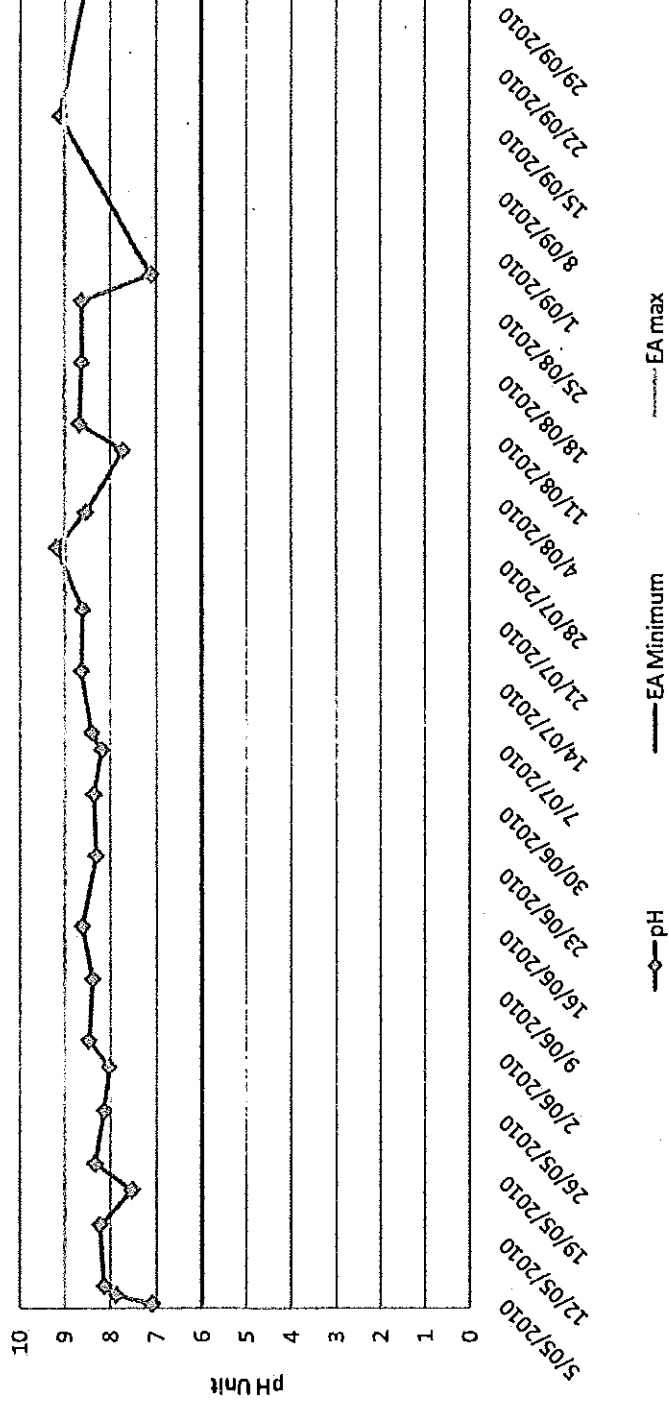
# Spring Creek Pit Water Quality



# Spring Creek Pit Weekly EC Levels vs EA Requirements



# Spring Creek Pit Weekly pH Levels vs EA Requirements



## 5. Spring Creek Pit Laboratory Results

Spring Creek, PA				WORKGROUP		EB1007992_0_XTAB.XLS		EB1007702_0_XTAB		EB1011863_0_XTAB		EB1013771_0_XTAB.XLS		EB1015689_0_XTAB.XLS		EB1016387_0_XTAB.XLS	
WATER				WORKGROUP		REQ		REQ		REQ		REQ		REQ		REQ	
Project Name/Number				Project Name/Number		06/05/2010		07/06/2010		07/07/2010		04/08/2010		02/09/2010		14/09/2010	
SPRING PIT				SPRING PIT		SPRING PIT		SPRING PIT		SPRING PIT		SPRING PIT		Spring Creek PA		SPRING PIT	
Analyte Grouping/Analyte	CAS Number	Units	Units														
Temperature																	
EA005P: pH by PO Tester		pH Unit	pH Unit														
EA006P: Conductivity by PO Tester		µS/cm	µS/cm														
EA019: Total Dissolved Solids	658-219-010	mg/L	mg/L														
EA025: Suspended Solids		mg/L	mg/L														
EA046: Turbidity		NTU	NTU														
ED017P: Acidity by PO Tester	640-210-001	mg/L	mg/L														
Hydroxy Acidity as CaCO3	391331-6	mg/L	mg/L														
Carbonic Acidity as CaCO3	71-52-3	mg/L	mg/L														
Total Acidity as CaCO3		mg/L	mg/L														
ED046P: Dissolved Major Anions	14306-79-8	mg/L	mg/L														
Sulfate as SO4 2-		mg/L	mg/L														
ED047P: Total Major Anions	14306-79-8	mg/L	mg/L														
Sulfate as SO4 2-		mg/L	mg/L														
ED048P: Chloride Dissolve Analyser	16837-00-6	mg/L	mg/L														
Chloride		mg/L	mg/L														
ED049P: Chloride by PO Tester	16837-00-6	mg/L	mg/L														
ED050P: Dissolved Major Cations		mg/L	mg/L														
Calcium	7440-70-2	mg/L	mg/L														
Magnesium	7439-95-4	mg/L	mg/L														
Sodium	7440-23-5	mg/L	mg/L														
Potassium	7440-09-7	mg/L	mg/L														
ED051P: Dissolved Metals by ICP-AES		mg/L	mg/L														
Iron	7439-95-4	mg/L	mg/L														
ED052P: Total Metals by ICP-AES		mg/L	mg/L														
ED053P: Dissolved Metals by ICP-MS		mg/L	mg/L														
Aluminum	7429-90-5	mg/L	mg/L														
Arsenic	7440-38-2	mg/L	mg/L														
Cadmium	7440-43-9	mg/L	mg/L														
Chromium	7440-47-3	mg/L	mg/L														
Cobalt	7440-48-4	mg/L	mg/L														
Copper	7440-50-8	mg/L	mg/L														
Lead	7439-92-1	mg/L	mg/L														
Manganese	7439-96-5	mg/L	mg/L														
Molybdenum	7439-98-7	mg/L	mg/L														
Nickel	7782-49-2	mg/L	mg/L														
Selenium	7440-22-4	mg/L	mg/L														
Silver	7440-51-1	mg/L	mg/L														
Vanadium	7440-63-2	mg/L	mg/L														
Zinc	7440-66-6	mg/L	mg/L														
Boron	7440-42-6	mg/L	mg/L														
Iron	7439-95-4	mg/L	mg/L														
ED054P: Fluoride by PO Tester	10584-42-6	mg/L	mg/L														
Fluoride		mg/L	mg/L														
ED055P: Iodic Balance		mg/L	mg/L														
Total Anions		mg/L	mg/L														
Total Cations		mg/L	mg/L														
Iodic Balance		%	%														
ED057P: Total Major Cations		mg/L	mg/L														
Calcium	7440-70-2	mg/L	mg/L														
Magnesium	7439-95-4	mg/L	mg/L														
Sodium	7440-23-5	mg/L	mg/L														
Potassium	7440-09-7	mg/L	mg/L														
ED058P: Ammonia as N by Chloride Analyser	7664-41-7	mg/L	mg/L														
Ammonia as N		mg/L	mg/L														
ED059P: Nitrate as N by Chloride Analyser		mg/L	mg/L														
Nitrate as N		mg/L	mg/L														
ED060P: Nitrate as N by Chloride Analyser	14797-55-6	mg/L	mg/L														
Nitrate as N		mg/L	mg/L														
ED060P: NO3 as N by Chloride Analyser		mg/L	mg/L														
Nitrate as N		mg/L	mg/L														
ED060P: NO3 as N by Chloride Analyser		mg/L	mg/L														
Nitrate as N		mg/L	mg/L														
ED060P: Total Petroleum Hydrocarbons		µg/L	µg/L														
C6 - C8 Fraction		µg/L	µg/L														
C10 - C16 Fraction		µg/L	µg/L														
C18 - C26 Fraction		µg/L	µg/L														
C28 - C36 Fraction		µg/L	µg/L														
C10 - C36 Fraction (sum)		µg/L	µg/L														
ED060P: TPH by BTEX Samples		%	%														
1,2-Dichloroethane-Cl	12062-01-0	%	%														
Toluene-Cl	2032-26-8	%	%														
4-Bromobenzonitrile	400-00-4	%	%														
ED061P: Total Resolvable Mercury by FIMS	7439-97-6	mg/L	mg/L														
Mercury		mg/L	mg/L														
ED061P: Dissolved Mercury by FIMS	7439-97-6	mg/L	mg/L														
Mercury		mg/L	mg/L														

From: [REDACTED]  
Sent: Monday, 18 October 2010 2:35 PM  
To: [REDACTED]  
Cc: [REDACTED]

Subject: Rolleston Coal Mine - Sprin Creek Dam TEP 20101018

Attachments: Stat\_Dec\_signed.pdf; 20101018\_Rolleston Coal\_TEP\_Spring Creek Dam water release\_revised.pdf

Hi [REDACTED]

Please find attached updated TEP for Rolleston Coal to release water from Spring Creek Dam. Please don't hesitate to contact me if any clarification is required. The original is in the mail.

Regards

[REDACTED]  
Environment & Community Manager  
Rolleston Coal  
Xstrata Coal Queensland  
PO Box 11  
Springsure QLD 4722



\*\*\*\*\*  
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\*\*\*\*\*

CTS No. [CTS No.]

Department of Environment and Resource Management  
MINISTERIAL BRIEFING NOTE

TO: Minister for Climate Change and  
Sustainability

Advisor .....	<input type="checkbox"/> Ok
Dated        /        /	
<input type="checkbox"/> Approved <input type="checkbox"/> Not Approved <input type="checkbox"/> Noted	
<input type="checkbox"/> Further information required	
Minister.....	
Dated        /        /	

SUBJECT: Rolleston Coal Mine Transitional Environmental Program (TEP) Spring Creek  
Dam Water Release into Bootes Creek

TIMEFRAME

- Noting of this brief is non-urgent.

RECOMMENDATION

It is recommended that the Minister:

- **note** that a draft TEP voluntarily submitted to the department by Rolleston Coal Mine proposes to discharge mine affected water from their Spring Creek Dam into Bootes Creek, during a period of no natural flow in Bootes Creek.

BACKGROUND

- Draft TEP (MAN10919) was submitted by Xstrata Coal Queensland Pty Ltd (t/a Rolleston Coal Pty Ltd) for Rolleston Coal Mine (Rolleston) to the Department of Environment and Resource Management (the department) on 30 September 2010.
- The TEP proposed the release of 4 Giga Litres of water from Spring Creek Dam, which is a mixture of mine affected and raw water from overland flow, into Bootes Creek at a maximum rate of 100 ML per day (equivalent to a minimum of 40 days of discharge), irrespective of natural flows occurring in Bootes Creek.
- This action is not in compliance with Rolleston Coal Mine's existing environmental authority (EA) and TEP conditions, thus requiring approval through a TEP.
- Rolleston Coal Mine has stated that they need to release this water in order to maintain sufficient storage capacity in the water impoundments prior to the commencement of the wet season, in order to avoid potential uncontrolled discharges.
- Rolleston has a current TEP (MAN10239) approved in June 2010, permitting the dewatering of Spring Creek Pit (stage one of their dewatering plan). Since June, mine affected water in the Spring Creek Pit has been pumped into Spring Creek Dam, under TEP MAN10239.
- A decision was made to grant the TEP (MAN10919) on 28 October 2010 in accordance with section 337 of the *Environmental Protection Act 1994*.

CURRENT ISSUES

- Approval of the TEP will assist Rolleston in improving on-site water management and is a proactive action to avoid the potential for uncontrolled releases of mine affected water.
- The TEP includes daily and monthly reporting of water quality and volume data, in addition to water quality discharge limits to minimise the potential for environmental harm.
- The TEP has also been conditioned to include notification to downstream stakeholders and Central Highlands Regional Council prior to discharge.
- Release of mine affected waters in the Fitzroy Catchment is a community sensitive issue.

Author Name: Position: Tel No: Date:	Cleared by Name: Position: Tel No: Name: Position: Tel No:	Cleared by Name: Position: Tel No: Name: Position: Tel No:	Recommended: Name: John Bradley Director-General, DERM Tel No: <span style="background-color: black; color: black;">XXXXXXXXXX</span> Date:
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## RESOURCE/IMPLEMENTATION IMPLICATIONS

- There are no resource/implementation implications.

## PROPOSED ACTION

- No action by the Minister is proposed at this stage.

## OTHER INFORMATION

- *Consultation:*
- *Key Communication Messages:*

## MINISTER'S COMMENTS

## ATTACHMENTS

- List all attachments referred to in Brief

Author Name: Position: Tel No: Date:	Cleared by Name: Position: Tel No:	Cleared by Name: Position: Tel No:	Recommended: Name: John Bradley Director-General, DERM Tel No: [REDACTED] Date:
	Name: Position: Tel No:	Name: Position: Tel No:	



# Rolleston Coal Mine

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*Transitional Environmental Program (TEP)*

## **SPRING CREEK DAM WATER RELEASE INTO BOOTES CREEK**

October 2010



Rolleston Coal Pty Ltd ABN 73 106 690 037

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Spring Creek Dam

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## Table of Contents

1. Introduction .....	4
2. Environmental Authority .....	6
3. Submission .....	6
4. Authorisation .....	6
5. Program .....	7
5.1. Design of Spring Creek Dam .....	7
5.2. Water Transfer.....	7
5.3. Program Objectives .....	7
5.4. Water Quality.....	7
5.5. Volume of water discharged.....	10
5.6. Rate of water discharge .....	10
5.7. Risk of Environmental Harm.....	10
5.8. Notification and Reporting.....	11
5.9. Action Plan .....	11
6. Term of the Transitional Environmental Program.....	14
7. Transition to Compliance .....	14
Appendix A , Design Plans Spring Creek Dam .....	15
Appendix B Spring Creek Dam discharge & release point 1.....	17
Appendix C Discharge rating curves for Spring Creek Dam spillway.....	18
Appendix D Water quality in Spring Creek Dam.....	19
Appendix E Laboratory analysis of Spring Creek Dam water.....	20
Appendix F Water release contaminant trigger investigation levels in EA ,	24
Appendix G Water contaminant release limits in EA.....	25
Appendix H Completion Report – Proposed Contents .....	26

## 1. Introduction

This Transitional Environmental Program (TEP) describes the proposed actions to release up to 4GL of water from Spring Creek Dam into Bootes Creek outside of Rolleston Coal's Environmental Authority (EA) MIM800090802 flow conditions for the relevant release point outlined in Table 1 below.

**Table 1 Contaminant release during flow events**

Receiving water description	Release Point	Gauging station description	Easting (GDA94)	Northing (GDA94)	Minimum Flow in Receiving Water Required for a Release Event	Flow recording Frequency
Bootes Creek	RP 1	Bootes Creek Discharge Point 1	643688	7297724	0.75m <sup>3</sup> /s (750L/s)	Continuous (minimum daily)

Spring Creek Dam is a water storage which may contain water which has been in contact with mining areas. This is in accordance with approved TEP MAN10239. As such the quality of any water stored in Spring Creek Dam must be monitored quarterly for a wide range of potential contaminants. Water analysis is also required during any controlled releases from the storage.

District flooding resulting from exceptional rainfall between December 2009 and March 2010<sup>1</sup> resulted in the failure of Naroo Dam (a pastoral dam) and a subsequent overtopping release from Spring Creek Dam. The resultant surge of surface water flows resulted in Spring Creek Mining Pit being inundated. Subsequently Spring Creek Pit was used to moderate the flow of water, and minimize off-site release where possible. The majority of this water (in excess of 4GL) from Spring Creek Pit has now been pumped into Spring Creek Dam (in accordance with the approved TEP MAN10239).

Despite being in contact with mining areas, the quality of the water moved into Spring Creek Dam was good from the perspectives of human and stock consumption and in comparison with local streams. Water quality was monitored as it was pumped from Spring Creek Pit back into Spring Creek Dam (see Appendices D & E). At no stage were EA contamination release limits or investigation trigger levels exceeded during the transfer (see Appendices F & G).

Though the water quality in Spring Creek Dam remains good, the Dam's present capacity to account for heavy rainfall in the impending "wet season" is reduced. Rolleston Coal considers that the controlled release of 4GL now (thereby increasing available storage capacity) will minimise the risk of potential future environmental

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<sup>1</sup> On top of the exceptionally high rainfall that Rolleston Coal Mine experienced over January, February and March 2010, August and in particular September rainfall has exceed all records since rainfall recording commenced in the late 1800's. 1036mm of rain has been recorded for the nine months YTD with 199mm falling in September.

## Spring Creek Dam

issues that might arise in the event of an uncontrolled discharge. As at Tuesday 13<sup>th</sup> October 2010 Spring Creek Dam had a remaining storage capacity of approximately 800ML.

Spring Creek Pit is now estimated to contain around 450ML following repeated inflows in September from localised gullies draining into the pit. As a result of protracted rainfall impeding access, Rolleston Coal was unable to complete prior to these rain events the installation of a diversion structure to protect the pit from localised inflows and inflows from the Albinia National Park. The diversion structures were completed in early October thereby preventing any further inflows.

Since major flooding in the first quarter of 2010 and prior to August and September rainfall, construction of additional flood mitigation infrastructure was complete, that is all major storages, levees and diversions. This infrastructure will be detailed in Rolleston Coal's amended Water Management Plan due for submission to DERM by November 1<sup>st</sup> 2010 as required under the approved TEP MAN10239.

To ensure that Spring Creek Dam will not receive any overland flows from Spring Creek, a diversion bank has been constructed to prevent inflows. Despite this, water levels in Spring Creek Dam rose in September due to runoff from residual catchment areas not affected by the diversion bank, rain falling directly into the storage as well as groundwater suspected to be seeping from basalt outcrops.

The traditional "wet season" for Central Queensland is from December through to March. Rolleston Coal needs to maintain sufficient storage capacity in the water impoundments prior to the commencement of the wet season, in order to avoid uncontrolled discharges. The unseasonal, protracted and record-breaking rainfall in recent months has significantly impacted Rolleston Coal's water storage balance on site.

Rolleston Coal voluntarily submits this TEP to seek authorisation by the administering authority under the *Environmental Protection Act 1994* to discharge 4,0GL of water from Spring Creek Dam into Bootes Creek at the rate of approximately 100ML per day irrespective of water flow in Bootes Creek, provided water quality complies with the criteria stipulated by this TEP.

This TEP proposes the implementation of an Action Plan showing how the objectives of this TEP are to be achieved and the timetable in which they are to be achieved. Rolleston Coal will implement the Action Plan in addition to continued compliance with its existing obligations under EA MIM800090802.

Furthermore Rolleston Coal believes that by implementing this TEP and having sufficient capacity in Spring Creek Dam at the commencement of the "wet season" the potential risk of environmental harm is minimized as the likelihood of any uncontrolled discharges is significantly reduced.

## 2. Environmental Authority

Xstrata Coal Queensland Pty Ltd, ICRA Rolleston Pty Ltd and Sumisho Coal Australia Pty Limited (*Rolleston Coal*) hold Environmental Authority MIM800090802 to carry out mining activities on ML70307 and MDL227, issued on 30 November 2009.

## 3. Submission

This Transitional Environmental Program (TEP) 2010/03 is voluntarily submitted on behalf of Xstrata Coal Queensland Pty Ltd, ICRA Rolleston Pty Ltd and Sumisho Coal Australia Pty Limited by [REDACTED], General Manager, Southern Region, Xstrata Coal Queensland.

[REDACTED]

Signed

18/10/10

Date

## 4. Authorisation

When approved, this TEP will authorise the controlled release of up to 4.0GL of mine affected water from Spring Creek Dam into Bootes Creek at a discharge rate of up to 100ML per day, provided water quality complies with the criteria stipulated by this TEP. Spring Creek Dam water storage can discharge water to Release Point 1 (RP1) as identified in EA MIM800090802. Monitoring of discharge water will be undertaken in accordance with the conditions and requirements of this TEP. Ongoing water management will be in accordance with Rolleston Coal's Water Management Plan which is currently being updated for submission to DERM by 1 November 2010 in accordance with TEP MAN10239.

To the extent there are any inconsistencies between this TEP and EA MIM800090802 and any other operational documents, this TEP prevails.

## 5. Program

### 5.1. Design of Spring Creek Dam

Appendix A contains design drawings for the Spring Creek Dam, the construction of which has been monitored by appropriately skilled engineers. "As built" plans have been provided to DERM.

### 5.2. Water Transfer

It is proposed to undertake a controlled release of up to 4.0GL from Spring Creek Dam into Bootes Creek at the rate of up to 100ML per day.

### 5.3. Program Objectives

**Objective 1:** Prior to discharge commencing Rolleston Coal will continue to operate the site in accordance with conditions of EA MIM800090802 and TEP MAN10239.

**Objective 2:** Present DERM with the results from water quality testing of water from Spring Creek Dam, for the water quality characteristics specified Appendices F & G.

**Objective 3:** Discharge water from Spring Creek Dam via Release Point 1 as identified in EA MIM800090802 in accordance with the commitments set out in Section 5 of this TEP.

**Objective 4:** Rolleston Coal will complete and lodge with DERM a Completion Report outlining actions undertaken under this TEP and summarising compliance against this TEP, and the results of the Spring Creek Dam discharge water sampling, within 40 business days of the completion of the controlled release of water from Spring Creek Dam.

### 5.4. Water Quality

The quality of the water in Spring Creek Dam has been closely scrutinized in line with approved TEP MAN10239. Detailed results have been provided in Appendices D & E. Table 2 provides a comparison of average water quality (50<sup>th</sup> percentile) relative to EA discharge contaminant limits. Analyses of results indicate consistently high water quality.

Spring Creek Dam

Table 2: Spring Creek Dam water quality relative to EA discharge limits

Water quality characteristic	EA discharge limit	Spring Creek Dam level (50 <sup>th</sup> percentile)
Electrical Conductivity ( $\mu\text{S}/\text{cm}$ )	1500	326
pH	6.5 – 9.0	8.4
Turbidity (ntu)	n/a	33
Suspended solids (mg/L)	1200	44
Sulphate (mg/L)	1000	2.2
Aluminium ( $\mu\text{g}/\text{L}$ )	650	18
Arsenic ( $\mu\text{g}/\text{L}$ )	13	<1
Cadmium ( $\mu\text{g}/\text{L}$ )	0.2	<0.1
Chromium ( $\mu\text{g}/\text{L}$ )	3	<1
Copper ( $\mu\text{g}/\text{L}$ )	13	1.8
Iron ( $\mu\text{g}/\text{L}$ )	520	50
Lead ( $\mu\text{g}/\text{L}$ )	10	<1
Mercury ( $\mu\text{g}/\text{L}$ )	0.2	<0.1
Nickel ( $\mu\text{g}/\text{L}$ )	11	3
Boron ( $\mu\text{g}/\text{L}$ )	370	50
Cobalt ( $\mu\text{g}/\text{L}$ )	90	0.8
Molybdenum ( $\mu\text{g}/\text{L}$ )	34	2.4
Selenium ( $\mu\text{g}/\text{L}$ )	10	4.5
Silver ( $\mu\text{g}/\text{L}$ )	1	<1
Uranium ( $\mu\text{g}/\text{L}$ )	1	<1
Vanadium ( $\mu\text{g}/\text{L}$ )	10	10
Ammonia ( $\mu\text{g}/\text{L}$ )	900	82
Nitrate ( $\mu\text{g}/\text{L}$ )	1100	52
Petroleum hydrocarbons (C6-C9) ( $\mu\text{g}/\text{L}$ )	20	<20
Petroleum hydrocarbons (C10-C36) ( $\mu\text{g}/\text{L}$ )	100	<50
Zinc ( $\mu\text{g}/\text{L}$ )	8	3.75

## Spring Creek Dam

Monitoring discharges in this TEP will be conducted as follows:

- Sampling of water being discharged from Spring Creek Dam will be undertaken at the location and frequency specified in Table 3 below;
- Sampling of water discharged from Spring Creek Dam will be undertaken using calibrated field equipment for the parameters outlined in Table 4;
- Monthly analysis for the parameters outlined in Appendix F will be conducted by NATA certified laboratories;
- In the event that water analysis results exceed the defined contaminant limits (as outlined in Table 4) Rolleston Coal will cease discharging;
- In the event that water analysis results exceed the defined contaminant limits (as outlined in Appendix F) Rolleston Coal will investigate the reason for the exceedance in accordance with the procedures in Condition W5 of the EA.

**Table 3: Discharge water monitoring location**

Water storage description	Easting +/- 50m	Northing +/- 50m	Monitoring Location	Frequency of Monitoring
Spring Creek Dam	642472	7298442	Spring Creek dam spillway (which drains to RP1 in EA)	Daily during discharge for the parameters listed in Table 4. Monthly during discharge for the parameters listed in Appendix F.

**Table 4: Water sampling parameters and upper limits**

Parameter	Units	Maximum	Notes
Electrical Conductivity (EC)	µS/cm	483	90 <sup>th</sup> percentile of Bootes Creek upstream monitoring*
pH	n/a	9.0	In accord with EA conditions
Turbidity	NTU	290	80 <sup>th</sup> percentile of Bootes Creek upstream monitoring*
Volume released	Megalitres/ day	100	

\*Taken from 65 samples from Bootes Creek upstream water monitoring station in February and March 2010, the timeframe when the flooding of Spring Creek Pit occurred. Data has been supplied to DERM.

## Spring Creek Dam

### 5.5. Volume of water discharged

In addition to daily calculations of volumes released, weekly estimates of water volume remaining in Spring Creek Dam will be undertaken, by survey pickup of the RL on water during the period in which water is released.

### 5.6. Rate of water discharge

In order to calculate discharge rates, the consultancy firm AECOM have prepared discharge curves (Appendix C) using a broad crested weir design which will enable variation to flow rates by adjusting either the height or width of the spillway..

### 5.7. Risk of Environmental Harm

#### Water Quality

Rolleston Coal is confident that the program will not significantly increase the potential for environmental harm in the area. Weekly water quality sampling in Spring Creek Dam over the last 3 months has met all criteria specified in Tables 2 and 3 of Rolleston Coal's EA (see Appendices D & E). Rolleston Coal also proposes additional sampling of the water before it is discharged and will discharge only if the water is within acceptable levels, as stipulated by this TEP. During release water will be subject to monitoring at the dam spillway.

Furthermore Rolleston Coal believes that by implementing this TEP and having sufficient capacity in Spring Creek Dam at the commencement of the "wet season" the potential risk of environmental harm is minimized as the likelihood of uncontrolled discharges is reduced.

The proposed monitoring regime will assess water quality throughout the discharge event. Discharge will cease if water quality parameters stipulated by this TEP were exceeded.

Though this TEP seeks the controlled discharge of water irrespective of minimum flow conditions outlined in the EA, it is anticipated that there will be times when Bootes Creek will be flowing. During September there have been five flow events in Bootes Creek where the minimum flow requirement in the receiving water (Bootes Creek) has provided opportunity for controlled discharge. Current weather forecasts suggest strong "La Nina" conditions with well above average rainfall. Any natural flows in Bootes Creek will have a dilution effect thereby further reducing potential downstream impact.

#### Impacts on Downstream Landholders

Rolleston Coal does not predict any impact to downstream users as this discharge will be managed so as to comply with the water quality parameters outlined in Table 4. There are existing monitoring stations (pH, EC, temperature and flow height) located upstream and downstream of Release Point 1 where this discharge will occur (refer to Appendix B). These established automated monitoring stations will continue to operate in accordance with applicable requirements under EA MIM80009080.

## Spring Creek Dam

Rolleston Coal predicts that the impact on stock watering will be negligible as water quality parameters documented in the EA are consistent with those listed in ANZECC guidelines for stock water.

Rolleston Coal is confident that the rate of water released from Spring Creek Dam will not incur any increase in downstream flood levels as the creek system capacity is sufficient to accommodate very large volumes of water. Rolleston Coal will consult with the Ranger in Charge of the Albinia National Park as well as the adjacent landholder in relation to likely impacts on the usability of Springwood road.

### Erosion Potential

Rolleston Coal is also confident that the rate of water released from Spring Creek Dam will not result in downstream erosion as the creek system has sufficient capacity to accommodate very large volumes of water. Additionally the water being released has to traverse large areas of swamp prior to reaching Meteor Creek. Rolleston Coal will undertake weekly visual inspections of the riparian area immediately downstream of Spring Creek Dam. If erosion is evident a reduced discharge rate will be adopted to ensure maintenance of stream bank integrity.

## 5.8. Notification and Reporting

Rolleston Coal will:

1. Notify DERM of commencement of discharge from Spring Creek Dam into Bootes Creek within 2 business days of commencement;
2. Notify DERM, within 21 days of completion of discharge from Spring Creek Dam into Bootes Creek, the following;
  - a. controlled release completion date;
  - b. raw results on water quality testing under this TEP; and
  - c. volume of water transferred released from Spring Creek Dam into Bootes Creek; and
3. Complete and lodge with DERM a completion report outlining actions taken under this TEP within 40 business days of completion of discharging of water from Spring Creek Dam into Bootes Creek summarising sampling, results, observations, and other relevant details. A proposed format (TOC) for the completion report is provided in Appendix E

## 5.9. Action Plan

The key actions planned and scheduled are set out below in Table 5.

Table 5: Action Plan

Action Plan item	Objective No.	Performance Indicator	Completion date	Responsibility
AP - 1. Monitor in accordance with TEP and EA MIM800090802 prior to pumping	1	Sampling of Spring Creek Dam completed	Prior to commencement of discharge	Environmental Manager
AP - 2. Collate the sampling results of Spring Creek Dam and provide to DERM with and in support of this TEP	2	Data provided to DERM	Upon approval of this TEP	Environmental Manager
AP - 3. Commence discharging water from Spring Creek Dam into Bootes Creek via Release Point 1	3	Controlled discharging occurring	As soon as practicable after completion of AP-2 above	Operations Manager in conjunction with Environmental Manager
AP - 4. Notify DERM of commencement of discharging from Spring Creek Dam into Bootes Creek via Release Point 1	3	DERM notified of commencement of discharge	Within 2 business days of commencing pumping	Environmental Manager
AP - 5. Monitor in accordance with TEP and EA MIM800090802 during discharge	3	Sampling of Spring Creek Dam water Visually monitor the impact of erosion downstream of RP1 on a weekly basis during discharge and take remedial action as required	Prior to cessation of pumping Upon cessation of pumping	Environmental Manager

Spring Creek Dam

Action Plan item	Objective No.	Performance Indicator	Completion date	Responsibility
		Visually monitor the condition of roads downstream of RP1 on a weekly basis during discharge, and liaise with landholders as required		
AP - 6. Cease discharging from Spring Creek Dam	3	Pumping ceases	Upon cessation of pumping  Final discharging to cease when 4.0GL has been released or by 1 March 2011, whichever is the sooner.	Operations Manager
AP - 7. Notify DERM of the following under this TEP: <ul style="list-style-type: none"> <li>Controlled release completion date</li> <li>Raw results on water quality testing under this TEP; and</li> <li>Volume of water released from Spring Creek dam into Bootes Creek</li> </ul>	3	Notification to DERM occurs	Within 21 business days of cessation of pumping of water from Spring Creek Dam into Bootes Creek via Release Point 1	Environmental Manager
AP - 8. Submit completion report to DERM.	3	Report submitted to DERM in a form consistent with that outlined in Appendix H	Within 40 business days after cessation of discharging from Spring Creek Dam into Bootes Creek via Release Point 1 under this TEP	Environmental Manager

#### **6. Term of the Transitional Environmental Program**

This TEP will be current until 1 March 2011.

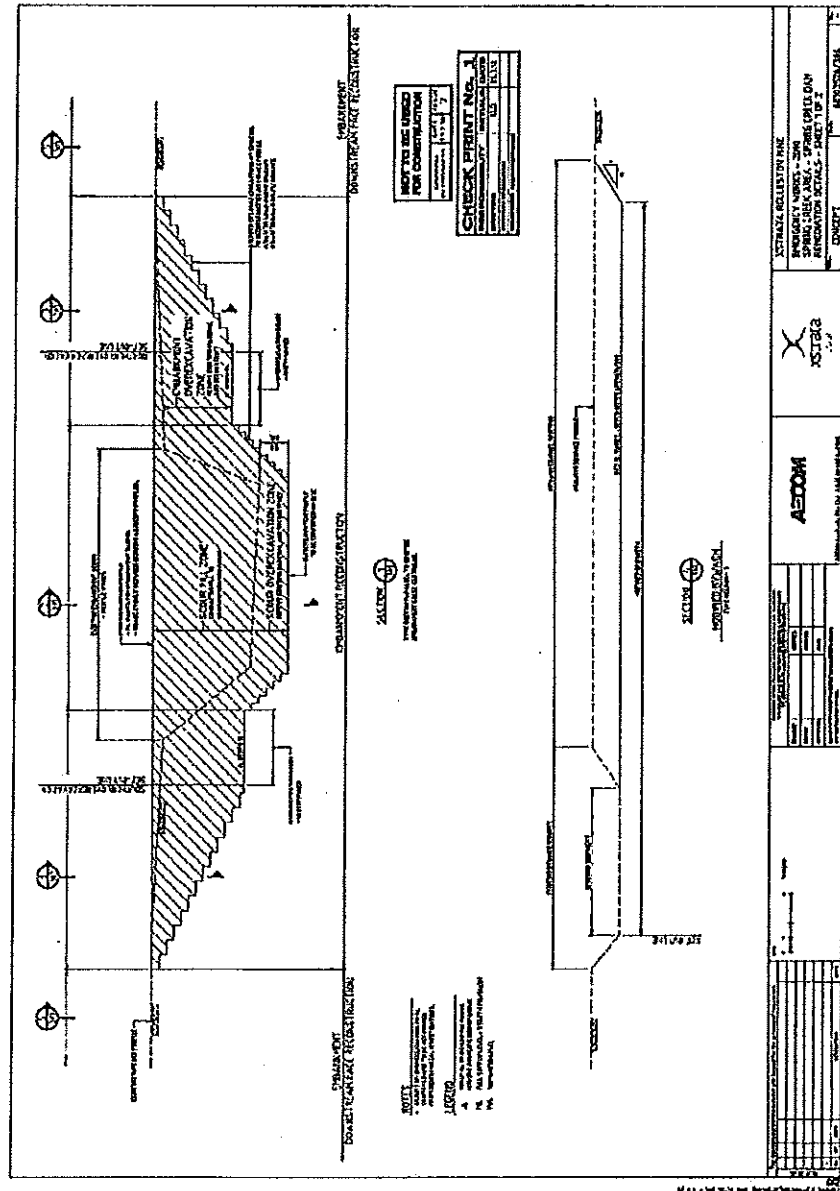
#### **7. Transition to Compliance**

The outcome of this TEP is considered integral to the site's "transition" to compliance which will be reflected by the:

- Updated Water Management Plan (which is to be completed by 1 November 2010 in accordance with TEP MAN10239)

X  
xstrata

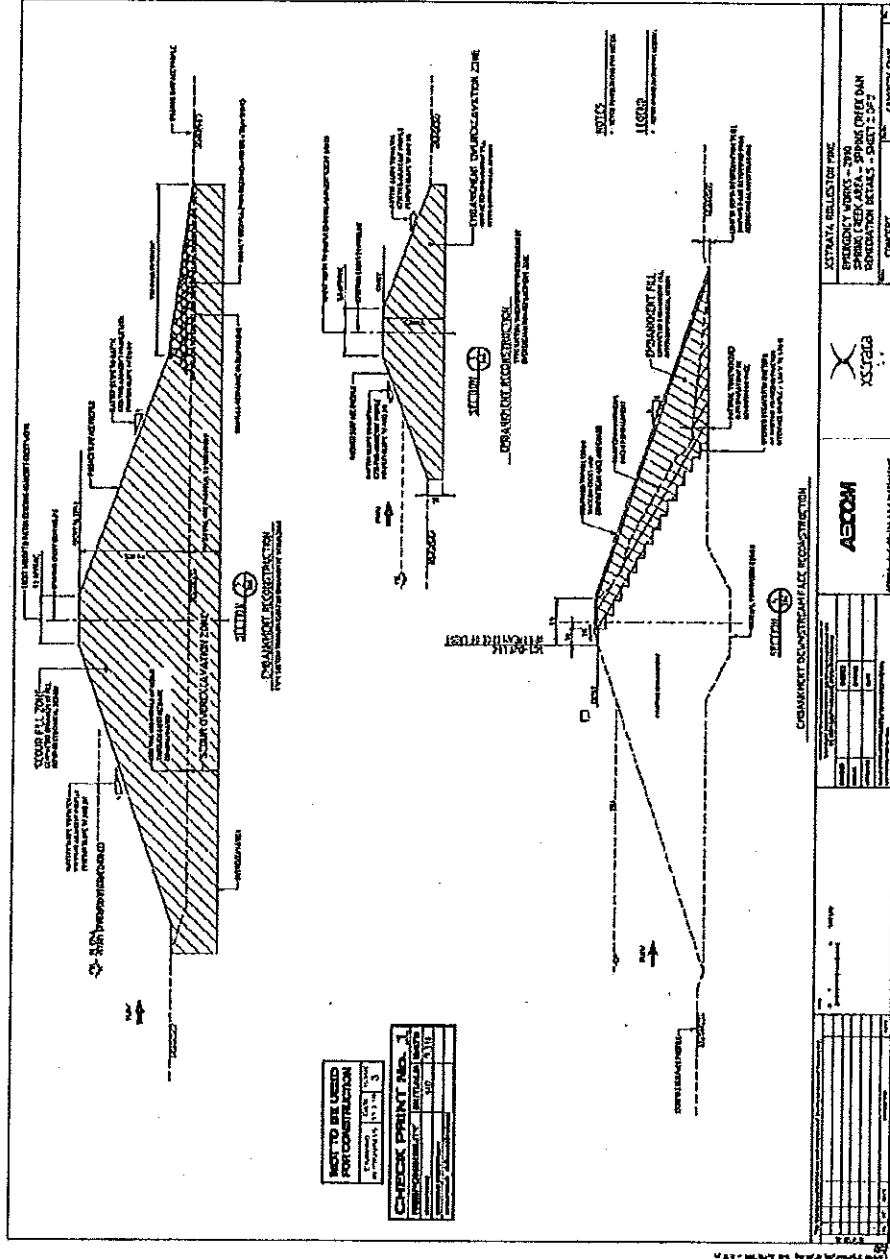
## Design Plans Spring Creek Dam



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Teléfono Nº 1089 0100 Familia Nº 1000 0127 Teléfono Nº 1089 0100 Familia Nº 1000 0127

