Drayton Management System Standard

Water Management Plan

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Revisions

Issue	Issue Date	Originator	Reviewed	Approved
1	February 2003	P Simpson	P Forbes	T Hulme
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3	June 2008	P Simpson	P Forbes	M Heaton
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Document Information

1 PURPOSE AND PROJECT DESCRIPTION

Anglo Coal Drayton Mine was granted project approval by the NSW Department of Planning on 1st February 2008 to further extend current mining operations until 2017, incorporating increased production and additional infrastructure.

The purpose of this procedure is to provide a framework for water management at Anglo Coal Drayton Mine. This procedure also combines five management plans with regard to the development consent conditions as outlined by the Department of Planning NSW (Project Approval 06-0202) and Modification #1 (October 2009), those being Site Water Balance, Erosion and Sediment Control, Surface Water Monitoring, Groundwater Monitoring and Surface and Ground Water Response Plan.

2 SCOPE

This procedure includes information relating to:

- Regulatory requirements
- Site Water Balance
    - Water sources and security
    - Water use
    - Water management
    - Off site water transfers
- Erosion and Sediment Control
    - Soil erosion
    - Remediation measures
    - Sediment control structures
    - Reporting
- Surface water monitoring
    - Baseline data
    - Surface water impact assessment criteria
    - Surface water monitoring program
    - Reporting
- Ground water monitoring
    - Baseline data
    - Groundwater assessment criteria
    - Groundwater monitoring program
    - Reporting
- Surface and Groundwater Response Plan
    - Exceedance Protocols
    - Mitigation measures

This management plan also addressed the requirements of the Drayton Rail Loop and Antiene Rail Spur (DA 106-04-00) Issued on 2nd November 2000.

3 DEFINITIONS

AEMR
Annual Environment Management Report

ACDWMP
Anglo Coal Drayton Water Management Plan

Clean Water
Any flow of water that has not originated or passed over a disturbed area.

Contaminated Water / Mine Water
Any flow of water that has originated or passed over a disturbed area.

DII
Department of Industry and Investment

DSC
NSW Dams Safety Committee

NOW
NSW Office of Water

Effluent
Discharged liquid from the sewage treatment plant.

Prescribed Dam
A dam is prescribed on the recommendation of the Dam Safety Committee, and is usually based on the size and hazard rating of the dam.

S&SD
Safety and Sustainable Development

TES
Technical Services

Waste Water
This is water that has passed through the workshop. It is collected in the Oil Pollution Control Dam.

4 STATUTORY REQUIREMENTS

Condition	Details	Reference
S3.27	*The Proponent shall only discharge water from the site in accordance with the provisions of an EPL or the 'Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002.'*	*5.6.2*
S3.28	*The Proponent shall prepare and implement a Site Water Management Plan for the project to the satisfaction of the Director General. This plan must:* *a) be prepared in consultation with the DECCW and NOW by suitably qualified expert/s whose appointment/s have been approved by the Director-General:* *b) be submitted to the Director-General for approval within 6 months of this approval; and* *c) include:* • *a Site Water Balance;* • *an Erosion and Sediment Control Plan;* • *a Surface Water Monitoring Program;* • *a Ground Water Monitoring Program; and* • *a Surface and Ground Water Response Plan.*	*This document*
S3.29	*The Site Water Balance must:* *a) include details of;* • *sources and security of water supply;* • *water use on site;* • *water management on site;* • *off-site water transfers; and* *b) investigate and describe measures to minimise water use by the project.*	*5.6.2*
S3.30	*The Erosion and Sediment Control Plan must:* *a) be consistent with the requirements of the 'Managing Urban Stormwater: Soils and Construction Manual' (Landcom 2004, or its latest version);* *b) identify activities that could cause soil erosion and generate sediment;* *c) describe measures to minimise soil erosion and the potential for the transport of sediment to downstream waters;* *d) describe the location, function, and capacity of erosion and sediment control structures over time.*	*5.6.3*
S3.31	*The Surface Water Management and Monitoring Plan must include:* *a) detailed baseline data on surface water flows and quality in creeks and other waterbodies that could be affected by the project;* *b) surface water impact assessment criteria;* *c) a program to monitor the impact of the project on surface water flows and quality and downstream water users; and* *d) reporting procedures for the results of this monitoring.*	*5.6.4*
S3.32	*The Groundwater Monitoring Plan must include:* *a) detailed baseline data of groundwater levels, yield and quality in the region (including privately owned groundwater bores within the predicted drawdown impact zone identified in the EA);* *b) a program to augment the baseline data over the life of the project* *c) groundwater assessment criteria, including trigger levels for investigating any potentially adverse groundwater impacts;* *d) a program to monitor:* • *regional groundwater levels and quality in the surrounding aquifers;* • *impacts on the groundwater supply of potentially affected landowners;* • *the volume of ground water seeping into the open cut mine workings;* • *the groundwater pressure response on the surrounding coal measures;* • *the seepage/leachate from the tailings dams, water storages or backfilled voids on site;* *e) procedures for the verification of the groundwater model; and* *f) reporting procedures of the results of the monitoring program and model verification.*	*5.6.5*
S3.33	*The Surface and Ground Water Response Plan must include:* *a) a protocol of the investigation, notification and mitigation of any exceedances of the surface water and groundwater impact assessment criteria;* *b) measures to mitigate and/or compensate potentially affected landowners with privately owned groundwater bores within the predicted drawdown impact zone identified in the EA, including provision of alternative supply of water to the affected landowner that is equivalent to the loss attributed to the project;* *c) the procedures that would be followed if any unforeseen impacts are detected during the project.*	*5.6.6*

5 PROCEDURAL REQUIREMENT

5.1 Responsibilities

Environment Coordinator

Coordinate monitoring and reporting as required by approval and licence conditions. The Environment Coordinator shall analyse all data, in conjunction with relevant authorities where appropriate, and report all data as required to do so.