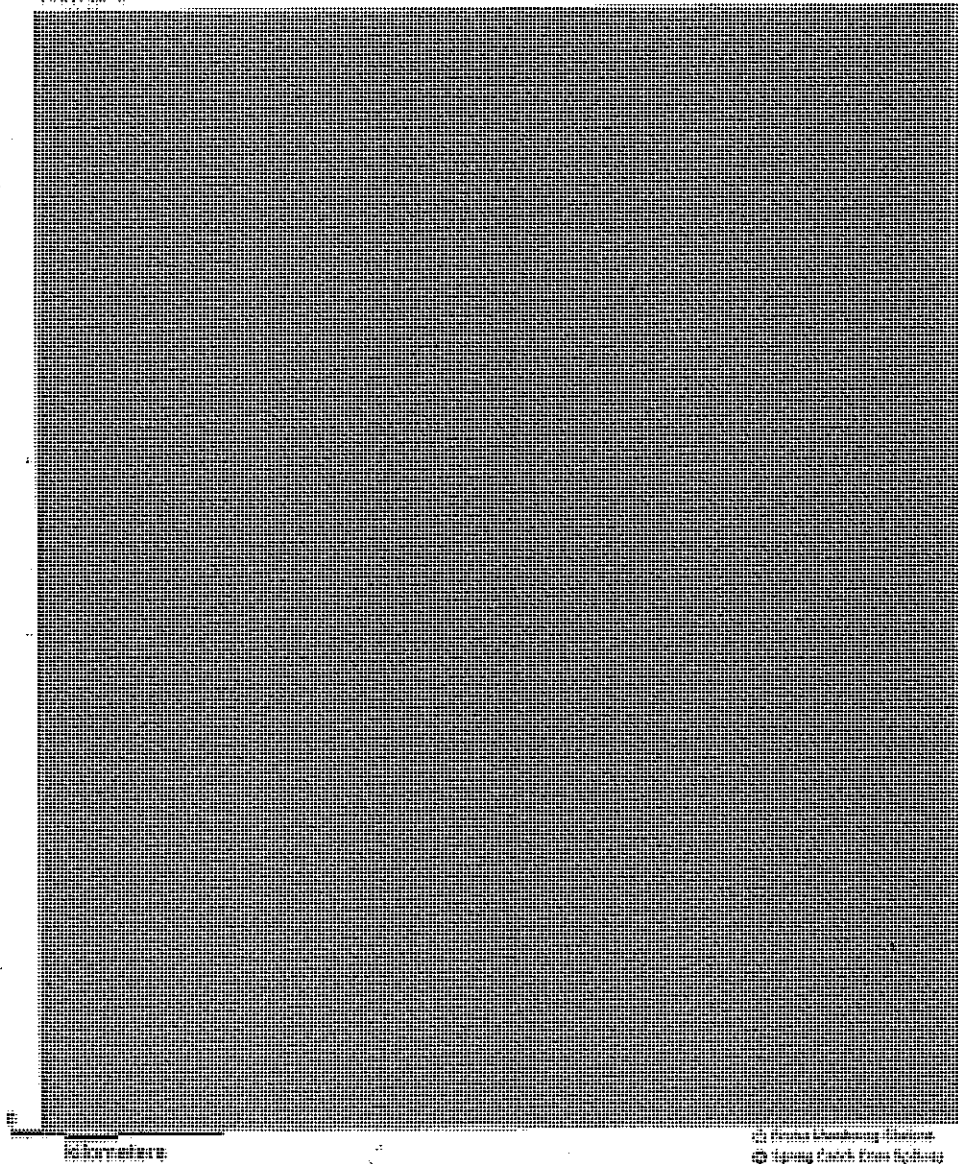


**Appendix B**

*Spring Creek Dam discharge & release point 1*

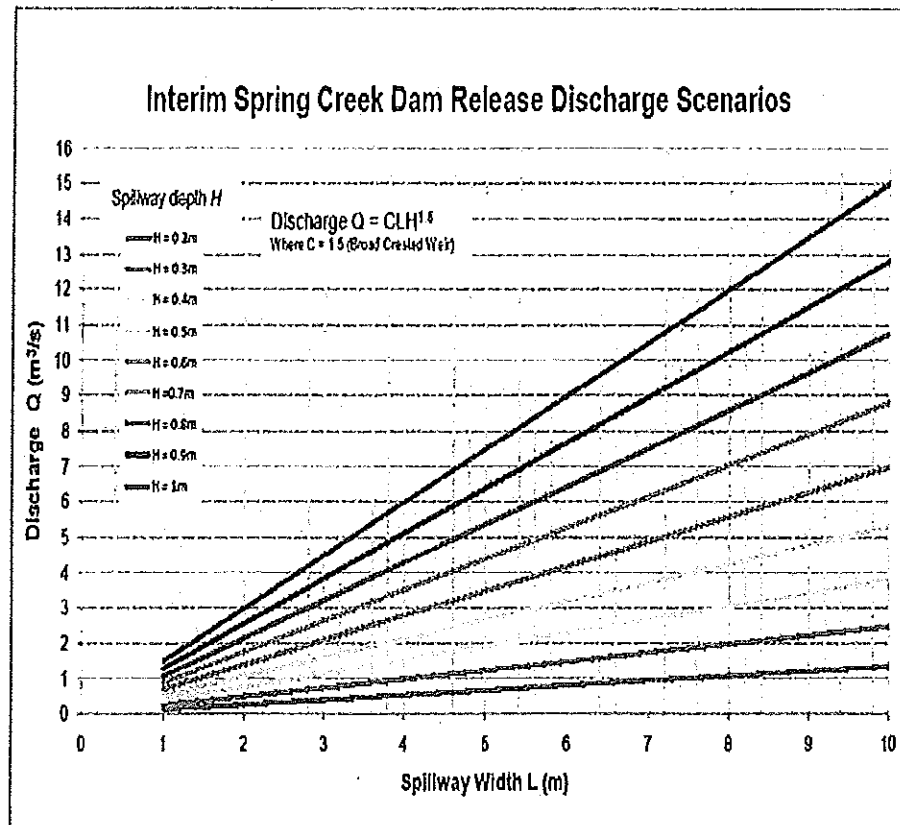


**Rolleston Coal Spring Creek Dam Discharge and Release Points**



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X40747

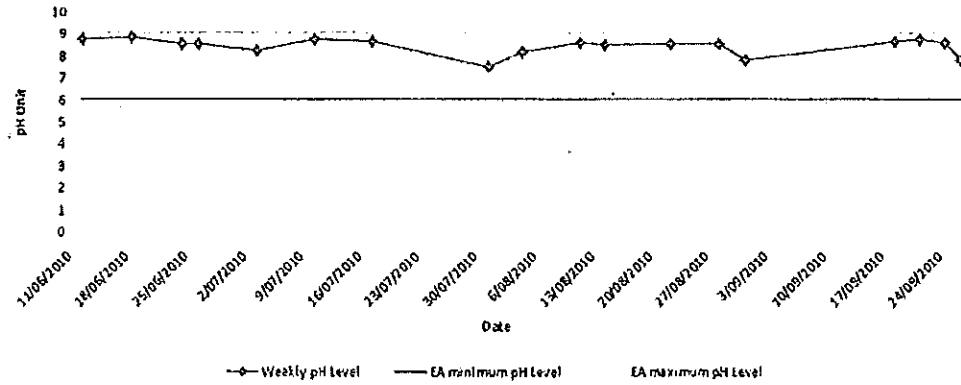
Appendix C Discharge rating curves for Spring Creek Dam spillway



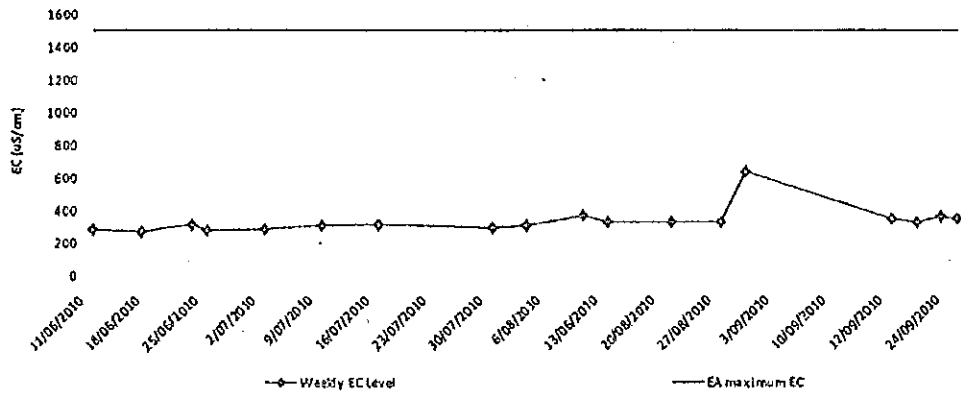
# Spring Creek Dam

## Appendix D Water quality in Spring Creek Dam

### Spring Creek Dam Weekly pH Levels



### Spring Creek Dam Weekly EC Levels



**Appendix E**     *Laboratory analysis of Spring Creek Dam water*

Sample Date:

04/08/2010

**Analyte grouping/Analyte**

<b>EA005P: pH by PC Titrator</b> pH Value	8.05
<b>EA010P: Conductivity by PC Titrator</b> ( $\mu\text{S}/\text{cm}$ ) Electrical Conductivity @ 25°C	310
<b>EA015: Total Dissolved Solids (mg/L)</b> Total Dissolved Solids @180°C	201
<b>EA025: Suspended Solids (mg/L)</b> Suspended Solids (SS)	5
<b>EA045: Turbidity</b> Turbidity	
<b>ED037P: Alkalinity by PC Titrator (mg/L)</b> Hydroxide Alkalinity as $\text{CaCO}_3$ Carbonate Alkalinity as $\text{CaCO}_3$ Bicarbonate Alkalinity as $\text{CaCO}_3$ Total Alkalinity as $\text{CaCO}_3$	<1 <1 150 150
<b>ED040F: Dissolved Major Anions (mg/L)</b> Sulphate as $\text{SO}_4^{2-}$	2
<b>ED040T: Total Major Anions</b> Sulphate as $\text{SO}_4^{2-}$	
<b>ED045G: Chloride Discrete analyser (mg/L)</b> Chloride	12
<b>ED045P: Chloride by PC Titrator</b> Chloride	
<b>ED093F: Dissolved Major Cations (mg/L)</b>	

Spring Creek Dam

Calcium	17
Magnesium	12
Sodium	35
Potassium	2

**EG005F: Dissolved Metals by ICP-AES**

Iron

**EG005T: Total Metals by ICP-AES**

Iron

**EG020F: Dissolved Metals by ICP-MS  
(mg/L)**

Aluminium	0.01
Arsenic	<0.001
Cadmium	<0.0001
Chromium	<0.001
Cobalt	<0.001
Copper	0.003
Lead	<0.001
Manganese	0.005
Molybdenum	<0.001
Nickel	0.004
Selenium	<0.01
Silver	<0.001
Uranium	<0.001
Vanadium	0.01
Zinc	<0.005
Boron	0.1
Iron	<0.05

**EG020T: Total Metals by ICP-MS (mg/L)**

Aluminium	0.42
Arsenic	0.001
Cadmium	<0.0001
Chromium	<0.001
Cobalt	<0.001
Copper	0.003
Lead	<0.001
Manganese	0.026
Molybdenum	<0.001
Nickel	0.005
Selenium	<0.01
Silver	<0.001

Spring Creek Dam

Uranium	<0.001
Vanadium	0.02
Zinc	<0.005
Boron	0.15
Iron	0.4

**EK040P: Fluoride by PC Titrator (mg/L)**

Fluoride	0.2
----------	-----

**EN055: Ionic Balance (meq/L)**

Total Anions	3.37
Total Cations	3.48
Ionic Balance (%)	1.57

**ED093T: Total Major Cations (mg/L)**

Calcium  
Magnesium  
Sodium  
Potassium

**EK055G: Ammonia as N by Discrete Analyser (mg/L)**

Ammonia as N	0.14
--------------	------

**EK057G: Nitrite as N by Discrete Analyser (mg/L)**

Nitrite as N	<0.01
--------------	-------

**EK058G: Nitrate as N by Discrete Analyser (mg/L)**

Nitrate as N	0.02
--------------	------

**EK059G: NOX as N by Discrete Analyser (mg/L)**

Nitrite + Nitrate as N	0.02
------------------------	------

**EP080/071: Total Petroleum Hydrocarbons (µg/L)**

C6 - C9 Fraction	<20
C10 - C14 Fraction	<50
C15 - C28 Fraction	<100
C29 - C36 Fraction	<50
C10 - C36 Fraction (sum)	<50

**EP080S: TPH(V)/BTEX Surrogates (%)**

1,2-Dichloroethane-D4	133
-----------------------	-----

Spring Creek Dam

Toluene-D8	110
4-Bromofluorobenzene	102

**EG035T: Total Recoverable Mercury by  
FIMS (mg/L)**

Mercury	<0.0001
---------	---------

**EG035F: Dissolved Mercury by FIMS (mg/L)**

Mercury	<0.0001
---------	---------

**Appendix F**

*Water release contaminant trigger investigation levels in EA*

Quality Characteristic	Trigger Levels (µg/L)
Aluminium	650
Arsenic	13
Cadmium	0.2
Chromium	3
Copper	13
Iron	520
Lead	10
Mercury	0.2
Nickel	11
Boron	370
Cobalt	80
Molybdenum	34
Selenium	10
Silver	1
Uranium	1
Vanadium	10
Ammonia	900
Nitrate	1100
Petroleum hydrocarbons (C6-C9)	20
Petroleum hydrocarbons (C10-C38)	100
Zinc	8

**Appendix G**

*Water contaminant release limits in EA*

Quality Characteristic	Interim Release Limits until 30-NOV-2011
Electrical conductivity (uS/cm)	1600
pH (pH Unit)	6.5 (minimum) 9.0 (maximum)
Turbidity (NTU)	NA*
Suspended Solids (mg/L)	1200
Sulphate (SO <sub>4</sub> <sup>2-</sup> ) (mg/L)	1000

**Completion Report**

**Transitional Environmental Program Spring Creek Dam Water Release**

1. Covering Letter
2. Summary Table of Program Statistics
  - a. Volume of water discharged from Spring Creek Dam
  - b. Days of pumping, Pumping rate averages
  - c. Other relevant Data
3. Summary Tables of Sample results
  - a. Spring Creek Dam water quality
  - b. Other results and Observations
4. Conclusions
  - a. Overall water quality status in discharged water.
  - b. Compliance with Transitional Environmental Program
5. APPENDICES

# Statutory declaration

Environmental Operations

## For an transitional environmental program

A statutory declaration is a written statement of facts that is sworn or declared under the Oaths Act 1867. In accordance with section 556 of the Environmental Protection Act 1994, this statutory declaration must be completed and submitted with an transitional environmental program (TEP) and/or any additional information about an TEP that is requested by the administering authority.

### Oaths Act 1867

QUEENSLAND  
TO WIT

I

Insert the name of the person making this declaration

of

Xstrata Coal Queensland Pty Ltd

Insert the street address of the person making this declaration

Rolleston QLD 4702

In the State of Queensland do solemnly and sincerely declare that in relation to the submission of the  
transitional environmental program entitled

Spring Creek Dam Water Release Into Bootes Creek

Insert title of TEP

for

Release of Water

at

Rolleston.

Insert reason for TEP

Insert location of activity TEP relates to

and in accordance with section 556 of the *Environmental Protection Act 1994*, I have:

Statutory declaration  
**For an environmental management program**

- not knowingly given any false or misleading information, and
- given all relevant information

In relation to:

(tick applicable box)

- ☒ the preparation of the transitional environmental program, or
- ☐ a request by the administering authority for additional information about the transitional environmental program.

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

Taken and declared before me, at

Rolleston

Insert location

this 18th day of October In the year 2010  
Insert day (e.g. 18th) Insert month Insert year

[Redacted signature]

Signed

(Person making this declaration)

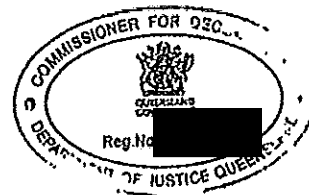
[Redacted signature]

Signed

(Delete whichever is not applicable — Justice of the Peace /  
Commissioner for Declarations / Solicitor / Barrister)

[Redacted name and registration number]

Printed name and registration number (if applicable)



**From:** [REDACTED]  
**Sent:** Wednesday, 20 October 2010 1:24 PM  
**To:** [REDACTED]  
**Subject:** FW: pH  
[REDACTED]

appears that 8.5 is the go, which aligns with [REDACTED] etc

**From:** [REDACTED]  
**Sent:** Wednesday, 20 October 2010 1:00 PM  
**To:** [REDACTED]  
**Subject:** RE: pH

6.5 to 8.5 for all catchments in the Fitz

---

**From:** [REDACTED]  
**Sent:** Wednesday, 20 October 2010 11:18 AM  
**To:** [REDACTED]  
**Subject:** pH

Hey

could you tell me what the local guidelines, QWQG and anzec values are for pH in slight to moderate modified freshwater streams, and in particular for say - Comet River?

and its the upper limit which is of interest, from what I can see its between 6 and 9 ?

its to do with licensing of releases from Rolleston mine...

Regards

[REDACTED]  
Senior Project Officer  
Planning and Assessment  
Resource Assessment and Information  
**Telephone:** [REDACTED]  
**Mobile:** [REDACTED]  
**Facsimile:** [REDACTED]  
**Email:** [REDACTED]  
[www.derm.qld.gov.au](http://www.derm.qld.gov.au)

Department of Environment and Resource Management  
209 Bolsover Street, Rockhampton Q 4700  
GPO Box 1762, Rockhampton Q 4700

**From:** [REDACTED]  
**Sent:** Wednesday, 20 October 2010 1:48 PM  
**To:** [REDACTED]  
**Subject:** another - FW: pH

appears that QWQG say max of 8,

but, all things considered, I still think 8.5 would be the go,  
I will chase up ANZECC to back this up,

at the end of the day - [REDACTED] is responsible for the EA numbers, so,  
if he is happy with 8.5 max, then so am I

---

**From:** [REDACTED]  
**Sent:** Wednesday, 20 October 2010 1:30 PM  
**To:** [REDACTED]  
**Subject:** RE: pH

Just to clarify  
Those values I gave you are ours from the local work we did – yet to be put into the QWQGs.

The ones to use at present are based on the QWQG - 6.5 to 8.0 – for the Central Coast Qld region guidelines 2009 (QWQG)

---

**From:** [REDACTED]  
**Sent:** Wednesday, 20 October 2010 1:20 PM  
**To:** [REDACTED]  
**Subject:** RE: pH

thanks

**From:** [REDACTED]  
**Sent:** Wednesday, 20 October 2010 1:00 PM  
**To:** [REDACTED]  
**Subject:** RE: pH

6.5 to 8.5 for all catchments in the Fitz

**From:** [REDACTED]  
**Sent:** Wednesday, 20 October 2010 11:18 AM  
**To:** [REDACTED]  
**Subject:** pH

Hey

could you tell me what the local guidelines, QWQG and anzec values are for pH in slight to moderate modified freshwater streams,  
and in particular for say - Comet River?

and its the upper limit which is of interest,  
from what I can see its between 6 and 9 ?

Its to do with licensing of releases from Rolleston mine...

Regards

[REDACTED]  
Senior Project Officer  
Planning and Assessment  
Resource Assessment and Information  
Telephone: [REDACTED]  
Mobile: [REDACTED]  
Facsimile: [REDACTED]  
Email: [REDACTED]  
[www.derm.qld.gov.au](http://www.derm.qld.gov.au)

Department of Environment and Resource Management  
209 Bolsover Street, Rockhampton Q 4700  
GPO Box 1762, Rockhampton Q 4700

**From:** [REDACTED]  
**Sent:** Monday, 25 October 2010 8:21 AM  
**To:** [REDACTED]  
**Subject:** FW: Spring Creek Dam stratification

**Attachments:** 20101022\_Spring\_Ck\_Dam\_Stratification\_Results(2).xls;  
20101021\_Lake\_McDonald\_Straification\_Sites.jpg  
Ed,

This came in on Friday arv.

**From:** [REDACTED]  
**Sent:** Friday, 22 October 2010 2:14 PM  
**To:** [REDACTED]  
**Cc:** [REDACTED]  
**Subject:** Spring Creek Dam stratification

Hi [REDACTED]  
As requested please find attached results for water testing for stratification in Spring Creek Dam.

Samples were collected using a Van Dorn water sampler.

Results indicate there is no stratification within the water body.

Regards

[REDACTED]  
Environment & Community Manager  
Rolleston Coal  
Xstrata Coal Queensland  
PO Box 11  
Springsure QLD 4722



\*\*\*\*\*  
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\*\*\*\*\*

	litres
100 ML	100000000
dv 24	4166666.667
dv 60	69444.44444
dv 60	1157.407407 litres/sec
dv 1000	1.157407407 cumecs

	1.157
dst 20 km	23140 cubmetres
	4628 cub metres over 5 days
	4628000 liters/day
	4.628 ML /day

**From:** [REDACTED]  
**Sent:** Monday, 25 October 2010 11:40 AM  
**To:** [REDACTED]  
**Subject:** FW: Spring Creek Dam stratification  
fyi

**From:** [REDACTED]  
**Sent:** Monday, 25 October 2010 9:50 AM  
**To:** [REDACTED]  
**Subject:** FW: Spring Creek Dam stratification

Hi [REDACTED]  
Some words on pH, 9 seems the magic number.

**From:** [REDACTED]  
**Sent:** Monday, 25 October 2010 9:46 AM  
**To:** [REDACTED]  
**Subject:** RE: Spring Creek Dam stratification

[REDACTED]  
Some bits from the ANZECC guidelines which may help.  
[REDACTED]

#### **Effects of pH changes on aquatic ecosystems**

Changes to pH may affect the physiological functioning (e.g. enzymes, membrane processes) of biota. Reviews of the effects of pH changes on freshwater biota indicate no acutely lethal effects to fish in the pH range 5 to 9 (Alabaster & Lloyd 1982, CCREM 1991). Chronic effects have been reported below pH 5, with harmful effects on eggs and fry (ANZECC 1992). Loss of fish populations have been attributed to spawning failure and diminished hatching success at moderate (less than 6.0) pH levels (CCREM 1991). Recent work by West et al. (1997) on nine New Zealand freshwater fishes showed that most species avoided pH values less than around 6.5.

Changes in pH can also lead to indirect toxic effects on aquatic biota through changes to the toxicity of several contaminants. For example, low pHs can increase the toxicity of cyanide and aluminium, while increased pH increases the toxicity of ammonia (ANZECC 1992).

Almost all water quality guidelines around the world (e.g. (ANZECC 1992, CCREM 1991, Alabaster & Lloyd 1982, USEPA 1986b) recommend that pH should be maintained in the range 6.5 to 9.0 to protect freshwater aquatic organisms.

(Alabaster & Lloyd 1982) have summarised the evidence used to establish the commonly accepted upper limit for pH of 9.

Both increases and decreases in pH can result in adverse effects, although decreases are likely to cause more serious problems.

---

**From:** [REDACTED]  
**Sent:** Monday, 25 October 2010 9:04 AM  
**To:** [REDACTED]  
**Subject:** FW: Spring Creek Dam stratification  
**Importance:** High

Hi [REDACTED]  
Can you give me a call on this asap.

[REDACTED]

---

**From:** [REDACTED]  
**Sent:** Monday, 25 October 2010 8:59 AM  
**To:** [REDACTED]  
**Subject:** FW: Spring Creek Dam stratification

[REDACTED]  
As discussed

[REDACTED]

---

**From:** [REDACTED]  
**Sent:** Monday, 25 October 2010 8:21 AM  
**To:** [REDACTED]  
**Subject:** FW: Spring Creek Dam stratification

[REDACTED]

This came in on Friday arv.

---

**From:** [REDACTED]  
**Sent:** Friday, 22 October 2010 2:14 PM  
**To:** [REDACTED]  
**Cc:** [REDACTED]  
**Subject:** Spring Creek Dam stratification

Hi [REDACTED]  
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Samples were collected using a Van Dorn water sampler.

Results indicate there is no stratification within the water body.

Regards

[REDACTED]

Environment & Community Manager  
Rolleston Coal  
Xstrata Coal Queensland  
PO Box 11  
Springsure QLD 4722



\*\*\*\*\*  
This email and any files transmitted with it are confidential and intended solely for the use of the individual or entity to whom they are addressed. If you have received this email in error please notify the sender immediately.  
\*\*\*\*\*



29 October 2010

[REDACTED]  
Queensland Parks and Wildlife  
Springsure QLD 4722

Dear Sir/Madam,

**Transitional Environmental Program MAN10919  
Release of Water from Spring Creek Dam to Bootes Creek**

Rolleston Coal has received approval from the Department of Environment and Resource Management (DERM) to release water from Spring Creek Dam into Bootes Creek. As a condition of this approval Rolleston Coal is required to notify potentially effected downstream users and landholders.

The Spring Creek Dam is located on site and is close to capacity. With the pending wet season it is necessary to release this water under controlled conditions now to prevent uncontrolled discharges during the wet season. This will assist in the protection of assets and the environment on site and downstream.

Water quality testing over recent months has demonstrated it is of a high standard and as such it is suitable for release to the environment via Bootes Creek. Daily water monitoring will ensure the water quality is maintained through out the period of release. If water quality is outside defined parameters, discharge is required cease immediately.

The water discharge will commence today **29 October 2010** and is limited to 100 ML per day.

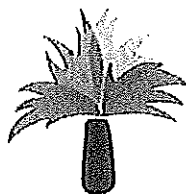
The Transitional Environmental Program remains in force until **1 March 2011**.

If you have any questions or concerns regarding this Transitional Environmental Program please contact Mr [REDACTED]

Yours Faithfully

[REDACTED]

[REDACTED]  
Environment and Community Manager



ROLLESTON  
COAL

29 October 2010



Springsure QLD 4722

Dear Sir/Madam,

**Transitional Environmental Program MAN10919  
Release of Water from Spring Creek Dam to Bootes Creek**

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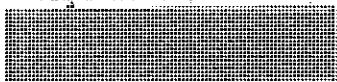
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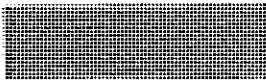
Yours faithfully



Environment and Community Manager



29 October 2010



Rolleston QLD 4702

Dear Sir/Madam,

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Release of Water from Spring Creek Dam to Bootes Creek**

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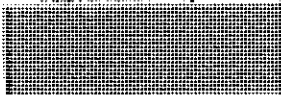
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If you have any questions or concerns regarding this Transitional Environmental Program please contact Mr [REDACTED]

Yours faithfully,



Environment and Community Manager



ROLLESTON  
COAL

29 October 2010

[REDACTED]  
Central Highlands Regional Council  
PO Box 21  
Emerald QLD 4720

Dear Sir/Madam,

**Transitional Environmental Program MAN10919  
Release of Water from Spring Creek Dam to Bootes Creek**

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If you have any questions or concerns regarding this Transitional Environmental Program please contact Mr [REDACTED]

Yours faithfully

[REDACTED]

[REDACTED] Environmental and Community Manager

Rolleston Coal Pty Ltd ABN 73 106 690 037  
Dawson Highway, Via Rolleston, PO Box 11, Springsure QLD 4722  
Telephone 07 4988 91001 Facsimile 07 4988 9151 Internet [www.xstrata.com](http://www.xstrata.com)

X  
xstrata



29 October 2010

[REDACTED]  
Agforce

Dear Sir/Madam,

**Transitional Environmental Program MAN10919  
Release of Water from Spring Creek Dam to Bootes Creek**

Rolleston Coal has received approval from the Department of Environment and Resource Management (DERM) to release water from Spring Creek Dam into Bootes Creek. As a condition of this approval Rolleston Coal is required to notify potentially effected downstream users and landholders.

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If you have any questions or concerns regarding this Transitional Environmental Program please contact Mr [REDACTED]

Yours faithfully  
[REDACTED]

[REDACTED]  
Environment and Community Manager

22nd October 2010 Spring Creek Dam Stratification Testing				
Site	Depth	pH (pH units)	EC (uS/cm)	Temp (C )
Site 1	1m	8.62	334	24.4
Site 1	2m	8.63	336	23.0
Site 1	3m	8.54	333	23.2
Site 2	1m	8.74	335	24.2
Site 2	2m	8.65	334	24.8
Site 2	3m	8.59	332	24.5
Site 3	1m	8.89	335	23.2
Site 3	2m	8.75	333	23.4
Site 3	3m	8.61	333	24.6
Site 4	1m	8.73	333	23.1
Site 4	2m	8.70	335	23.2
Site 4	3m	8.61	335	22.4
Site 5	1m	8.68	338	23.6
Site 5	2m	8.76	335	22.9
Site 5	3m	8.63	335	22.9
Site 6	1m	8.60	353	23.9
Site 6	2m	8.56	340	23.1
Site 6	3m	8.62	333	22.9
22/10/2010 - Average		8.66	336	23.52
Median		8.63	335	23.20
Max		8.89	353	24.80
Min		8.54	332	22.40

5 day rolling median	8.64	334.40
	8.63	334.00
	8.65	334.00
	8.74	334.00
	8.65	333.00
	8.73	333.00
	8.73	333.00
	8.70	333.00
	8.68	335.00
	8.70	335.00
	8.68	335.00
	8.63	335.00
	8.63	338.00
	8.62	335.00

5 day rolling median		
Max	8.74	338.00
Min	8.62	333.00

surface	at 3m
8.62	8.54
8.74	8.59
8.89	8.61
8.73	8.61
8.68	8.63
8.6	8.62
8.71	8.6

**From:** [REDACTED]  
**Sent:** Friday, 29 October 2010 4:17 PM  
**To:** [REDACTED]  
**Cc:** [REDACTED]  
**Subject:** FW: fitzroy river website

**Attachments:** rolleston\_website.doc

[REDACTED]  
I have made two changes  
I am not expecting to much flak but we still should brief Minister Jones

**From:** [REDACTED]  
**Sent:** Friday, 29 October 2010 3:47 PM  
**To:** [REDACTED]  
**Cc:** [REDACTED]  
**Subject:** FW: fitzroy river website

[REDACTED] think the words are good. I would appreciate your feelings after your discussions with stakeholders today as to whether this is likely to be contentions because if it is we should brief the minister before we make it public on the website.

**From:** [REDACTED]  
**Sent:** Friday, 29 October 2010 3:23 PM  
**To:** [REDACTED]  
**Subject:** fitzroy river website

Hi [REDACTED]

[REDACTED] and myself have provided the attached word document for upload to the Fitzroy River website. Could you please approve/make comment on the attachment before progressing.

Also, who else needs to approve this content before progressing with web upload?

Also, I heard back from [REDACTED] and he is keen to include DERM comment in the Rockhampton Regional Council Sandy Creek media release.

Cheers

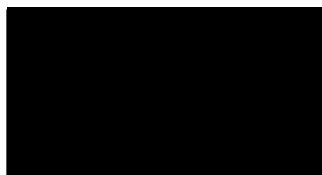
[REDACTED]  
Senior Communications and Client Liaison Officer  
Department of Environment and Resource Management  
Central West Region  
Po Box 1762, Rockhampton 4700  
Telephone: [REDACTED]  
Email: [REDACTED]

From: [REDACTED]  
Sent: Friday, 29 October 2010 3:38 PM  
To: [REDACTED]  
Subject: Rolleston Coal TEP water release

Attachments: davey dam WQ.xls; 20101022\_Spring\_Ck\_Dam\_Stratification\_Results(2).xls;  
201010206\_Spring\_Ck\_Water\_Quality.pdf; Bootes and Meteor results.xls

Hi [REDACTED]  
Please find attached water quality results for Spring Creek Dam, Davey Dam and Bootes Ck. Even though DERM has already been supplied with this data as part of the assessment process it is a Action under the TEP to provide this prior to water being released.  
Regards

[REDACTED]  
Environment & Community Manager  
Rolleston Coal  
Xstrata Coal Queensland  
PO Box 11  
Springsure QLD 4722



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\*\*\*\*\*

From: [REDACTED]  
Sent: Friday, 29 October 2010 3:58 PM  
To: [REDACTED]  
Cc: [REDACTED]  
Subject: notification

Attachments: [REDACTED]

Hi [REDACTED]

Please find attached notification letters that have been emailed or faxed to all of the parties which may be deemed as potentially being affected by Rolleston Coal's water discharge. [REDACTED] has been notified as an AgForce representative rather than a potentially affected landholder [REDACTED] from AgForce was also notified.

Please note that in addition to this written notification all of these landholders (barring the Borg's at Starlee) have been notified by telephone as well.

Please accept this notification to DERM as satisfying Condition 6 of TEP 10919.

Please also note that the notification letters to landholders indicate that discharge will commence today. The actual time when the dam will start to discharge may be sometime over the weekend or first thing Monday morning and that DERM will be notified within 6 hours as per Condition 4.

Regards

[REDACTED]

Environment & Community Manager  
Rolleston Coal  
Xstrata Coal Queensland  
PO Box 11  
Springsure QLD 4722



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\*\*\*\*\*

From: [REDACTED]  
Sent: Friday, 29 October 2010 12:41 PM  
To: [REDACTED]  
Cc: [REDACTED]  
Subject: Contacts  
Hi [REDACTED]

We have just spoke on the phone about this.. . . .

[REDACTED] asked me to pass on this message:

"Please contact [REDACTED] and ask him to call the following people in relation to the TEP discharge:

[REDACTED]

He said you would know who they are.

[REDACTED]

Ken said he is making a list of contacts, and so far it is:

[REDACTED]

[REDACTED]  
Senior Environmental Officer  
Environmental Services (Mining)

Telephone: [REDACTED]

Email: [REDACTED]

[www.derm.qld.gov.au](http://www.derm.qld.gov.au)

Department of Environment and Resource Management  
99 Hospital Road, Emerald, Q 4720  
PO Box 19, Emerald Q 4720

**From:** [REDACTED]  
**Sent:** Friday, 29 October 2010 10:26 AM  
**To:** [REDACTED]  
**Cc:** [REDACTED]  
**Subject:** FW: Rolleston TEP: water release from Spring Creek dam into Bootes Creek  
[REDACTED]

Following on from this morning's phone call, an email below.

[REDACTED]

---

**From:** [REDACTED]  
**Sent:** Friday, 29 October 2010 9:42 AM  
**To:** [REDACTED]  
**Cc:** [REDACTED]  
**Subject:** RE: Rolleston TEP: water release from Spring Creek dam into Bootes Creek

[REDACTED]

Please call [REDACTED]

[REDACTED] has spoken with [REDACTED] of AgForce to discuss details of the TEP. Ian has asked that [REDACTED] contact him and ensure that all landholders downstream of Bootes Creek are notified of the discharge. The landholders should be identified, up until where Bootes and related tributaries meet the Comet River.

Please refer to condition 6.

---

**From:** [REDACTED]  
**Sent:** Friday, 29 October 2010 8:59 AM  
**To:** [REDACTED]  
**Cc:** [REDACTED]  
**Subject:** Rolleston TEP: water release from Spring Creek dam into Bootes Creek

Hi [REDACTED]

Scanner is working again.

Your TEP has been approved by the delegate [REDACTED], with conditions.

I will call soon and talk you through the conditions, if any questions.

The delegate's decision letter and the TEP certificate are attached.

<< File: 101029 dec ltr Rolleston TEP MAN10919.pdf >> << File: 101029 cert Rolleston TEP MAN10919.pdf >>

Regards,

Senior Environmental Officer  
Environmental Services (Mining)

Telephone:

Email:

[www.derm.qld.gov.au](http://www.derm.qld.gov.au)

Department of Environment and Resource Management  
99 Hospital Road, Emerald, Q 4720  
PO Box 19, Emerald Q 4720

## File Note

File Reference: EMD866: MIM500239304

**Subject: Phone call between Ed Donohue (DERM) and [REDACTED]  
(Rolleston Coal Mine)**

*Print and file when complete.*

Date: 2:40 pm, 29 October 2010

File Name: N:\Mines\Tenure\Coal\Mining Lease\_ML's\Rolleston\Compliance\2010\100930 vol TEP Release  
water from Spring Creek Dam into Bootes Creek

Subject (Detail): Rolleston TEP MAN10919 - Phone call between [REDACTED]

[REDACTED] (DERM) rang me and requested that I make a file note of his last phone call with [REDACTED]  
(Rolleston Coal Mine). [REDACTED] was asked by [REDACTED] to contact a list of names given to him in  
regards to TEP MAN10919. [REDACTED] is resisting to contact 4 names on this list. [REDACTED] has advised  
[REDACTED] to contact [REDACTED] as well.

[REDACTED] has contacted [REDACTED] again to state that he has now rung [REDACTED] and convinced [REDACTED] that [REDACTED] does not need  
to contact these 4 names on [REDACTED] list. [REDACTED] will now also contact [REDACTED] of AgForce.

NOTE – File Reference above will appear on all pages once saved or printed.)

	Signature	Date
Author:	[REDACTED]	
Position:	Snr Env Officer	
Unit/Office:	DERM Environmental Services	
(Mining) Emerald		
Phone:	[REDACTED]	

	Signature	Date
Select and complete as appropriate		
Position:		
Unit/Office:		
Phone:		

## File Note

File Reference: EMD866: MIM500239304

**Subject: Phone call between Ed Donohue (DERM) and Ken Dixon  
(Rolleston Coal Mine)**

*Print and file when complete.*

Date: 1 pm, 29 October 2010

File Name: N:\Mines\Tenure\Coal\Mining Lease\_ML's\Rolleston\Compliance\2010\100930 vol TEP Release  
water from Spring Creek Dam into Bootes Creek

Subject (Detail): Rolleston TEP MAN10919 - Phone call between [REDACTED]

[REDACTED] (DERM) rang me and requested that I make a file note of his last phone call with [REDACTED]  
(Rolleston Coal Mine). [REDACTED] was asked by [REDACTED] to contact a list of names given to him in  
regards to TEP MAN10919. [REDACTED] is resisting to contact 4 names on this list. [REDACTED] has advised  
[REDACTED] to contact [REDACTED] as well.

NOTE – File Reference above will appear on all pages once saved or printed.)

	Signature	Date
Author:	[REDACTED]	
Position:	Snr Env Officer	
Unit/Office:	DERM Environmental Services	
(Mining) Emerald		
Phone:	[REDACTED]	

	Signature	Date
Select and complete as appropriate		
Position:		
Unit/Office:		
Phone:		



29 October 2010

[REDACTED]  
"Springwood"  
Springsure QLD 4722

Dear Sir/Madam,

**Transitional Environmental Program MAN10919  
Release of Water from Spring Creek Dam to Bootes Creek**

Rolleston Coal has received approval from the Department of Environment and Resource Management (DERM) to release water from Spring Creek Dam into Bootes Creek. As a condition of this approval Rolleston Coal is required to notify potentially effected downstream users and landholders.

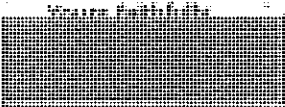
The Spring Creek Dam is located on site and is close to capacity. With the pending wet season it is necessary to release this water under controlled conditions now to prevent uncontrolled discharges during the wet season. This will assist in the protection of assets and the environment on site and downstream.

Water quality testing over recent months has demonstrated it is of a high standard and as such it is suitable for release to the environment via Bootes Creek. Daily water monitoring will ensure the water quality is maintained through out the period of release. If water quality is outside defined parameters, discharge is required cease immediately.

The water discharge will commence today **29 October 2010** and is limited to 100 ML per day.

The Transitional Environmental Program remains in force until **1 March 2011**.

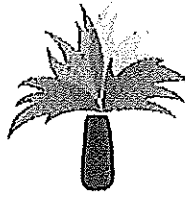
If you have any questions or concerns regarding this Transitional Environmental Program please contact [REDACTED] on telephone [REDACTED]



[REDACTED]  
Environment and Community Manager

Rolleston Coal Pty Ltd ABN 73 106 690 037  
Dawson Highway, Via Rolleston, PO Box 11, Springsure QLD 4722  
Telephone 07 4988 9100 Facsimile 07 4988 9151 Internet [www.xstrata.com](http://www.xstrata.com)

X  
xstrata



ROLLESTON  
COAL

29 October 2010

[REDACTED]  
"Mayneland"  
Rolleston QLD 4702

Dear Sir/Madam,

**Transitional Environmental Program MAN10919  
Release of Water from Spring Creek Dam to Bootes Creek**

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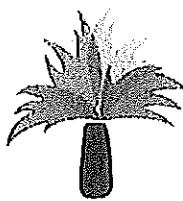
If you have any questions or concerns regarding this Transitional Environmental Program please contact Mr [REDACTED]

[REDACTED]

[REDACTED]  
Environment and Community Manager

Rolleston Coal Pty Ltd ABN 73 106 690 037  
Dawson Highway, Via Rolleston, PO Box 11, Springsure QLD 4722  
Telephone 07 4988 9100 Facsimile 07 4988 9151 Internet [www.xstrata.com](http://www.xstrata.com)

xstrata



ROLLESTON  
COAL

29 October 2010

[REDACTED]  
"Meteor Park"  
Moura QLD 4718

Dear Sir/Madam,

**Transitional Environmental Program MAN10919  
Release of Water from Spring Creek Dam to Bootes Creek**

Rolleston Coal has received approval from the Department of Environment and Resource Management (DERM) to release water from Spring Creek Dam into Bootes Creek. As a condition of this approval Rolleston Coal is required to notify potentially effected downstream users and landholders.

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The Transitional Environmental Program remains in force until **1 March 2011**.

If you have any questions or concerns regarding this Transitional Environmental Program please contact Mr [REDACTED]

Yours faithfully

[REDACTED]

[REDACTED]  
Environment and Community Manager

Rolleston Coal Pty Ltd ABN 73 106 690 037  
Dawson Highway, Via Rolleston, PO Box 11, Springsure QLD 4722  
Telephone 07 4988 9100 Facsimile 07 4988 9151 Internet [www.xstrata.com](http://www.xstrata.com)

xstrata

## Fitzroy River Website

### Latest News:

The Department of Environment and Resource Management has approved a request from Xstrata's Rolleston Coal Mine to release up to 4000 Megalitres from its Spring Creek Dam into Bootes Creek.

Rolleston Coal Mine's Transitional Environmental Program (TEP) has been approved to allow for this release in accordance with section 337 of the *Environmental Protection Act 1994*.

The mine requested the water release to maintain sufficient storage capacity in the water impoundments prior to the commencement of the 2010/2011 wet season.

The department approved this amendment to assist Rolleston Coal Mine in improving on-site water management and it provides a proactive direction to avoid the potential for future uncontrolled releases of mine affected water.

Good quality water is being released from the mine's water storage dam with electrical conductivity in the range of 330 to 355 micro/siemens per cm.

**Table: Spring Creek Dam release conditions**

Parameter	Units	Maximum
Electrical Conductivity (EC)	µS/cm	483
pH	n/a	9.0
Turbidity	NTU	290
Volume released	Megalitres/day	100

Rolleston Coal Mine will regularly undertake sampling of water being discharged from Spring Creek Dam.

The mine will notify the ranger-in-charge of the Albinia National Park, Central Highlands Regional Council and any other relevant/potentially effected users/landholders downstream of the discharge into the Bootes Creek.

## **Fitzroy River Website**

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CTS No. [CTS No.]

Department of Environment and Resource Management  
MINISTERIAL BRIEFING NOTE

TO: Minister for Climate Change and  
Sustainability

Advisor .....	<input type="checkbox"/> Ok
Dated        /        /	
<input type="checkbox"/> Approved <input type="checkbox"/> Not Approved <input type="checkbox"/> Noted	
<input type="checkbox"/> Further Information required	
Minister.....	
Dated        /        /	

SUBJECT: Rolleston Coal Mine Transitional Environmental Program (TEP) Spring Creek  
Dam Water Release into Bootes Creek

TIMEFRAME

- Noting of this brief is non-urgent.

RECOMMENDATION

It is recommended that the Minister:

- note that a draft TEP voluntarily submitted to the department by Rolleston Coal Mine proposes to discharge mine affected water from their Spring Creek Dam into Bootes Creek, during a period of no natural flow in Bootes Creek.

BACKGROUND

- Draft TEP (MAN10919) was submitted by Xstrata Coal Queensland Pty Ltd (t/a Rolleston Coal Pty Ltd) for Rolleston Coal Mine (Rolleston) to the Department of Environment and Resource Management (the department) on 30 September 2010.
- The TEP proposed the release of 4 000 Megalitres of water from Spring Creek Dam, which is a mixture of mine affected and raw water from overland flow, into Bootes Creek at a maximum rate of 100 ML per day (equivalent to a minimum of 40 days of discharge), irrespective of natural flows occurring in Bootes Creek.
- This action is not in compliance with Rolleston Coal Mine's existing environmental authority (EA) and TEP conditions, thus requiring approval through a TEP.
- Rolleston Coal Mine has stated that they need to release this water in order to maintain sufficient storage capacity in the water impoundments prior to the commencement of the wet season, in order to avoid potential uncontrolled discharges.
- Rolleston has a current TEP (MAN10239) approved in June 2010, permitting the dewatering of Spring Creek Pit (stage one of their dewatering plan). Since June, mine affected water in the Spring Creek Pit has been pumped into Spring Creek Dam, under TEP MAN10239.
- A decision was made to grant the TEP (MAN10919) on 28 October 2010 in accordance with section 337 of the *Environmental Protection Act 1994*.

CURRENT ISSUES

- Approval of the TEP will assist Rolleston in improving on-site water management and is a proactive action to avoid the potential for uncontrolled releases of mine affected water.
- The TEP includes daily and monthly reporting of water quality and volume data, in addition to water quality discharge limits to minimise the potential for environmental harm.
- The TEP has also been conditioned to include notification to downstream stakeholders and Central Highlands Regional Council prior to discharge.
- Release of mine affected waters in the Fitzroy Catchment is a community sensitive issue.

Author: Name: [REDACTED] Position: A Manager Environmental Services – Mining) Tel No: [REDACTED] Date: 29 October 2010	Cleared by: Name: [REDACTED] Position: A/ Regional Manager Environmental Services - Mining Tel No: [REDACTED] Name: Position: Tel No:	Cleared by: Name: Position: Tel No: Name: Position: Tel No:	Recommended: Name: [REDACTED] Director-General, DERM Tel No: [REDACTED] Date:
--	--	---	---

## RESOURCE/IMPLEMENTATION IMPLICATIONS

- There are no resource/implementation implications.

## PROPOSED ACTION

- The Department will ensure compliance with the conditions of the TEP.

## MINISTER'S COMMENTS

## ATTACHMENTS

- Attachment A - Draft of Proposed FWQAG Website Update

Author: Name: [REDACTED] Position: A Manager Environmental Services – Mining) Tel No: [REDACTED] Date: 29 October 2010	Cleared by Name: [REDACTED] Position: A/ Regional Manager Environmental Services - Mining Tel No: [REDACTED]	Cleared by Name: Position: Tel No:	Recommended: Name: John Bradley Director-General, DERM Tel No: [REDACTED] Date:
	Name: Position: Tel No:	Name: Position: Tel No:	

**From:** [REDACTED]  
**Sent:** Friday, 29 October 2010 5:01 PM  
**To:** Corro OER RSD CW  
**Cc:** [REDACTED]  
**Subject:** Brief - Rolleston TEP

**Attachments:** 2010 10 29 101018 min\_jones\_brief Rolleston TEP October 2010.doc; 2010 10 29 101018 min\_jones\_brief Rolleston TEP October 2010 -ATTACHMENT A.doc  
Good afternoon

Please find attached [REDACTED] final version of Rolleston TEP Brief to be added to MECS.

Thanks

[REDACTED]  
Administration Officer, Water Planning

**Telephone:** [REDACTED]

**Email:** [REDACTED]

[www.derm.qld.gov.au](http://www.derm.qld.gov.au)

Department of Environment and Resource Management  
209 Bolsover Street, Rockhampton Q 4700  
PO Box 1762, Rockhampton Q 4700

**From:** [REDACTED]  
**Sent:** Saturday, 30 October 2010 5:49 AM  
**To:** [REDACTED] Manager MiningCWR  
**Cc:** [REDACTED]  
**Subject:** TEP Water Discharge Notification - 30/10/10

Rolleston Coal will commence discharging from Spring Creek Dam at around 10.00AM this morning under the Transitional Environmental Program (TEP) and its approval the conditions.

Results from this morning's Insitu-monitoring:

pH: 8.65

EC: 371

Temp: 23.9

Turbidity 25.3

If you have any questions or concerns please contact Mr [REDACTED] on [REDACTED] or myself.

Regards

[REDACTED]  
Senior Environment & Community Advisor  
Rolleston Coal Pty Ltd | Xstrata Coal Queensland  
PO Box 11, Springsure Q 4722  
p [REDACTED]

\*\*\*\*\*  
This email and any files transmitted with it are confidential and intended solely for the use of the individual or entity to whom they are addressed. If you have received this email in error please notify the sender immediately.  
\*\*\*\*\*

Microsoft Excel - Daily Monitoring Log.xls [Read-Only]

File Edit View Insert Format Tools Data Window Help

Font Arial 10 Bold Italic Underline Text Color Background Color

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From: [REDACTED]  
Sent: Tuesday, 2 November 2010 9:37 AM  
To: [REDACTED]  
Cc: [REDACTED]  
Subject: water release monitoring

Attachments: Daily\_Monitoring\_Log.xls

[REDACTED]  
Attached data as requested  
Cheers  
[REDACTED]

Environment & Community Manager  
Rolleston Coal  
Xstrata Coal Queensland  
PO Box 11  
Springsure QLD 4722



\*\*\*\*\*  
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# WEEKLY REPORT & PLANNER

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As at week commencing 8 November 2010

**CONFIDENTIAL – Not for distribution**

This report now contains three parts:

**Part 1—Top issues for the coming week**

**Part 2—Project/program updates**

**Part 3—Media forward alert for coming three months**

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# WEEKLY REPORT & PLANNER

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**DERM Weekly Report – Contents page**

<b>PART 1 – TOP ISSUES FOR THE WEEK BEGINNING 8 NOVEMBER .....</b>	<b>4</b>
OPERATIONS AND ENVIRONMENTAL REGULATOR.....	4
REGIONAL SERVICE DELIVERY .....	4
 <b>PART 2—PROJECT/PROGRAM UPDATES .....</b>	 <b>19</b>
OPERATIONS AND ENVIRONMENTAL REGULATOR.....	19
REGIONAL SERVICE DELIVERY .....	19
 <b>PART 3 – MEDIA FORWARD ALERT FOR COMING THREE MONTHS (CHRONOLOGICAL ORDER) .....</b>	 <b>23</b>
OPERATIONS AND ENVIRONMENTAL REGULATOR.....	23
REGIONAL SERVICE DELIVERY .....	23

## PART 1 – Top Issues for the week beginning 8 November

The endorsed size limit for the description of items in Part 1 is 10 lines of text.

### Operations and Environmental Regulator

#### REGIONAL SERVICE DELIVERY

**Update Title:** Paradise Wetlands Neighbourhood Plan and Ace Waste Incineration facility  
**Responsible Minister:** Minister Jones  
**Milestone date:** December 2010  
**Description:**

- Brisbane City Council informed the department that it would submit a draft 'final' air study report on 25 November and allow one week for the department to comment.
- Ace Waste has provided the department with results of an Ace Waste initiated ambient air monitoring program for Polycyclic Aromatic Hydrocarbons between 7 and 9 July 2010. The department will discuss the sampling methods and approach used by Ace Waste in late October.
- In response to a request from the council on 7 October 2010, the department has written to Ace Waste requiring extra data to input into the latest SIMTARS report.

**Timeframe / Funding:** Ongoing. Final air study report is due by December 2010.  
**Media Opportunities:** There has been significant media and political interest in this issue.  
**Relevant B/Ns:** CTS10197/10, CTS10093/10, CTS10035/10, CTS08967/10, CTS08185/10, CTS06197/10, CTS03643/10, CTS00766/10, CTS12040/10, CTS10869/10, CTS10982/10, CTS10928/10, CTS10872/10, CTS10511/10, CTS0010530/10, CTS12063/10, CTS12062/10, CTS 14611/10, CTS15283/10  
2 DLO requests dated 28 June 2010 and 2 July  
**Contact Officer:** [REDACTED] Regional Manager, Environmental Services South, South East Region, Telephone [REDACTED]

**Update Title:** Amcor Packaging (Australia) Pty Ltd - Waste water discharges into the North Pine River in non-compliance with development approval  
**Responsible Minister:** Minister Jones  
**Milestone date:** 26 November 2010  
**Description:**

- Amcor is currently undertaking an Environmental Evaluation (EE) following a non-compliant discharge of waste water from its site.
- Amcor is currently preparing a voluntary Transitional Environmental Program to implement the necessary changes that have been identified within the EE to improve wastewater management onsite.
- Correspondence was also sent to Amcor on 21 October 2010 requesting Amcor to draft stormwater and emergency management procedures.

**Timeframe / Funding:**  
**Media Opportunities:** N/A  
**Relevant B/Ns:** CTS 12918/10  
**Contact Officer:** [REDACTED] Manager (Moreton Bay), Environmental Services, South East Region Telephone: [REDACTED]

**Update Title:** Landfill gas migration into the adjacent residential estate from the Gold Coast City Council operated Suntown waste disposal facility  
**Responsible Minister:** Minister Jones  
**Milestone date:** 3 December 2010 (EPO) milestone date  
**Description:**

- Gold Coast City Council (the council) operates Suntown Landfill. Landfill gas (LFG) monitoring detected below ground concentrations of methane above the Lower Explosive Limit.
- The council is currently subject to an Environmental Protection Order, which includes orders related to the upgrade of the LFG and leachate extraction systems, as well as the submission of a landfill closure plan.
- The department is currently amending the Suntown Development Approval to

	<p>provide certainty on air particulate limits and improve the LFG monitoring conditions. A survey of the existing leachate collection sumps has delayed the DA amendment process.</p> <ul style="list-style-type: none"> <li>On 18 September 2010 the department received revised modelling estimates from the council regarding the LFG generation rates for the site which suggest that more gas is being produced than predicted. The department is currently assessing this information.</li> <li>On 4 October 2010, a second particulate monitoring program commenced in the Arundel Hills Estate.</li> <li>A monitoring program in the Arundel State School is expected to commence shortly.</li> </ul>
<b>Timeframe / Funding:</b>	The department is expected to finalise the DA amendment by end November 2010.
<b>Media Opportunities:</b>	On 6 October 2010 a media article in the Gold Coast Sun highlighted potential concerns with dust nuisance associated with the site. There is significant ongoing local media interest in this issue.
<b>Relevant B/Ns:</b>	Ministerial correspondence on this matter has been provided; refer to CTS 0197/10, CTS 00513/10 and CTS 00701/10, CTS 05887/10, CTS 05203/10 and CTS 04336/10, CTS08490/10, CTS18866/10, CTS18809/10, CTS18159/10
<b>Contact Officer:</b>	██████████ Manager, Environmental Services, South East Region, ██████████
<b>Update Title:</b>	<b>Williams Corporation Pty Ltd - Port Hinchinbrook dredging</b>
<b>Responsible Minister:</b>	Minister Jones
<b>Milestone date:</b>	
<b>Description:</b>	<ul style="list-style-type: none"> <li>Dredging commenced on the 16 July 2010. Monitoring of the bores has identified an increase of salinity in two of the bores, suggesting that the Dredge Spoil Pond is leaking.</li> <li>Dredging of the waterways at Port Hinchinbrook has ceased in line with the Environmental Protection Order issued by the department on 27 July 2010.</li> <li>Flanagans Consulting has submitted a revised strategy for recommencement of dredging operations. The department is currently considering this proposal which includes improvements to spoil deposition methods within the pond to decrease permeability and reduce seepage.</li> <li>Additional monitoring bores are proposed, combined with a contingency plan to install a series of interception bores to collect any saline seepage should it be detected.</li> <li>Amendment of the current dredging approval and the approved dredge management plan may be required if the revised strategy is considered acceptable.</li> </ul>
<b>Timeframe / Funding:</b>	Ongoing
<b>Media Opportunities:</b>	N/A
<b>Relevant B/Ns:</b>	CTS 15566/10; CTS 15297/10; CTS 14598/10; CTS 14130/10; CTS 13157/10; CTS 08853/10; CTS 07650/09; CTS 07692/10
<b>Contact Officer:</b>	██████████ Manager Environmental Services, North Region ██████████
<b>Update Title:</b>	<b>Non-Commercial Assets Review including water supply options of Irvinebank community</b>
<b>Responsible Minister:</b>	Minister Jones
<b>Milestone Date:</b>	N/A
<b>Description:</b>	<ul style="list-style-type: none"> <li>GHD Consultants has been engaged to undertake an independent assessment of Non-Commercial Assets (NCA) as part of a Cabinet Budget Review Committee (CBRC) submission.</li> <li>During this assessment, it was identified that the structural integrity of one of the NCAs (Ibis Dam) did not meet current Acceptable Flood Capacity (AFC) guidelines. The population at risk is 75.</li> <li>Water is supplied to Irvinebank residents from Ibis Dam via a pipeline. This water supply is non-potable and contains iron, manganese and levels of arsenic that marginally exceed the drinking water guidelines.</li> <li>A number of options for water supply arrangements at Irvinebank are now being considered as part of the NCA review.</li> <li>These include the decommissioning of the dam and the provision of an</li> </ul>

	<p>alternative water supply to current users.</p> <ul style="list-style-type: none"> <li>The department attended an Irvinebank Progress Association meeting on 14 October 2010. The future of the Ibis Dam was raised by the association which was adamant that an alternative supply should be provided if the dam is decommissioned.</li> </ul>
<b>Progress:</b>	The NCA Review Report has been completed and the CBRC submission has been drafted. The CBRC submission will be forwarded to Cabinet Liaison Officer for review and comments. Final documentation to be provided to the Department of Premier and Cabinet by 29 November 2010.
<b>Timeframe / Funding</b>	The CBRC submission for the AFC Upgrade Program or additional funding request is due to Treasury by 29 November 2010
<b>Media Opportunities:</b>	N/A
<b>Relevant B/Ns:</b>	A Director-General Briefing Note is currently being prepared - CTS 16957/10.
<b>Contact Officer:</b>	[REDACTED] Principal Engineer, Non-Commercial Assets, Water Services, Central West Region, Telephone [REDACTED]
<b>Update Title:</b>	<b>Land Availability for Mine Worker Accommodation in Blackwater</b>
<b>Responsible Minister:</b>	Minister Robertson
<b>Milestone Date:</b>	N/A
<b>Description:</b>	<ul style="list-style-type: none"> <li>Demand for land in Blackwater is increasing as a result of the expansion of mining activities in the region.</li> <li>Three mine worker accommodation camps are currently located on State land in the town. The operators of two of these camps have applied for and have been offered Term Leases under the <i>Land Act 1994</i>. The operators of the other camp are currently discussing the matter of making an application for a Term Lease with departmental officers.</li> <li>There is also substantial demand for State land to be made available for additional worker camps in the town to support planned mine expansions.</li> <li>An Urban Development Area was declared over the town of Blackwater on 30 July 2010. The Urban Land Development Authority (ULDA) is currently preparing a draft planning scheme for the town that will guide future land use.</li> </ul>
<b>Progress:</b>	The department held a teleconference with the ULDA and Central Highlands Regional Council (the council) on 21 and 27 September 2010 to progress discussions on how to most appropriately address land availability demand in Blackwater. The department met with the ULDA and the council on Friday 8 October 2010 to further discuss options for meeting this demand. An option to address the need for a new area of land to be made available for one of the existing camps is currently being considered by the council. The department met with representatives of the camp on 18 October 2010 to discuss possible options. The department considers that freehold is the most suitable tenure to make land available for additional camps and has commenced the process to create these new land parcels. The department is having further discussions with camp providers that have contacted the department seeking additional land.
<b>Timeframe / Funding</b>	Ongoing
<b>Media Opportunities:</b>	N/A
<b>Relevant B/Ns:</b>	CTS 18987/10
<b>Contact Officer:</b>	[REDACTED] Manager, Land Management and Use, Central West Region, Telephone [REDACTED]
<b>Update Title:</b>	<b>Lungfish deaths reported by Sunwater, associated with Paradise Dam, near Childers</b>
<b>Responsible Minister:</b>	Minister Jones
<b>Milestone Date:</b>	N/A
<b>Description:</b>	<ul style="list-style-type: none"> <li>Sunwater has advised the department of fish deaths at Paradise Dam on 15, 17, 23, 24, 29 September and 1 and 22 October 2010. Sunwater advice indicates dead fish (including Qld Lungfish) have been observed up and downstream of Paradise Dam.</li> <li>Sunwater advised that some dead fish had serious physical injuries.</li> <li>Sunwater has previously advised the dam is being managed in accordance with the Resource Operations Plan and to prevent an overtopping event, a significant portion of the flows are being passed through the environmental gate.</li> <li>These recent reports are in addition to similar reports earlier in 2010.</li> </ul>
<b>Progress:</b>	The Assistant Director General, Regional Service Delivery, met with the CEO of

Sunwater on 30 September 2010 to discuss the reporting of fish deaths and possible management options to minimise fish deaths. Sunwater advised that it is confident reasonable and practical measures are being implemented. The Regional Manager, Environmental Services North, and the Manager Wide Bay Burnett, met with the General Manager Infrastructure Management and the State Environment Manager of Sunwater on 7 October 2010 to progress outcomes of the first meeting. Sunwater agreed to provide a report on the current situation at Paradise Dam and will develop an improved reporting protocol in conjunction with the department. Sunwater will also implement reporting procedures to provide notification prior to the occurrence of significant events such as overtopping of the dam.

**Timeframe / Funding**  
**Media Opportunities:**  
**Relevant B/Ns:**

4 November 2010.  
N/A  
Revised Environmental Incident Reports were submitted on 17, 23, 24 and 29 September and 25 October 2010

**Contact Officer:**

██████████ Manager (Wide Bay Burnett), Environmental Services North, South East Region, Telephone ██████████

**Update Title:**

**Colton Coal – Decision that Environmental Management Plan did not comply with the content requirements of the Environmental Protection Act**

**Responsible Minister:**

Minister Jones

**Milestone Date:**

N/A

**Description:**

- An application was made for an Environmental Authority for a coal mine 10 km north of Maryborough on 3 February 2010.
- On 13 August 2010 Colton Coal Pty Ltd submitted an Environmental Management Plan (EM Plan) for the coal mine.
- On 24 September 2010 a decision was made that the EM Plan did not meet the content requirements of the *Environmental Protection Act 1994*.
- Key areas of concern were the assessment of the potential for acid mine drainage and the management of this issue during operation and post closure, and the assessment of the impacts of discharging mine water directly to the Mary River.
- Officers of the department have offered to meet with Colton Coal before it resubmits a revised EM Plan.
- This decision has prompted significant local media interest.

**Progress:**

Officers from the Wide Bay Burnett Environmental Services office met with representatives of Colton Coal on 13 October 2010. Colton Coal advised that further assessment of acid mine drainage and associated issues would be undertaken and an improved Environmental Management Plan will be provided. Colton Coal stated that it continues to work cooperatively with the department to adequately address the issues of concern and will advise when the Environmental Management Plan is expected to be resubmitted.

**Timeframe / Funding**  
**Media Opportunities:**  
**Relevant B/Ns:**

Colton Coal has up to 12 months to respond to the decision.

N/A

Ministerial briefing note submitted to the Regional Service Director's office on 24 September 2010.

**Contact Officer:**

██████████ Manager (Wide Bay Burnett), Environmental Services North, South East Region, Telephone ██████████

**Update Title:**

**Mulgrave Aquifer Development by Cairns Regional Council**

**Responsible Minister:**

Minister Robertson

**Milestone date:**

**Description:**

- Cairns Regional Council arranged a public meeting in Gordonvale on 6 October 2010 to discuss the proposed development of the Mulgrave Aquifer for Cairns City water supply purposes.
- The meeting was rescheduled to 27 October 2010 due to venue incapacibilities.
- Some members of the Mulgrave Landcare and Catchment Group Inc are opposed to the council's development proposal and are looking to the department to reverse its 2001 decision to allocate water from the Mulgrave Aquifer.

**Timeframe / Funding:**

**Media Opportunities:**

**Relevant B/Ns:**

CTS 16734/10

**Contact Officer:**

██████████ Regional Manager, Water Services, North Region, ██████████

**Title:** Collapse of Tipperary Point Swing Bridge Mount Morgan - Rockhampton Regional Council

**Responsible Minister:** Minister Jones

**Description:**

- The Tipperary Point Swing Bridge collapsed on 7 October 2010 while the Rockhampton Regional Council (the council) was attempting to erect fencing to prevent public access.
- The bridge was being considered for listing on the Queensland Heritage Register.
- An engineer, contracted by the department, inspected the site on 12 October 2010 and has provided an engineering report on the condition of the bridge and future options.
- The department will not investigate the cause of the collapse as the bridge was not protected by the *Queensland Heritage Act 1992* at the time of collapse.
- The department has delayed making a recommendation to the Queensland Heritage Council on whether the bridge should be listed on the Queensland Heritage Register while the council considers its options.
- The department will continue to operate in partnership with the council to identify and implement required actions

**Timeframe /Funding:**

**Media Opportunities:** Media Statement CTS 18688/10, Media Response 18467/10

**Relevant B/Ns:** CTS 18681/10, CTS 19431/10 and CTS 18248/10

**Contact Officer:** [REDACTED] Regional Manager, Land Services, Rockhampton, Central West Region, Regional Service Delivery Ph: [REDACTED]

**Update Title:** Wet Tropics Water Resource Planning Groundwater Audit

**Responsible Minister:** Minister Robertson

**Milestone date:**

**Description:**

- An audit of groundwater use in the Wet Tropics water resource plan area will be undertaken by the department between October 2010 and March 2011.
- The audit is necessary to inform the water resource planning process by determining the extent of groundwater use; highlight trends in groundwater development; inform groundwater allocation and management policy; and assist the validation of groundwater modelling.
- The Wet Tropics Water Resource Plan Community Reference Panel membership has been approved by Minister Robertson. Members will be notified by letter.

**Timeframe / Funding:**

**Media Opportunities:**

**Relevant B/Ns:**

**Contact Officer:** [REDACTED] Regional Manager, Water Services, North Region, [REDACTED]

**Update Title:** Proposed rock wall on state land adjacent to [REDACTED] Daintree River

**Responsible Minister:** Minister Jones

**Milestone date:** End October 2010

**Description:**

- Cairns River Improvement Trust (the trust) has applied for approval for Resource Entitlement for a proposed 80 metre rock wall on the Daintree River.
- The trust believes that the rock wall is necessary to protect grazing land from further erosion.
- The proposal is inconsistent with the principles and policies of the State and Regional Coastal Management Plans and the objectives of the Conservation Park Zone of the Great Barrier Reef Coast Marine Park.
- Key concerns include the aesthetic impacts in an area of high scenic value, potential transfer of bank erosion onto adjacent land and poor design.
- On 25 October 2010, the State Land Asset Management Unit (SLAM) was advised by Environmental Services that it objects to the proposal, due to the abovementioned inconsistencies.
- SLAM will notify the applicant of the decision later this week.

**Timeframe / Funding:**

**Media Opportunities:**

**Relevant B/Ns:**

**Contact Officer:**

There has not been any media interest in the application.

An unsolicited Briefing Note is being prepared for the Director-General.

Principal Environmental Officer, North Region,

**Update Title:**

**Responsible Minister:**

**Milestone Date**

**Description:**

**Reduced Operational Capacity of the Acid Plant at Mount Isa Mines**

Minister Jones

- Incitec Pivot Limited own and operate the acid plant adjacent to the Xstrata Mount Isa Mines copper smelter. This plant plays a major role in reducing atmospheric sulphur dioxide emissions from the mine.
- On 13 October 2010, one of the two blowers in the acid plant had a mechanical failure. This means that the acid plant is operating between 60-70 per cent capacity, resulting in increased and more visible sulphur dioxide emissions from Xstrata's copper smelter stack.
- Ground level concentrations of sulphur dioxide in the Mount Isa Community will continue to be managed through Xstrata's Air Quality Control System.
- The plant was fully operational on the 26 October 2010.

**Timeframe / Funding:**

**Media Opportunities:**

**Relevant B/Ns:**

**Contact Officer:**

Nil

The incident was reported in the Northwest Star Newspaper on 13 October 2010.

Briefing note is being prepared (CTS18959/10).

Principal Environmental Officer, North Region, Regional Service Delivery. Ph:

**Update Title:**

**Responsible Minister:**

**Milestone date:**

**Description:**

**Pete's Tyres – storage of excess tyres in Toowoomba**

Minister Jones

26 October 2010

- Mr Peter Hole is the registered operator of a tyre recycling operation in Toowoomba which stores approximately 180 000 tyres. Emergency Services advised that a large part of Toowoomba may have to be evacuated if a fire starts on site.
- A court order directed Mr Hole to reduce the number of tyres on site to 3 000 by 30 July 2010. As of 19 October 2010, no tyres have been removed.
- On 26 October 2010 the judge hearing the department's application for a court order that would allow it to remove the excess tyres indicated he would make the order in about two weeks and issue his reasons at that time.
- The department has begun a tender to have the tyres removed, with cost recovery from Mr Hole. This will be finalised once a court order is made.

**Timeframe / Funding:**

**Media Opportunities:**

**Relevant B/Ns:**

**Contact Officer:**

Previous Director-General/DDG Briefing/DDG notes: CTS 06998/10; 11115/10; 12424/10 13105/10; 13272/10 19405/10

Regional Manager, Environmental Services,

**Update Title:**

**Responsible Minister:**

**Milestone date:**

**Description:**

**Sustainable Organics – contaminated water discharges into the North Pine River in non-compliance with development approval**

Minister Jones

N/A

- There was a high risk of failure of the dam bund walls which could cause significant environmental harm if the on-site material was released uncontrolled to the North Pine River.
- An Emergency Direction was issued to Sustainable Organics on 11 October 2010 to conduct a controlled release of collected water from the bunded areas on the site to North Pine River to minimise further risk of bund failure after the significant rainfall on the weekend commencing 9 October.
- Daily monitoring conducted indicates that the freeboard is moving into compliance range and there have been no further breaches or overtopping.
- Correspondence was sent to Sustainable Organics on 22 October 2010 requesting Sustainable Organics draft stormwater and emergency

management procedures to avoid this type of event occurring again.

**Timeframe / Funding:** N/A  
**Media Opportunities:** Media holding statement about contaminated water runoff into the North Pine River prepared 12 October 2010.  
**Relevant B/Ns:** Incident report lodged prepared 11 October 2010  
**Contact Officer:** [REDACTED] Manager (Moreton Bay), Environmental Services, South East  
**Region Telephone:** [REDACTED]

**Update Title:** Boral – Inundation of site at Lawnton Rd, Lawnton  
**Responsible Minister:** Minister Jones  
**Milestone date:** 10 November 2010  
**Description:**

- Boral has lodged a voluntary Transitional Environmental Program (TEP) to undertake controlled discharge to the North Pine River, following recent heavy rains which resulted in the North Pine River overtopping (breaching) its banks and inundating the Boral site.
- The TEP has been approved by the department and discharge is to cease by 10 November 2010.
- Correspondence was sent to Boral on 22 October 2010 requesting Boral to draft stormwater and emergency management procedures.

**Timeframe / Funding:** N/A  
**Media Opportunities:** N/A  
**Relevant B/Ns:** Regional Services Director (SER) briefed on issues.  
**Contact Officer:** [REDACTED] Manager (Moreton Bay), Environmental Services, South East  
**Region Telephone:** [REDACTED]

**Update Title:** Land acquisition in the Burdekin Shire – CassTech  
**Responsible Minister:** Minister Robertson  
**Milestone date:** N/A  
**Description:**

- On 20 October 2010, Minister Tim Mulherin and the Associate Director-General of the department met to discuss the issues impacting on the integrated cassava project proposed by CassTech.
- The issues impacting on the project are the Land and Water Management Plan, Wetlands State Planning Policy and the proposed clearing of remnant and regrowth vegetation. A briefing note will be prepared to address the issues raised at this meeting.
- The department have scheduled a follow up meeting with CassTech in Townsville on 28 October 2010.

**Timeframe / Funding:** N/A  
**Media Opportunities:** N/A  
**Relevant B/Ns:** CTS19093/10  
**Contact Officer:** [REDACTED] Regional Manager, Planning and Assessment, North Region (Regional Service Delivery Division)

**Update Title:** DLO Request: Mareeba composting proposal – Vital Soils  
**Responsible Minister:** Minister Jones  
**Milestone date:**  
**Description:**

- The department is the assessment manager of a development application for a soil conditioning (composting) operation located at the Mareeba landfill.
- The department requested further information regarding leachate management and odour modelling. The odour modelling information remains outstanding; once it is provided, the application will then progress into the assessment stage.
- This modelling is required to assist the department in ensuring it does not approve activities that may cause unlawful nuisance to local residents. Council were informed of the need for this modelling in November 2009.
- The contractor who will undertake the composting has questioned the need for odour modelling, raising this issue with his local member and in the media.

**Timeframe / Funding:**

**Media Opportunities:** Nil.

**Relevant B/Ns:**

**Contact Officer:** [REDACTED] Team Leader, Mining and Industry, North Region, Regional Service Delivery. Ph [REDACTED]

**Update Title:** DLO Request: Visy Recycling - Townsville

**Responsible Minister:** Minister Jones

**Milestone date:**

**Description:**

- Visy Recycling operate a waste transfer station ERA in Townsville for sorting recyclable materials from domestic kerbside recycling collection.
- Townsville City Council and the department have responded to complaints of inappropriate storage of recycling material during the 2009 and 2010 wet seasons. On both occasions, actions were taken by Visy Recycling to rectify the issue.
- The department received another complaint on 7 October 2010 regarding storage of material in the open during rainfall. The department conducted a compliance inspection at the site on 15 October 2010 and identified non-compliance with conditions relating to the management of contaminated stormwater. Compliance action is currently being initiated to address the situation in line with the department's Enforcement Guidelines.

**Timeframe / Funding:**

**Media Opportunities:** Nil

**Relevant B/Ns:** CTS19166/10

**Contact Officer:** [REDACTED] Manager, Mining and Industry, North Region, Ph [REDACTED]

## PART 2—Project/program updates

The endorsed size limit for Part 2 is half a page.

### Operations and Environmental Regulator

#### REGIONAL SERVICE DELIVERY

<b>Update title:</b>	<b>Great Artesian Basin Sustainability Initiative (GABSI) Phase 3</b>
<b>Responsible Minister:</b>	Minister Robertson
<b>Date:</b>	25 October 2010
<b>Business group:</b>	
<b>Description:</b>	The GABSI is a jointly funded Queensland and Australian Government (\$46.5million each) program which aims to reduce water wastage and increase pressure in the Great Artesian Basin through the subsidised rehabilitation of uncontrolled flowing bores and the replacement of bore drains with pipeline reticulation systems. The 10/11 implementation plan will be provided to the Commonwealth by November 2010
<b>Current issues:</b>	At this stage, the level of voluntary participation in the GABSI will not be sufficient to fully expend the available funding for phase 3. Competition from the resources sector for qualified engineers and drilling contractors is also affecting the department's ability to deliver phase 3 within the five-year timeframe. A brief for the Minister on these issues will be prepared in the next few weeks following the completion of landholder surveys and follow up phone contact as a result of these surveys. As a result of these delivery issues it is anticipated that total expenditure on GABSI will not exceed \$12 million per year and this will be communicated to the Commonwealth in the 2010/2011 implementation plan.
<b>Consultation:</b>	N/A
<b>Milestone dates:</b>	Phase 3 started on 1 July 2009 and is due for completion by 30 June 2014
<b>Risks:</b>	Due to the impediments described, the funding made available by the Queensland and Australian Governments for GABSI Phase 3 will not be fully utilised by June 2014. This may result in a substantial number of higher priority bores continuing to waste significant amounts of water from the Great Artesian Basin.
<b>Relevant B/Ns:</b>	
<b>Contact Officer</b>	[REDACTED] Regional Manager GABSI & Major Projects, South West Region (Regional Service Delivery Division) [REDACTED]
<b>Update title:</b>	<b>Healthy Headwaters Water Use Efficiency Project</b>
<b>Responsible Minister:</b>	Minister Robertson
<b>Date:</b>	25 October 2010
<b>Business group:</b>	
<b>Description:</b>	The Healthy Headwaters Water Use Efficiency (HHWUE) Project aims to subsidise the installation of water-efficient infrastructure in specified Queensland Murray-Darling Basin catchments. The project is funded by the Australian Government, which is providing \$36 million over two years.
<b>Current issues:</b>	The project schedule for the first phase of the HHWUE project has been signed by both DERM and DEWHA. The first milestone report under the proposed project schedule was submitted to DEWHA on 12 July 2010. The final report for the startup funding provided by the Commonwealth was submitted on 24 September 2010. Applications for the first round of funding were extended to Monday 4 October 2010 due to recent rain and flooding. 12 applications were received seeking approximately \$29 million in funding from the project. The total volume of water offered to the Commonwealth is 8 252 megalitres at an average price of \$3 590 per megalitre. The second milestone report for the project was submitted to DEWHA by 15 October 2010.
<b>Consultation:</b>	N/A
<b>Milestone dates:</b>	Applications for the first round closed close of business Monday 4 October 2010. The applications will be assessed by the department on 27 October 2010 and recommendations submitted to DEWHA in the first week of November. DEWHA are expected to have completed their assessment by end of November 2010.
<b>Risks:</b>	A number of applications have been received and are yet to be assessed and ranked by the department. It is possible that several of these applications may not be suitable. Once this is complete, the department will submit a recommendation

**Relevant B/Ns:**  
**Contact Officer:**  
**Extension:**

to DEWHA for consideration. There has been no indication from DEWHA regarding the acceptable price of water to be transferred or how they intend to assess the potential environmental and socio-economic benefits of the projects.  
CTS 08466/10

Regional Manager GABSI & Major Projects, South West Region

**Update title:**  
**Responsible Minister:**  
**Date:**  
**Business group:**  
**Description:**

**Rolleston Coal Mine: Spring Creek Dam Water Release into Bootes Creek**  
Minister Robertson  
2 November 2010

A Transitional Environmental Program (TEP) MAN10919 for the Rolleston Coal Mine was approved by the department on 28 October 2010. This TEP allows Rolleston Coal Mine to release up to 4 GL of their Spring Creek Dam water into Bootes Creek at a maximum rate of 100 ML per day (1.16 m<sup>3</sup>/s), irrespective of the natural flow rate of Bootes Creek. Rolleston Coal Mine has stated that they need to release this water in order to maintain sufficient storage capacity in the water impoundments prior to the commencement of the wet season, in order to avoid potential uncontrolled discharges.

**Current issues:**

This TEP will assist Rolleston Coal Mine in improving on-site water management and is a proactive action to avoid the potential for uncontrolled releases of mine affected water. This TEP has also been conditioned to include notification to downstream stakeholders and Central Highlands Regional Council prior to this water release. Rolleston Coal Mine notified the department that they commenced their first water release from Spring Creek Dam at approximately 10 AM on 30 October 2010, under this TEP and its approval conditions.

**Consultation:**

Downstream stakeholders and the Central Highlands Regional Council were notified prior to the water release taking place.

**Milestone dates:**

Rolleston Coal Mine's first water release from Spring Creek Dam took place at approximately 10 AM on 30 October 2010, under this TEP and its approval conditions. Water quality data for Spring Creek Dam and Bootes Creek have been supplied to the department prior to any water being released, and from the dam spillway as it is being released. Notification letters have been emailed or faxed to all of the parties which may be deemed as potentially being affected by this release of water under this TEP. This TEP is in force until 1 March 2011.

**Risks:**

**Relevant B/Ns:**  
**Contact Officer:**

Clancy Mackaway, Manager – Environmental Services (Mining), Emerald, Central West Region

**Extension:**

Spring Creek Dam Transitional Environmental Program

Date	pH	pH	EC	Temp	Turbidity	Volume	Comment
		(average)	$\mu\text{S/cm}$	$^{\circ}\text{C}$	NTU	ML	
30/10/2010	8.65	8.65	371	23.9	25.3		Only 14hrs discharge
31/10/2010	8.69	8.67	357	23.4	75.8		
1/11/2010	8.60	8.65	354	25.6	42.0		
2/11/2010	8.70	8.66	350	23.7	68.3		
3/11/2010		6.93					
4/11/2010		5.20					
5/11/2010		3.46					
6/11/2010		1.74					
7/11/2010		0.00					
8/11/2010		0.00					
9/11/2010		0.00					
10/11/2010		0.00					
11/11/2010		0.00					
12/11/2010		0.00					
13/11/2010		0.00					
14/11/2010		0.00					
15/11/2010		0.00					
16/11/2010		0.00					
17/11/2010		0.00					
18/11/2010		0.00					
19/11/2010		0.00					
20/11/2010		0.00					
21/11/2010		0.00					
22/11/2010		0.00					
23/11/2010		0.00					
24/11/2010		0.00					
25/11/2010		0.00					
26/11/2010		0.00					
27/11/2010		0.00					
28/11/2010		0.00					
29/11/2010		0.00					
30/11/2010		0.00					
1/12/2010		0.00					
2/12/2010		0.00					
3/12/2010		0.00					
4/12/2010		0.00					
5/12/2010		0.00					

0.0

101102\_FW FWQAG Update.txt

From: [REDACTED]  
Sent: Thursday, 11 November 2010 3:17 PM  
To: [REDACTED]  
Subject: FW: FWQAG Update

Attachments: 2010 11 02 Rolleston Website Update.doc

fyi

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From: [REDACTED]  
Sent: Tuesday, 2 November 2010 3:42 PM  
To: [REDACTED]

Subject: FWQAG Update

Dear members and proxies

I wish to advise you that the Department has approved a Transitional Environmental Program (TEP) for a discharge of water by Rolleston Coal Pty Ltd on 28 October 2010.