S&SD Manager
Coordinate all responsibilities outlined in this plan are undertaken as described.

Mining Superintendent
Coordinates the activities of the Drayton pump crew

Mine Manager
Coordinate water management across Drayton mining area adheres to this procedure and that no off-site discharges occur. Also supervise investigations related to water management that are undertaken and actions arising from these investigations are completed.

CHP Superintendent
Shall coordinate water management regarding the coal handling plant and coal treatment unit. The CHP Superintendent shall review tailings and water management and shall direct coal plant operators in the management of water and tailings to the sedimentation ponds and throughout the coal handling plant.

5.2 Audit/Review Schedule

This procedure shall be subject to a review every three years and in consultation with the relevant government agencies. The S&SD Manager shall be responsible for such reviews.

This procedure has been prepared in consultation with Parsons Brinkerhoff (see Appendix 3), the DECCW and NOW. All correspondence received from the authorities shall be maintained and stored by the Environment Coordinator.

5.3 Records Management

All records of monitoring details must be kept on file in the S&SD department for the life of the mine. All analysis data must be entered into the Environmental Database. This is the responsibility of the Environmental Coordinator.

5.4 Revision Status

February 2003
Changes in this revision include:

- Changes to wording to update the procedure with current operating conditions as per new DA conditions.

Comments were requested from Manager Coal and Parting, Senior Mining Engineer/Long-Term Planning and S&SD Manager. Consultation was also sought from the DLWC and Muswellbrook Shire Council.

November 2005
Changes in this revision include:

- Updating into Anglo Coal Australia procedure format
- Reorganisation of procedure
- Updating responsibilities of key personnel

This management plan was forwarded to Muswellbrook Shire Council, Department of Lands and the Department of Primary Industries -Minerals (now DII) on 19th September 2005 for review.

The Department of Primary Industries - (Minerals) advised the modifications made to this procedure were acceptable and that the DPI had no additional comments (letter dated 29 September 2005). No comments were received from the other parties consulted.

June 2008
This procedure has been updated as a requirement of project approval as issued by the Department of Planning NSW. Changes in this review include:

- Integration of separate Management Plans:
    - Site Water Balance
    - Erosion and Sediment Control
    - Surface Water Monitoring
    - Groundwater Monitoring
    - Surface and Groundwater Response Plan

This procedure has been prepared in consultation with the DECCW and NOW. All correspondence received from the authorities shall be maintained and stored by the Environment Coordinator. This version was not formerly approved and during the review period, Drayton applied for a modification.

November 2009
As a result of the approval of a modification to the existing consent, this procedure was updated and submitted in accordance with the conditions within the Environmental Assessment (2007), Development Consent issued February 2008 and MOD 1 issued in October 2009.

5.5 References and Relationship With Other Environmental Documentation

- Protection of the Environment Operations Act, 1997 (Section 120)
- Dams Safety Committee
- Hunter River Salinity Trading Scheme Regulations
- Water Act 1912
- Project Approval - Department of Planning NSW (PA 06_0202)
- Coal Mines Health & Safety Act 2002
- (Draft) NOW Water Reporting Requirements for Mines - NOW
- (Draft) Groundwater Monitoring Guidelines for Mine Sites within the Hunter Region - NOW

Drayton is currently being issued with Water Access Licences by the NSW Office of Water.

5.6 Legislative Requirements and Regulations

The conditions that relate to water management at Drayton are described briefly below.

No contaminated water can be discharged off-site under any circumstances; consequently, it must be stored or used on site. The licence conditions state that the licensee also must not pollute waters.

It is also a licence requirement to keep rainfall records and other meteorological records. Records relating to monitoring required by the DECCW must be maintained in a legible form for a minimum of three years after the event that was monitored. Records shall be maintained within the S&SD database system.

Dams Safety Committee
The Dams Safety Committee (DSC) has statutory functions under the Dams Safety Act 1978 and the Coal Mines Health & Safety Act 2002. Its main objective is to ensure that all 'prescribed dams' in NSW are maintained in such a condition so as to not pose an unacceptable danger to downstream residents and property, or to adversely affect public welfare and environment. The

DSC hazard ratings relate to the potential loss of human life or direct property damage downstream of a dam in the event of catastrophic failure or misoperation of the dam or its facilities.

Under the NSW Dams Safety Act 1978, the DSC requires owners of all prescribed dams in NSW to organise the preparation and submission to the Committee of surveillance reports in respect of their dams (Section 5.6.6 ACDWMP). These must be undertaken at specific intervals not exceeding five years. The Committee's requirements for these surveillance reports vary according to the height and hazard rating of a dam. Although the committee requires these reports at regular intervals, it has been emphasised that regular inspections of the dam should be made at frequent intervals and at times of unusual events (e.g. flooding, earthquakes).

Drayton has two structures listed under the Dams Safety Committee: the Access Road Dam (Dam 2081) and the Liddell Ash Dam Levee.

Hunter River Salinity Trading Scheme
The Hunter Salinity Trading Scheme is a scheme overseen by the DECCW (EPA). It was originally designed to help control the discharge of saline water into the Hunter River by limiting discharges with respect to volume and time. Drayton was has an allocation of 15 credits in the scheme. Credits can be traded, utilised or transferred when opportunities to discharge occur. This is primarily in times of peak flow in the Hunter River system. Since Drayton cannot directly discharge water off site, Drayton has transferred its credits for a block period to other recipients.