The TEP authorises the discharge of 4000 megalitres of mine affected water from the Spring Creek Dam into Bootes Creek which is a tributary of Meteor Creek and the Comet River.

Water quality monitoring over a range of depths in the dam indicates the water to be good quality water with conductivity in the range of 330 - 380 micro Siemens per centimetre and with low turbidity.

Further details including key water release conditions will be shown on the Fitzroy Water Quality Website <http://www.fitzroyriver.qld.gov.au/>. I attach a draft of the proposed update to the website for your information.

I will advise the date of the next meeting of the Fitzroy Water Quality Advisory Group shortly.

[REDACTED]  
A/Regional Manager, Environmental Services (Mining)  
Telephone: [REDACTED]

Email: [REDACTED]  
[www.derm.qld.gov.au](http://www.derm.qld.gov.au)

101102\_FW FWQAG Update.txt  
Department of Environment and Resource Management

209 Bolsover Street, Rockhampton Q 4700  
PO Box 1762, Rockhampton Q 4700



	C10 - C14 Fraction	µg/L	<50	<50	<50	<50	<50
100	C15 - C28 Fraction	µg/L	100	<100	<100	<100	<100
100	C29 - C36 Fraction	µg/L	50	<50	<50	<50	<50
100	C10 - C36 Fraction (sum)			<50	<50	<50	<50
<b>EG035F: Dissolved Mercury by FIMS</b>							
0.0002	Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001

04/02/201C	40213	05/02/201C	06/02/201C	06/02/201C	07/02/201C	07/02/201C	08/02/201C	40219	11/02/201C	12/02/201C	13/02/201C	14/02/201C	15/02/201C
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[illegible]

Variable	Category	Frequency	Percentage	Mean	SD	Median	Mode	Skewness	Kurtosis	Shapiro-Wilk	Normality
Age	<50	150	15.0%	45.0	10.0	40.0	40.0	-0.5	3.0	0.95	<0.0001
	50-59	100	10.0%	55.0	5.0	50.0	50.0	-0.2	2.5	0.98	<0.0001
	60-69	80	8.0%	65.0	5.0	60.0	60.0	-0.1	2.2	0.99	<0.0001
	≥70	70	7.0%	75.0	5.0	70.0	70.0	-0.1	2.2	0.99	<0.0001
Gender	Male	120	12.0%	55.0	10.0	50.0	50.0	-0.5	3.0	0.95	<0.0001
	Female	100	10.0%	55.0	10.0	50.0	50.0	-0.5	3.0	0.95	<0.0001
	Other	80	8.0%	55.0	10.0	50.0	50.0	-0.5	3.0	0.95	<0.0001
	Unknown	70	7.0%	55.0	10.0	50.0	50.0	-0.5	3.0	0.95	<0.0001
Education	<High School	150	15.0%	45.0	10.0	40.0	40.0	-0.5	3.0	0.95	<0.0001
	High School	100	10.0%	55.0	10.0	50.0	50.0	-0.5	3.0	0.95	<0.0001
	College	80	8.0%	65.0	10.0	60.0	60.0	-0.5	3.0	0.95	<0.0001
	Postgraduate	70	7.0%	75.0	10.0	70.0	70.0	-0.5	3.0	0.95	<0.0001
Income	<5000	150	15.0%	45.0	10.0	40.0	40.0	-0.5	3.0	0.95	<0.0001
	5000-9999	100	10.0%	55.0	10.0	50.0	50.0	-0.5	3.0	0.95	<0.0001
	10000-14999	80	8.0%	65.0	10.0	60.0	60.0	-0.5	3.0	0.95	<0.0001
	≥15000	70	7.0%	75.0	10.0	70.0	70.0	-0.5	3.0	0.95	<0.0001
Marital Status	Single	150	15.0%	45.0	10.0	40.0	40.0	-0.5	3.0	0.95	<0.0001
	Married	100	10.0%	55.0	10.0	50.0	50.0	-0.5	3.0	0.95	<0.0001
	Divorced	80	8.0%	65.0	10.0	60.0	60.0	-0.5	3.0	0.95	<0.0001
	Widowed	70	7.0%	75.0	10.0	70.0	70.0	-0.5	3.0	0.95	<0.0001
Occupation	Unemployed	150	15.0%	45.0	10.0	40.0	40.0	-0.5	3.0	0.95	<0.0001
	Self-employed	100	10.0%	55.0	10.0	50.0	50.0	-0.5	3.0	0.95	<0.0001
	Employee	80	8.0%	65.0	10.0	60.0	60.0	-0.5	3.0	0.95	<0.0001
	Retired	70	7.0%	75.0	10.0	70.0	70.0	-0.5	3.0	0.95	<0.0001
Health Status	Good	150	15.0%	45.0	10.0	40.0	40.0	-0.5	3.0	0.95	<0.0001
	Fair	100	10.0%	55.0	10.0	50.0	50.0	-0.5	3.0	0.95	<0.0001
	Poor	80	8.0%	65.0	10.0	60.0	60.0	-0.5	3.0	0.95	<0.0001
	Very Poor	70	7.0%	75.0	10.0	70.0	70.0	-0.5	3.0	0.95	<0.0001



[illegible]



Variable	Category	Count	Percentage	Mean	SD	Median	Mode	Skewness	Kurtosis	Shapiro-Wilk	Normality
Age	<50	120	24.0%	35.0	10.0	30.0	30.0	-0.5	2.5	0.95	Normal
	50-60	180	36.0%	55.0	10.0	50.0	50.0	-0.5	2.5	0.95	Normal
	60-70	150	30.0%	65.0	10.0	60.0	60.0	-0.5	2.5	0.95	Normal
	>70	150	30.0%	75.0	10.0	70.0	70.0	-0.5	2.5	0.95	Normal
Gender	Male	200	40.0%	55.0	10.0	50.0	50.0	-0.5	2.5	0.95	Normal
	Female	180	36.0%	55.0	10.0	50.0	50.0	-0.5	2.5	0.95	Normal
	Other	100	20.0%	55.0	10.0	50.0	50.0	-0.5	2.5	0.95	Normal
	Unknown	20	4.0%	55.0	10.0	50.0	50.0	-0.5	2.5	0.95	Normal
Education	<High School	100	20.0%	45.0	10.0	40.0	40.0	-0.5	2.5	0.95	Normal
	High School	150	30.0%	55.0	10.0	50.0	50.0	-0.5	2.5	0.95	Normal
	College	120	24.0%	65.0	10.0	60.0	60.0	-0.5	2.5	0.95	Normal
	>College	130	26.0%	75.0	10.0	70.0	70.0	-0.5	2.5	0.95	Normal
Income	<\$20,000	80	16.0%	35.0	10.0	30.0	30.0	-0.5	2.5	0.95	Normal
	\$20,000-\$40,000	120	24.0%	45.0	10.0	40.0	40.0	-0.5	2.5	0.95	Normal
	\$40,000-\$60,000	100	20.0%	55.0	10.0	50.0	50.0	-0.5	2.5	0.95	Normal
	>\$60,000	100	20.0%	65.0	10.0	60.0	60.0	-0.5	2.5	0.95	Normal
Marital Status	Single	100	20.0%	45.0	10.0	40.0	40.0	-0.5	2.5	0.95	Normal
	Married	150	30.0%	55.0	10.0	50.0	50.0	-0.5	2.5	0.95	Normal
	Divorced	80	16.0%	65.0	10.0	60.0	60.0	-0.5	2.5	0.95	Normal
	Widowed	40	8.0%	75.0	10.0	70.0	70.0	-0.5	2.5	0.95	Normal
Health Status	Excellent	60	12.0%	35.0	10.0	30.0	30.0	-0.5	2.5	0.95	Normal
	Good	120	24.0%	45.0	10.0	40.0	40.0	-0.5	2.5	0.95	Normal
	Fair	100	20.0%	55.0	10.0	50.0	50.0	-0.5	2.5	0.95	Normal
	Poor	20	4.0%	65.0	10.0	60.0	60.0	-0.5	2.5	0.95	Normal



[illegible]

min	max
7.16	8.56
101	573
6	2940
5.1	1100
1	6
0.01	0.63
0.001	0.002
0.0001	0.0013
0.001	0.002
0.001	0.001
0.001	0.006
0.001	0.102
0.002	0.002
0.001	0.007
0.01	0.01
0.005	0.133
0.05	0.08
0.05	0.66
0.01	0.61
0.01	0.16

80	80
120	120
50	110
50	180

0.0001	0.0001
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	pH	Rolling median	Rolling mean (5 days)	EC	Temp	Turbidity
	8.7	8.7	8.578	274	19	
	8.8	8.6	8.532	260	21.5	
	8.48	8.53	8.506	271	20	
	8.22	8.53	8.494	276	17.1	
	8.71	8.53	8.482	297	17.6	
	8.6	8.47	8.48	301	18.8	
	8.53	8.47	8.49	303	16.7	
	7.5	8.47	8.512	282	21.6	
	8.17	8.47	8.534	294	18.3	
	8.47	8.52	8.556	318	19.9	
	8.52	8.52	8.578	317	19.1	
	8.52	8.58	8.588	316	21.6	
	7.1	8.58	8.585	660	22.7	
	8.58	8.58	8.583	362	20.7	
	8.63	8.63	8.594	341	21	
	8.71	8.57	8.582	316	19	
	8.56	8.565	8.585	351	19.7	85.6
	7.77	8.57	8.592	335	20.6	60.7
	8.7	8.635	8.603	322	21.4	30.2
	8.57	8.57	8.57	331	24.1	14.5

min	7.1	8.47	0	8.48	260	16.7	14.5
Max	8.8	8.7	8.603		660	24.1	85.6
Median	8.545						
SD	0.444257						
Mean	8.392	8.5545	8.551	326.35	20.02	47.75	

8.836257

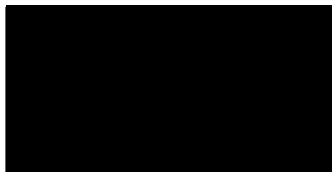
From: [REDACTED]  
 Sent: Wednesday, 3 November 2010 9:59 AM  
 To: [REDACTED]  
 Subject: rolleston coal discharge

Today's Spring Creek discharge water quality. The discharge rate has noticeably dropped at the discharge point but we aim to maintain it at around the 0.8 cumecs for the time being.  
 Regards  
 [REDACTED]

Spring Creek Dam Transitional Environmental Program

Date	pH	pH	EC	Temp	Turbidity	Comment
		(average)	µS/cm	°C	NTU	
3/11/2010	8.23	8.57	353	22.6	37.4	

[REDACTED]  
 Environment & Community Manager  
 Rolleston Coal  
 Xstrata Coal Queensland  
 PO Box 11  
 Springsure QLD 4722



\*\*\*\*\*  
 This email and any files transmitted with it are confidential and intended solely for the use of the individual or entity to whom they are addressed. If you have received this email in error please notify the sender immediately.  
 \*\*\*\*\*

**Update title:** Rolleston Coal Mine: Spring Creek Dam Water Release into Bootes Creek  
**Responsible Minister:** Minister Robertson

**Milestone date:** N/A

**Description:**

- A Transitional Environmental Program (TEP) MAN10919 for the Rolleston Coal Mine was approved by the department on 28 October 2010.
- This TEP allows Rolleston Coal Mine to release up to 4 GL of their Spring Creek Dam water into Bootes Creek at a maximum rate of 100 ML per day (1.16 m<sup>3</sup>/s), irrespective of the natural flow rate of Bootes Creek.
- Rolleston Coal Mine has stated that they need to release this water in order to maintain sufficient storage capacity in the water impoundments prior to the commencement of the wet season, in order to avoid potential uncontrolled discharges.
- This TEP will assist Rolleston Coal Mine in improving on-site water management and is a proactive action to avoid the potential for uncontrolled releases of mine affected water.
- This TEP has also been conditioned to include notification to downstream stakeholders and Central Highlands Regional Council prior to this water release.
- Rolleston Coal Mine notified the department that they commenced their first water release from Spring Creek Dam at approximately 10 AM on 30 October 2010, under this TEP and its approval conditions.

**Timeframe / Funding:** Ongoing

**Media Opportunities:** Nil

**Relevant B/Ns:** CTS

**Contact Officer:** [REDACTED] A/Manager, Environmental Services Mining, Central West  
Region, Regional Service Delivery Ph: [REDACTED]

Microsoft Excel - Daily Monitoring Log (2).xls														
File Edit View Insert Format Tools Data Window Help														
10 100% Arial														
012 8.75														
1 Spring Creek Dam Transitional Environmental Program														
2	Date	pH	pH	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC
3														
4	30/10/2010	8.65	8.75	9.00	371	483	23.8	25.3	290	Only 14hrs discharge				
5	31/10/2010	8.69	8.67	9.00	357	483	23.4	75.8	290					
6	1/11/2010	8.60	8.65	9.00	354	483	25.6	42.0	290					
7	2/11/2010	8.70	8.68	9.00	350	483	23.7	88.3	290					
8	3/11/2010	8.73	8.57	9.00	353	483	22.6	37.4	290					
9	4/11/2010	8.78	8.50	9.00	331	483	22.3	18.4	290					
10	5/11/2010			9.00		483			290					
11	6/11/2010			9.00		483			290					
12	7/11/2010			9.00		483			290					
13	8/11/2010			9.00		483			290					
14	9/11/2010			9.00		483			290					
15	10/11/2010			9.00		483			290					
16	11/11/2010			9.00		483			290					
17	12/11/2010			9.00		483			290					
18	13/11/2010			9.00		483			290					
19	14/11/2010			9.00		483			290					
20	15/11/2010			9.00		483			290					
21	16/11/2010			9.00		483			290					
22	17/11/2010			9.00		483			290					
23	18/11/2010			9.00		483			290					
24	19/11/2010			9.00		483			290					
25	20/11/2010			9.00		483			290					
26	21/11/2010			9.00		483			290					
27	22/11/2010			9.00		483			290					
28	23/11/2010			9.00		483			290					
29	24/11/2010			9.00		483			290					
30	25/11/2010			9.00		483			290					
31	26/11/2010			9.00		483			290					
32	27/11/2010			9.00		483			290					
33	28/11/2010			9.00		483			290					
34	29/11/2010			9.00		483			290					
35	30/11/2010			9.00		483			290					
36	31/12/2010			9.00		483			290					
37	27/2/2010			9.00		483			290					
38	31/2/2010			9.00		483			290					
39	4/2/2010			9.00		483			290					
40	5/2/2010			9.00		483			290					
41														
42														

From: [REDACTED]  
Sent: Thursday, 4 November 2010 6:59 AM  
To: [REDACTED]  
Cc: [REDACTED]  
Subject: Rolleston Coal Spring Creek Dam - TEP - Daily Monitoring log

Attachments: Daily\_Monitoring\_Log.xls  
Good morning [REDACTED]

Please find attached spreadsheet regarding the TEP for Spring Creek Dam at Rolleston Coal which has been updated with today's results. Sheet 2 has graphical representation of the results compared to limits

Today's results:

- pH – 8.28
- EC – 331  $\mu\text{S}/\text{cm}$
- Turbidity – 18.4 NTU

If you have any questions or concerns, please contact [REDACTED] or myself to discuss.

Regards

[REDACTED]  
Senior Environment & Community Advisor  
Rolleston Coal Pty Ltd | Xstrata Coal Queensland  
PO Box 11, Springsure Q 4722

p [REDACTED]

\*\*\*\*\*  
This email and any files transmitted with it are confidential and intended solely for the use of the individual or entity to whom they are addressed. If you have received this email in error please notify the sender immediately.  
\*\*\*\*\*

From: [REDACTED]  
Sent: Friday, 5 November 2010 11:33 AM  
To: [REDACTED]  
Cc: [REDACTED]  
Subject: Rolleston Coal water discharge  
Dear [REDACTED]

**Re: discharge of water into Bootes Creek**

Thank you for your correspondence dated 1/11/2010 regarding Rolleston Coal's water discharge into Bootes Creek.

Please be advised that DERM, in exercising due diligence, required exhaustive water quality testing prior to granting Rolleston Coal permission to discharge water under a Transitional Environmental Program (TEP). In addition, DERM require daily monitoring of discharge water at its source for pH, Electrical Conductivity and turbidity. Also required are monthly tests for dissolved metals or other potential contaminants. Limits based on background natural flows have been imposed.

DERM is the regulator for Rolleston Coal's Environmental Authority (EA) as well as this TEP. As such all water quality results are being and will continue to be reported to DERM. Rolleston Coal will not be providing copies of results of water quality testing other than to DERM. Under the TEP Rolleston Coal must undertake daily water quality monitoring at the point where it is being discharged into the natural environment. In addition to this requirement Rolleston Coal will be periodically conducting downstream water quality tests along Bootes Creek as well as Meteor Creek. This water quality testing of Meteor Creek does not include the Mayneland pumping site. This is because Meteor Creek already has a water flow in addition to any flows under this TEP from the mine. Background analyses of Meteor Creek water quality also indicate naturally elevated Electrical Conductivity levels unrelated to water being discharged under this TEP.

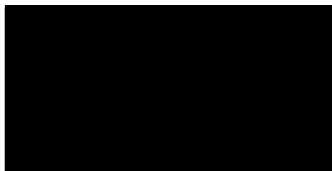
Your letter requested that in the event of any future water releases Rolleston Coal provide you with more notice. Water releases are determined under the EA for the mine site, and the regulator.

Given that Mayneland straddles Meteor Creek and that you have indicated you regularly cross the creek, a request is hereby made for myself and Alan Shaw to meet with you on-farm at a convenient time to look at and discuss any access issues which may potentially arise as a result of protracted discharge under this TEP.

Regards

[REDACTED]

Environment & Community Manager  
Rolleston Coal  
Xstrata Coal Queensland  
PO Box 11  
Springsure QLD 4722



\*\*\*\*\*  
This email and any files transmitted with it are confidential and intended solely for the use of the individual or entity to whom they are addressed. If you have received this email in error please notify the sender immediately.  
\*\*\*\*\*

From: [REDACTED]  
Sent: Friday, 5 November 2010 2:48 PM  
To: [REDACTED]  
Cc: [REDACTED]  
Subject: FW: PB FTP Site File Download Notification

Importance: High

As discussed below is the virtual world for PB where you can download the Design submission for Dam 5 (DSA Non Compliance TEP). I have asked PB to arrange for two (2) printed copies (1 for myself and 1 for DERM). I will forward this to you as soon as the printers have completed same.

Regards

-----Original Message-----

From: [REDACTED]  
Sent: Friday, 5 November 2010 11:57 AM  
To: [REDACTED]  
Cc: [REDACTED]  
Subject: PB FTP Site File Download Notification  
Importance: High

Parsons Brinckerhoff File Download Instructions:

A file that is too large to transmit via email has been made available to you for download.

Please follow the link below to download the file in zipped format.

General Disclaimer:

NOTICE: This communication and any attachments (this message) may contain confidential information for the sole use of the intended recipient(s). Any unauthorized use, disclosure, viewing, copying, alteration, dissemination or distribution of, or reliance on this message is strictly prohibited. If you have received this message in error, or you are not an authorized recipient, please notify the sender immediately by replying to this message, delete this message and all copies from your e-mail system and destroy any printed copies.  
<https://ftp.pbworld.com/GetFile.aspx?fn=314696800.zip>

TEP\_Sandy Creek

**From:** [REDACTED]  
**Sent:** Friday, 4 February 2011 10:57 AM  
**To:** [REDACTED]  
**Cc:** [REDACTED]  
**Subject:** RE: TEP\_Sandy Creek

**Attachments:** Rolleston TEP - Discharge to Meteor Creek via Sandy Creek 20110204.pdf

Sorry [REDACTED] I forgot to attach it.

Regards  
[REDACTED]

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**From:** [REDACTED]  
**Sent:** Friday, 4 February 2011 10:00 AM  
**To:** [REDACTED] (lleston - Coal)  
**Cc:** [REDACTED]  
**Subject:** RE: TEP\_Sandy Creek

Can you please send me through an amended TEP via email so it can continue to be assessed?

Regards,  
[REDACTED]

---

**From:** [REDACTED]  
**Sent:** Friday, 4 February 2011 9:59 AM  
**To:** [REDACTED]  
**Cc:** [REDACTED]  
**Subject:** RE: TEP\_Sandy Creek

Hi [REDACTED]

Rather than withdraw the TEP application I have taken the liberty of changing a couple of words so that the TEP isn't made redundant the moment the new EA is authorised.

In the 2<sup>nd</sup> last paragraph at the bottom of page three and also in Section 7 on page 14.

The sole reason for needing to make these couple of minor changes is that whilst Rolleston Coal have the culverts and written permission from Council to install them as per the new EA, all of our civil construction machinery is off-site doing repair work for Queensland Rail on Rolleston Coal's badly damaged section of rail line. This may take 6-8 weeks. To avoid a gap in being able to discharge into Meteor Creek the TEP will still be required.

Please call me if this doesn't make sense.

Regards  
[REDACTED]

TEP\_Sandy Creek

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**From:** [REDACTED]  
**Sent:** Thursday, 3 February 2011 3:15 PM  
**To:** [REDACTED] (Rolleston - Coal)  
**Cc:** [REDACTED]  
**Subject:** TEP\_Sandy Creek

Hi [REDACTED]

Further to our conversation this afternoon, can you please email [REDACTED] and I if you wish to withdraw the TEP application for Rolleston Coal Discharge into Meteor Creek via Sandy Creek.

Regards,

[REDACTED]

---

[REDACTED] Senior Environmental Officer | Environmental Services (Mining)

**P:** [REDACTED]

**E:** [REDACTED] | [www.derm.qld.gov.au](http://www.derm.qld.gov.au)

**DERM** Department of Environment & Resource Management

99 Hospital Road, Emerald QLD 4720 | PO Box 906, Emerald QLD 4720

+-----+  
Think B4U Print

1 ream of paper = 6% of a tree and 5.4kg CO2 in the atmosphere

3 sheets of A4 paper = 1 litre of water  
+-----+

TEP\_Sandy Creek

# 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.

**(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
<i>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.</i>	<i>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.</i>  <i>Compliance inspections conducted in May 2008, 2009</i>

*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.	
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## 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.

## TEP Part 1 – Notice requiring a draft TEP

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### 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 it 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.

## TEP Part 1 – Notice requiring a draft TEP

### 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.

# 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.

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**TEP Part 2 – Considering and making a decision about a draft TEP**

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**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

## TEP Part 2 – Considering and making a decision about a draft TEP

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- 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.

## TEP Part 2 – Considering and making a decision about a draft TEP

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### 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 led 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.

## TEP Part 2 – Considering and making a decision about a draft TEP

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### 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

## TEP Part 2 – Considering and making a decision about a draft TEP

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.

## TEP Part 2 – Considering and making a decision about a draft TEP

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### (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?

## TEP Part 2 – Considering and making a decision about a draft TEP

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- 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?

## TEP Part 2 – Considering and making a decision about a draft TEP

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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.

## TEP Part 2 – Considering and making a decision about a draft TEP

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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 meet the requirements of the Act.

## TEP Part 2 – Considering and making a decision about a draft TEP

### 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.

## TEP Part 2 – Considering and making a decision about a draft TEP

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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

## TEP Part 2 – Considering and making a decision about a draft TEP

- 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

## TEP Part 2 – Considering and making a decision about a draft TEP

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- 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.

[s 329]

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**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.

[s 332]

## 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 transitional 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

[s 335]

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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.

[s 338]

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**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.

[s 342]

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**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

[s 347]

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- (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.

[s 338]

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**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.

# 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.

**(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
<i>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.</i>	<i>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.</i>  <i>Compliance inspections conducted in May 2008, 2009</i>

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.	
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## 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 it 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.

# 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.

## TEP Part 2 – Considering and making a decision about a draft TEP

### 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

## TEP Part 2 – Considering and making a decision about a draft TEP

- 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.

## TEP Part 2 – Considering and making a decision about a draft TEP

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### 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 led 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.

## TEP Part 2 – Considering and making a decision about a draft TEP

### 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

## TEP Part 2 – Considering and making a decision about a draft TEP

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.

## TEP Part 2 – Considering and making a decision about a draft 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?

## TEP Part 2 – Considering and making a decision about a draft TEP

- 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?

## TEP Part 2 – Considering and making a decision about a draft TEP

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.

## TEP Part 2 – Considering and making a decision about a draft TEP

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 meet the requirements of the Act.

## TEP Part 2 – Considering and making a decision about a draft TEP

### 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.

## TEP Part 2 – Considering and making a decision about a draft TEP

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

## TEP Part 2 – Considering and making a decision about a draft TEP

- 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

## TEP Part 2 – Considering and making a decision about a draft TEP

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- 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.

# Assessment report

*Environmental Protection Act 1994*  
Transitional Environmental Program (TEP)

## Part 1 – Notice requiring a draft TEP

*This document is intended for internal use to assist Environmental Services officers to record the information considered by the Department when deciding to issue a notice requiring a draft TEP.*

Identifying Details	
Compliance activity number	Number
EcoTrack number	Number
Permit number:	Permit number (if applicable)
File number:	File Number
Applicant number:	Number
Trading as:	Trading as details (if applicable)
Registered business address:	Registered business address

### Note:

1. Assessment reports recommending a decision be made are to be structured in the format shown below.
2. Explanatory notes for completing the report are given under each heading.
3. The report is to be endorsed by the responsible officer, supervisor and the delegated decision-maker.

### 1. Brief history of the matter

Briefly outline any historical information relevant to this decision in chronological order.

Briefly outline the historical information in chronological order.

### 2. Grounds for issuing a notice requiring a draft TEP

Section 332 of the *Environmental Protection Act 1994* provides that the Department may require the submission of a draft Transitional Environmental Program (TEP) in certain circumstances. Identify on which of the following grounds the decision to issue a notice requiring a draft TEP is based.

The Department may require a person or public authority to prepare and submit to it for approval a draft TEP:

☐ As a condition of an environmental authority (EA).

OR



- ☐ As a development condition of a development approval (DA).

The Department may also require a person or public authority to prepare and submit to it for approval a draft Transitional Environmental Program if it is satisfied:

- ☐ An activity carried out, or proposed to be carried out, by the person or authority is causing, or may cause, unlawful environmental harm.

OR

- ☐ It is not practicable for the person or public authority to comply with an environmental protection policy or regulation on its commencement.

OR

- ☐ That a condition of an environmental authority held by the person or public authority is, or has been, contravened.

OR

- ☐ That a standard environmental condition of a code of environmental compliance for a Chapter 4 activity is, or has been, contravened by the person or public authority.

OR

- ☐ A development condition of a development approval is, or has been, contravened and the person or public authority is:

- ☐ an owner of the land for which the approval is granted or  
☐ another person in whom the benefit of the approval vests.

### 3. Expand Upon the Grounds

Expand upon the grounds identified for issuing the notice requiring a draft TEP. This can include identifying an alleged offence or any statutory requirement which must be met prior to the Department issuing the notice.

Each ground should be listed independently and allocated a separate number.

Number	Specific Ground
1	Example: ABC Pty Ltd is a timber preservation/treatment operator. While conducting timber preservation/treatment activities, ABC Pty Ltd has released stormwater from its operating site that does not comply with release limits, thereby causing unlawful environmental harm. If ABC Pty Ltd does not upgrade its site and improve its stormwater management system, it is likely that non-compliant releases of stormwater from the site will continue, thereby causing further environmental harm.
2	
3	
4	

#### 4. Detail the Matters Considered

The purpose of the following table is to ensure that there is evidence to support the use of the statutory tool. This is achieved by linking the elements of the breach to the evidence gathered and the conclusions formed (i.e. the facts and circumstances).

When analysing evidence or developing the facts and circumstances, officers are encouraged to consider the accuracy and relevance of the information available, historical details, professional expertise and the weight attributed to any direct testimony provided.

Elements of the offence or legislative requirement	Evidence	Facts and Circumstances
<i>List the elements of any grounds for issuing the notice requiring a TEP</i>	<i>Identify the evidence considered which is relevant to the elements or requirement (i.e. statements, photographs, and recordings)</i>	<i>Detail the facts and circumstance that support the Department's findings.</i>
<b>Number 1 (Number taken from Section 2)</b>		
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.	<p>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.</p> <p>The site operator says that ABC Pty Ltd has made significant investment in stormwater management infrastructure in 2005. However, the business has grown substantially since this time.</p> <p>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.</p>
	File note written by environmental officer Mary Green on 23 June 2010.	<p>ABC Pty Ltd is carrying out timber preservation/treatment activities at a site at 123 Creek Road, Murphyville.</p> <p>Visual inspections of the site in 2008, 2009 and 2010 have indicated that the business has grown substantially and the stormwater management system and infrastructure are no longer coping and require improvements.</p> <p>Annual stormwater release quality monitoring records for 2009 and 2010 indicate that ABC Pty Ltd has exceeded its stormwater release limits on a number</p>

		<p>of occasions.</p> <p>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.</p> <p>In the circumstances, the Department considers that a notice requiring a draft TEP should be issued to ABC Pty Ltd.</p>
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
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Proposed requirement	Justification
Proposed requirement	Justification
Proposed requirement	Justification
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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)
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<b>Reasons for Decision</b> <i>For example:</i> <i>I approve this recommendation based upon the information set out above.</i> <i>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.</i> <i>Or, I reject the above recommendation as I consider it more appropriate for the Department to take an educational approach to this breach.</i>
<b>Print Name:</b>
<b>Position:</b>
<b>Date:</b>

# 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 <i>Note: The department has 20 business days after the application date in which to make a decision in relation to the draft TEP.</i>

**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.



## TEP Part 2 – Considering and making a decision about a draft TEP

### 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.

## TEP Part 2 – Considering and making a decision about a draft TEP

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.

## TEP Part 2 – Considering and making a decision about a draft TEP

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	

TEP Part 2 – Considering and making a decision about a draft TEP

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.

## TEP Part 2 – Considering and making a decision about a draft TEP

### *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 be 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.

## TEP Part 2 – Considering and making a decision about a draft TEP

- ☐ 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.

## TEP Part 2 – Considering and making a decision about a draft TEP

## 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.

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Deleted: <#>The administering authority may require the preparation of a TEP or a person or public authority may voluntarily submit a TEP.]

## **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 caused 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-compliance 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

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## Assessing draft Transitional Environmental Programs

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.

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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.

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### 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.

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## **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

**Enquiries:**

Permit and Licence Management

Ph: 1300 368 326

Fax: (07) 3115 9600

Email:

[eco.access@derm.qld.gov.au](mailto:eco.access@derm.qld.gov.au)

Date: xx/mm/2010

# Request for Statutory Approval



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:
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*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;

[s 52]

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- (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.

[s 53]

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*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](http://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.

## **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	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		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.

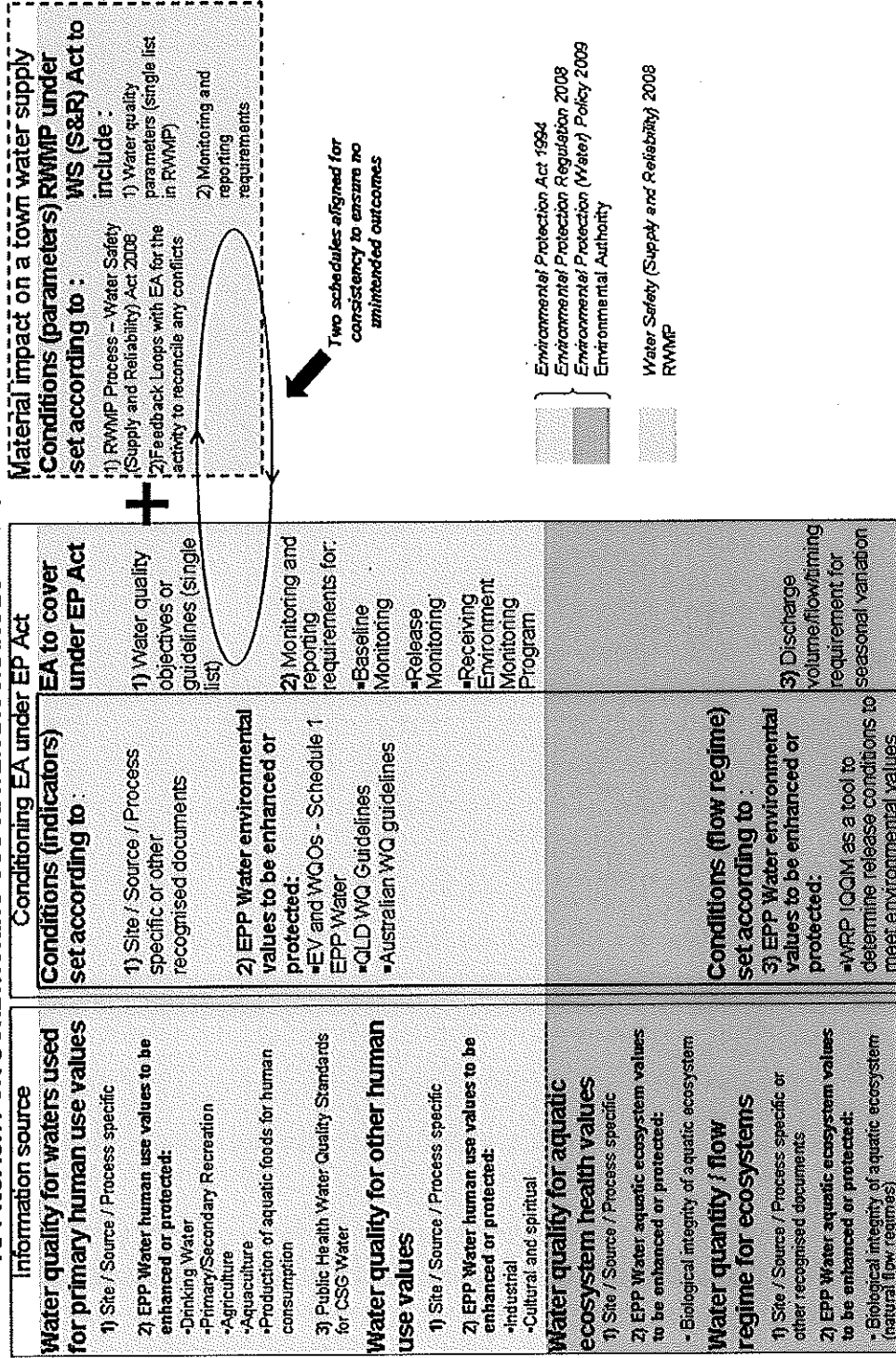
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# Attachment 1.

## Approach for Conditioning CSG Water Discharges to Protect Environmental Values

### 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 than 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 - <b>may be produced inadvertently by chlorination reactions which take place during the disinfection of wastewater effluents or drinking water sources</b>
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 - <b>may be produced inadvertently by chlorination reactions which take place during the disinfection of wastewater effluents or drinking water sources.</b>
1,2 Dichloroethene	540-59-0	60	ID	NHTV	NNS	Used as a chemical intermediate for the manufacture of dyes - <b>may be produced inadvertently by chlorination reactions which take place during the disinfection of wastewater effluents or drinking water sources</b>
1, 2 Dichlorobenzene (DI)	106-46-7	1500	160	EV	NNS	
1,4 Dichlorobenzene (DI)	106-46-7	40	60	EV	NNS	
2,2 Dichloropropionic Acid (DPA)	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 - <b>may be produced inadvertently by chlorination reactions which take place during the disinfection of wastewater effluents or drinking water sources</b>
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	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-Methylphenol (p-cresol)	106-44-5	600	-	EV	NA	
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
4-Nonylphenol	104-40-5	500	-	NHTV	NNS	during the application of the insecticide
Acenaphthene	83-32-9	20	SED	EV	Yes	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.
Acenaphthylene	208-96-8	0.014	SED	NHTV	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.
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 <sub>2</sub> ).
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. <b>The predominant environmental release of bromodichloromethane results from its inadvertent formation during chlorination treatment processes of drinking, waste, and cooling waters.</b> 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 concentration 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 ( $\text{ClO}_2^-$ ) 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 ( $\text{ClO}_2^-$ ) 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 <b>photodecomposition of chlorine dioxide when treated water is exposed to bright sunlight in open basins</b> . 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 <b>by-product of chlorination and chloramination of drinking water</b> , 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 <b>disinfection by-product in the chlorination of drinking water</b> , 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 <b>chemical by-product of chlorination and chloramination of drinking water.</b>
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 <i>Azotobacter</i>

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
						<p>agile.</p> <p>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</p>
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 (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 (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, and 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 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	108-95-2	150	320	EV	Yes	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	<p>Toluene occurs in nature in natural gas deposits and has been detected in emissions from volcanos, forest fires and crude oil.</p> <p>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.</p>
Total Petroleum Hydrocarbons (reported as separate fractions)		(Total) 200	-			
Trichloroacetic acid (DI)	76-03-9	100	-	EV	Unlikely	Trichloroacetic acid is produced photooxidatively 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. ... <b>also one of the main disinfection by-products during drinking water chlorination.</b>
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<sup>th</sup> percentiles for median EC, 80<sup>th</sup> 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  $\mu\text{S}/\text{cm}$  are unlikely to affect adult fish although salinity around 1000-1500  $\mu\text{S}/\text{cm}$  may effect early life stages of fish. Macroinvertebrates are unlikely to be affected at below around 1000 $\mu\text{S}/\text{cm}$ . However, for those species adapted to quite low salinity (200-300 $\mu\text{S}/\text{cm}$ ) such as in the south of the Fitzroy Basin, permitting ambient EC concentrations to reach 1000-1500  $\mu\text{S}/\text{cm}$  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 1500 $\mu\text{S}/\text{cm}$ ) 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 80<sup>th</sup> 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 analysed 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 95<sup>th</sup> 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  $\mu\text{S}/\text{cm}$  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 ( $\text{m}^3/\text{s}$ ) 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<sup>th</sup> 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 ( $\text{m}^3/\text{s}$ ) 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  $\mu\text{S}/\text{cm}$ . 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  $\mu\text{S}/\text{cm}$ . 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  $\leq 9.0$ ) 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  $\mu\text{S/cm}$  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<sup>th</sup> 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  $\mu\text{S}/\text{cm}$ .**

Sub catchment	95 <sup>th</sup> Percentile Guideline	90 <sup>th</sup> Percentile Guideline	75 <sup>th</sup> 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**

	<b>TDS (mg/L)</b>	<b>EC* (µS/cm)</b>
Drinking Water	500	750
Irrigation**		1100
Stockwater***	2400	3600

\* using theoretical conversion  $\text{mg/L TDS} = 0.67 \times \mu\text{S/cm EC}$ ;

\*\* 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)**

<b>Parameter</b>	<b>Guideline (lowland)</b>	<b>Guideline (upland)</b>
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**

<b>Parameter</b>	<b>ANZECC Guideline for slightly- moderately disturbed environ. (µg/L)</b>	<b>Comment</b>
Aluminium	55	Trigger value for pH > 6.5
Ammonia	900	Based on a pH of 8
Antimony	9	Low reliability trigger
Arsenic (As III)	24	
Arsenic (As V)	13	
Beryllium	0.13	Low reliability trigger
Boron	370	See Note 1
Cadmium	0.2	
Chromium (Cr VI)	1	See Note 1
Copper	1.4	
Iron	300	Low reliability trigger
Lead	3.4	
Manganese	1900	See Note 1
Mercury (inorganic)	0.06	99% PL as can bioaccumulate
Molybdenum	34	Low reliability trigger.
Nickel	11	
Selenium (Total Speciated)	5	99% PL as can bioaccumulate
Silver	0.05	
Uranium	0.5	Low reliability trigger
Vanadium	6	Low reliability trigger
Zinc	8	See Note 1

**Note 1:** May not protect key species from chronic toxicity.

**Table 6. Metal Guideline Values for Stock, Crops and Drinking Water**  
 (units in mg/L)

Parameter	Stock Drinking	Crop Irrigation	Drinking/ Household
Total Aluminium	5	200	0.2
Total Arsenic	0.5	0.1	0.007
Total Boron	5	0.5	4
Total Cadmium	0.01	0.01	0.002
Total Chromium (DW should be Cr (VI))	1	0.1	0.05
Total Cobalt	1		
Total Copper	1	200	1
Total Iron		0.2	0.3
Total Lead	0.1	2	0.01
Total Manganese		0.2	0.1
Total Mercury	0.002	0.001	0.001
Total Molybdenum	0.15	0.01	0.05
Total Nickel	1	0.2	0.02
Total Selenium	0.02	0.02	0.01
Total Zinc	20	2	3

# Operational policy

Licensing

## Waste water discharge to Queensland waters

Operational policies provide a framework for consistent application and interpretation of legislation by the Environmental Protection Agency, which incorporates the Queensland Parks and Wildlife Service. Operational policies will not be applied inflexibly to all circumstances. Individual circumstances may require an alternative application of policy.

This operational policy<sup>1</sup> 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

<b>1. Operational policy overview</b>	<b>3</b>
1.0 Policy subject	3
1.1 Key legislation and policy frameworks	3
1.2 Application of policy	3
<b>2. Policy/technical issues determination</b>	<b>5</b>
2.0 Policy statements	5
2.1 Describe the proposed activity and discharge	9
2.2 Describe the receiving environment	15
2.3 Predict outcomes or impacts of the proposed discharge	21
2.3.1 Predicted impact of the proposed discharge of residual waste water on the EVs and WQOs of the receiving waters	22
2.3.2 Where WQOs are not currently being achieved, is the discharge likely to further reduce receiving water quality?	22
2.3.3 Initial mixing zone	22
2.3.4 Assimilative capacity and sustainable load	25
2.4 Set residual waste water discharge limits, discharge and impact monitoring requirements	28
2.5 Environmental offsets	32
<b>3. Additional information</b>	<b>36</b>
3.0 Process for using default EVs and WQOs	36

<sup>1</sup> 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.)



## Waste water discharge to Queensland waters

3.1 Use of local reference data.....	37
3.2 Temporary streams.....	38
3.3 Hydrological impacts.....	38
3.4 Riparian habitat impacts .....	38
3.5 Public health impacts.....	39
3.6 Groundwater impacts.....	39
<b>4. Relevant legislation, intergovernmental agreements and EPA operational policies .....</b>	<b>39</b>
<b>5. Further information.....</b>	<b>40</b>
<b>6. Appendices.....</b>	<b>41</b>
Appendix 6.1: Glossary of terms.....	41
Appendix 6.2: Mixing zone determination.....	47
Appendix 6.3: Numerical modelling of environmental impacts and mitigation actions .....	50
Appendix 6.4: Application of Multiple Before-After Control-Impact design to HEV water assessment .....	52

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## 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<sup>2</sup> to Queensland waters<sup>3</sup>, including to waters of high ecological value (HEV). It also applies when assessing applications under other Acts that involve environmental values (EVs) of water or water quality objectives (WQOs), decisions made under the *State Coastal Management Plan 2001* and Regional Coastal Management Plans.

### 1.1 Key legislation and policy frameworks

The operational policy is based primarily on the EP Act and the Environmental Protection (Water) Policy 1997 (the EPP Water). The object of the EP Act is "to protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends (ecologically sustainable development)" (from Section 3 of the EP Act). The explanatory notes to Section 5 of the EP Act (Obligations of persons to achieve object of Act) require "all people who are given power under this Act, to use that power to protect the Queensland environment and do so consistent with the principles of ESD".

The current EPP Water includes statements of policy about assessment and decision making that resulted from consultation on the Regulatory Impact Statement for the Environmental Protection (Water) Amendment Policy No 1 2006 (the EPP (Water) AP). These are described in the corresponding explanatory notes. This operational policy provides further information on the implications of 'scheduling' EVs and WQOs under the EPP Water for residual waste water discharge. Refer also to the EPA Information sheet Scheduling environmental values and water quality objectives.

The operational policy also informs officers and applicants on key provisions of the EPP Water, the Queensland Water Quality Guidelines 2006 and the ANZECC Water Quality Guidelines.

The environmental offsets policy at Section 2.6 is to be used in conjunction with the Queensland Government Environmental Offsets Policy.

Relevant legislation, intergovernmental agreements and other EPA Operational policies are listed at Section 4.

### 1.2 Application of policy

This operational policy applies when assessing or deciding applications (hereinafter referred to as development applications) relating to activities that are proposing to discharge residual waste water to waters, such as:

- development approvals under the Integrated Planning Act 1997 (IPA) for EP Act chapter 4 activities (non-mining and non-petroleum environmentally relevant activities (ERAs)) prescribed under the Environmental Protection Regulation 1998;
- environmental authorities under the EP Act for mining and petroleum activities;
- the assessment of *Environmental Impact Statements* prepared under the EP Act chapter 3 or the Environmental Protection and Biodiversity Conservation Act 1999 (the EPBC Act);
- projects declared to be significant projects by the Coordinator General under the State Development and Public Works Organisation Act 1971 (the SDPWO Act);

<sup>2</sup> Under the EPP Water, waste water means liquid waste and includes contaminated stormwater.

<sup>3</sup> 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*).

## Waste water discharge to Queensland waters

- 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 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<sup>5</sup> is preserved for future ecologically sustainable development;*
- the proposal is in the public interest<sup>6</sup> and provides outstanding net benefits to the region, or State as a whole<sup>7</sup>;*
- where practicable, the proposal includes a like kind environmental offset<sup>8</sup>; and*
- compliance with State Government obligations under intergovernmental agreements which include the management and protection of world heritage areas under the UNESCO Convention<sup>9</sup>; the management and conservation of wetlands under the Ramsar Convention on Wetlands<sup>10</sup>; and the management and protection of migratory birds and their environment under JAMBA and CAMBA<sup>11</sup>; or*

<sup>4</sup> 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.)

<sup>5</sup> 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.

<sup>6</sup> Refer to the standard criteria listed under Section 3 of the Environmental Protection Act 1994.

<sup>7</sup> Refer to the Terms and abbreviations section of the State Coastal Management Plan 2001.

<sup>8</sup> 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.

<sup>9</sup> The Convention Concerning the Protection of the World Cultural and Natural Heritage (UNESCO) 1972.

<sup>10</sup> RAMSAR Convention on Wetlands, Iran 1971.

<sup>11</sup> 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."*

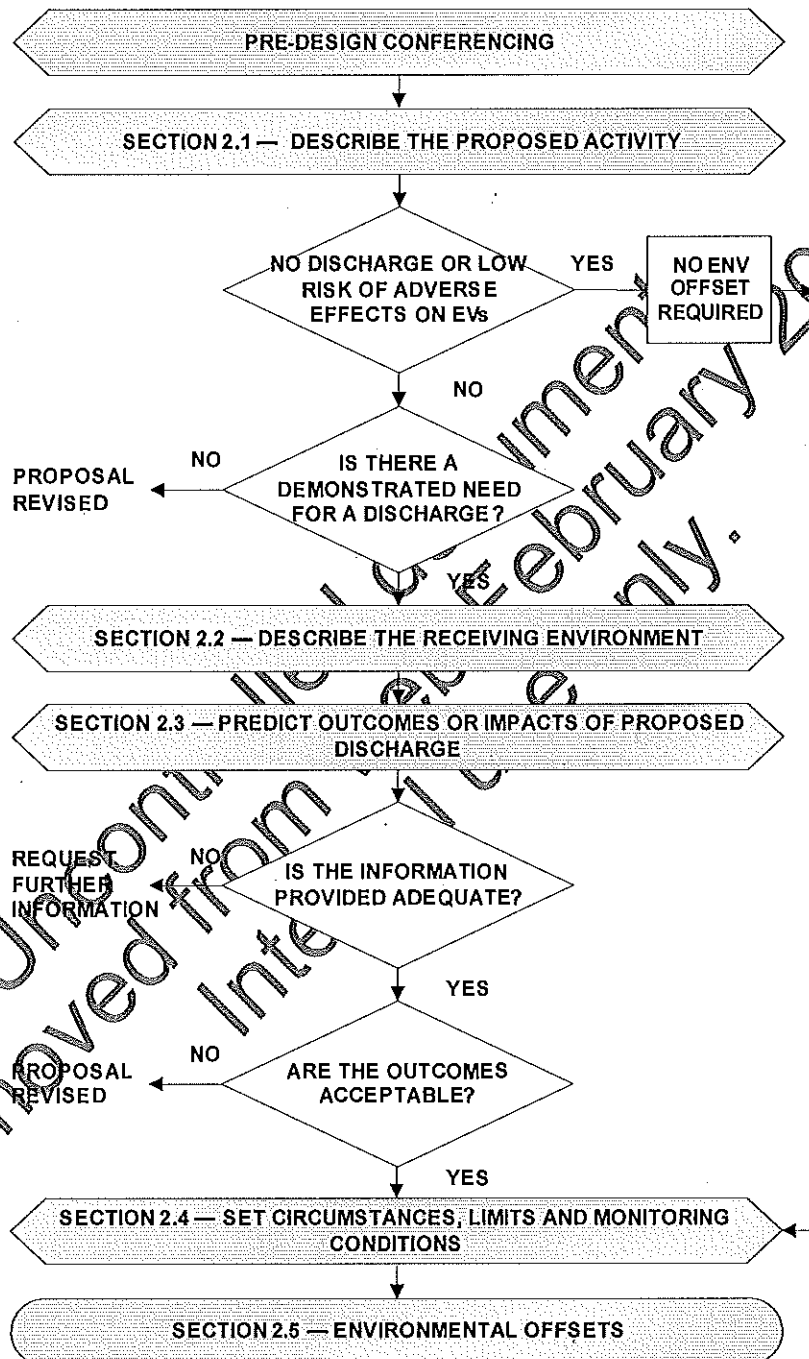
*For any new ERA, if after consideration of the waste evaluation procedure the release of contaminants to surface water is environmentally acceptable, the management intent is to halt the decline and reverse the trend in existing water quality. However it is recognised that attainment of scheduled water 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



Waste water discharge to Queensland waters

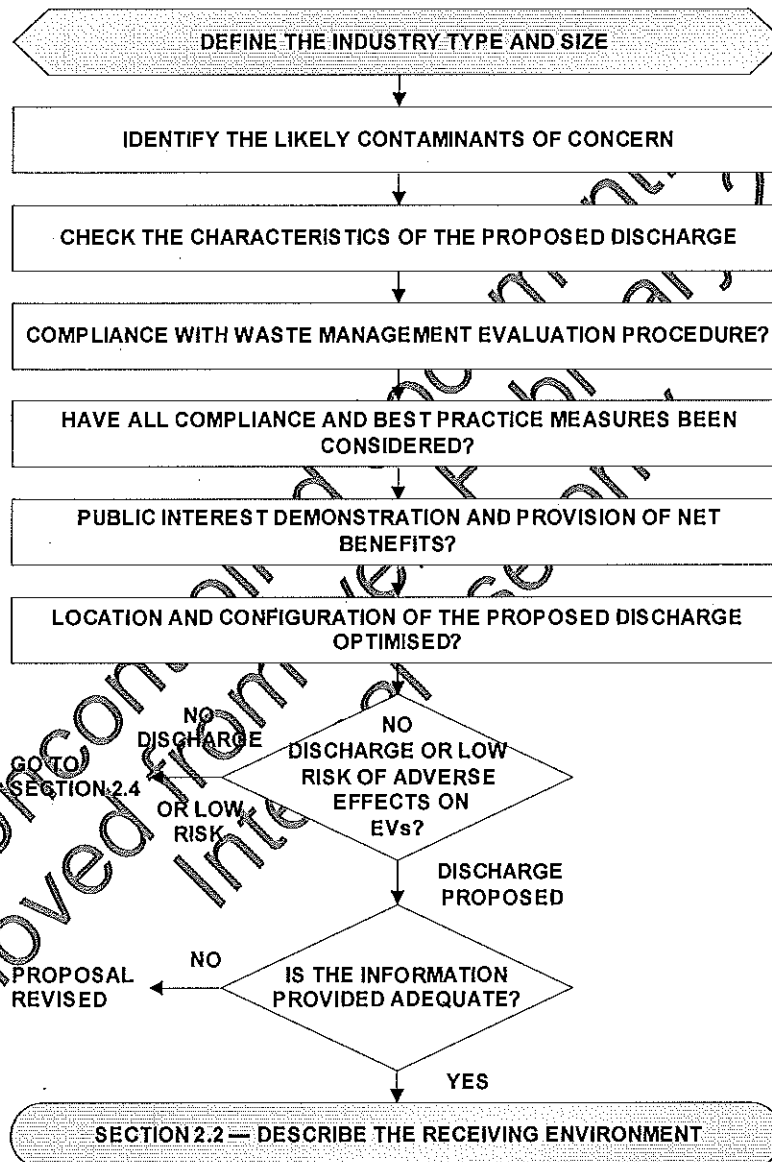
Table 1 — Task list for assessing the discharge of residual waste water

Section	Activity	Task list
2.1	Describe the proposed activity	<p>Define the industry type and size (proposed production).</p> <p>Is a residual waste water discharge proposed, or is the discharge assessed as low risk of having an adverse effect on an environmental value?</p> <p>Identify the potential contaminants of concern in the proposed discharge.</p> <p>Check the characteristics of the proposed discharge (quality/quantity/variability).</p> <p>Check the location and configuration of the proposed discharge.</p> <p>Have all reasonable and practicable measures been used to avoid or minimise the discharge (for example best practice, source reduction, recycling)?</p>
2.2	Describe the receiving environment	<p>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?</p> <p>Check government planning requirements that apply to these water bodies (e.g. Ramsar, IPA Iterative Wetlands, National Parks and Fish Habitat Areas).</p> <p>Has relevant information on the receiving environment been provided? Is it adequately described given the contaminants and risks associated with the proposed discharge?</p> <p>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).</p> <p>Have other sources and loads of contaminants in the catchment, including future loads, and previous history, been considered?</p>
2.3	Predict outcomes of the proposed activity	<p>Identify the need for predicting outcomes of the proposed activity (i.e. is modelling required?) and what predictive methods/models were used.</p> <p>Were the predictive methods used appropriately?</p> <p>If a mixing zone is proposed, check the EPP Water (Section 16) and ANZECC Water Quality Guidelines.</p> <p>For receiving water bodies, are WQOs met and EVs protected? If not, does the activity contribute to achieving them in the future?</p> <p>Determine the need for consideration of environmental offsets.</p>
2.4	Set limits, circumstances and reporting conditions	<p>Specify any circumstances (for example limitations or timing issues) related to the approved discharge.</p> <p>Derive end-of-pipe limits from approved discharge loads/characteristics.</p> <p>Include compliance monitoring for the end-of-pipe/receiving environment.</p> <p>Include reporting requirements for the approved activity.</p> <p>As required, condition the execution of an environmental offset agreement.</p>

## 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.

## Waste water discharge to Queensland waters

### 2.1.2 Identify the potential contaminants of concern in the discharge from the proposed activity

The first step in assessing the discharge of residual waste water from the proposed activity is identifying the source waste streams and potential contaminants of concern. Contaminants can be a gas, liquid or solid, an odour, an organism, energy (as in a thermal discharge) or a combination of contaminants. Common industry point source discharges and their likely effects are summarised in Table 2.

Note that some industries/ERAs are commonly associated with particular classes of aquatic contamination; for example Waste Water Treatment Plants and nutrients. The National Pollutant Inventory emission estimation technique manuals list 90 priority substances on the basis of health and environmental risk, by industry sector, and the USA EPA Toxic Release Inventory lists 313 priority substances.

These inventories may assist in identifying other key contaminants by industry/ERA. The information can be used as a guide to check information in the application. A search of the academic literature and the internet would be undertaken for more information on specific activities not mentioned. Contaminants are related to process inputs and outputs and can transfer from media other than water (for example leach from solids, scrubber effluent, etc). Contaminants in residual waste water may also occur as unintended by-products of processes (for example dioxins and metal compounds).

Depending on the character and resilience of the receiving environment, and the degree of risk, direct toxicity assessment may be required on any available laboratory or pilot plant samples to complement literature evaluation of the additive toxicity of contaminants in the proposed discharge. Such analysis more closely resembles the situation in the natural environment than single chemical testing approach. Refer to the ANZECC Water Quality Guidelines — volume 2, Section 3.4.3.

[illegible]

Point source discharges	Potential issues	Water quality contaminants
Sewage effluent	Reduction of dissolved oxygen levels, low dissolved oxygen levels leading to harmful algae blooms, smothering of fish and flora, impairment of ecosystem services and human and public health risks	Carbonaceous material, nutrients, pathogens, suspended solids, toxicants (metals/metalloids, pesticides, residual disinfectants and pharmaceuticals)
Abattoir effluent	Reduction of dissolved oxygen levels, low dissolved oxygen levels leading to harmful algae blooms, smothering of fish and flora, impairment of ecosystem services and human and public health risks	Carbonaceous material, suspended solids, nutrients, pathogens, residual disinfectants and toxicants
Mine discharges	Toxicity of sulphate, arsenic, nitrate, silicates and heavy metals, increased salinity of fresh water, pH changes, smothering of flora and fauna, impairment of ecosystem services and human and public health risks, effect on water and riparian water	pH, sulphate, temperature, suspended solids, turbidity, salinity, toxicants (metals/metalloids and other chemicals, including fluoride)
Aquaculture discharges	Reduction of dissolved oxygen levels, low dissolved oxygen levels leading to harmful algae blooms, smothering of fish and flora, impairment of ecosystem services and human and public health risks	Carbonaceous material, suspended solids, nutrients and toxicants  Diseased organisms and antibiotics may be an issue in some operations

## Waste water discharge to Queensland waters

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.

## Waste water discharge to Queensland waters

### ***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.

## Waste water discharge to Queensland waters

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.***

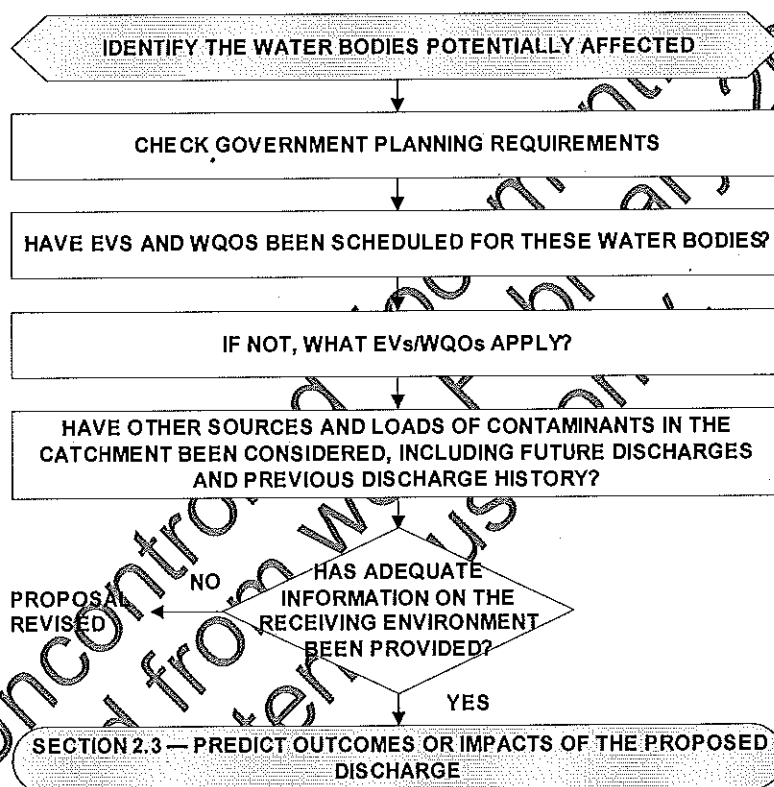
Pre-design conferencing is offered by the EPA to all prospective applicants seeking direction and advice on development applications; including on the preparation of development applications and the necessary documentation to ensure that lodged applications are supported by the requisite information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

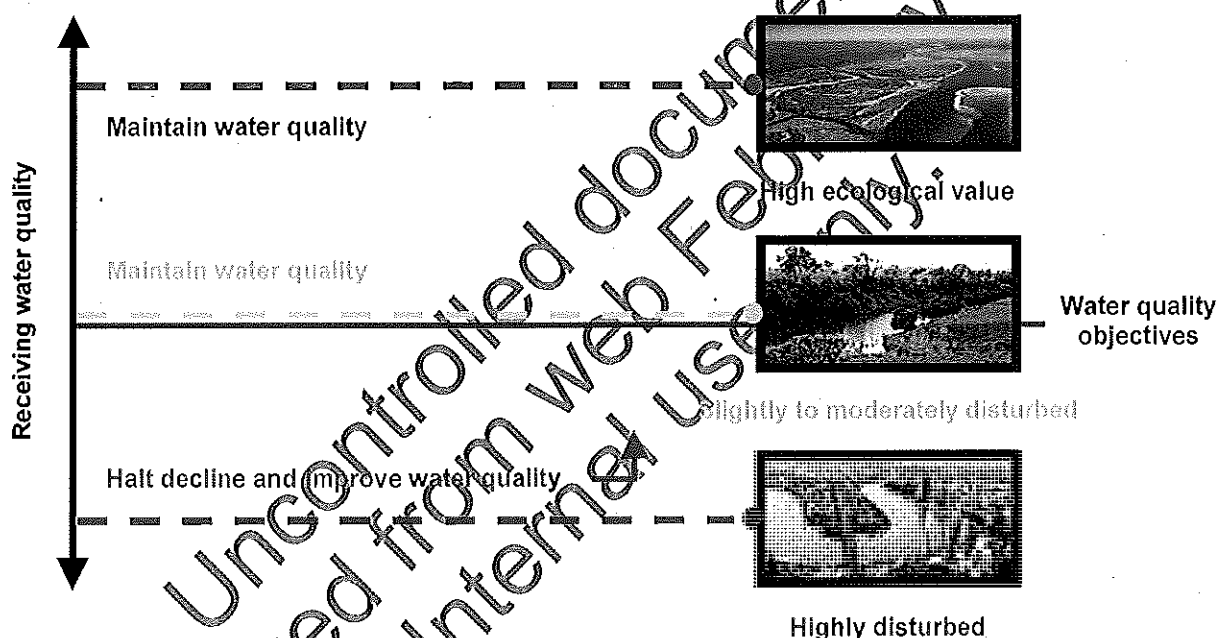


### 2.2.1 Identify the water bodies potentially affected by the proposed discharge

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 DRNW, 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
<p>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.</p> <p>For toxicants listed in Section 3.4 of the ANZECC Water Quality Guidelines, environmental management decisions would include trigger values for toxicants<sup>12</sup> to protect 90 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.</p>
Slightly to moderately disturbed
<p>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.</p> <p>Environmental effects of a 'like kind' may be considered by the administering authority where there are no feasible alternatives to discharge of residual waste water.</p> <p>For toxicants listed in Section 3.4 of the ANZECC Water Quality Guidelines, environmental management decisions would include trigger values for toxicants<sup>13</sup> 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. EPA officers should request assistance from the Environmental Sciences Division in assessing the validity of the data.</p>
Highly disturbed
<p>The policy intent for highly disturbed waters is that receiving water quality should:</p> <ul style="list-style-type: none"> <li>a) improve towards achieving the WQOs to protect the EVs over time, and</li> <li>b) not measurably deteriorate as a result of the proposed discharge.</li> </ul> <p>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 50 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.</p> <p>Environmental effects of a 'like kind' may be considered by the administering authority where there are no feasible alternatives to the discharge of residual waste water.</p>

<sup>12</sup> See Table 3.4.2 of the ANZECC Water Quality Guidelines.

<sup>13</sup> Refer above.

## Waste water discharge to Queensland waters

### 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 8.1. The EPA guideline *Establishing and maintaining 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
<b>Aquatic ecosystems EVs</b> The level of protection for aquatic ecosystems is increased to protect resources: <ul style="list-style-type: none"> <li>• High ecological value ecosystems</li> <li>• Water is more key environment</li> <li>• High quality ecosystems</li> </ul>	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 fauna diversity and abundance (depending on the level of protection), including water associated wildlife.
<b>Human use EVs include:</b> <ul style="list-style-type: none"> <li>• Recreation and aesthetics</li> </ul>	Primary contact recreation (e.g. swimming). Secondary contact recreation (e.g. boating). Visual recreation (e.g. natural landscape).
<ul style="list-style-type: none"> <li>• Drinking water</li> </ul>	Water sources used for drinking water.
<ul style="list-style-type: none"> <li>• Primary industries</li> </ul>	Irrigation, general agricultural use and stock watering. Stock watering. Human consumption of aquatic foods (fish, crustacean and mollusks) — commercial and recreational sources. Aquaculture.
<ul style="list-style-type: none"> <li>• Industry</li> </ul>	Generic processes (heating and cooling). Specific industries (textile, chemical, paper and pulp). Power generation (hydro-electric).
<ul style="list-style-type: none"> <li>• Cultural and spiritual</li> </ul>	Protection of cultural resources — places or objects of historic or indigenous significance or value.

## Waste water discharge to Queensland waters

**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.

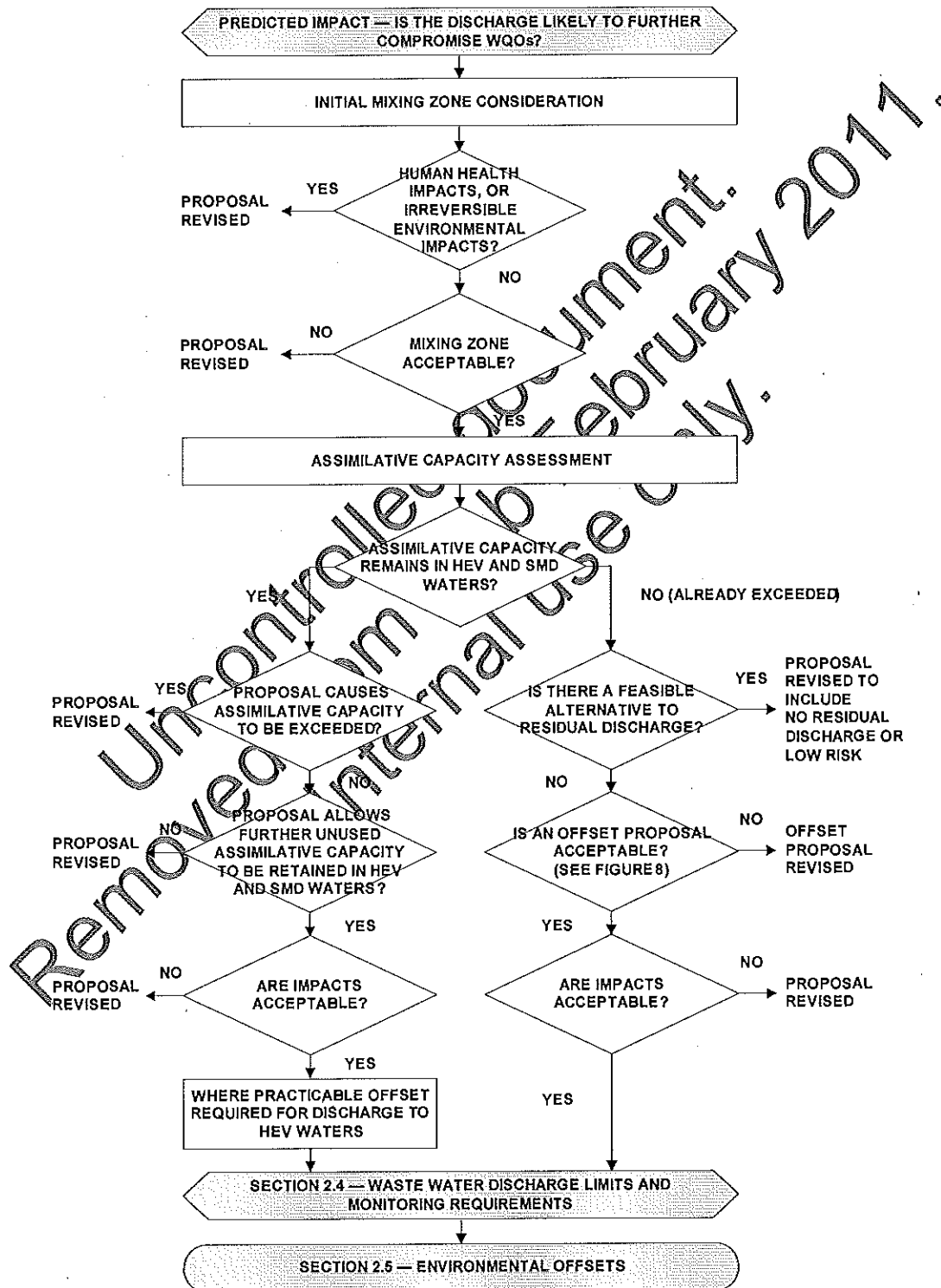
If not demonstrated, the application should be revised following an information request.

*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 physical-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

## Waste water discharge to Queensland waters

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.

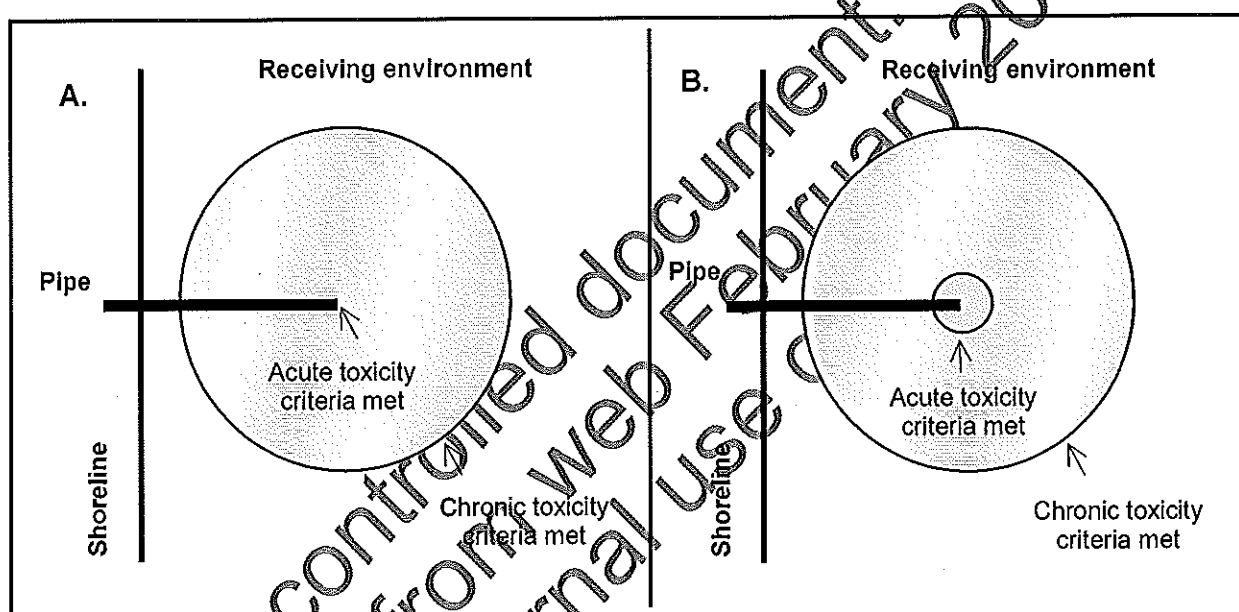


Figure 6 — Spatially defining an initial mixing zone.

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.

## Waste water discharge to Queensland waters

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<sup>14</sup> 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.

<sup>14</sup> 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.

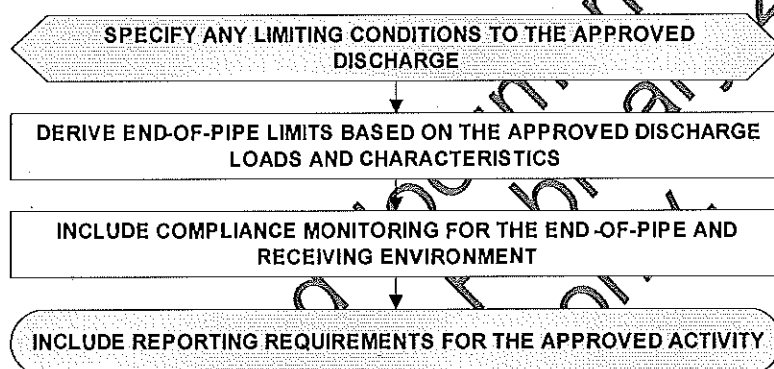
*Pre-design conferencing is encouraged to address the prediction of impacts of the discharge on receiving waters, mixing zone and assimilative capacity requirements.*

## 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.

## Waste water discharge to Queensland waters

### 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 *Enterococcus 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 80<sup>th</sup> 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 3 — 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	50 <sup>th</sup> percentile Maximum Mass loads	50 <sup>th</sup> percentile to achieve mass load (and prevent local impacts). Maximums to prevent local impacts (generally three times limit for 50 <sup>th</sup> percentile). Mass loads based on systems sustainable load or capacity.
Sediments	Maximum	Use levels achievable by BPBM (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, <i>Enterococcus spp.</i> and pathogenic protozoa).

## Waste water discharge to Queensland waters

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 80 <sup>th</sup> percentile Maximum	Mass loads based on systems sustainable load or capacity. 80 <sup>th</sup> percentile to achieve mass load (and prevent local impacts). Maximums to prevent local impacts (generally three times limit for 80 <sup>th</sup> 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.

## Waste water discharge to Queensland waters

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:

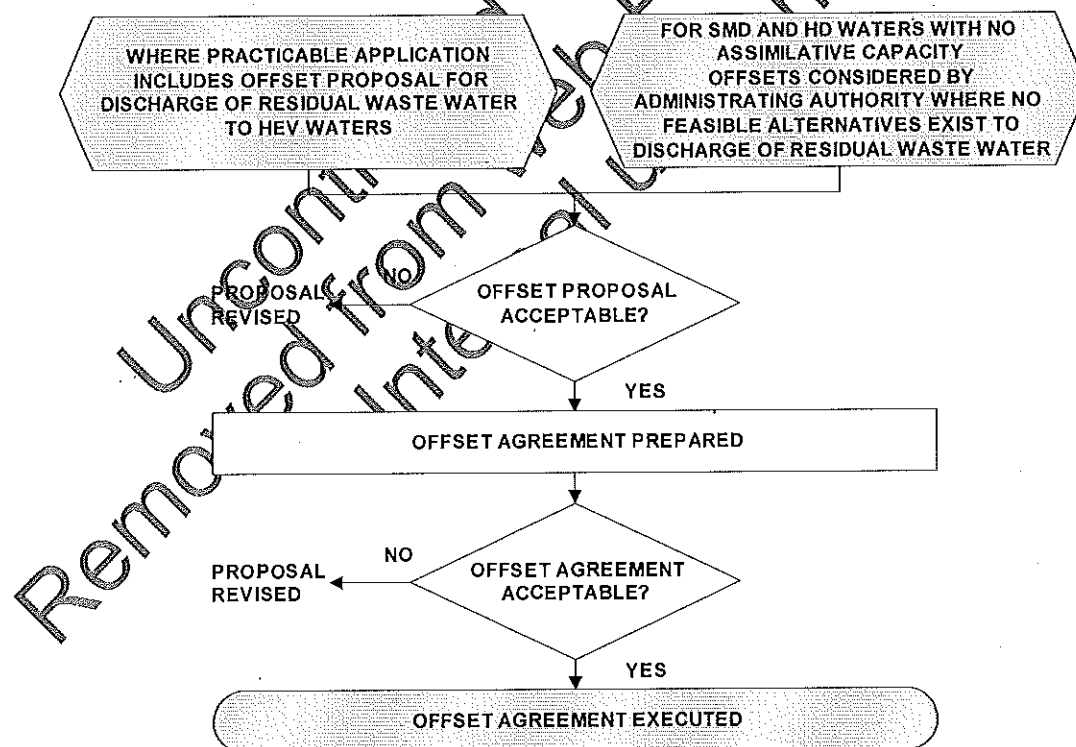
- HEV waters, where practicable the application includes a like kind environmental offset proposal - counterbalancing the discharge of residual waste water (the discharge) from the proposed ERA<sup>15</sup>; and
- SMD and HD waters with no assimilative capacity, environmental offsets (offsets) may be 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<sup>16</sup> 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

<sup>15</sup> 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.

<sup>16</sup> 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.

## Waste water discharge to Queensland waters

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.

## Waste water discharge to Queensland waters

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 administering authority. 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 EPA procedural guide *Procedural information for the operational policy waste water discharge to Queensland waters*, provides guidance in determining environmental equivalence through minimum default offset ratios and determining riparian and wetland buffer widths.

**e. Discharge contaminants must be suitable for management by offsets**

Discharge contaminants that are potentially suitable for management by offsets include nutrients (nitrogen and phosphorus), sediment (TSS and TDS), organic carbon, contaminated stormwater or other contaminants where the scientific basis can be demonstrated and the contaminants do not have human health impacts, irreversible environmental impacts or unacceptable biota impacts.

**f. Development application to include an offset proposal**

Where required the development application must include an offsets proposal that meets the acceptability requirements listed below. The onus is on the applicant to provide sufficient information to allow the administering authority to consider whether the offset proposal is acceptable.

**g. Acceptability of offset proposal**

At pre-design conferencing the administering authority would advise on the requirements for an acceptable offset proposal, that must:

- meet statutory, regulatory and planning requirements and be enforceable—through development conditions, covenants or contracts;
- be additional to the consideration of ERP and EP Act provisions, as summarised in Sections 2.1 to 2.4;
- be enduring—offset the impact of the development from commencement and for the period that the impact occurs. Where onset is delayed, offsets must balance any initial shortfall over the project life;
- be suitable and targeted—contaminants must be suitable for management by offsets, be of the same contaminant and chemical form;
- be capable of being supplied and secured by the applicant or authorised agent;
- be appropriately located—apply to the same waters impacted by the proposed residual waste water discharge, or to other water types in the same catchment;
- initially consider point source offsets and then diffuse urban offsets or diffuse rural offsets (involving the restoration of degraded riparian or wetlands buffers) in accordance with catchment priorities as advised by the administering authority;
- seek to achieve a net environmental gain to the receiving waters;
- demonstrate compliance through emissions monitoring and reporting to the administering authority;
- be compatible with any flexible or incentive based mechanisms such as nutrient trading; and,
- address other elements, pending case by case assessment by the administering authority.

***h. Offset agreement***

If the offset proposal is acceptable to the administering authority and the application is approved, the administering authority must include development conditions that require the applicant:

- to secure the offsets proposal through an agreement between the applicant and the administering authority; and
- to execute the agreement before the commencement of site works, that:
  - includes a memorandum of agreement if the offset proposal involves either the State or a Local Government;
  - includes a deed of agreement for private developers; and generally use a financial guarantee, refundable on demonstrated offset establishment;
  - requires rural diffuse offsets to be legally secured with covenants or conservation agreements and addresses the on-going management and maintenance of offset sites, where relevant; and
  - requires the offset to be recorded on the appropriate register.

Other elements may need to be considered, pending case by case assessment by the administering authority.

***i. Financial contribution***

The discussion paper on a proposed Queensland Government Environmental Offsets Policy (QGEOP) provides for financial contributions to be made to meet offset requirements in certain circumstances. The discussion paper outlines several principles that must be complied with for a financial contribution to be acceptable. The use of financial contributions under the operational policy will be considered further upon the implementation of the QGEOP.

**Summary**

*Pre-design conferencing is encouraged to address environmental offset requirements*

### 3. Additional information

#### 3.0 Process for using default EVs and WQOs

Where EVs for the waters have not been specifically set in Schedule 1 of the EPP Water, then, under Section 11(2) of the EPP Water, the WQOs are the set of water quality guidelines (the *Queensland Water Quality Guidelines 2006* and the ANZECC Water Quality Guidelines) that will protect all EVs for the waters.

Where the above guideline values are considered inappropriate for the receiving environment the following provides information on default EVs and WQOs based on water quality guidelines derived from data collected at appropriate local reference sites.