The scheme is administered by the DECCW (EPA) through electronic web based entry.

NSW Office of Water (NOW)
The NSW Office of Water administers the licensing of dams and bores. Drayton will be progressing updating of water licences to water access licences as part of project approval conditions.

Current Licences and Approvals
Drayton currently holds water licences (20BL111869 and 20BL122620), which relates to the extraction of groundwater through bores. Drayton is currently applying for a water access licence. Details pertaining to this licence will be included in the first revision of this plan. Drayton applied for water access licences in 2008, however these are still to be received from the NSW Office of Water.

5.6.1 Site Water Balance

Drayton's water management system is based on a closed system, as Drayton does not possess a discharge licence. All mine water is stored on site in established dams and voids and is utilised by the mining operation primarily for coal processing and dust suppression purposes.

The surface water impact assessment undertaken for the Drayton Environmental Assessment (Hansen Bailey 2007) included a review of the mine water management system and predicted the water balances for potential wet dry and average rainfall events in Year 5 (or 2012) and Year 10 (2017) of the operation.

The water balance is revised annually and is presented as part of the Annual Environmental Management Report (AEMR).

A summary of the water balance predictions from the Drayton Environmental Assessment is presented in Table 1 below.

Table 1: Predicted Site Water Balance

Water Balance	Annual Water Volume (ML)					
	Year 5			Year 10		
	Dry	Average	Wet	Dry	Average	Wet
Water Supply Sources						
Pit water						
Surface Water Run-off	515	780	1000	410	620	795
Groundwater Inflow	815	815	815	980	980	980
Industrial Area Run-off	90	140	175	85	125	160
Rehabilitated Area Run-off	80	120	155	95	145	185
Dam Catchments	145	215	285	135	205	265
Sub-Total	1640	2065	2425	1705	2075	2385
Water Demands						
Dust Suppression						
Haul Roads Coal Stockpiles	600 50	600 50	600 50	300 25	300 25	300 25
Industrial Use	400	400	400	200	200	200
Coal Handling Plant	600	600	600	130	130	130
Evaporation Losses	370	330	280	370	325	275
Sub-Total	2020	1980	1930	1025	980	930
SURPLUS (DEFICIT)	**(380)**	**85**	**495**	**680**	**1095**	**1455**

The above predictions for wet, dry and average rainfall years have been made utilising significant available historical rainfall and evaporation data from the Jerrys Plains (1884 to 2005) and Scone Soil Conservation (1965 to 2005) Bureau of Meteorology stations, respectively. The Dry year water balance has been conservatively assessed using the 10th percentile rainfall and 90th percentile evaporation. Further, the Wet year water balance has been assessed conservatively using the 90th percentile rainfall and 10th percentile evaporation.

The various water supplies and demands have been calculated based on assumptions based on more than twenty years of operational experience as described in the following sections.

As shown in Table 1, in Year 5 with a Dry Year rainfall and evaporation, the water balance would be in a deficit of approximately 380 ML. Given the extensive quantity of on site storage capacity and that under average rainfall conditions, a surplus of 85 ML is predicted to be experienced, it is highly probably that this deficit would be able to be sourced from on site storages.

5.6.1.1 Sources and Security of Water Supply

Drayton, unlike many other mines in the Upper Hunter, sources all of it's water internally from within the existing mining operational area, rather than direct extraction from the Hunter River. Drayton historically has an excess of water availability and this is predicted to continue throughout the future mining operations. This was apparent throughout the excessively dry period between 2003 to 2007 when other coal mines in the region were experiencing the effects which resulted in reduction in production levels.

The main sources of mine water for the mine water management system are as follows:

- Open cut pit water (including surface run-off and groundwater inflow) from open cut areas;

- Run-off from areas disturbed by mining (including overburden emplacement areas and rehabilitation); and
- Surface water run-off from industrial areas.

Water from these sources either reports directly to the main mine water storage dams or is pumped to these dams from minor storages or in pit sumps.

Groundwater is expected to be a dominant water supply to the site water balance. The groundwater impact assessment undertaken for inclusion in the Drayton Environmental Assessment predicted rates of groundwater inflows ranging from 2.2 ML/day in Year 5 to 2.7 ML/day in Year 10.

Potable water is sourced directly from Muswellbrook.

Any surplus mine water is stored in existing voids and established dams on site for use in the water management system.

5.6.1.2 Water Use on Site

Primary water use on site comprises of dust suppression requirements for haul roads, coal handling plant, transfer points and stockpiles. In addition mine water is also used in washdown and Drayton's coal treatment plant.

The predicted annual water uses as presented in Table 1 have been based on assumptions derived from over 20 years of operational experience.

Site water demands are as follows:

- Dust Suppression on haul roads and stockpiles;
- Industrial use such as workshops and truck washdown facilities;
- Coal handling and processing;
- Natural losses due to evaporation; and
- Losses to seepage into overburden and coal seams.

Historically, Drayton's water balance has remained in surplus. Throughout drought periods, water storage levels have previously dropped, however, adequate water storage supplies still remained sufficient for normal mining operations to occur without adverse impacts on operations.

5.6.1.3 Water Management System

Figure 1 the general locations of major water storages on site. Figure 2 shows a schematic of Drayton's mine water management system and the various connection and flow paths between the water storages. As shown in this schematic, Drayton does not have an external raw water supply for industrial purposes.

Surface water is currently managed using a series of mine water dams for water storage. There are no clean water catchments located on site and as such, no clean water storages are required. Some dams are interconnected to allow for water transfers across the mining operation.

A summary of the main water storage dams and their capacities, supply sources and uses are provided in the Table 2.