##### a. Define default EVs

Information on existing and possible future EVs should be obtained from maps, site inspections, surveys, local knowledge, water abstraction licences, planning documents, scientific studies and monitoring data. It is recommended that any changes to default EVs be agreed upon through consultation with key stakeholders, such as representatives of government, community, and industry groups.

EVs may be discounted if sufficient information can be obtained to justify that this value does not currently exist and is unlikely to exist in the future. It should be noted that the protection of the aquatic ecosystems and visual aesthetics should always be included as an environmental value of any water body. However, the level of aquatic ecosystem protection can vary between water bodies or zones of water bodies.

##### b. Define default environmental goals

Locally specific information on EVs can be used to propose environmental goals. These goals define in more detail what needs to be protected and represent major subdivisions of EVs. Examples of typical environmental goals for EVs include protection of specific habitats (such as seagrass beds), protection of specific aquatic species (such as wallum frogs), minimisation of algal blooms, and maintenance of biodiversity or protection of the public during swimming activities.

##### c. Define default water quality indicators

The next step involves determining the water quality indicators and concentrations required to protect the identified EVs. This is a technical process to be conducted by the applicant and involves reference to water quality data and guidelines. The indicators and concentrations determined in this step will become the WQOs for the next step of the process.

Water quality indicators may include physical-chemical, biological or toxicant measures applying to a combination of water, sediment and biota. Some sources of information to determine suitable indicators for protection of EVs are included in Table 6 below.

##### d. Define default WQOs

To determine default WQOs, trigger values can be taken from published guidelines (for all values) or from local reference data (for aquatic ecosystem protection only). Once the numerical criteria are determined, they should be listed in a matrix of water quality indicators versus EVs for each geographical zone that has different EVs. For some indicators in a particular zone, different guideline numbers may be quoted to protect more than one EV or goal. In these cases, the more stringent guideline should be adopted as the default water quality objective for that indicator.

Reference data for Queensland waterways can be obtained from the EPA, or as listed in Table 6. Guidelines for biological, toxicants and sediment indicators and for primary industry, recreational water quality and drinking water values can be obtained from the ANZECC Water Quality Guidelines. Local reference information may be particularly important in determining the water quality characteristics required to protect local aquatic

ecosystems. This would be the case if there are known unique species, such as acid frogs that require low pH conditions.

Determining default WQOs to protect aquatic ecosystems often requires significant technical input and should be considered as trigger values, below which a very low risk to the environment from that pollutant may be assumed. Default WQOs may depend on the levels of aquatic protection assigned for each zone. Further information on how to determine levels of aquatic ecosystem protection is provided in [Table 3](#).

The *Queensland Water Quality Guidelines 2006* will become a repository for such sub-regional and local information for Queensland waters as it becomes available, and should be referenced for the default WQOs. The ANZECC Water Quality Guidelines will remain important for a range of indicators (for example toxicants and pathogens).

### 3.1 Use of local reference data

The *Queensland Water Quality Guidelines 2006* and ANZECC Water Quality Guidelines recommend using data from local reference sites to derive WQOs. The three main steps in the process are to establish a suitable reference site, collect sufficient data and calculate typical reference ranges and objectives. For further detail refer to Section 7.4.4 of the *ANZECC Water Quality Guidelines (Volume 1)*.

**Table 8 — Guideline and reference information for determining WQOs**

EWQ of Water	Source of guideline and reference information
Drinking water	EPA website for the <i>Queensland Water Quality Guidelines</i> and physical-chemical reference data. National water targets online for nutrients, turbidity and salinity. National Water Quality Management Strategy website for biological, toxicant and sediment guidelines. Fact sheets on biological indicators and groundwater are at the above site.
Recreational use/swimming	National Water Quality Management Strategy website. National water targets online for nutrients, turbidity and salinity. World Health Organisation Guidelines.
Fishing water	Australian Drinking Water Guidelines (NHMRC 2004).
Fishery resources	National Water Quality Management Strategy website.
Industry	National Water Quality Management Strategy website.
Coastal waters	EIS assessments and other site specific information where relevant. Refer also the <i>State Coastal Management Plan</i> .

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*.

## Waste water discharge to Queensland waters

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 20<sup>th</sup> percentile to the 80<sup>th</sup> 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 80<sup>th</sup> percentile. For pH and dissolved oxygen where low values are also undesirable, lower WQOs are also derived from the 20<sup>th</sup> 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;

## Waste water discharge to Queensland waters

- 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](mailto:eco.access@epa.qld.gov.au)

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Approved by

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## 6. Appendices

### Appendix 6.1: Glossary of terms

**Administering authority** means the administering authority under the EP Act, and will be the chief executive of the Environmental Protection Agency or the Local Government's chief executive officer.

The chief executive of the DPIF has delegated authority for ERAs 3 and 4 (i.e. cattle feedlotting and pig farming). These ERAs have been delegated to the DPIF.

**Applicant** means the applicant for a development approval or environmental authority application. In the context of this operational policy it may also mean employees of organisations contracted by the applicant to assist in the preparation of the application.

**Aquatic ecosystems** is defined in the ANZECC Water Quality Guidelines as the animals, plants and micro-organisms that live in water, and the physical and chemical environment and climatic regime in which they interact. It is predominantly the physical components (for example light, temperature, mixing, flow, and habitat) and chemical components (for example organic and inorganic carbon, oxygen (nutrients) of an ecosystem that determine what lives and breeds in it, and therefore the structure of the food web. Biological interactions (for example grazing and predation) can also play a part in structuring many aquatic ecosystems.

**Assessable development** means development specified under Part 1, Schedule 3 of IPA and includes the carrying out of a chapter 4 activity, other than an activity (or part of an activity) for which a code of environmental compliance has been approved.

**Assessment manager** for an application for a development approval means the Local Government or the entity prescribed under the Integrated Planning Regulation 1998.

**Assimilative capacity** means the capacity of the receiving waters to receive some human induced input of contaminants, or alteration, without causing the water quality to deteriorate so the water quality objectives are no longer met.

**Basin** means the major hydrological drainage basins in the national spatial database provided by Geoscience Australia. Australia is divided into drainage divisions which are sub-divided into water regions which are in-turn sub-divided into river basins. The data, which includes the name and number of each Queensland drainage division, region and river basin, is available at the Australian Government Geoscience Australia website.

**Best practice environmental management** is defined in the EP Act as the management of the activity to achieve an on-going minimisation of the activity's environmental harm through cost effective measures assessed against the measures currently used nationally and internationally for the activity. Section 21(2) lists measures to be regarded in deciding best practice environmental management of an activity. These measures include, but are not limited to, strategic planning, systems and training, product and process design, public consultation, waste prevention/treatment and disposal.

**Biological integrity** of a water is defined in the EPP Water as the water's ability to support and maintain a balanced, integrative, adaptive community of organisms having a species composition, diversity and functional organisation comparable to the natural habitat of the locality in which the water is situated.

**Catchment** means the total watershed draining into a river, creek, reservoir or other body of water. The limits of a given catchment are the heights of land (such as hills or mountains) separating it from neighbouring catchments. Catchments can be made up of smaller sub-catchments.

**Character, resilience and environmental values** of the receiving environment – see **Resilience**.

## Waste water discharge to Queensland waters

**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 SDRWA 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

## Waste water discharge to Queensland waters

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
<b>Protection of aquatic ecosystems (Aquatic ecosystem EV)</b> Protection of aquatic ecosystems, under three possible levels of protection relating to the following three ecosystem conditions: <ul style="list-style-type: none"> <li>• High ecological value waters;</li> <li>• Slightly to moderately disturbed waters; and</li> <li>• Highly disturbed waters.</li> </ul> (suitability for seagrass has also been specifically identified for some waters as a component of this EV)	✓	✓
<b>EVs other than aquatic ecosystem EV (called human use EVs)</b> 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.

## Waste water discharge to Queensland waters

**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.

## Waste water discharge to Queensland 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

## Waste water discharge to Queensland waters

- (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 (AWTRs) 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 delivered 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<sup>17</sup>. 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;

<sup>17</sup> There are very few validated cellular based methods currently available. Consequently the great majority of DTA-related bioassays will be Whole of Organisms tests.

## Waste water discharge to Queensland waters

- 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

## Waste water discharge to Queensland waters

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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.

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## 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<sup>18</sup> (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).

<sup>18</sup> In the default method for physico-chemical indicators, use of the 75<sup>th</sup> rather than 95<sup>th</sup> 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**

<b>Preamble</b> .....	<b>3</b>
<b>1. Initial assessment of proposed activity</b> .....	<b>3</b>
Attachment to Section 1- Waste management evaluation / waste water characterisation .....	4
<b>2. Receiving waters assessment – character, resilience and values of the receiving environment</b> .....	<b>7</b>
2.1 What EVs and WQOs and levels of aquatic ecosystems protection apply? .....	7
2.2 Receiving water quality information sources .....	9
2.3 Assessing water quality – for DA and strategic planning .....	11
2.4 Assessing the contribution of multiple discharges to receiving waters .....	13
2.5 Waste water discharge to ephemeral streams – ecological and hydrological impacts.....	13
2.6 EPA guidelines - sampling / experimental design / sample analysis / data analysis and pre-development water quality monitoring .....	14
2.7 Predicting the impacts of the proposed waste water discharge on the receiving waters.....	15
2.8 Considering the results of water quality assessments in accordance with the Operational Policy .....	16
Attachment 1 to Section 2 – Box model estimation – steady state TN concentration .....	20
Attachment 2 to Section 2 Steady state calculations – estimation of activity impact .....	23
<b>3. Environmental offsets</b> .....	<b>25</b>
3.1 What is an environmental offset in the context of waste water discharge? .....	25
3.2 When may an environmental offset be required? .....	25
3.3 Queensland Government Environmental Offsets Discussion Paper .....	26
3.4 Information on the development of an acceptable offsets proposal .....	26
3.5 Determining environmental equivalence of offsets at different discharge points - offset ratios ..	28
3.6 Determining riparian and wetland buffer widths.....	30
Attachment to Section 3- Offsets suitability for phosphorous, nitrogen and sediments .....	32
<b>4. Science &amp; Capacity Building</b> .....	<b>35</b>
4.1 Decision Support Software .....	35
4.2 Relevant Water Quality Guidelines.....	40



Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

4.3 Water Quality Advice & Technical Services.....	42
Attachment1 to Section 4 – Point Source Database Information Guide for EPA Staff .....	43
Attachment 2 to Section 4 – Point Source Database – New Ecomaps Layers.....	50
<b>5. Direct Toxicity Assessment.....</b>	<b>56</b>
5.1 Introduction .....	56
5.2 Warranting Direct Toxicity Assessment .....	56
Toxicant Concentrations .....	57
Discharge Characteristics .....	61
Aquatic Receiving Environment .....	65
5.3 Essential Components of the DTA Design .....	65
Test-effluent Management.....	65
Appropriate End Points .....	66
Appropriate Test Specimens.....	67
Toxicity Identification Evaluation .....	75
5.4 Related Matters .....	75
Routine DTAs.....	75
Receiving Environment Monitoring Programs.....	76
5.5 References .....	77
<b>6. Acronyms and Abbreviations .....</b>	<b>78</b>
<b>7. Glossary.....</b>	<b>78</b>
<b>8. Appendices.....</b>	<b>80</b>

**Note this is a draft document for internal EPA purposes only.**

**It is not Government policy.**

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## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

### 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](mailto: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](mailto:water.tools@epa.qld.gov).

Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

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,

Decreasing order of preference

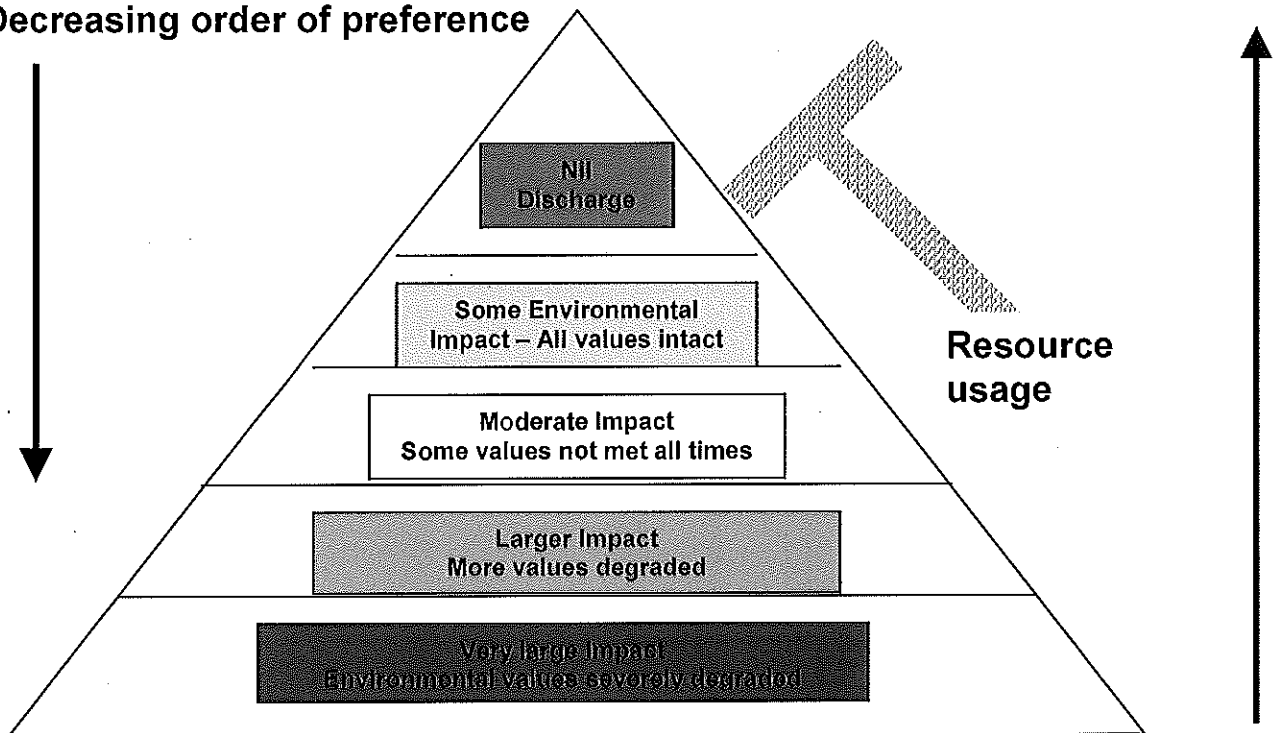


Figure 1. Decision preference hierarchy

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.

## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

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### 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.

## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

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### **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](http://www.ephc.gov.au/pdf/cs/cs_01_inv_levels.pdf) and [http://www.ephc.gov.au/pdf/cs/cs\\_06\\_groundwater.pdf](http://www.ephc.gov.au/pdf/cs/cs_06_groundwater.pdf).

## 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](mailto: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 Section 4.1.
- 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](mailto:water.tools@epa.qld.gov.au).

## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

Spatial datasets and metadata are available for:

- EPA staff through Ecomaps - Environment and Conservation category. Schedule 1 documents are available through the EPA Intranet system ROBIN (Fast find/EVs) or the QWQGs (link above);
- EPA GIS staff through Enterprise GIS ('O' drive). Schedule 1 documents as above;
- Other State Government Departments and Local Governments may access spatial data through the Queensland Government Infolink, accessible through the GovNet homepage at <http://wwwhost.env.qld.gov.au/HomePage/GovNet.htm>. Schedule 1 documents for the specific waters are available through the EPA website or the QWQGs (link above); and
- Consultants, stakeholders and members of the public. CD copies containing the spatial datasets, metadata and the EPP Water Schedule 1 documents are available on request through the EPA Environmental Information Systems Unit, by email from [data.coordinator@epa.qld.gov.au](mailto:data.coordinator@epa.qld.gov.au) or by telephone (07) 3227 6447.

### Notes

1. The EPA has developed Queensland water quality guidelines (QWQGs) based on the ANZECC scientific principles and management protocols. The QWQGs are:

- based on data collected from un-impacted Queensland reference sites, that are listed in Appendix F (by region, site name and location (latitude and longitude).) The QWQGs are derived from the 20<sup>th</sup> and 80<sup>th</sup> percentiles of the reference sites' data--the 80<sup>th</sup> percentiles are used where high values of an indicator cause problems (e.g. nutrients or chlorophyll-a), the 20<sup>th</sup> percentiles where low values cause problems (Secchi depth) and both the 20<sup>th</sup> and 80<sup>th</sup> 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.

## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

### 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 600 (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](mailto: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](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;

## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

- 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.**

## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

### 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.

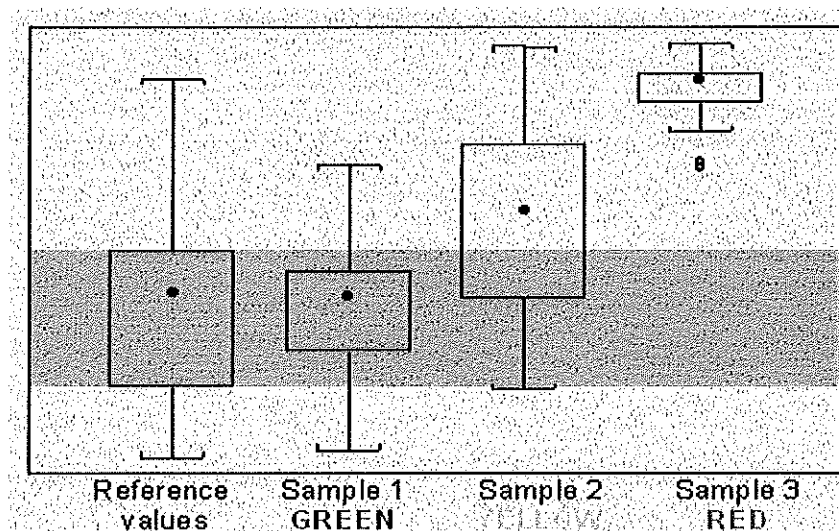
In both assessment cases the level of level of aquatic ecosystem condition that the water quality objectives for that water are intended to achieve should be determined from either the Schedule 1 document for the waters, or from the QWQGs in conjunction with planning designations for impacted or downstream 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, 20<sup>th</sup> and 80<sup>th</sup> 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 20<sup>th</sup> or 80<sup>th</sup> 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 20<sup>th</sup> or 80<sup>th</sup> 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 20<sup>th</sup> and 80<sup>th</sup> percentiles and the highest and lowest values (not outliers) for comparison with the WQOs for the waters. Refer to Figure 2 below.

Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

**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 20<sup>th</sup> or 80<sup>th</sup> percentile is within the WQOs – sample/test site is slightly/moderately impacted with some signs of poor ecological health

**Red:** WQOs not met. Median and 20<sup>th</sup> or 80<sup>th</sup> 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](mailto: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.

## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

### 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 recessionary 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/FinalReportTempWatersSep20042.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,

## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

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/](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, 20<sup>th</sup> and 80<sup>th</sup> 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](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.)

Procedural information for the Operational Policy *Waste water discharge to Queensland waters***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 Cornix 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.



## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

- **Catchment models** typically simulate the flows and loads of suspended sediment, total phosphorus and total nitrogen from freshwater catchments with consideration of land use, rainfall, soil characteristics, vegetation cover etc. Flows and loads are routed through stream networks, typically to the tidal limits of estuaries. Catchment models are available from a number of sources including CSIRO Land and Water, eWATER CRC and Regional NRM Groups.
- **Receiving water quality models** for estuaries and embayments are specific and complex models that simulate the hydrodynamic and water quality variations in the water body, subject to external inputs. Receiving water quality models enable scenario modelling of water quality to be undertaken to predict the likely impacts of contaminants. Receiving water quality models are available through major consultant organisations for specific parts of the State, and are required to be used for significant projects.
- **Box models for estuarine water quality modelling** provide a simple computational framework that may be used to determine contaminant load estimates (e.g. N and P). Box models are relatively straightforward, available through most consultant organisations or may be developed for the estuarine waters of interest. A simple box model of steady state increase of contaminant concentration is at Attachment 1 to Section 2.

### 2.8 Considering the results of water quality assessments in accordance with the Operational Policy

Development applications and environmental authority applications proposing to discharge waste water to receiving waters should provide information to characterise the receiving environment and predicted impacts of the proposed discharge of waste water, in accordance with sections 2.1 to 2.7 above, and in summary as follows.

- Environmental values, water quality objectives, water types and levels of aquatic ecosystem protection for the receiving waters should be provided, preferably with spatial datasets including application details and relevant overlays (e.g. protected estate and constraints mapping).
- Waste water contaminant assessment, discharge and monitoring information – refer Attachment to Section 1.
- Existing receiving water quality and ecological health information should be sourced and collated to include riverine, estuarine and coastal waters and the broadest range of indicators and indicator values.
- Future planning intent for the catchment and associated waters should be determined.
- Conduct baseline water quality monitoring for HEV waters, and as required for SMD/HD waters. Use agreed experimental design to establish pre-development water quality at control sites and proposed impact sites:
  - The QWQGs provide guidance on the number of site samples and time period to establish baseline development water quality, refer also to Section 2.6; and
  - The EPA Sampling Manual informs sampling techniques and sample analysis requirements. Sample data statistical analysis should include the calculation of median values, 20<sup>th</sup> and 80<sup>th</sup> percentiles and data outliers, by indicators, by sample sites for a given water type. Box plot presentation is preferred.

## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

- 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 20<sup>th</sup> or 80<sup>th</sup> percentile is within the WQOs – sample /test site is slightly/moderately impacted site; and
  - **Red:** Median of site sample data or test data and 20<sup>th</sup> or 80<sup>th</sup> 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):

## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

- 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 20<sup>th</sup> or 80<sup>th</sup> 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

## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

(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.

## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

### 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  $0.05 \text{ day}^{-1}$  (derived by John Bennett from modelling work on Southeast Queensland estuaries.)

The basic relationship is

$$\frac{d \text{ Total N}}{dt} = \text{Load TN} - K_T \text{ Total N}$$

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 ( $\text{m}^2$ ) 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.

$$\text{Tidal prism ML} = \text{areal extent (m}^2\text{)} \times \text{depth (m)} / 1000$$

In this case, 40m wide X 3000 m long X 1.0m mean neap tide difference/1000

$$\rightarrow \text{Tidal prism} = 120 \text{ ML}$$

#### Calculating aquaculture daily load of total nitrogen (TN)

$$\begin{aligned} \text{Daily Discharge in m}^3 &= 5\% \text{ of growout pond volume} \\ &= 0.05 \times 6 \times 5000\text{m}^2 \times 1\text{m} \\ &= 1500 \text{ m}^3 \end{aligned}$$

$$\begin{aligned} \text{Daily Discharge in ML} &= \text{discharge in m}^3 / 1000 \\ &= 1.5 \text{ ML} \end{aligned}$$

$$\begin{aligned} \text{Max Daily Load TN (kg/day)} &= \text{daily discharge (ML/day)} \times \text{concentration TN (mg/L)} \\ &= 1.5 \times 0.6 \\ &= 0.9 \text{ kg/day (Scenario 1)} \end{aligned}$$

#### Calculating the change in total N ( $\Delta \text{TN}$ )

The Basic Relationship again is

Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

$$\frac{d \text{ Total N}}{dt} = \text{Load} - K_T \text{ Total N}$$

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:

$$\begin{aligned} \text{Total N (kg)} &= \frac{\text{Load (kg day}^{-1}\text{)}}{K_T \text{ (day}^{-1}\text{)}} \quad (\text{Note from above, } K_T \text{ (day}^{-1}\text{) value is a given factor}) \\ &= 0.9/0.05 \\ &= 18 \text{ kg} \end{aligned}$$

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 ( $\Delta$ TN)

$$\begin{aligned} \Delta \text{TN mg/l} &= \text{mass TN (kg) / volume (ML) of the tidal prism} \\ &= 18/120 \\ &= 0.15 \text{ mg/L} \end{aligned}$$

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

## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

### 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  
 $= 0.5 \text{ m/sec} \times 6 \text{ hours}$   
 $= 0.5 \text{ m/sec} \times 60 \times 60 \times 6 \text{ sec}$   
 $= 10800 \text{ metres}$

2. Tidal prism

Tidal prism ML = areal extent ( $\text{m}^2$ ) X depth (m) /1000

In this case, 70m wide X 10800 m long X 1.2 mean neap tide difference/1000  
 $= 907.2 \text{ ML}$

### Calculating the change in total N concentration ( $\Delta\text{TN}$ )

$\Delta\text{TN mg/l} = \text{mass TN (kg) /volume (ML) of the tidal prism}$   
 $= 18/907.2$   
 $= 0.02 \text{ mg/L}$

### 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

Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

**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 –  $25.3/0.058 = 436:1$

**B. Estimated concentration in creek method**

To calculate the resultant water concentration the following formula can be used:

$$C_{res} = \frac{(Q_{creek} * C_{creek}) + (Q_{dis} * C_{dis})}{(Q_{creek} + Q_{dis})}$$

With:

$C_{res}$  = Resultant concentration in the creek in  $\mu\text{g/L}$   
 $Q_{creek}$  = Flow in the creek in ( $\text{m}^3/\text{s}$ ) upstream of discharge  
 $C_{creek}$  = Concentration in Creek upstream of discharge ( $\mu\text{g/L}$ )  
 $Q_{dis}$  = Discharge volume of activity ( $\text{m}^3/\text{s}$ )  
 $C_{dis}$  = Concentration in discharge ( $\mu\text{g/L}$ )

**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**

## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

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 m³/s

Cdis = 30 µg/L maximum (assume all dissolved copper)

$$C_{resulting} = \frac{(12.77 * 0.4) + (0.058 * 30)}{(12.77 + 0.058)} = 0.5 \mu\text{g/L}$$

### 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 m³/s

Cdis = 30 µg/L maximum (assume all dissolved copper)

Substituting from equation above gives:

$$C_{resulting} = \frac{(x * C_{creek}) + (Q_{dis} * C_{dis})}{(x + Q_{dis})}$$

$$\rightarrow 1.4 = \frac{(x * 0.4) + (0.058 * 30)}{(x + 0.058)}$$

$$\rightarrow Q_{creek} = 1.6588$$

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)

## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

### 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 to 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.

## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

### 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

## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

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)—toxics 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.

Procedural information for the Operational Policy *Waste water discharge to Queensland waters***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 <i>upstream</i> 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 bioavailability differences.
Point	Diffuse (urban)	3:1	As above.

## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

### 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.



## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

### 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](http://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	Buffer width
To re-establish degraded watercourse riparian or wetland function.	Guideline buffer widths to re-establish degraded watercourse riparian and wetlands function — shown below as <b><u>bold/italics/underlined text</u></b> .
<p><b>Watercourses</b> To regulate the clearing of vegetation in a way that prevents the loss of biodiversity and maintains ecological processes — remnant vegetation associated with any <u>watercourse</u> is protected to maintain —</p> <ul style="list-style-type: none"> <li>a) <u>bank stability by protecting against bank erosion;</u></li> <li>b) <u>water quality by filtering sediments, nutrients and other pollutants;</u></li> <li>c) <u>aquatic habitat; and</u></li> <li>d) <u>wildlife habitat.</u></li> </ul>	<p><b><u>Buffer width</u></b> Clearing does not occur —</p> <ul style="list-style-type: none"> <li>a) in any <u>watercourse</u>;</li> <li>b) within <b><u>200 metres from each high bank of each watercourse with a stream order 5 or greater;</u></b></li> <li>c) within <b><u>100 metres from each high bank of each watercourse with a stream order 3 or 4;</u></b> and</li> <li>d) within <b><u>50 metres from each high bank of each watercourse with a stream order 1 or 2.</u></b></li> </ul>
<p><b>Wetlands</b> To regulate the clearing of vegetation in a way that prevents the loss of biodiversity and maintains ecological processes — remnant vegetation associated with any <u>significant wetland</u> and/or <u>wetland</u> is protected to maintain —</p> <ul style="list-style-type: none"> <li>a) <u>water quality by filtering sediments, nutrients and other pollutants;</u></li> <li>b) <u>aquatic habitat; and</u></li> <li>c) <u>wildlife habitat.</u></li> </ul>	<p><b><u>Buffer Width</u></b> Clearing does not occur —</p> <ul style="list-style-type: none"> <li>a) in any <u>wetland</u>;</li> <li>b) in any <u>significant wetland</u>;</li> <li>c) within <b><u>100 metres from any wetland;</u></b> and</li> <li>d) within <b><u>200 metres from any significant wetland.</u></b></li> </ul>

## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

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](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/crobs 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 habitat. © Photographs CSIRO Land and Water

## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

### 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](http://www.epa.gov/owow/watershed/trading/handbook/docs/NationalWQTHandbook_FINAL.pdf).



## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

### 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 ( $\text{NO}_3^-$ ), nitrite ( $\text{NO}_2^-$ ), ammonia ( $\text{NH}_3$ ) and ammonium ( $\text{NH}_4^+$ ). The primary sources of inorganic nitrogen are mineralized organic matter, nitrogenous fertilizers, point source discharges and atmospheric deposition. Inorganic nitrogen is bioavailable.

Total nitrogen is typically calculated based on the total load - it is assumed that all of the organic nitrogen will become bioavailable within a relevant time period. Offsets are based on total nitrogen load.

**Impact.** The effects of excessive nitrogen include those related to eutrophication—such as habitat degradation, algal blooms, hypoxia, anoxia and direct toxicity effects. While nutrient and eutrophication impacts associated with excess phosphorus may be more commonly of concern in freshwater systems, nitrogen is generally the limiting nutrient in marine environments and thus has a greater impact in estuarine systems. Some forms of nitrogen may pose particular problems; including ammonia that can cause localized toxicity problems and high concentrations of nitrate in drinking water may raise human health concerns.

A key consideration in determining offset requirements is to understand the nitrogen loss from the waterway. In addition to nitrogen exiting the waterway via irrigation diversions is nitrogen attenuation in the waterway, e.g. vegetation can draw dissolved inorganic nitrogen ( $\text{NO}_3^-$  and  $\text{NH}_4^+$ ) from the system. Another form of attenuation involves the process of "denitrification" whereby nitrate is reduced to gaseous nitrogen mainly by microbiological activity. Waterway reaches associated with high denitrification are usually associated with low, shallow flows. If offset nitrogen is mainly in the form of nitrate a (potentially large) portion of nitrogen may not reach the receiving waters and hence higher offset requirements. Conversely, nitrogen loads discharged to swiftly flowing, deep waters will have less opportunity for denitrification and have lower offset requirements.

Another factor important to water quality impacts in estuarine environments is the degree of flushing activity, particularly from tides. For example some estuarine waters may have a low level of tidal activity, mixing, and flushing. It is likely that these zones will retain the nitrogen for long periods of time and may have significant water quality concerns from discharge to such waters.

**Timing.** Nitrogen offsets are expressed in terms of annual loads as a common metric to ERA discharge loads. While point sources such as WWTPs are likely to have relatively consistent discharge timing, rural diffuse sources will have variable loadings that change seasonally based on land management activities and increased nitrogen levels during periods of high rainfall.

## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

### 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.

## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

### 4. Science & Capacity Building

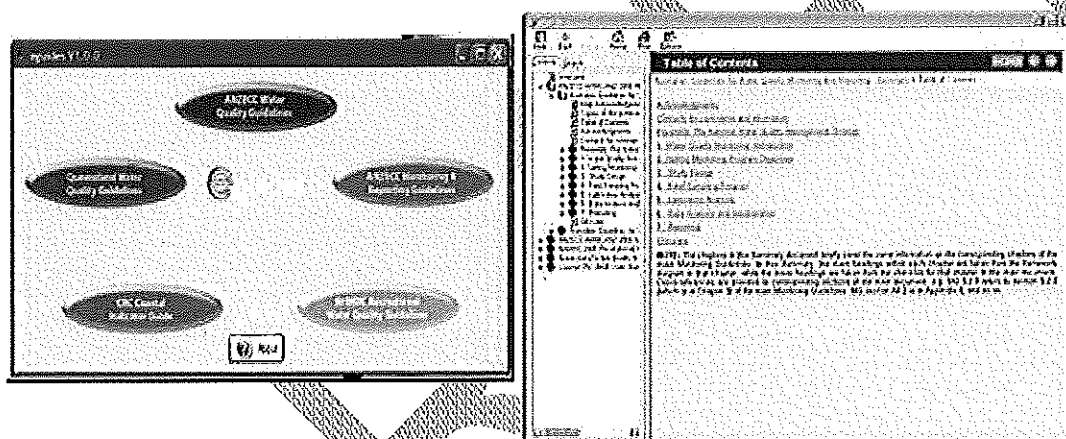
#### 4.1 Decision Support Software

##### 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](mailto:water.tools@epa.qld.gov.au).



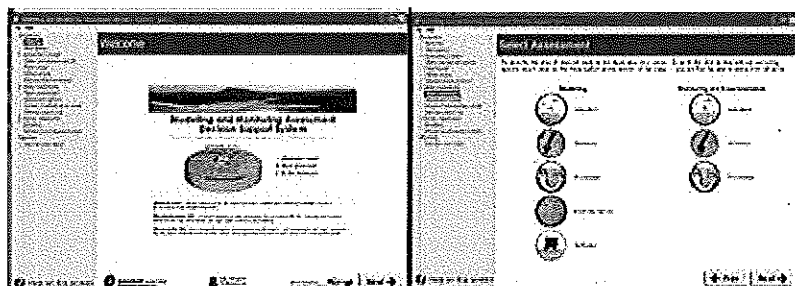
##### Modelling and Monitoring Assessment Decision Support System (MAMA DSS)

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.au](mailto:water.tools@epa.qld.gov.au). Further information on the tool can be obtained from <http://www.coastal.crc.org.au/3m/>.

## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*



### 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.

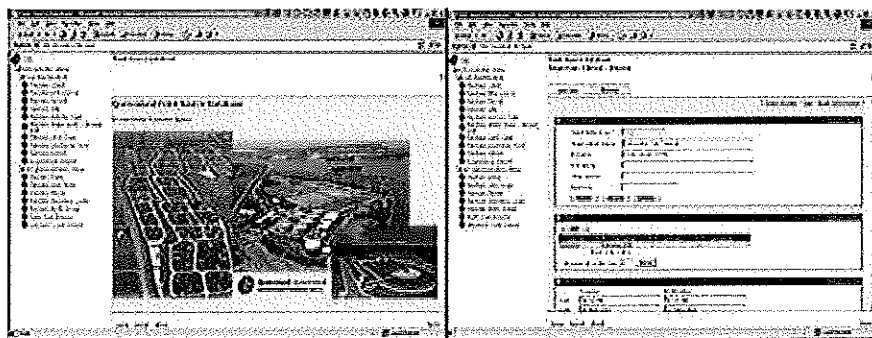
Further information can be obtained by emailing [water.data@epa.qld.gov.au](mailto:water.data@epa.qld.gov.au) or from [http://www.epa.qld.gov.au/environmental\\_management/water/water\\_quality\\_monitoring](http://www.epa.qld.gov.au/environmental_management/water/water_quality_monitoring)



## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

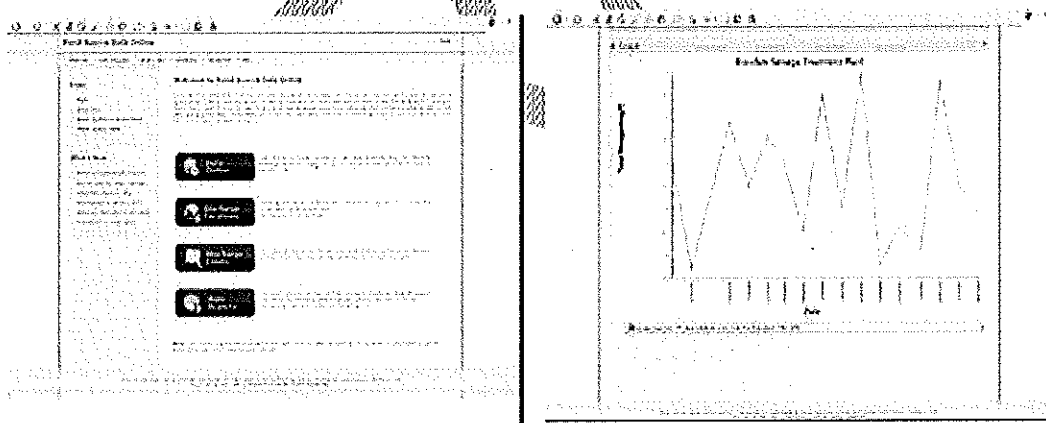
### Point Source Database

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](mailto: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/](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](mailto:psd.help@epa.qld.gov.au) or contact the Freshwater & Marine Sciences Group of the EPA.

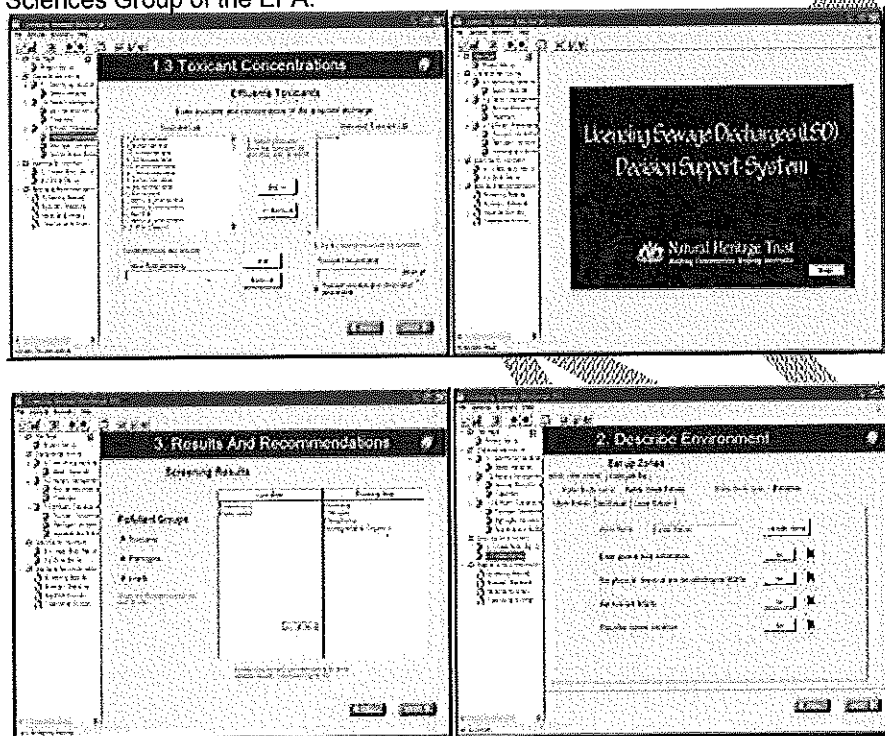
### Licensing Sewage Discharges Decision Support System (LSD DSS)

## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

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.

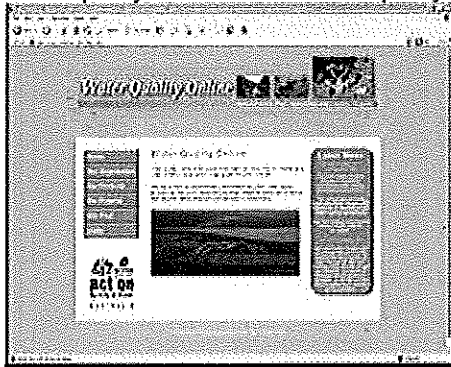
For further information about the DSS please contact [water.tools@epa.qld.gov.au](mailto:water.tools@epa.qld.gov.au) or the Freshwater & Marine Sciences Group of the EPA.



## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

### 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/>.



## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

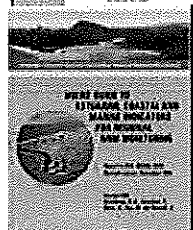
### 4.2 Relevant Water Quality Guidelines



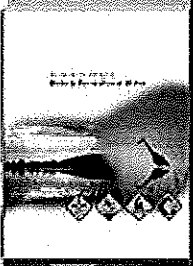
**ANZECC & ARMCANZ - Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000.** These guidelines provide substantial information on the nationally agreed approaches and trigger values for the protection of fresh and marine water. The guidelines are available with eGuides described 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 a range of hazards including microbial contamination. It includes a new risk assessment approach including sanitary 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>.

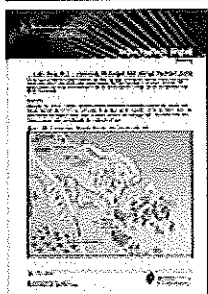
## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*



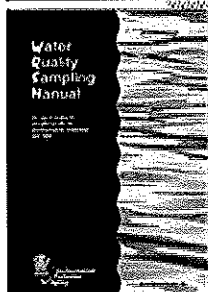
*Queensland Water Quality Guidelines, Queensland EPA, March 2006.* These guidelines were developed to complement the ANZECC/ARMCANZ Freshwater and Marine Guidelines. It includes site specific trigger values for regions of Queensland based on monitoring data from relevant reference sites. The guidelines 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](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>



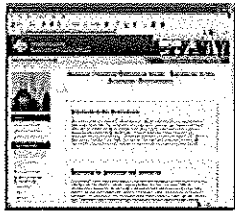
*Review of Methods for Water Quality Assessment for Temporary Stream and Lakes Systems, Australian Centre for Environmental Research (ACMER), September 2004.* This document provides information on methods used to assess ephemeral streams. The document is available from <http://www.acmer.uq.edu.au/research/attachments/FinalReportTempWatersSep20042.pdf>



*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/](http://www.epa.qld.gov.au/environmental_management/water/water_quality_monitoring/publications/)

## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*



*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/ICRG\\_OWNER.CRGPPUBLIC.pStart](http://hermes.erin.gov.au/pls/crg_public/ICRG_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: [REDACTED]

Postal: Indooroopilly Sciences Centre  
EPA (Botany Building)  
80 Meiers Road, Indooroopilly  
Brisbane, QLD, 4068



## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

### Attachment1 to Section 4

The Point Source Database Information Guide for EPA Staff  
October 2007  
Version 3.0

#### Overview

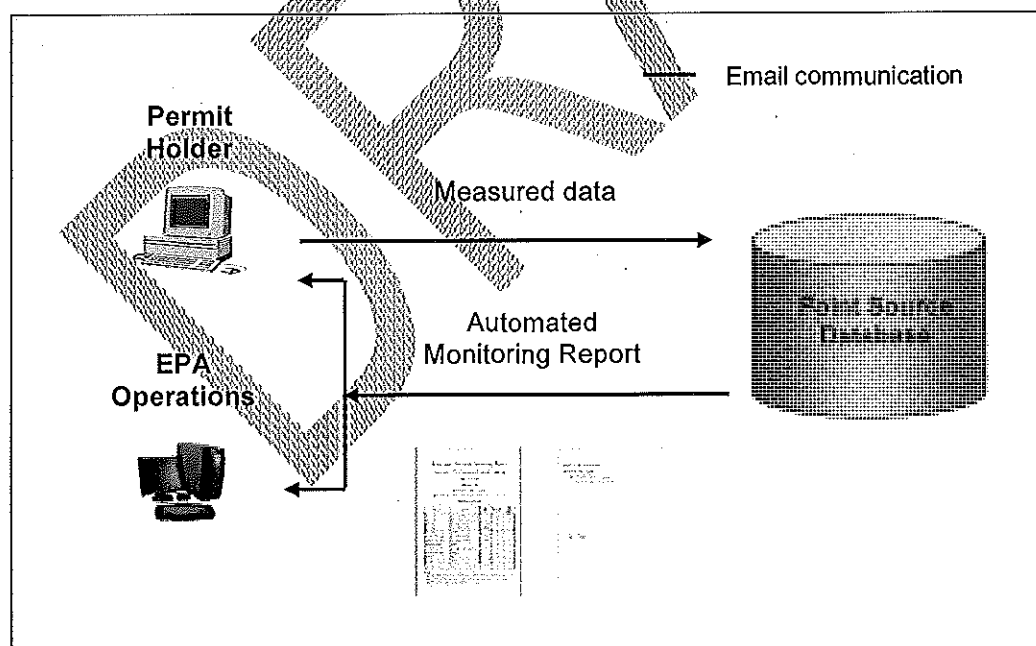
The Point Source Database (PSD) was designed and developed by the EPA to hold monitoring data for discharges to water required under EPA development permits for environmentally relevant activities (ERA's). It allows electronic submission of data and undertakes automated checks of the data against compliance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

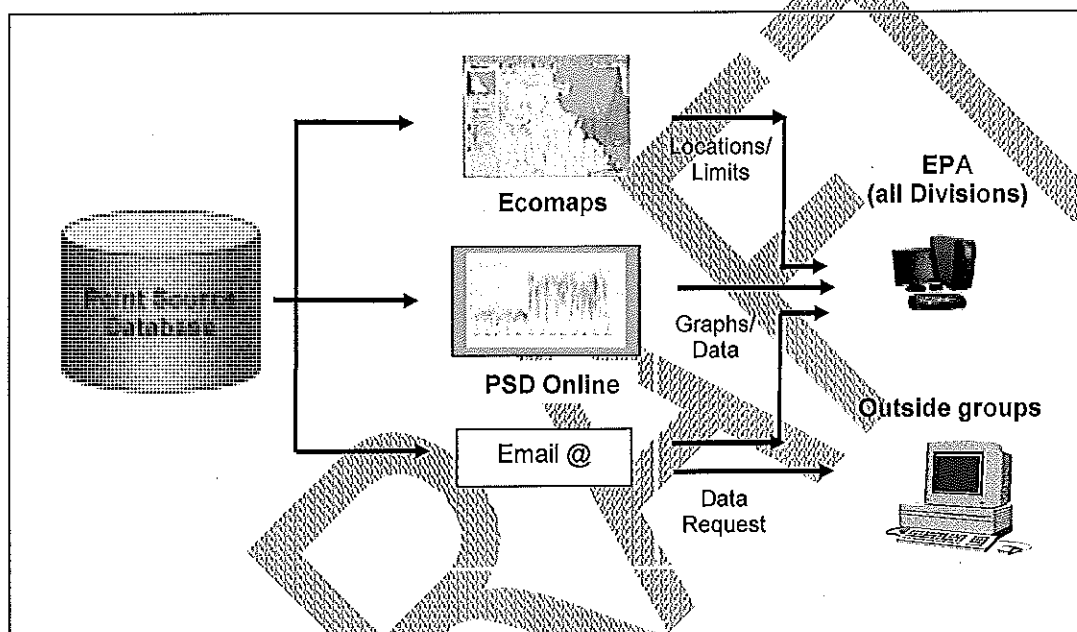
#### Electronic Submission and Reporting



## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

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 ([water.data@epa.qld.gov.au](mailto:water.data@epa.qld.gov.au)). The GIS layer of locations and limits can be requested from the Environmental information Systems Unit via email ([data.coordinator@epa.qld.gov.au](mailto:data.coordinator@epa.qld.gov.au)).

## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

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### 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 licensee's 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 [psd.help@epa.qld.gov.au](mailto:psd.help@epa.qld.gov.au)). The completed templates should be attached to an email as a .CSV file (comma delimited text file) and sent to [psd.data@epa.qld.gov.au](mailto:psd.data@epa.qld.gov.au). 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 [psd.help@epa.qld.gov.au](mailto:psd.help@epa.qld.gov.au).

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.

## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

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 permit 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 [psd.help@epa.qld.gov.au](mailto:psd.help@epa.qld.gov.au)). 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



## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

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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]

### Sample Automated Monitoring Report

DRAFT

Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

## 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)	80th 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)	80th 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)	80th percentile (long-term)	12 Months	13	0
N-NH <sub>3</sub> (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.



# Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

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.

## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

### 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.

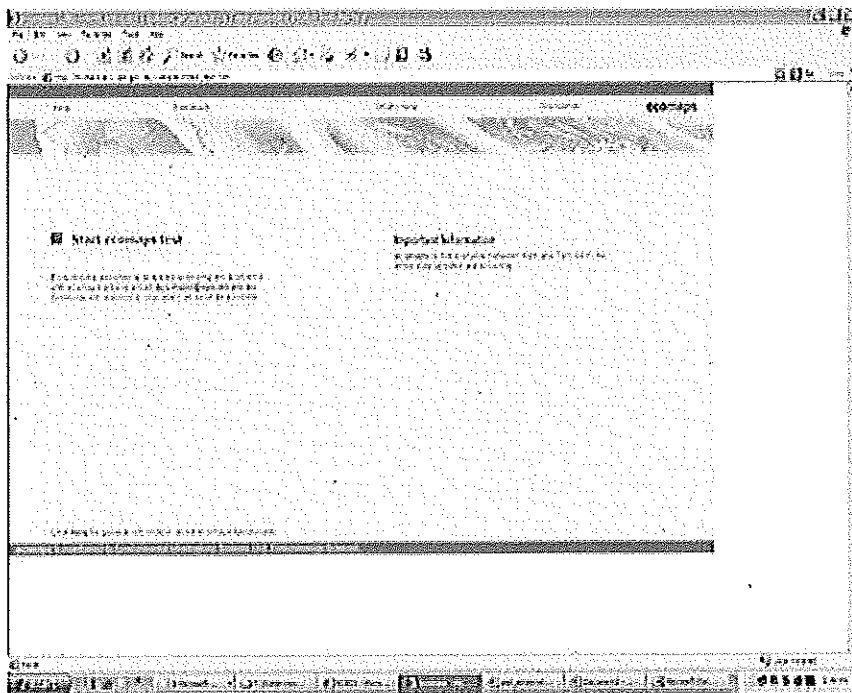
The Point Source Database is a joint initiative Environmental Sciences and Environmental Operations Divisions. For further information or feedback, please contact Freshwater & Marine Sciences on [REDACTED]

## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

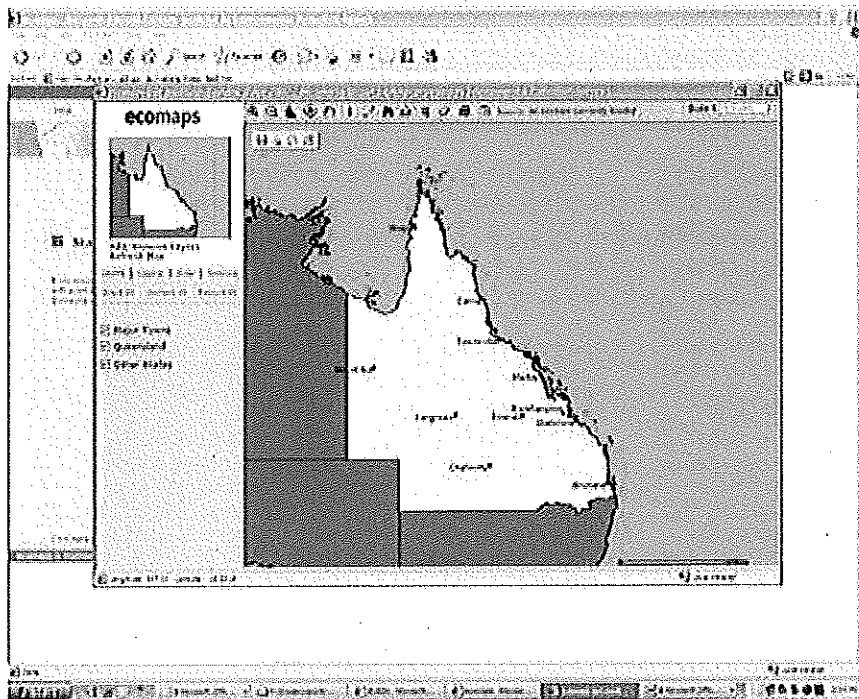
### Instructions

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

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

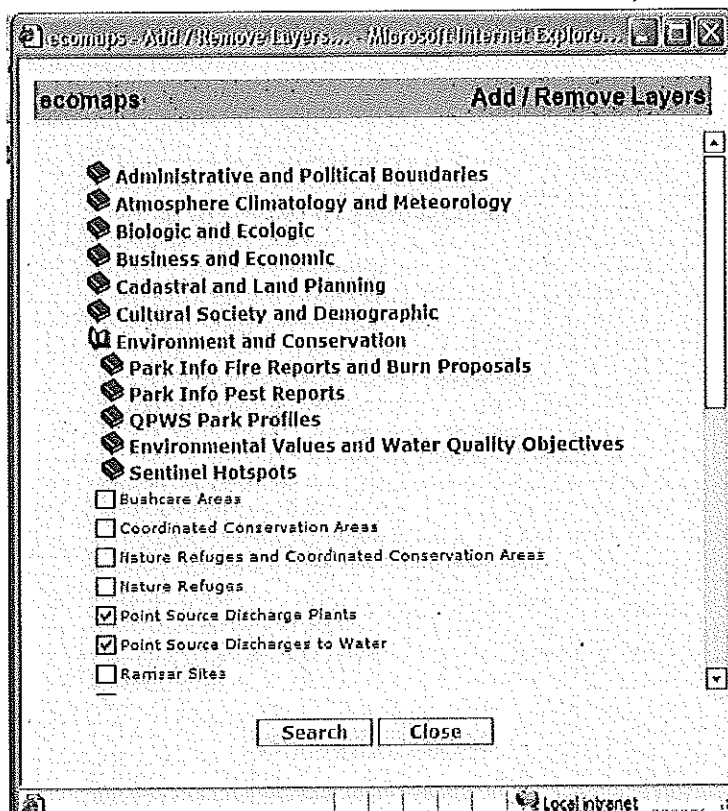


Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

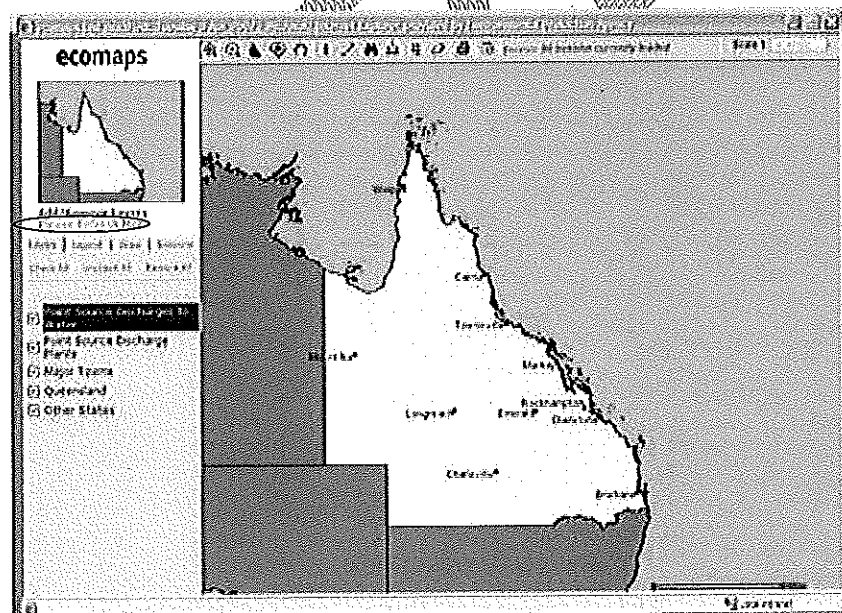


Step 2 – Click on Add/Remove Layers and choose Environment and Conservation. You can click the two boxes related to Point Sources and then Close

# Procedural information for the Operational Policy Waste water discharge to Queensland waters



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

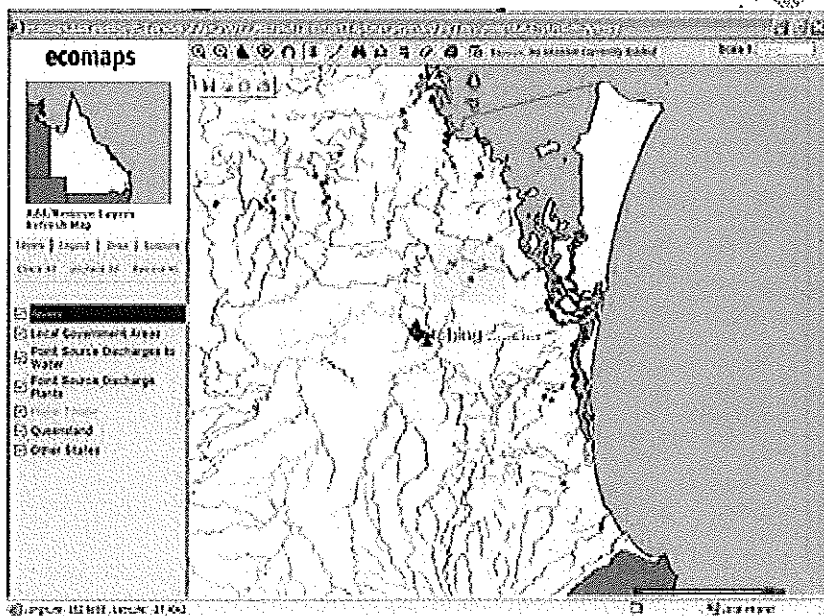
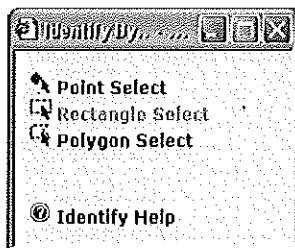


## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

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:

# Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

**ecoaccess** Info Results

Save Results Print Results Close Results

**Point Source Discharges to Water**

No	Site Name	EPC/EPH Client No	Permit Ref	ERA	Local Government Authority	Lot	Plan	Location	Stream	Catchment	Permit Limits
1	Bealiba Creek	3773	SR2208	119	Gold Coast City Council	1	SP113215	203 and 211	BEALIBA CREEK	Upper Albert River Basin	View Permit Limits
2	Bealiba Creek	3773	SR2208	119	Gold Coast City Council	1	SP113215	203 and 211	BEALIBA CREEK	Upper Albert River Basin	View Permit Limits
3	Bealiba Creek	3773	SR2208	119	Gold Coast City Council	1	SP113215	203 and 211	BEALIBA CREEK	Upper Albert River Basin	View Permit Limits

**Point Source Discharge Flares**

No	Site Name	EPC/EPH Client No	Permit Ref	ERA	Local Government Authority	Lot	Plan	Location	Stream	Catchment	Permit Limits
1	Bealiba Creek	3773	SR2208	119	Gold Coast City Council	1	SP113215	203 and 211	BEALIBA CREEK	Upper Albert River Basin	View Permit Limits
2	Bealiba Creek	3773	SR2208	119	Gold Coast City Council	1	SP113215	203 and 211	BEALIBA CREEK	Upper Albert River Basin	View Permit Limits
3	Bealiba Creek	3773	SR2208	119	Gold Coast City Council	1	SP113215	203 and 211	BEALIBA CREEK	Upper Albert River Basin	View Permit Limits

Queensland  
EPA

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

**ecoaccess** Info Results

Save Results Print Results Close Results

**Permit Limit Data:**  
Permit Ref = SR2208  
Site ID = BEEMLEWH

No	Indicator	Limit Type	Lower Limit	Upper Limit	Percentile Calculation Period	Enforcement Date (Hours limits only)
1	BOD 5	80TH PERCENTILE - SHORT TERM		15	5 d	
2	BOD 5	85TH PERCENTILE - LONG TERM		10	12 d	
3	BOD 5	MAXIMUM		15		
4	SUSPENDED SOLIDS	80TH PERCENTILE - SHORT TERM		25	5 d	
5	SUSPENDED SOLIDS	85TH PERCENTILE - LONG TERM		15	12 d	
6	SUSPENDED SOLIDS	MAXIMUM		25		
7	pH	MINIMUM	4			
8	pH	85TH PERCENTILE - SHORT TERM		10	5 d	
9	pH	85TH PERCENTILE - LONG TERM		1	12 d	
10	pH	MAXIMUM		9		
11	AMMONIA-NITROGEN	80TH PERCENTILE - SHORT TERM		7.0	5 d	
12	AMMONIA-NITROGEN	85TH PERCENTILE - LONG TERM		6	12 d	

## 5. Direct Toxicity Assessment

**This Section provides 'stand alone' information in considering a requirement for direct toxicity assessment. It also informs Section 2.3 of the Operational Policy.**

### 5.1 Introduction

This section of the *Procedural Guide* has been prepared by the Freshwater & Marine Sciences Unit (Environmental Sciences Division) for staff of the Environmental Protection Agency involved with regulating wastewater discharges to aquatic receiving environments.

The following subsections outline what assistance this document can provide for EPA staff contemplating the need to request or impose Direct Toxicity Assessment of an existing or proposed effluent discharge and what information would be required to make an informed decision. The following sections in the *Procedural Guide* will detail the specific effluent quality data required to determine whether or not there is a significant risk of toxic effects and therefore whether one-off, event-based or routine assessment for the toxic potential of the effluent is required. This assessment is referred to as a Direct Toxicity Assessment.

It should be noted that a Direct Toxicity Assessment (DTA) is also widely known as Whole Effluent Toxicity (WET) tests and both refer to an experimental procedure aimed at quantifying the potential toxicity of a sample of effluent through exposing a range of test specimens to that effluent. To remain consistent with the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC & ARMCANZ 2000), only the term DTA will be used hereafter.

#### **This Document (the Procedural Guide/Policy)**

This *Procedural Guide* will assist EPA officers who have reason to believe (or suspect) that:

- an effluent may have the potential of exhibiting toxic effects in aquatic biota, and consequently
- need to decide whether or not a DTA of the effluent is warranted.

A new Development Application (DA) or Amendment to an existing DA should contain detailed information that characterises the effluent and the receiving aquatic environment.

#### **Information Submitted by the Proponent**

The information provided in an Environmental Impact Assessment (EIA), Environmental Impact Statement (EIS), or other equivalent document, will form the basis of the assessment to determine whether or not there is a significant risk of toxic effects being caused by the effluent. If the required effluent quality data has not been presented in EIA/EIS then the priority would be to obtain it via a Request for Further Information (RFI).

In most cases however, the EIA/EIS should already contain detailed information that:

- identifies and quantifies the actual (or expected) effluent water quality characteristics;
- discusses whether or not the contaminants in the effluent comply with local Water Quality Objectives (WQOs) and preserve the Environmental Values (EVs) attributed to the specific receiving waters, and
- describes the effluent quality criteria in comparison to *Toxicity Trigger Values* (TTVs) presented in (ANZECC & ARMCANZ 2000) or alternate equivalent guideline.

### 5.2 Warranting Direct Toxicity Assessment

Performing a DTA usually involves initiating a series of laboratory-based toxicological bioassays that are designed to determine whether or not the effluent is toxic to any of a range of aquatic biota. The DTA of an effluent is both a time-consuming undertaking (at least several weeks) and expensive; hence for a DTA to be warranted there needs to be one or more issues of concern regarding some aspect of the:

- toxicant concentrations;
- discharge characteristics, and

## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

- 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 50<sup>th</sup> 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 have the potential to harm the health of aquatic receiving environments and are therefore frequently analysed via chemical analysis. The following categories contain the

Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

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%
<b>Metals &amp; Metalloids</b>								
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 <sup>C</sup>	360 <sup>C</sup>	ID	ID	ID	ID
Arsenic (As V)	0.8	13	42	140 <sup>C</sup>	ID	ID	ID	ID
Boron	90	370 <sup>C</sup>	680 <sup>C</sup>	1300 <sup>C</sup>	ID	ID	ID	ID
Cadmium	0.06	0.2	0.4	0.8 <sup>C</sup>	0.7 <sup>B</sup>	5.5 <sup>B,C</sup>	14 <sup>B,C</sup>	36 <sup>B,A</sup>
Chromium (Cr III)	ID	ID	ID	ID	8 <sup>A</sup>	27 <sup>A</sup>	50 <sup>A</sup>	90 <sup>A</sup>
Chromium (Cr VI)	0.01	1.0 <sup>C</sup>	6 <sup>A</sup>	40 <sup>A</sup>	0.14	4.4	20 <sup>C</sup>	85 <sup>C</sup>
Cobalt	ID	ID	ID	ID	0.005	1	14	150 <sup>C</sup>
Copper	1.0	1.4	1.8 <sup>B</sup>	2.5 <sup>C</sup>	0.3	1.3	3 <sup>C</sup>	8 <sup>A</sup>
Lead	1.0	3.4	5.6	9.4 <sup>C</sup>	2.2	4.4	6.6 <sup>C</sup>	12 <sup>C</sup>
Mercury (inorganic)	0.06	0.6	1.9 <sup>C</sup>	5.4 <sup>A</sup>	0.1	0.4 <sup>C</sup>	0.7 <sup>C</sup>	1.4 <sup>C</sup>
Mercury (methyl)	ID	ID	ID	ID	ID	ID	ID	ID
Nickel	8	11	13	17 <sup>C</sup>	7	70 <sup>C</sup>	200 <sup>A</sup>	560 <sup>A</sup>
Selenium (Total)	5	11	18	34	ID	ID	ID	ID
Silver	0.02	0.05	0.1	0.2 <sup>C</sup>	0.8	1.4	1.8	2.6 <sup>C</sup>
Zinc	2.4	8.0 <sup>C</sup>	15 <sup>C</sup>	31 <sup>C</sup>	7	15 <sup>C</sup>	23 <sup>C</sup>	43 <sup>C</sup>

\* 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](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<sub>3</sub> 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.**



# Procedural information for the Operational Policy Waste water discharge to Queensland waters

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%
<b>Non-metallic Inorganics</b>								
Ammonia	320	900 <sup>C</sup>	1430 <sup>C</sup>	2300 <sup>A</sup>	500	910	1200	1700
Chlorine	0.4	3	6 <sup>A</sup>	13 <sup>A</sup>	ID	ID	ID	ID
Cyanide	4	7	11	18	2	4	7	14
Nitrate*	4900	7200	8700 <sup>C</sup>	12000 <sup>A</sup>	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<sub>3</sub>-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<sub>2</sub>S, 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 {{{XXXXXXXXXX}}}

## 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%
<b>AROMATIC HYDROCARBONS</b>								
Benzene	600 <sup>A</sup>	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 <sup>C</sup>	70 <sup>C</sup>	90 <sup>C</sup>	120 <sup>C</sup>
Nitrobenzene	230	550	820	1300	ID	ID	ID	ID
<b>Polychlorinated Biphenyls (PCBs) &amp; Dioxins</b>								
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
<b>PHENOLS &amp; XYLENOLS</b>								
Phenol	85	320	600	1200 <sup>C</sup>	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 <sup>A</sup>	11	22	33	55 <sup>A</sup>
<b>ORGANIC SULFUROUS COMPOUNDS</b>								
Carbon Disulfide	ID	ID	ID	ID	ID	ID	ID	ID



Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

PHTHALATES								
Dimethylphthalate		3000	3700	4300	5100	ID	ID	ID
Dibutylphthalate	B	9.9	26	40.2	64.6	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, xlenols 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%
<b>ORGANOCHLORINE PESTICIDES</b>								
Chlordane	0.03	0.08	0.14	0.27 <sup>B</sup>	ID	ID	ID	ID
Heptachlor	0.01	0.09	0.25	0.7 <sup>A</sup>	ID	ID	ID	ID
Lindane	0.07	0.2	0.4	1.0 <sup>A</sup>	ID	ID	ID	ID
<b>ORGANOPHOSPHATE PESTICIDES</b>								
Chlorpyrifos	0.00004 <sup>B</sup>	0.01	0.11 <sup>A</sup>	1.2 <sup>A</sup>	0.0005	0.009	0.04 <sup>A</sup>	0.3 <sup>A</sup>
Diazinon	0.00003	0.01	0.2 <sup>A</sup>	2 <sup>A</sup>	ID	ID	ID	ID
Dimethoate	0.1	0.15	0.2	0.3	ID	ID	ID	ID
Parathion	0.0007	0.004 <sup>C</sup>	0.01 <sup>C</sup>	0.04 <sup>A</sup>	ID	ID	ID	ID
<b>HERBICIDES &amp; FUNGICIDES</b>								
Atrazine	0.7	13	45 <sup>B</sup>	150 <sup>C</sup>	ID	ID	ID	ID
Diquat	0.01	1.4	10	80 <sup>A</sup>	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 <sup>A</sup>	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

## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

### *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**



## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

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.

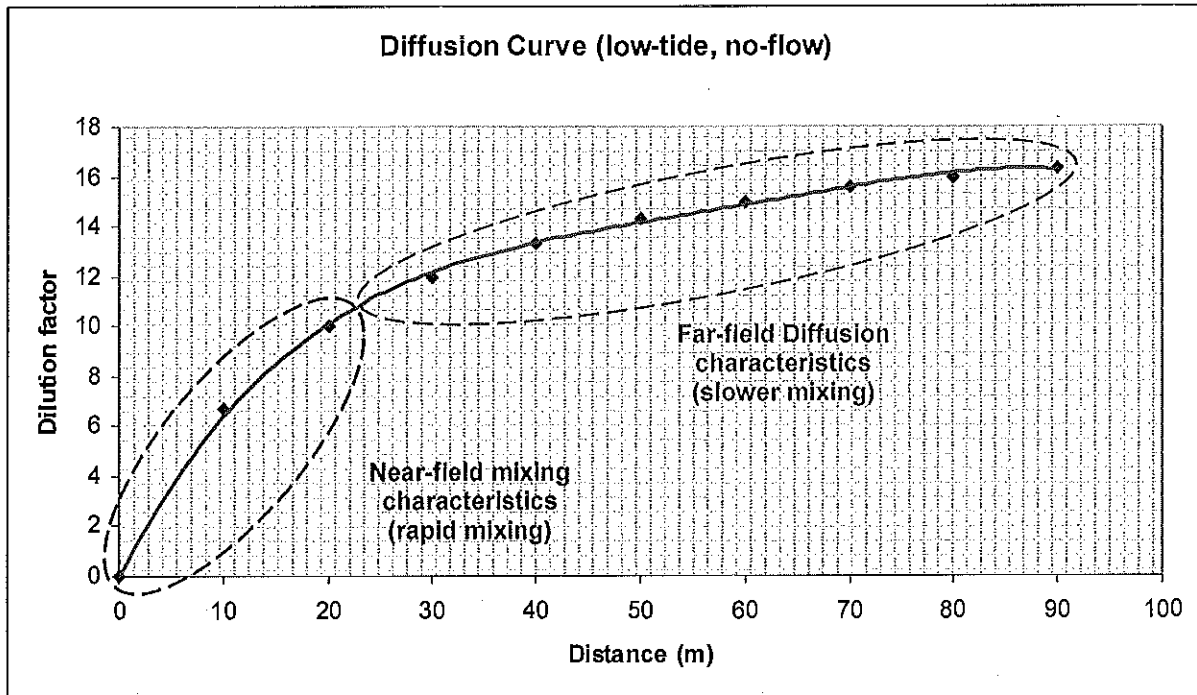
Note that Distances X and Y should typically be determined using the average dilution scenario (e.g. mean current velocity and tide). A worst-case dilution scenario with low velocity (e.g. 0.05m/s) at low tide should also be determined to check no overlap with other mixing zones or contact with the shore 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.

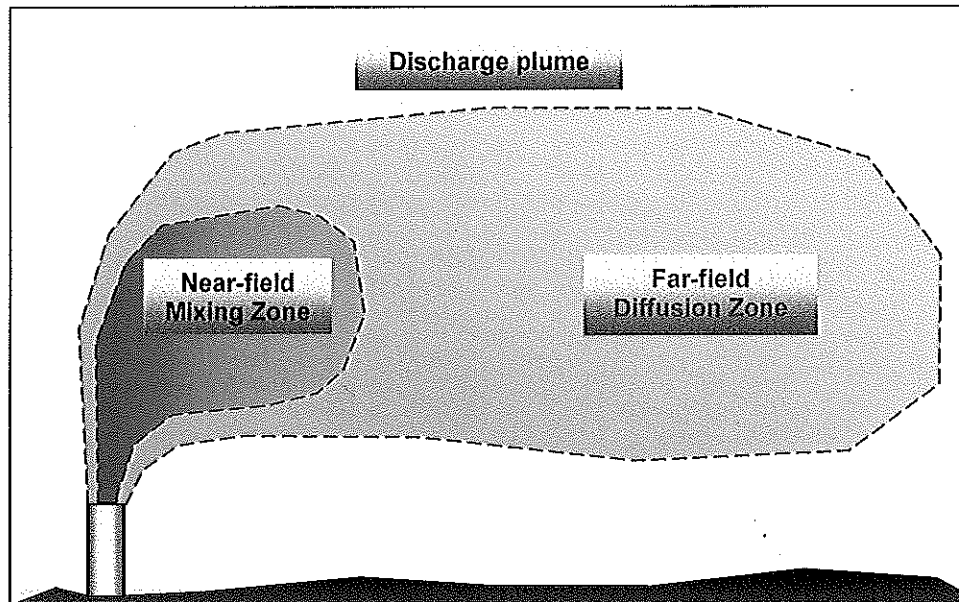
Procedural information for the Operational Policy *Waste water discharge to Queensland waters*



**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.



## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

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 & ARMICANZ (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 & ARMICANZ 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 & ARMICANZ 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 & ARMICANZ 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 that is being assessed.

#### Discharges to Marine waters

Marine waters are saline waters (salinity between 30-40 ppt ANZECC & ARMICANZ (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



## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

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) (undiluted)	Resultant Percentage of the original effluent concentration
	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

## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

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 inhospitable 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:



## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

- 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.

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Procedural information for the Operational Policy Waste water discharge to Queensland waters

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
<b>Plant</b>						
<i>Selenastrum capricornutum</i> 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
<i>Lemna gibba</i> <i>Lemna minor</i> 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
<i>Isocorysis aff. galbana</i> 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)
<i>Chlorella protothecoides</i>	Laboratory	72 hours chronic	Cell division rate			
<b>Fish (vertebrate)</b>						
<b>Insect (invertebrate)</b>						
<b>Mollusc (invertebrate)</b>						
<i>Saccostrea commercialis</i> Rock oyster						
<i>Mimachlamys asperima</i> Doughboy scallop	Laboratory	48 hours chronic	Larval abnormality	WE	Estuarine, marine	Krassoi et al. (1996)
<b>Crustacean (invertebrate)</b>						
<i>Ceriodaphnia dubia</i> <i>Ceriodaphnia cf. dubia</i> <i>Daphnia carinata</i> Freshwater water fleas	Laboratory	24-96 hours acute 72 days chronic	Juvenile survival 3 <sup>rd</sup> brood of neonates	WE, chemicals, sediment, leachates, groundwater	Freshwater	USEPA Method 1003.0 Stauber et al. (1996)

<i>Daphnia magna</i> Freshwater water flea	Laboratory				Freshwater	
<b>Amphipod (invertebrate)</b>						
<i>Corophium cf. volutator</i> Aquatic amphipod	Laboratory	10 days acute	Juvenile survival, emergence and reburial	Sediment	Freshwater, estuarine, marine	USEPA OPPTS 850.1020
<b>Echinoderm (invertebrate)</b>						
<i>Helicodonta tuberculata</i> Sea urchin	Laboratory	1 hour acute 72 hours chronic	Fertilisation success Larval development	WE, chemicals, sediment, leachates, groundwater	Estuarine, marine	APHA Method 8810C Simon and Laginestra (1997) 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
<b>Plant</b>						
<i>Chlorella</i> sp. Green alga	Laboratory	72 hours chronic	Population growth	Cu, herbicides, WE	Lowland streams, floodplains	{{56 Riethmuller, N. 2003;}}
<i>Chlorella</i> sp. (2 tropical species)	Laboratory	48 or 72 hrs chronic	Cell division rate	WE		Franklin et al 1998 Franklin et al (in press)
<i>Ceratophyllum demersum</i> Hornwort	Laboratory	96 hours chronic	Growth inhibition	Cu, herbicides, WE	Lowland streams, floodplains	{{56 Riethmuller, N. 2003;}}
<i>Lemna aquinoctialis</i> sp. Duckweed	Laboratory	4-7 days chronic	Plant growth	Cu, herbicides	Lowland streams, floodplains	{{56 Riethmuller, N. 2003;}}
<i>Monoraphidium arcuatum</i> Tropical green alga	Laboratory	72 hours chronic	Cell division rate	Cu		{{69 Levy, J.L. 2007;}}
<b>Fish (vertebrate)</b>						
<i>Melanotaenia nigra</i> Black-banded rainbowfish	<i>In-situ</i> / Laboratory	96 hours acute	Larval survival	U, Cu, WE	Escarpment streams, floodplains	eriss notes
<i>Magurda magurda</i> Purple-spotted gudgeon	Laboratory	96 hours acute	Larval survival	U, Cu, WE	Upland streams, floodplains	{{56 Riethmuller, N. 2003;}}
<b>Insect (invertebrate)</b>						

Procedural Guide  
Procedural information for the Operational Policy Waste water discharge to Queensland waters

<i>Chironomus crassiforceps</i> Chironomid	Laboratory	5 days chronic	Larval growth	U, Cu	Permanent billabongs, floodplains	eriss notes
<b>Mollusc (invertebrate)</b>						
<i>Amerianna cumingii</i> Freshwater gastropod	In-situ	96 hours chronic	Reproduction, juvenile survival	U, Cu, WE	Permanent billabongs, floodplains	eriss notes
<b>Crustacean (invertebrate)</b>						
<i>Moinodaphnia macleayi</i> Freshwater cladoceran	Laboratory	6 day sub-lethal 24 hours chronic 6 day acute	Reproduction (3 brood) Feeding inhibition Survival	U, Cu, HCN, Mn, NO <sub>3</sub> , Cd, WE	Permanent billabongs	{{56 Riethmuller, N. 2003;}}
<b>Cnidarian (invertebrate)</b>						
<i>Hydra viridissima</i> Green hydra	Laboratory	96 hours chronic	Population growth	U, Cu, Mg, Na, WE	Permanent billabongs, floodplains	{{56 Riethmuller, N. 2003;}}

Cd – Cadmium  
Na – Sodium

Cu – Copper  
NO<sub>3</sub> – Nitrite

HCN – Cyanide  
U – Uranium

Mg – Magnesium  
WE – whole-effluent

Mn – Manganese  
WS – whole-sediment

**Queensland Brackish Waters**

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**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
<b>Plant</b>						
<i>Nitzschia closterium</i> 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)
<i>Nitzschia closterium</i> (tropical)	Laboratory	72 hours chronic	Cell division rate	WE	Marine	{{62 Johnson, H.L. 2007;}}
Marine microalga (diatom)	Laboratory	72 hours chronic	Cell division rate	WE	Marine	{{63 Franklin, N.M. 2001;}}
<i>Phaeodactylum tricornutum</i> Marine microalga (diatom)	Laboratory	72 hours chronic	Cell division rate	WE	Marine	{{64 Adams, M.S. 2004;}}
<i>Entomoneis cf punctulata</i> microalga (diatom)	Laboratory	72 hours chronic 24 hour acute	Cell division rate Esterase inhibition	WS	Marine	
<i>Dunaliella tertiolecta</i> Green alga	Laboratory	1 hour acute 72 hour chronic	Enzyme inhibition Cell division rate	WE	Marine	Peterson & Stauber {{59 Stauber, J.L. 1994;}}
<b>Fish (vertebrate)</b>						
<b>Insect (invertebrate)</b>						
<b>Mollusc (invertebrate)</b>						
<i>Tellina deltoidealis</i> bivalve	Laboratory	10 days acute 4 week chronic	Survival Growth	WS	Estuarine, marine	{{68 Simpson, S.L. 2005;}}
<i>Spicula trigonella</i> Bivalve	Laboratory	10 days acute	Survival	WS	Estuarine, marine	Strom spadaro simpson
<b>Crustacean (invertebrate)</b>						

Procedural information for the Operational Policy Waste water discharge to Queensland waters

<i>Penaeus monodon</i> Tiger prawn	Laboratory	96 hours acute	Juvenile survival	WE	Estuarine, marine	USEPA OPPTS 850.1045
<b>Amphipod (invertebrate)</b>						
<i>Allochroetes compressa</i>						
Marine amphipod	Laboratory	96 hours acute	Juvenile survival	WE, chemicals, sediment, leachates, groundwater	Marine	USEPA OPPTS 850.1020
<i>Hyale crassicornis</i>						
<i>Melita</i> spp.						
<i>Melita plumulosa</i>		10 days acute	Survival, growth			{{66 King, C.K. 2006:}}
Epibenthic deposit feeder	Laboratory	6 week chronic 13 day chronic	Reproduction Reproductive index	WS	Estuarine, marine	{{67 Gale, S.A. 2006:}} Hyne et al
<b>Copepod (invertebrate)</b>						
<i>Acartia sinjiensis</i> (tropical) Copepod	Laboratory	48 hours acute	Immobilisation	WE	Marine	{{65 Rose, A. 2006:}}
<i>Nitocra</i> sp. Copepod	Laboratory	7 day chronic	Life cycle (split) 7 day reproduction 7 day development	WE	Marine	?
<b>Cnidarian (invertebrate)</b>						

## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

### 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

## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

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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.