Table 2
Existing Mine Water Storage Dams

Reference No.	Dam Names	Storage Capacity (ML)	Supply Source	Water Use

Reference No.	Dam Names	Storage Capacity (ML)	Supply Source	Water Use
1969	Industrial Dam	750 ML	Runoff from rehabilitated area, industrial areas and East Pit	Haul road dust suppression, industrial wash down water and supply to Dam 2081
2081	Access Road Dam	750ML	Runoff from undisturbed and rehabilitated land and pumping in from Industrial Dam	Industrial areas, CHP and fire system
2114	Rail Loop Dam	18ML	Runoff from CHP, coal stockpile area and fine rejects settling ponds, and direct pumping from Access Road Dam	Transfer to MAC or Industrial Dam
1609	Savoy Dam	140ML	Runoff from undisturbed and rehabilitated land, SW Void transfer point	Mine water storage or transfer to tanker fill stations
SW13 Void	West Pit Void	1000ML (est)	This storage is a key buffer storage for wet weather a source of water in dry weather and contains a large volume of water which is otherwise unaccounted for in the system	Key storage for Drayton and Mt Arthur Coal. This location will be available for both Drayton and Mt Arthur Coal to extract water from during the life of the mine.
TOTAL		2658ML		


2221
RAIL LOOP DAM
CHPP
ACCESS ROAD DAM
OFFICES
INDUSTRIAL DAM
MOUNT ARTHUR COAL
FAR EAST TIP DAM
DRAYTON
LIDDELL ASH DAM
SAVOY DAM
N
ANGLO COAL
ANGLO COAL AUSTRALIA
DRAYTON
Figure 1
Water Storage Sites
Prepared By:
Date:
WOP:
Figure
1

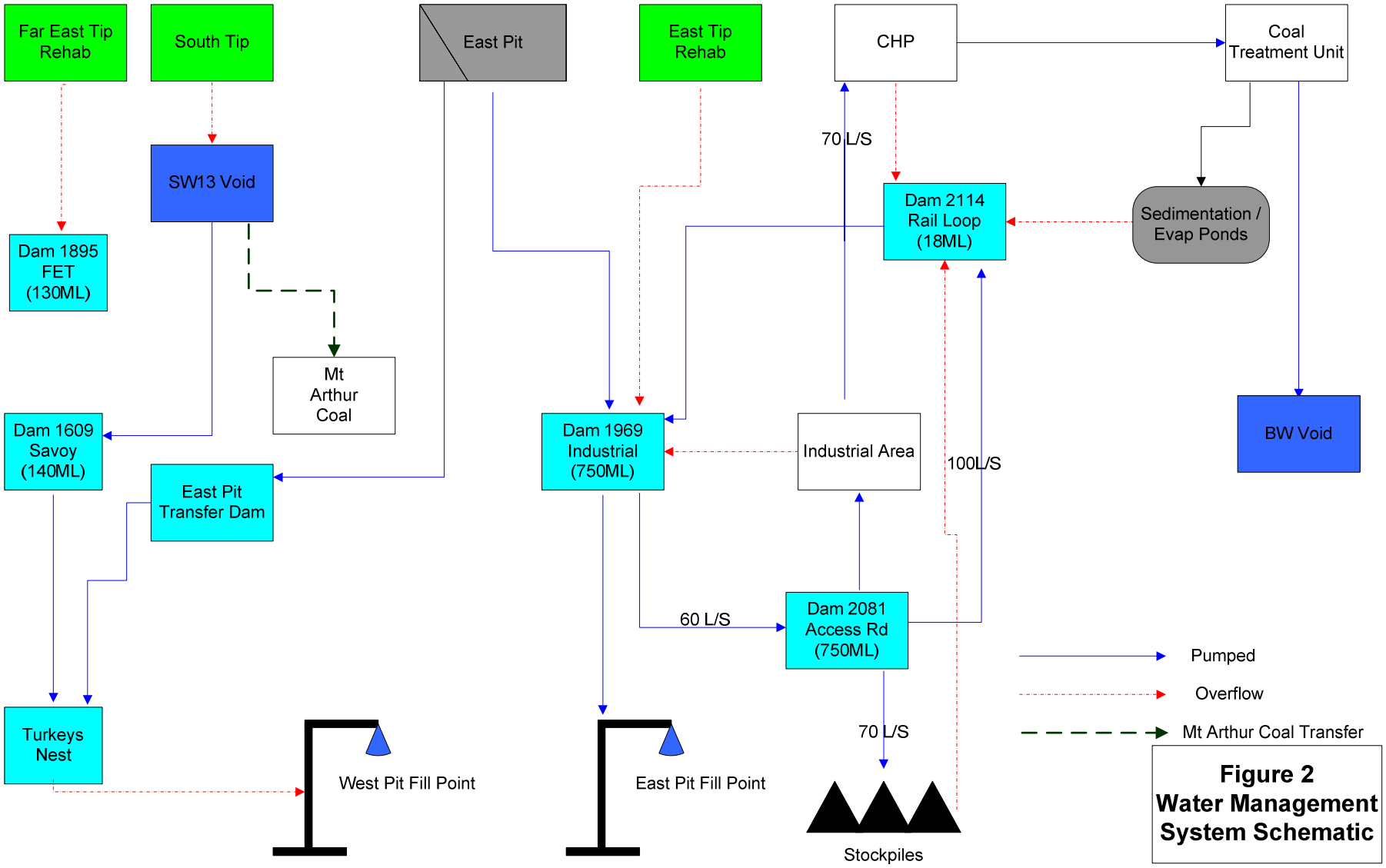


Figure 2
Water Management System Schematic

Each of these mine water dams does not capture significant quantities of rainfall runoff as they have minimal catchment areas to sustain. A majority of the surface water runoff around the site is captured within the existing open cut pit which is then pumped back into the mine water management system for reuse or storage for later use. With more than twenty years of operation during wet and dry years, Drayton has not experienced any failures to water storages and as such these storages are considered sufficient for ongoing operations.

Figure 3, 4, 5 and 6 illustrates dam volumes recorded for each of the water storages since 1998. As shown, the water levels have fluctuated significantly. However they have always remained within their capacity. Of note is the Rail Loop Dam which has an automated sensor installed which activates a pump to transfer water back to the industrial dam once the water level in the dam reaches 80% capacity.

Figure 3: Dam 2114 - Historical Storage Levels

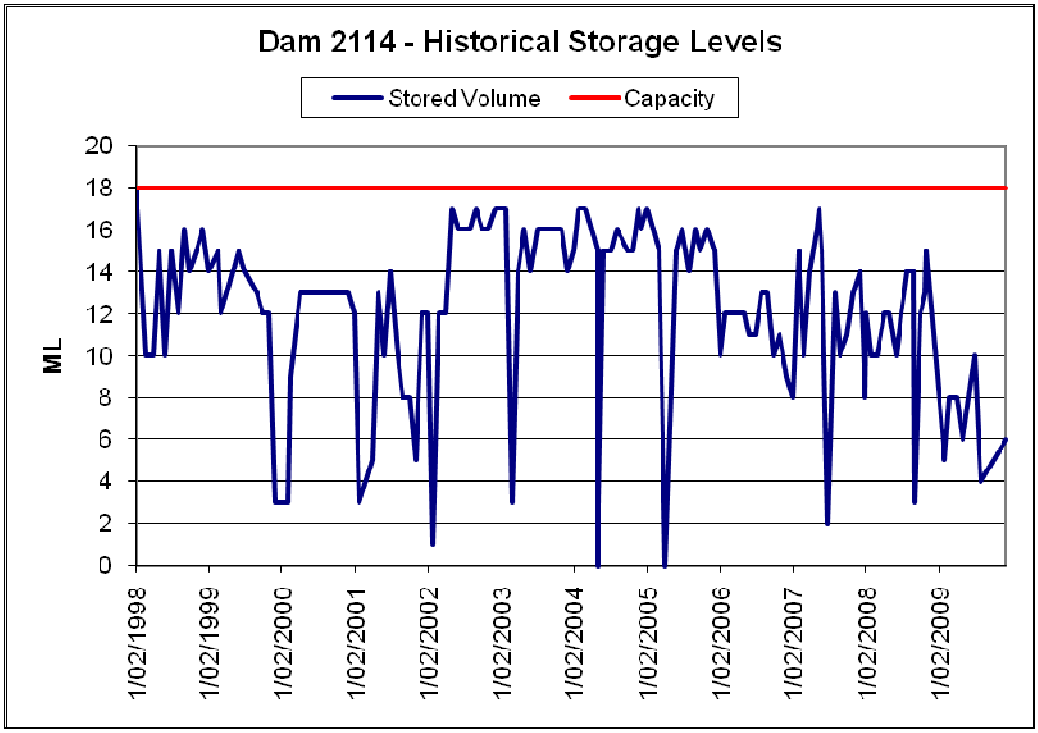


Figure 4: Dam 2081 - Historical Storage Levels

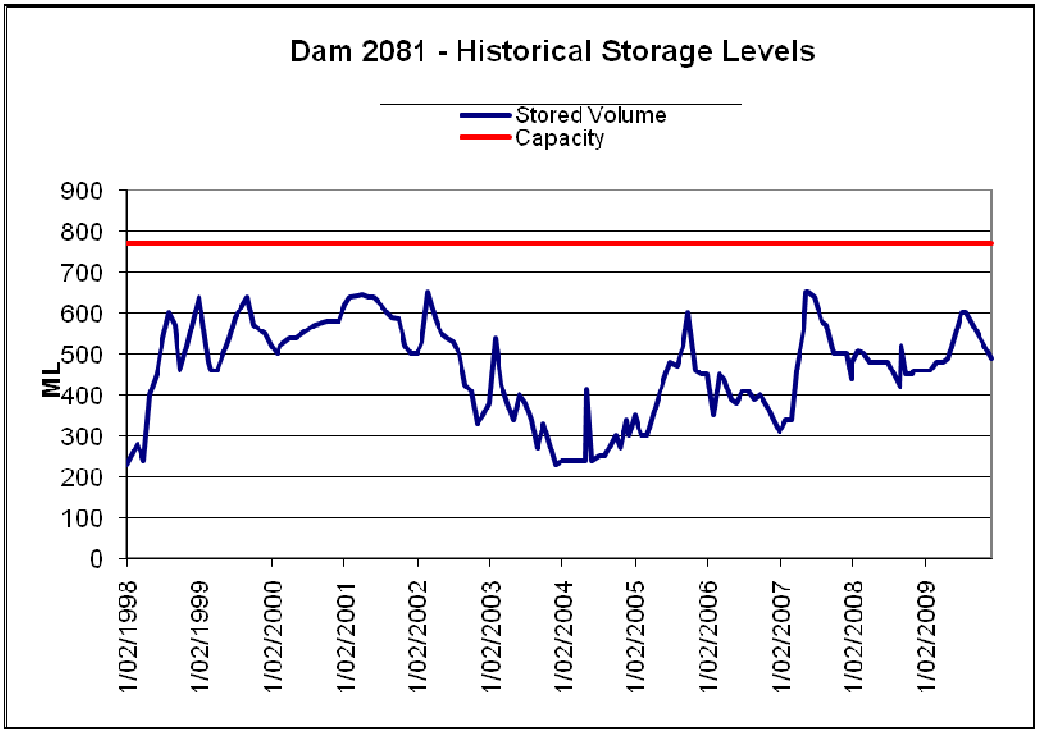