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## Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

### 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 <sub>50</sub>	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 <sub>50</sub>	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.

# Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

<b>Contaminant</b>	Biological (e.g. bacterial and viral pathogens) and chemical (see <b>Toxicants</b> ) introductions capable of producing an adverse response (effect) in a biological system, seriously injuring structure or function or producing death.
<b>Direct Toxicity Assessment</b>	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).
<b>EC<sub>50</sub></b>	The concentration of material in water that is estimated to be effective in producing some response in 50% of the test organisms. The EC <sub>50</sub> is usually expressed as a time dependant value (e.g. 24 hour or 96 hour EC <sub>50</sub> ).
<b>Near-field mixing zone</b>	The Near-field Mixing Zone (or the <b>Initial Mixing Zone</b> ) 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.
<b>Far-field Mixing Zone</b>	The Far-field Mixing Zone (or the <b>Absolute Mixing Zone</b> ) 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) prevails.
<b>LC<sub>50</sub></b>	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 <sub>50</sub> is usually expressed as a time dependant value (e.g. 24 hour or 96 hour LC <sub>50</sub> ).
<b>TIE</b>	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.
<b>Total Dissolved Salts</b>	A measure of the inorganic salts dissolved in water. The organic component of the water has been removed via some laboratory technique.
<b>Total Dissolved Solids</b>	A measure of the inorganic salts (and organic compounds) dissolved in water.
<b>Total Metal</b>	The concentration of a metal in an unfiltered sample that is digested in strong nitric acid.
<b>Toxicant</b>	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, ciguatera and saxitoxins).
<b>Toxicity</b>	The inherent potential or capacity of a material to cause adverse effects in a living organism.
<b>Trigger Values</b>	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 (ecological) 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.
<b>Water Quality Criteria</b>	Scientific data evaluated to derive the recommended quality of water for various uses.
<b>Whole Effluent Toxicity Testing</b>	The use of toxicity tests to determine the acute and/or chronic toxicity of effluents.

Source: ANZECC & ARMCANZ (2000)

# Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

## 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, nematocide, 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, anthelmintic, 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 Dimethyldithiocarbamate: fungicide; corrosion inhibitor; rubber accelerator; intermediate; polymerization shortstop; nematocide and herbicide with a fumigant action.  Lead Dimethyldithiocarbamate: vulcanization accelerator.

Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

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 kills ticks, lice and sarcoptic mange mites.
Malathion	Insecticide on fruits, vegetables, ornamentals, household and livestock use, an acaricide, 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-leaved 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, molluscicide, fungicide, bactericide, anti-mildew agent, slimicide and algicide. 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;

Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

	ingredient in de-emulsifiers for oil field use and motor oil.
Phthalates	<p>Butyl benzyl phthalate (BBP) resins: solvent and a fixative in perfume.</p> <p>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.</p> <p>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.</p> <p>Di-n-pentyl phthalate (DPP): plasticizer for nitrocellulose and resin lacquers; anti-foaming agent in the manufacture of glue; in rubber cements.</p>
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>

Procedural information for the Operational Policy *Waste water discharge to Queensland waters*

Endocrine Disrupting Chemicals (Pharmaceuticals)

**Table 10. Example known and suspected Pharmaceutical Endocrine Disrupting Chemicals**

Aspirin	Analgesic
Bacitracin	Antibiotic
Carbamazepine	Antiepileptic
Chloramphenicol	Antibiotic
Ciprofloxacin <sup>1</sup>	Antibiotic
Clofibrate	Lipid regulator
Clofibric Acid	Lipid regulator
Enrofloxacin <sup>2</sup>	Antibiotic
Erythromycin	Antibiotic
Fluoxetine HCl	Antidepressant
Fluvoxamine	Antidepressant
Ibuprofen	Analgesic/Anti-inflammatory
Lincomycin <sup>1,2</sup>	Antibiotic
Naladixic acid <sup>2</sup>	Antibiotic
Naproxen sodium	Analgesic/Anti-inflammatory
Norfloxacin <sup>2</sup>	Antibiotic
Oleandomycin <sup>2</sup>	Antibiotic
Oxytetracycline	Antibiotic
Paracetamol	Analgesic
Paroxetine HCl	Antidepressant
Roxithromycin <sup>2</sup>	Antibiotic
Salicylic Acid	Topical keratolytic
Sulfamethoxazole <sup>1</sup>	Antibiotic
Sulfamethazine	Antibiotic
Tetracycline	Antibiotic
Triclosan	Antibacterial
Trimethoprim <sup>1,2</sup>	Antibiotic
Tylosin	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;}}

*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;

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- (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.

[s 53]

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*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](http://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.



**DEPARTMENT OF MINERALS AND ENERGY**

# **TECHNICAL GUIDELINES FOR THE ENVIRONMENTAL MANAGEMENT OF EXPLORATION AND MINING IN QUEENSLAND**

Prepared with the assistance of:

*Queensland Mining Council,*

*Queensland Department of Primary Industries*

*Queensland Department of Environment and Heritage and*

*University of Queensland*

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## **CONTENTS**

### **PART A**

- 1.0 Background**
- 2.0 Aim**
- 3.0 Scope**
- 4.0 Quality Assurance**
- 5.0 Commitment to Ecologically Sustainable Development**
- 6.0 The Role of Environmental Management**
- 7.0 Description of the Guidelines**
  - 7.1 *Mine Planning Guidelines***
  - 7.2 *Water Management Guidelines***
  - 7.3 *Rehabilitation Guidelines***
- 8.0 Use of the Guidelines**
- 9.0 Glossary of Terms**
- APPENDIX List of Responsible Authority Contacts**

### **PART B**

- Mine Planning Guidelines**
- Identification of Potential Environmental Issues
- Initial Advice Statement
- Land Suitability Assessment Techniques
- Determination of Post-Mining Land Use
- Good Relations with Landowners
- Community Consultation
- Air Pollution Control
- Noise Management
- Exploration and Mining in Watercourses
- Identification of Suitable Mine Environmental Management Expertise
- Progressive Rehabilitation
- Assessment and Management of Acid Drainage
- Assessment and Management of Saline/Sodic Wastes
- Environmentally Sound Exploration Practices
- Assessment and Management of Land Contamination
- Assessment of Risk in Relation to Land Contamination
- Design of Mining Waste Landfills

### **PART C**

- Water Management Guidelines**
- Water Supply
- Site Water Management
- Water Discharge Management
- Tailings Management
- Water Monitoring

### **PART D**

- Rehabilitation Guidelines**
- Rehabilitation of Areas Containing Shafts, Boreholes or Adits
- Open Pit Rehabilitation
- Rehabilitation of Spontaneous Combustion Areas
- Rehabilitation of Land Subsidence Areas
- Geotechnical Slope Stability
- Erosion Control
- Growth Media Management
- Revegetation Methods
- Assessment of Revegetation
- Housekeeping on Rehabilitated Areas
- Minesite Decommissioning
- Estimation of Mine Rehabilitation Costs
- Sampling and Analysis of Potentially Contaminated Soil and Groundwater

# INTRODUCTION TO THE TECHNICAL GUIDELINES FOR THE ENVIRONMENTAL MANAGEMENT OF EXPLORATION AND MINING IN QUEENSLAND

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## 1.0 BACKGROUND

The *Mineral Resources Act 1989* (the Act) requires environmental impacts to be addressed and managed during all prospecting, exploration, mining and rehabilitation activities. The principal objectives of the Act include:

- to minimise land use conflict,
- to encourage environmental responsibility, and
- to encourage responsible land care management.

To assist the mining industry in meeting environmental responsibilities, the Department of Minerals and Energy (DME), in consultation with the Queensland Mining Council (QMC), has developed an *Environmental Management Policy for Mining in Queensland*. The policy seeks to develop eventual industry self-regulation with respect to environmental management.

The purpose of environmental management, as stated in the policy, is to achieve:

- acceptable post-mining land use capability/suitability,
- stable post-mining landform(s), and
- preservation of downstream water quality.

As well as its regulatory role, the DME has an advisory and co-ordinating role in the implementation of this policy and in this role has prepared these Technical Guidelines. With the assistance of the QMC, other government departments (particularly the Department of Environment and Heritage and the Department of Primary Industries), and tertiary education institutions.

## 2.0 OBJECTIVES

- (1) To provide advice about mine planning, water management and rehabilitation which can assist the mining industry to manage its exploration, mining operation and rehabilitation activities so as to satisfy the environmental objectives of the Mineral Resources Act and the Environmental Management Policy for Mining in Queensland.
- (2) To assist proponents and operators in the preparation of the Environmental Management Overview Strategy (EMOS), Plan of Operations and Environmental Audit required to plan for and manage environmental impacts generated by mining operations.

## 3.0 SCOPE

These Guidelines provide advice on practices for sound environmental management during all Phases of a mine project - from exploration and planning, through establishment, commissioning and operation, to rehabilitation and decommissioning. They are not intended to establish mandatory requirements, but seek to provide useful advice which can assist in the formulation of site-specific solutions to environmental management problems.

These Guidelines are intended to apply to all existing and proposed exploration and mining projects which are subject to the Act.

In using these Guidelines, it should be recognised that each mine has site-specific features, and project-specific considerations. Different or better approaches than those set out here may apply to particular mine sites where warranted by site-specific circumstances. It should also be recognised that new technologies, changing economics and new or reviewed legislation may have significant impacts on mining activities over time. These guidelines will be amended from time to time to accommodate such changes.

## 4.0 QUALITY ASSURANCE

The Technical Guidelines reflect a quality assurance approach to the provision of advice and information on environmental management of exploration and mining activities.

This approach requires client needs to be identified and procedures to be put in place to address those needs. Such procedures are being developed through the full co-operation and participation of both providers and clients.

The guidelines have been developed with the full participation of the mining industry through the QMC to meet the need for information on environmental management practices acceptable to the Department and other government agencies with an interest in the regulation of mining. In this regard the Departments of Environment and Heritage and Primary Industries also participated. Further advice was provided by the University of Queensland.

The participatory process provides credibility and accountability whilst allowing the development of effective and practical advice to the industry.

## 5.0 COMMITMENT TO ECOLOGICALLY SUSTAINABLE DEVELOPMENT

Australia's National Strategy for Ecologically Sustainable Development (December 1992) in relation to mining sets a primary focus of action on *"improving opportunities for ecologically sustainable minerals and energy development ....."*

Consistent with this primary focus are a number of objectives which include *Objective 5.1 -*

*"To ensure sound environmental practices throughout the mining industry."*

The Queensland Government through the DME is committed to this strategy as it applies to exploration and mining. This commitment is expressed through the environmental management provisions of the Act, the Environmental Management Policy, The Draft Environmental Impact Assessment Policy and these Guidelines.

## 6.0 THE ROLE OF ENVIRONMENTAL MANAGEMENT

Environmental management should be an integral part of mineral exploration, mine development and mine operations, including rehabilitation. It should be treated as an essential part of the production process.

An appropriate level of ongoing management, technical and financial resources need to be provided to ensure that environmental management programmes and commitments are integrated into mine planning and operation and are understood, properly costed, effectively implemented and regularly monitored, reviewed and revised as appropriate.

While one of the functions of the DME is to ensure compliance with statutory requirements, prime responsibility for the environment of each mine site must be taken by miners themselves.

## 7.0 DESCRIPTION OF THE GUIDELINES

The following thirty five (35) guidelines are broken into three (3) sections dealing with mine planning, water management and rehabilitation.

### 7.1 Mine Planning Guidelines

These consist of the following seventeen (17) guidelines each covering a critical environmental management issue that either applies to or should be considered in the exploration, feasibility and planning/design stages of the project:

The use of these mine planning guidelines is intended to ensure that the planning of exploration activities, mining operations and rehabilitation works takes proper account of:

- sound environmental management practices,

- the roles and interests of the proponent, the government, landowners/occupiers and the community in the development and environmental management of mining projects, and
- all relevant statutory requirements.

### Identification of Potential Environmental Issues

Describes the range of environmental issues that may be relevant to mining projects and the identification of those environmental issues which may apply to any particular project.

### Initial Advice Statement

Provides advice on the intent, timing, content and format of Initial Advice Statements and the government's assessment processes related to these statements.

### Land Suitability Assessment Techniques

Addresses the applicability and use of land suitability assessment techniques in determining pre-mining land capability and post-mining land use potential.

### Determination of Post-Mining Land Use

Describes the identification and selection of suitable post-mining land use options.

### Good Relations with Landowners

Addresses the requirements for and means of establishing and maintaining good relations with the owners and occupiers of land on which exploration activities are carried out.

### Community Consultation

Outlines the approaches and techniques which may be used by a mining project proponent to establish and maintain effective communication with the local community and other interested/concerned groups and organisations through all stages of mine planning, operation and decommissioning.

### Air Pollution Control

Addresses the prevention and management of air pollution, particularly the control of dust, associated with mining activities.

### Noise Management

Addresses the control and management of noise generated by mining projects.

### Exploration and Mining in Watercourses

Addresses the planning for and carrying out of exploration and mining activities in or adjoining rivers, creeks, streams, lakes, wetlands and other non-tidal watercourses.

### **Identification of Suitable Mine Environmental Management Expertise**

Outlines how to determine and identify the skills and knowledge needed to plan, supervise, monitor and evaluate rehabilitation programmes.

### **Progressive Rehabilitation**

Describes the advantages of and opportunities and strategies for progressive rehabilitation.

### **Assessment and Management of Acid Drainage**

Addresses the identification, evaluation and management of solid waste materials with potential to generate acid drainage and/or heavy metal toxicity.

### **Assessment and Management of Saline/Sodic Wastes**

Addresses the identification, evaluation and management of solid waste materials which have the potential to be or to generate saline and/or Sodic wastes.

### **Environmentally Sound Exploration Practices**

Outlines the identification of areas which are sensitive to adverse environmental impacts and practices which should be generally used to ensure that environmental impacts from exploration activities are minimised, and that exploration sites are properly cleaned up and rehabilitated.

### **Assessment and Management of Land Contamination**

Discusses hazardous substances, land contamination and contaminated land and provides guidance on statutory requirements and procedures, assessment of potential land contamination, an approach to hazard characterisation and risk assessment, measures to avoid, minimise, identify, assess, manage and remediate land contamination and initial and final notification procedures.

### **Assessment of Risk in Relation to Land Contamination**

Discusses the recommended approach and the techniques available for identifying, assessing and managing environmental risks in the mining industry.

### **Design of Mining Waste Landfills**

Outlines the criteria that must be considered in the design of structures for the storage of wastes on an exploration or mining tenure. Such criteria include siting, leachate characteristics, cell design, liner selection, capping requirements and design and strategies for environmental monitoring.

## **7.2 Water Management Guidelines**

These consist of the following five (5) guidelines covering the environmental management issues relevant to the sourcing, management, discharge and monitoring of water in mining operations:

The use of these water management guidelines is intended to ensure that water is supplied to, used on, and discharged from mine sites in a manner that:

- allows surface water and groundwater resources to be sustained,
- protects downstream uses, and
- meets all relevant statutory requirements.

### **Water Supply**

Provides advice on environmental issues related to the sourcing and planning of water for mining.

### **Site Water Management**

Discusses the management of water on mine sites so as to reduce the amount of contaminated water that may need to be handled.

### **Water Discharge Management**

Addresses the management of water discharged from mine sites to ensure compliance with statutory requirements and protection of downstream uses.

### **Tailings Management**

Discusses the planning, design and operation of tailings management systems, specifically tailings dams.

### **Water Monitoring**

Provides advice on procedures for monitoring the quantity and quality of water used on and discharged from mine sites.

## **7.3 Rehabilitation Guidelines**

These consist of the following thirteen (13) guidelines each covering a critical environmental management issue relevant to the rehabilitation of exploration and mining sites:

The use of these rehabilitation guidelines is intended to ensure that land disturbed by exploration activities and mining operations is effectively rehabilitated such that:

- the agreed post-mining land use suitability is achieved,
- stable environmental conditions are established which are able to be sustained, and
- all relevant statutory requirements are complied with.

### **Rehabilitation of Areas Containing Shafts, Boreholes and Adits**

Outlines measures to ensure the proper rehabilitation of areas which contain shallow or deep shafts, small or large boreholes, or adits.

### **Open Pit Rehabilitation**

Discusses the criteria to be applied in the design and rehabilitation of open pits having regard to geophysical aspects, sealing of strata, water accumulation and safety issues.

### **Rehabilitation of Spontaneous Combustion Areas**

Describes the causes of spontaneous combustion, measures to prevent and control spontaneous combustion of mined material, and methods of rehabilitating areas where spontaneous combustion has occurred.

### **Rehabilitation of Land Subsidence Areas**

Describes the causes of land subsidence (particularly in relation to coal mining), measures to prevent or minimise the surface effects of subsidence, and methods of rehabilitating areas affected by subsidence.

### **Geotechnical Slope Stability**

Discusses the geotechnical aspects of designing for stable sloping post-mining land forms.

### **Erosion Control**

Addresses the prediction, control and measurement of soil erosion on mining lease areas.

### **Growth Media Management**

Outlines the selection, handling, storage, treatment and replacement of soils and other media to be used for establishing and growing vegetation on land following mining.

### **Revegetation Methods**

Discusses species selection, preparation methods and establishment techniques for revegetation of land following mining.

### **Assessment of Revegetation**

Addresses the criteria and procedures to be used in monitoring and assessing the progressive and final revegetation of rehabilitated areas.

### **Housekeeping on Rehabilitated Areas**

Addresses environmentally sound working practices (ie. housekeeping) in areas subject to disturbance by exploration and mining activities. Particular consideration is given to waste disposal and weed control.

### **Minesite Decommissioning**

Addresses the closure and decommissioning of areas, works and facilities used for mining, including tailings dams.

### **Estimation of Mine Rehabilitation Costs**

Outlines how to estimate the progressive and total costs of rehabilitating areas disturbed by mining activities.

### **Sampling and Analysis of Potentially Contaminated Soil and Groundwater**

Provides guidance on recommended protocols for the sampling and analysis of soils and groundwater. Information is provided on the development of a sampling plan, requisites for laboratory analysis and the importance of Occupational Health and Safety and Quality Assurance protocols.

## **8.0 USE OF THE GUIDELINES**

These Guidelines are intended to be used by explorers, miners, government officers, public authority decision makers and others having an active interest in the mining industry in Queensland.

The guidelines are intended to assist in providing advice and direction on environmental matters relevant to:

- preparation and assessment of applications and environmental documentation for exploration permits, mineral development licenses and mining leases;
- carrying out and review of environmental assessments and impact studies;
- preparation, implementation, assessment and monitoring of environmental management strategies and programmes; and
- undertaking exploration, development, mining, environmental management and rehabilitation activities.

It is recommended that in the planning stage and at the commencement of each particular project activity, the proponent or assessor select and refer to all the Guidelines applicable to that particular activity.

It is important to recognise that these Guidelines are not intended to be prescriptive, definitive, or regulatory and that their use should be subject to:-

- practical experience, local knowledge and site-specific conditions,
- consultation with the DME and other relevant departments and authorities,
- reference to relevant published information, and
- findings of project-specific studies.

In summary, these Guidelines can be used to assist the development of project-specific environmental management practices.

The guidelines contain references for further reading. The DME holds a copy of each of these references. Access can be obtained by contacting the Librarian on (07) 237 1442 or (07) 237 1432 or by visiting the Library on Level 5, Queensland Minerals and Energy Centre, 61 Mary Street, Brisbane.

TABLE 1 indicates the related guidelines listed in each guideline.

**TABLE 1  
RELATED GUIDELINES**

Guideline	Related Guideline
Identification of Potential Environmental Issues	1
Initial Advice Statement	2
Land Suitability Assessment Techniques	3
Determination of Post-Mining Land Use	4
Good Relations with Landowners	5
Community Consultation	6
Air Pollution Control	7
Noise Management	8
Exploration and Mining in Watercourses	9
Identification of Suitable Mine Env Management Expertise	10
Progressive Rehabilitation	11
Assessment and Management of Acid Drainage	12
Assessment and Management of Saline/Sodic Wastes	13
Environmentally Sound Exploration Practices	14
Assessment and Management of Land Contamination	15
Assessment of Risk in Relation to Land Contamination	16
Design of Mining Waste Landfills	17
Water Supply	18
Site Water Management	19
Water Discharge Management	20
Tailings Management	21
Water Monitoring	22
Rehabilitation of Shafts, Boreholes, or Adits	23
Open Pit Rehabilitation	24
Rehabilitation of Spontaneous Combustion Areas	25
Rehabilitation of Land Subsidence Areas	26
Geotechnical Slope Stability	27
Erosion Control	28
Growth Media Management	29
Revegetation Methods	30
Assessment of Revegetation	31
Housekeeping on Rehabilitation Areas	32
Minesite Decommissioning	33
Estimation of Mine Rehabilitation Costs	34
Sampling and Analysis of Potentially Contaminated Soil and Groundwater	35

## 9.0 GLOSSARY OF TERMS

Key technical and legislative terms, and abbreviations, which are used throughout the Guidelines are defined as follows (unless the context indicates otherwise):

- "the Act" refers to the Mineral Resources Act 1989;
- "Agreed" refers to a standard, level or criterion which, if achieved, ensures that no significant environmental impact is likely to occur. Such standards, levels or criteria may be drawn from published sources or proven practice but in all cases must be to the satisfaction of the relevant Responsible Authority.
- "ANZECC" is the Australian and New Zealand Environment and Conservation Council;
- "Contaminated" refers to a condition or state which represents an actual or potential adverse health or environmental impact because of the presence of any potentially hazardous substances.
- "the DME" refers to the Department of Minerals and Energy or other Department of the Queensland Government which for the time being is administering the Act;
- "Ecologically Sustainable Development (ESD)" involves using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased;
- "Environment" includes:
  - (a) ecosystems and their constituent parts including people and communities;
  - (b) all natural and Physical resources;
  - (c) those qualities and characteristics of locations, places and areas, however large or small, which contribute to their biological diversity and integrity, intrinsic or attributed scientific value or interest, amenity, harmony, and sense of community; and
  - (d) the social, economic, aesthetic and cultural conditions which affect the matters referred to in paragraphs (a), (b) and (c) or which are affected by those matters;
- "Environmental impact", in relation to the use, development, or protection of natural and Physical resources, or in relation to the environment includes:-
  - (a) positive or adverse impact;
  - (b) temporary or irreversible impact;
  - (c) cumulative impact which may arise over time or in combination with other effects considering the scale, intensity, duration or frequency of the effect;

- (d) any potential impact of high probability;  
and
- (e) any potential impact of low probability  
which has a high potential impact;
- **"EMOS"** is the acronym for Environmental Management Overview Strategy. This is the comprehensive and strategic environmental management plan for the life of a mining project from which regular Plans of Operations are formulated to promote achievement of environmental management commitments including protecting the environment and rehabilitation of environmental disturbances to agreed standards for the purpose of lease surrender;
- **"Hazard"** refers to the capacity of a substance an activity or event to produce an adverse health, safety or environmental effect.
- **"Hazardous substance"** means a substance that because of its quantity, concentration, acute or chronic toxic effects, carcinogenicity, teratogenicity, mutagenicity, corrosiveness, flammability, explosiveness, radioactivity, or Physical, chemical or infectious characteristics, may pose a hazard to human health or the environment when improperly treated, stored, disposed of or otherwise managed.
- **"Pollution"** is the degradation or impairment of the purity of the environment by causing a condition which is hazardous to public health, safety, aesthetics or welfare, or to animals, or to plants;
- **"Protect"**, in relation to the environment, means to implement any measure that ensures that an activity, a process, or a substance will not affect the environment to such an extent that a significant adverse impact is likely to be created or made worse;
- **"Rehabilitation"** refers to the measures and actions used to repair land disturbed by mining operations and/or exploration activities;
- **"Remediation"** refers to the clean-up or mitigation of pollution or of contamination of soil by various methods;
- **"Referable dam"** under the *Water Resources Act*, means:
  - (a) works or proposed works that include or would include a barrier whether permanent or temporary that does or could or would impound, divert or control water, which barrier -
    - (i) is 10 metres or more in height and creates a reservoir storage capacity of more than 20,000 cubic metres; or
    - (ii) is more than 5 metres in height and creates a reservoir storage capacity of 50,000 cubic metres or more;

(b) works -

- (i) that consist of or include or would consist of or include a barrier whether permanent or temporary that does or could or would impound, divert or control water or hazardous waste, other than a barrier defined in paragraph (a) of this definition;
- (ii) other than a barrier whether permanent or temporary that does or could or would impound, contain, divert or control hazardous waste;

declared by the chief executive by notification published in the Gazette to be a referable dam by reason of the danger to life or property that could or would eventuate upon the collapse or failure of or the escape of hazardous waste from those works;

The term includes the storage area created by the works but does not include a tank constructed of steel or concrete or a combination of those materials;

- **"Responsible Authority"** means any State Government Department, corporation, statutory authority or local authority empowered to determine an application for the granting of approval for a development proposal or any component of that proposal (by way of general consent, licence or permit, etc.);
- **"Risk"** refers to the probability that a substance, an activity or an event will produce an adverse health, safety or environmental effect under a given set of circumstances.
- **"Significant"**, in relation to environmental impact, means a change in the existing conditions of an area or system that is measurable and of such a degree that the existing environmental capacity and/or value of such area or system cannot be sustained.

Definitions of other key terms are included in the specific guidelines to which such terms are particularly relevant.

## ***APPENDIX***

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### **List of Responsible Authority Contacts**

**DEPARTMENT OF MINERALS AND ENERGY**

<b>Head Office</b>	Queensland Minerals & Energy Centre 61 Mary Street GPO Box 194 Brisbane Qld 4001 Ph: (07) 237 1435 Fax: (07) 221 9517
<b>DISTRICT OFFICES Brisbane District Office</b>	Queensland Minerals & Energy Centre GPO Box 2564 Brisbane Qld 4001 Ph: (07) 237 1659 Fax: (07) 221 1452
<b>Charters Towers</b>	Court House Hodgkinson Street PO Box 704 Charters Towers Qld 4820 Ph: (077) 87 1514 Fax: (077) 87 3785
<b>Emerald</b>	Clerana Centre 29-31 Clermont Street PO Box 463 Emerald Qld 4720 Ph: (079) 82 4011 Fax: (079) 82 4230
<b>Georgetown</b>	Court House PO Box 28 Georgetown Qld 4871 Ph: (070) 62 1204 Fax: (070) 62 1260
<b>Mareeba</b>	159 Walsh Street PO Box 1414 Mareeba Qld 4880 Ph: (070) 92 4211 Fax: (070) 92 4224
<b>Mount Isa</b>	75 Camooweal Street PO Box 334 Mount Isa Qld 4825 Ph: (077) 446 903 Fax: (077) 437 165
<b>Quilpie</b>	Court House Buln Buln Street PO Box 29 Quilpie Qld 4480 Ph: (076) 56 1266 Fax: (076) 56 1442
<b>Rockhampton</b>	Government Building 209-214 Bolsover Street PO Box 257 Rockhampton Qld 4700 Ph: (079) 27 7741 Fax: (079) 22 5929
<b>Winton</b>	Court House PO Box 230 Winton Qld 4735 Ph: 076 57 1727 Fax: 076 57 1760

**DEPARTMENT OF ENVIRONMENT AND HERITAGE**

<b>Head Office</b>	160 Ann Street, Brisbane PO Box 155 Brisbane Albert Street Qld 4002 Ph: (07) 227 7111 Fax: (07) 227 6485
<b>DISTRICT OFFICES Southeastern</b>	Kantara House 64/70 Mary Street, Brisbane Qld 4000 Ph: (07) 224 5612 Fax: (07) 224 5411
<b>Southwestern</b>	158 Hume Street, PO Box 7054 Toowoomba Mail Centre Qld 4352 Ph: (076) 39 4254 Fax: (076) 39 4524
<b>Central Coast</b>	Yeppoon Road, PO Box 3130 Rockhampton Qld 4701 Ph: (079) 36 0511 Fax: (079) 36 2212
<b>Northern</b>	Quarantine Station, Cape Pallarenda PO Box 5391 Townsville Mail Centre Qld 4810 Ph: (077) 74 1211 Fax: (077) 21 1746
<b>Far Northern</b>	10-12 McLeod Street, PO Box 2066 Cairns Qld 4870 Ph: (070) 52 3096 Fax: (070) 52 3080
<b>Queensland Herbarium</b>	<b>Agricultural Research Laboratory</b> Meiers Road Indooroopilly Qld 4068 Ph: (07) 226 9318 Fax: (07) 371 6655
<b>Wet Tropics Management Agency</b>	Floor 5, 15 Lake Street, PO Box 2050 Cairns Qld 4870 Ph: (070) 31 6555 Fax: (070) 31 1364

**DEPARTMENT OF PRIMARY INDUSTRIES  
(Selected Offices)**

<b>Head Office</b>	80 Ann Street Brisbane Qld 4000 Ph: (07) 239 3111 Fax: (07) 234 0304
<b>SOUTH-EAST REGION</b>	
<b>Nambour</b>	4 Caroll Street Sunshine Coast Mail Centre, PO Box 5165, Nambour, 4560 Ph: (074) 706 277 Fax:(074) 412 235
<b>Brisbane District Office:</b>	80 Ann Street Brisbane Qld 4000 Ph: (07) 239 3111 Fax:(07) 234 0304
<b>Brisbane District Office (Water Resources)</b>	41 George Street GPO Box 2454, 4001 4 <sup>th</sup> Floor, Mineral House Ph: (07) 224 2111 Fax:(07) 224 2933
<b>Brisbane Office (Forest Services Group)</b>	160 Mary Street Brisbane, 4000 Ph: (07) 234 0111 Fax:(07) 221 4713
<b>Land use and fisheries</b>	Resource Assessment and Planning Unit Meiers Road, Indooroopilly, 4068 Ph: (07) 877 9515 Fax:(07) 371 8258
<b>Deception Bay (southern fisheries):</b>	13 Beach Road PO Box 76, Deception Bay 4508 Ph: (07) 203 1444 Fax:(07) 203 3517
<b>Bundaberg:</b>	Government Offices, Quay Street PO Box 1143, Bundaberg, 4670 Ph: (07) 538 111 Fax:(071) 512 320
<b>Gayndah:</b>	Court House Building, Capper Street PO Box 48, Gayndah, 4625 Ph: (071) 611 166, 611 408 Fax:(071) 611 397

<b>Gympie:</b>	Government Offices, Corner Louisa Street and Cartwright Road PO Box 395, Gympie, 4570 Ph: (074) 821 522, 821 770, 821 010 Fax:(074) 821 529
<b>Ipswich:</b>	Corner Limestone & East Streets PO Box 96, Ipswich, 4305 Ph: (07) 280 1711 Fax:(07) 812 1715
<b>Monto:</b>	Court House Building, Newton Street PO Box 76, Monto, 4630 Ph: (071) 661.633 Fax:(071) 661 839
<b>SOUTH REGION</b>	
<b>South region Directorate:</b>	203 Tor Street, Toowoomba PO Box 102, Toowoomba, 4350 Ph: (076) 314 200 Fax:(076) 333 083
<b>Dalby:</b>	Government Offices, Cunningham Street PO Box 597, Dalby, 4405 Ph: (076) 622 322, 622 818, 622 631 Fax:(076) 624 966
<b>Goondiwindi:</b>	27 Herbert Street Locked Bag 2, Goondiwindi, 4390 Ph: (076) 711 388, 711 565, 711 578, 711 479 Fax:(076) 712 782
<b>Roma:</b>	Government Offices, Corner Bowen & Spencer Streets PO Box 308, Roma, 4455 Ph: (076) 221 511 Fax:(076) 223 235
<b>Toowoomba:</b>	203 Tor Street PO Box 102, Toowoomba, 4350 Ph: (076) 314 200 Fax:(076) 347 421
<b>Warwick:</b>	Government Offices, Corner Guy & Fitzroy Streets PO Box 231, Warwick, 4370 Ph: (076) 611 733 Fax:(076) 615 329

<b>WEST REGION</b>	
<b>West region directorate:</b>	Landsborough Highway, Longreach PO Box 519, Longreach, 4730 Ph: (076) 584 400 Fax:(076) 582 461
<b>Charleville:</b>	38 King Street PO Box 23, Charleville, 4470 Ph: (076) 541 377 Fax:(076) 541 853
<b>Longreach:</b>	Landsborough Highway PO Box 519, Longreach, 4730 Ph: (076) 584 400 Fax:(076) 584 433
<b>Mount isa:</b>	Old Court House Building, Isa Street PO Box 1333, Mount Isa, 4825 Ph: (077) 446 828 Fax:(077) 439 790
<b>CENTRAL REGION</b>	
<b>Central region directorate:</b>	Capricornia Electricity Building, Corner Fitzroy and Alma Streets PO Box 1834, Rockhampton, 4700 Ph: (079) 319 016 Fax:(079) 319 007
<b>Biloela:</b>	62 Grevillea Street PO Box 81, Biloela, 4715 Ph: (079) 921 588, 921 759 Fax:(079) 823 459
<b>Emerald:</b>	Government Offices, Hospital Road PO Box 81, Emerald, 4720 Ph: (079) 828 800 Fax:(079) 823 459
<b>Gladstone:</b>	Government Building, Roseberry Street PO Box 1258, Gladstone, 4680 GladstonePh: (079) 760 729 Fax:(079) 760 781
<b>Rockhampton:</b>	Cnr Bruce Highway & Yeppoon Road PO Box 6014, Rockhampton Mail Centre, 4702 Ph: (079) 360 211 Fax:(079) 361 484

<b>NORTH REGION</b>	
<b>Cairns:</b>	3 <sup>rd</sup> Floor, Queensland Government, 36 Shields Street PO Box 652, Cairns, 4870 Ph: (070) 523 288 Fax:(070) 519 090
<b>Cairns (special fisheries):</b>	64-66 Tingira Street, Portsmith, 4870 PO Box 7453, Cairns, 4870 Ph: (070) 527 404, 527 420, 527 419 Fax:(070) 351 603
<b>Charters towers:</b>	109 Hodgkinson Street PO Box 183, Charters Towers, 4820 Ph: (077) 872 155 Fax:(077) 874 998
<b>Ingham:</b>	52 McIlwraith Street PO Box 1322, Ingham, 4850 Ph: (077) 762 354, 762 777 Fax:(077) 763 500
<b>Innisfail:</b>	Court House Building, Corner Edith & Rankin Streets PO Box 105, Innisfail, 4860 Ph: (070) 612 144, 612 093, 612 725 Fax:(070) 612 795
<b>Mackay:</b>	Government Offices, Tennyson Street PO Box 668, Mackay, 4740 Ph: (079) 518 724 Fax:(079) 514 509
<b>Mareeba:</b>	28 Peters Street PO Box 1054, Mareeba, 4880 Ph: (070) 921 555, 921 796, 921 435, 921 362, 921 232 Fax:(070) 923 593
<b>Townsville:</b>	Government Offices, 12 Wickham Street PO Box 931, Townsville, 4810 Ph: (077) 221 440, 221 441, 221 442 Fax:(077) 721 958
<b>Walkamin research station:</b>	Walkamin, 4872 Ph: (070) 933 733, 933 708 Fax:(070) 933 903

<b>DEPARTMENT OF LANDS</b>	
<b>Sunmap centre:</b>	Cnr Main and Vulture Streets Woolloongabba Qld 4102 PO Box 40 Woolloongabba Qld 4102 Published Maps - (07) 896 3333 Unpublished Maps - (07) 896 3202 - Aerial Photography - (07) 896 3322 - Remote Sensing -(07) 896 3187 Cadastral Working Plans and Maps - (07) 896 3311 -
<b>Division of titles:</b>	Anzac Square Bldg Adelaide Street GPO Box 1442 Brisbane 4000 Brisbane Qld 4000 (07) 227 6293
<b>REGIONAL CENTRES</b>	
<b>Cairns:</b>	15 Lake Street Cairns Qld 4870 PO Box 937 Ground Floor National Mutual Tower Ph: (070) 523 222 Fax: (070) 510 851
<b>Townsville:</b>	3 <sup>rd</sup> Floor State, Government Building Corner Stanley and Walker Streets PO Box 5318 Townsville Qld 4810 Ph: (077) 221 201 Fax: (077) 714 779
<b>Mackay:</b>	Corner River and Woods Streets PO Box 63 Mackay Qld 4740 Ph: (079) 518 820 Fax: (079) 574 005
<b>Rockhampton:</b>	QIDC House 34 East Street PO Box 1762 Rockhampton Qld 4700 Ph: (079) 319 815 Fax: (079) 319 800

<b>Maryborough:</b>	Floor 1 Horsburgh Place 314-318 Kent Street PO Box 212 Maryborough Qld 4650 Ph: (071) 237 729 Fax: (071) 224 007
<b>Caboolture</b>	Level 5 Caboolture Park Shopping Centre, King Street PO Box 1080 Caboolture Qld 4510 Ph: (074) 953 499 Fax: (074) 957 758
<b>Brisbane:</b>	Anzac Square State Government Building, Corner Adelaide and Edward Streets GPO Box 1401 Brisbane Qld 4000 Ph: (07) 227 6626 (Map Enquiries) Fax: (07) 227 8758
<b>Beenleigh:</b>	108 George Street PO Box 1164 Beenleigh Qld 4207 Ph: (07) 826 0020 Fax: (07) 826 0079
<b>Toowoomba:</b>	QTV Place, Corner Hume and Clopton Streets PO Box 962 Toowoomba Qld 4350 Ph: (076) 319 149 Fax: (076) 326 627
<b>Roma:</b>	31 McDowall Street PO Box 350 Roma Qld 4455 Ph: (076) 201 010, (076) 221 355 Fax: (076) 201 059

**QUEENSLAND ELECTRICITY COMMISSION  
AND ELECTRICITY BOARDS**

<b>Q.E.C.</b>	Queensland Electricity Commission G.P.O. Box 10 Brisbane Qld 4001 Map Inquiries Survey Section Ph: (07) 228 7854
<b>M.E.B.</b>	The Mackay Electricity Board PO Box 259 Mackay Qld 4740 Ph: (079) 51 2800
<b>S.E.Q.E.B.</b>	South East Queensland Electricity Board G.P.O. Box 1461 Brisbane Qld 4001 Map Inquiries Survey Branch Ph: (07) 223 4143
<b>C.E.B.</b>	The Capricornia Electricity Board P.O. Box 308 Rockhampton Qld 4700 Ph: (079) 27 6677
<b>F.N.Q.E.B.</b>	The Far North Queensland Electricity Board P.O. Box 358 Cairns Qld 4870
<b>W.B.B.E.B.</b>	The Wide Bay-Burnett Electricity Board P.O. Box 163 Maryborough Qld 4650 Ph: (071) 22 1111
<b>N.O.R.Q.E.B.</b>	The North Queensland Electricity Board PO Box 1090 Townsville Qld 4810 Ph: (077) 81 0211
<b>S.W.Q.E.B.</b>	The South West Queensland Electricity Board P.O. Box 483 Dalby Qld 4405 Ph: (074) 62 1011

**OTHER**

<b>Goprint</b>	371 Vulture Street PO Box 364 Woolloongabba Qld 4102 Ph. (07) 224 4146 Fax. (07) 896 3534
<b>Goprint bookshop</b>	135-147 George Street Brisbane Qld 4000 Ph. (07) 896 3654
<b>Australian bureau of statistics</b>	13 <sup>th</sup> Floor 313 Adelaide Street GPO Box 9817 Brisbane Qld 4001 (07) 222 6351 - Inquiries (07) 222 6350 - Bookshop Fax. (07) 229 6042