Figure 5: Dam 1609 - Historical Storage Levels

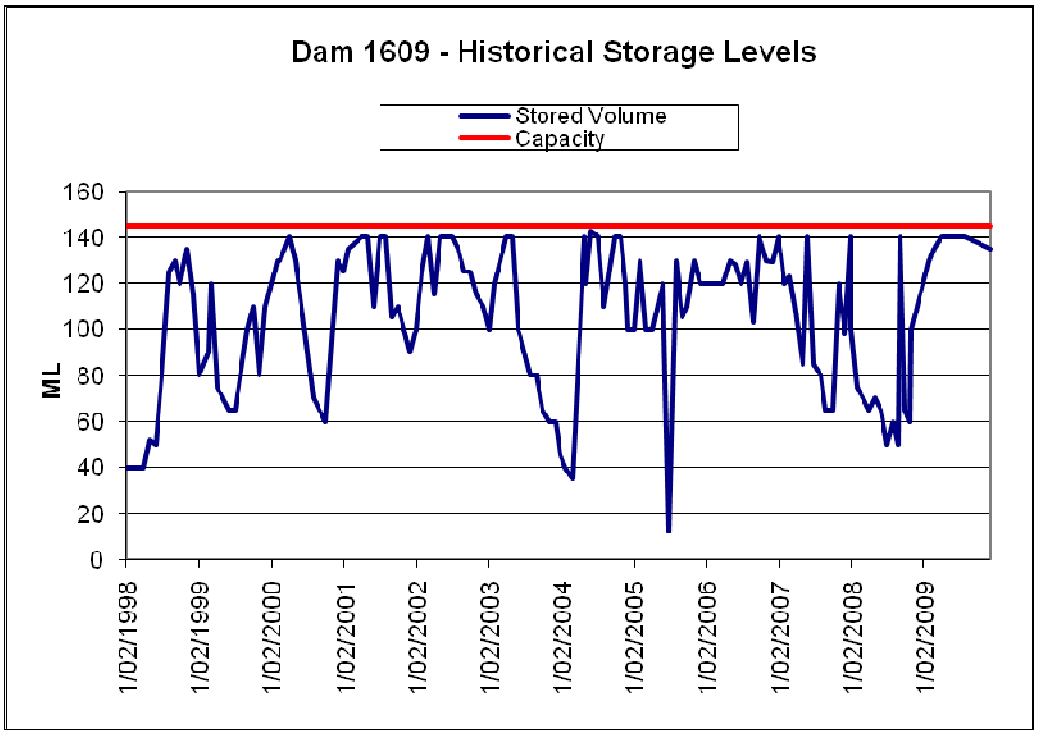
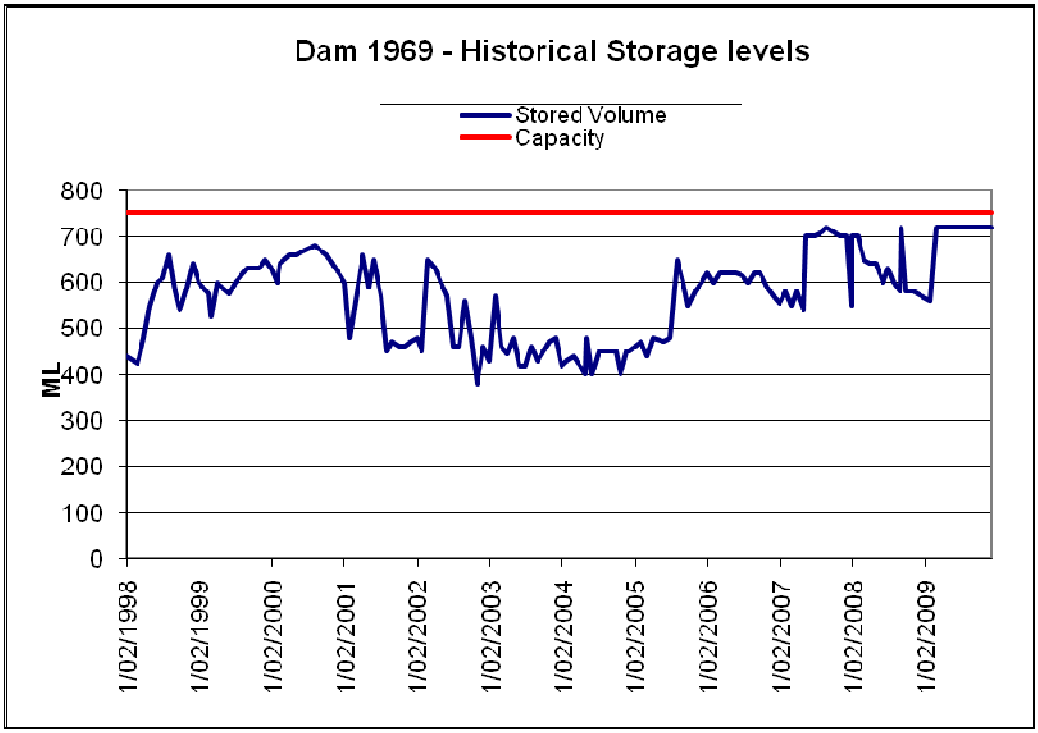


Figure 6: Dam 1969 - Historical Storage Levels



One dam at Drayton is listed with the NSW Dam Safety Committee under the provisions of the Dams Safety Act 1978, that being 2081 (Access Road Dam). As required by the listing of this dam with the Dam Safety Committee, an annual surveillance report is undertaken and submitted. In addition to this report, detail on the status of this dam and a summary of the surveillance report is included in Drayton's AEMR.

The Drayton West Pit void which has become available since the cessation of mining in this area in 2007 is available for the storage of considerable amounts of excess water generated on site. This void has an existing pumping station installed to allow for the transfer of mine water back to current mining operations for industrial uses via Savoy Dam to a tanker fill station.

Drayton also operates a small coal treatment plant. This facility enables Drayton to wash additional coal that may otherwise remain in pit or spoils. Waste water and fine rejects is pumped from the coal treatment unit to a series of small sedimentation ponds located adjacent to the current coal stockpile area, allowed to settle and dry through evaporation. Following evaporation, the reject material being transferred via trucks back to overburden spoil emplacement areas. Any overflow from these ponds reports to the Rail Loop Dam which is connected to the Industrial Dam for reuse in the site water management system.

Any potentially contaminated rainfall runoff from the Industrial area is diverted to the Oil Pollution Control Dam which is located immediately upstream of the Industrial Dam.
The Oil Pollution Control Dam has an oil/water separator in place which removes any possible oil residue from the water runoff prior to it being fed into the Industrial Dam.

Potable water for domestic use is supplied by pipeline from Muswellbrook Shire Council (MSC). This water is used for drinking, showering and toilets within the personnel facilities within the mining operation areas.

Drayton also operates an on site waste water treatment plant, which treats effluent on site and recycles the water back to a small area on rehabilitation on Drayton's East Tip area. The reuse of this effluent is approved under Drayton's Environmental Protection Licence No. 1323.

5.6.1.4 Off-site Water Transfers

Drayton does not have a licence to discharge mine water off site under the POEO Act (1997) from the DECCW, however credits are retained under the Hunter River Salinity Trading Scheme (HRSTS) for water trading purposes. However Drayton does have a water sharing arrangement with Mt Arthur Coal (MAC) to transfer up to 600ML of excess mine water to the neighbouring MAC mine. This water is transferred via pipeline from Drayton to Mt Arthur Coal.

Recorded volumes of transfers are contained in Drayton's AEMR.

5.6.1.5 Minimisation of Water Use

Drayton's mine water management system has historically resulted in a surplus of water available to the mine. Since Drayton does not obtain any additional mine water from external sources, minimisation of mine water is not considered to be an effective management of on site water. Drayton has sustained it's current water management system throughout the life of Drayton, extending in excess of twenty years.

Water utilisation within the coal preparation plant is dependent upon washing requirements, however current washing is approximately 50% of ROM coal production. Water usage is minimised through the presence of thickeners and a medium density cyclone configuration.

However, Drayton does source it's potable water from the Muswellbrook Town water supply. Potable water is transferred via underground pipes to the site. Potable water is utilised as human consumption and bathing water. Potable water is monitored on a monthly basis, and is minimised where possible through conscious monitoring and maintenance activities.

5.6.2 Erosion and Sediment Control

Erosion and sediment control structures at Drayton have been designed to be consistent with the objectives and targets as outlined in *Managing Urban Stormwater: Soils and Construction Manual (Landcom 2004 or previous versions)*. Historically erosion and sediment control structures have been designed and constructed by the NSW Department of Lands on areas of rehabilitation. These structures are reviewed annually by the Department of Industry and Investment (DII) from details supplied in Drayton's AEMR. Further, the DII completes annual inspections of the operation to confirm any issues that need to be addressed.

Various aspects will now be detailed regarding the ongoing identification and management of erosion and sediment control structures.

5.6.2.1 Impacts from Mining Operations

It is easily recognised that mining operations have major impacts on landforms. Substantial land disturbances have occurred at Drayton, since mining operations commenced over twenty years ago.

Mining activities if not managed successfully can impact on landforms and create serious erosion issues. Such activities include loss of vegetation through clearing of topsoil, stockpiling of topsoil, construction of infrastructure and roads and construction of overburden spoil dumps, rehabilitation works, coal stockpiling, rejects disposal and coal loading activities.

If not managed successfully, these activities can lead to increased surface erosion from disturbed lands from the removal of vegetation cover and the stripping of topsoil, increased sediment load entering dams and water supply bodies and increased siltation in creeks and dams.

5.6.2.2 Sediment Control Measures

Since Drayton is an existing operation, sediment control measures have already been extensively installed throughout the mining operation areas. Drayton has effectively managed it's sedimentation control structures by undertaking regular inspections and maintenance activities where needed.

Control measures at Drayton begin with topsoil stripping by limiting the extent of disturbance ahead of mining operations. Surface runoff is collected in established dams downstream of disturbed areas. These structures have been designed and constructed to hold rainfall runoff from a 1 hour 1 in 10 Average Recurrence Interval rainfall event in accordance to the requirements of Landcom (2004).

With regard to rehabilitation areas, control measures are implemented to improve stability and prevent surface erosion from occurring. These consist of graded banks (typically 1-1.5% slope, 3-5m basal width, 1-1.5m height) on rehabilitated areas with level spreaders (typically 5m wide). During the construction phase of rehabilitation, sediment control and water management structures are designed by the Department of Lands in accordance with Landcom (2004).

The DII undertake an annual inspection of rehabilitation and disturbed areas to identify issues that need to be addressed.
This entails inspections, interviews with key personnel and reviewing of documentation against pre defined mining operation plans of rehabilitation and mine progression status, including the effectiveness and status of water and sediment management structures. The issues raised during this inspection and the actions taken are reported in the AEMR.

Sediment traps have also been installed in runoff zones of industrial areas, catch drains have been installed to prevent sediment from entering waterways and sedimentation ponds from the coal treatment unit. Controls have also been implemented to direct storm water runoff from industrial areas into one of two dams located near the main industrial area.

Although mining operations have ceased in the west pit area, rehabilitation works are ongoing in this area. All runoff from the west pit enters a mine void in the west pit and does not discharge off site. This void has an estimated capacity of around 3000ML and is currently storing around 1800ML. This void is utilised by both Drayton and Mt Arthur Coal, each having an allocation of the water storage in the void. Drayton have access to 1000ML storage/utilisation and Mt Arthur Coal have 2000ML storage/utilisation.

To the east of the mining operation, lies the Liddell Ash Dam. The Liddell Ash Dam levee, a structure lying between the current mining operation and the Liddell Ash Dam, prevents water and fly ash ingression from the Liddell Ash Dam into the mining operation. This Levee under routing surveillance under the NSW Dams Safety Committee and is not influenced by sediment from the mining operation side of the levee.

To the north of the mining operation and coal handling plant lies the Rail Loop Dam, which collects surface runoff from the CHP area. This dam is designed as a cellular unit, which traps excess sediment load in the upper reaches of the dam. Sediment is regularly removed from the dam and returned to in-pit areas for co-disposal. The sediment free water is recycled back into the mine water management system for use through the mining operation. This dam is also equipped with a permanent pumping station which has a sensor to monitor water levels and activates a pump should water levels reach a certain level.

Drayton does not possess a licence to discharge water off site, so sediment is not dislodged from mining areas to subsequently enter streams leading off site.

5.6.2.3 Sediment Control Structures

Sediment control structures as stated in Section 5.6.3.2 have been designed originally by the relevant standard applicable at the time of construction (Landcom 2004 now) and are designed to

ensure effective management of surface waters. All diversion banks on rehabilitated land are designed and constructed by the NSW Department of Lands (previously referred to as Soil Conservation Service et al).
These are designed at 1% - 1.5% grade with level spills and are spaced to minimise down slope flows. The function of these structures is to divert water through rehabilitated lands at a rate that does not create erosion or damage and to deliver it to established dams or water holding bodies located in strategic locations near rehabilitated areas.

Location of main storage dams is shown on Figure 1 and details of capacities are given in Table 2. The function of these dams is to support a network of water storages that can be utilised internally for water transfers or direct to pumping stations for dust suppression purposes within the mining operations.

These dams are monitored on a monthly basis for storage volumes and water quality purposes (see Section 5.6.3 for detail). Pumping records are also collected across the site water management system to identify water transfer. Data relating to water quality, both physical and chemical, water storages and pumping volumes are also summarised and reported in the AEMR.

Operational experience for more than twenty years of operation at Drayton has shown that the current site water management system is fully adequate for Drayton. The various erosion and sediment control structures have been of sufficient capacity to capture rainfall runoff following extreme rainfall events to date.

During July 2007, the Hunter Valley region experienced a rainfall event which has been described as an event greater than a 1 in 100 year rainfall event. Drayton's weather station recorded 163 millilitres of rainfall in approximately 10 hours. The current water storages were shown to have sufficient capacity to hold rainfall runoff from this event with none of the dams exceeding their capacity.

5.6.2.4 Maintenance of Sediment Control Structures

Maintenance and inspections of diversion banks, dams and voids are integral to water management on site.

Dams and voids are visually inspected on a monthly basis as part of normal environmental monitoring processes. If issues are detected, action plans are implemented to rectify or manage the issue. Some dams, those listed with the DSC have a more frequent inspection regime as required by the DSC.

Rehabilitated areas are visually inspected regularly for damage or maintenance purposes. For example, if a significant rainfall event should occur, rehabilitation areas are inspected to determine that no damage has been sustained by diversion banks. If damage is discovered, a management plan is implemented to repair the damage as soon as practical after the event. Any remediation work undertaken is detailed in the AEMR and the annual rehabilitation report.

Major dams are inspected monthly for sediment content during water quality monitoring. One dam however, the rail loop dam, which collects sediment from the CHPP area, is desilted on a regular basis. This is coordinated by the Coal Handling and Preparation Superintendent as required.

5.6.3 Surface Water Monitoring

Drayton has an established surface water monitoring plan, which has been in place for the life of the mine (1982 to current) and addresses surface water management and monitoring. As part of this plan, monthly surface water monitoring is undertaken at dams located along the creeks on site or in creeks themselves when sufficient water is available. Long term monitoring data is also available for current main storages since their construction, with data being available for some structures in excess of twenty years.

Since Drayton does not possess a discharge licence, surface water flows off site do not and have not occurred to date. Drayton has a water sharing agreement with Mt Arthur Coal, whereby both operations have access to pumping from the Drayton West Pit Void, for use on their operations. This reduces Mt Arthur Coal's reliance on additional mine water being sourced from the Hunter River.

5.6.3.1 Baseline Data

Since Drayton is an existing mining operation, true baseline data is unavailable for pre disturbance periods. As such, the following sites have been selected to represent the three major catchments and the structures located on each.

Naturally, saline conditions exist in these reaches of the Hunter Valley and these are reflected here. Whilst other sites are also monitored on a monthly basis, these three sites are located on the existing creeks that leave the site.

Baseline data is summarised in Table 3 for the three main catchments at Drayton. This summarises the categories listed and Table 3 reflects the average of each parameter over the periods listed. Electrical conductivity and pH levels have been displayed in Figures 7, 8 and 9 to demonstrate historical performances of each site.

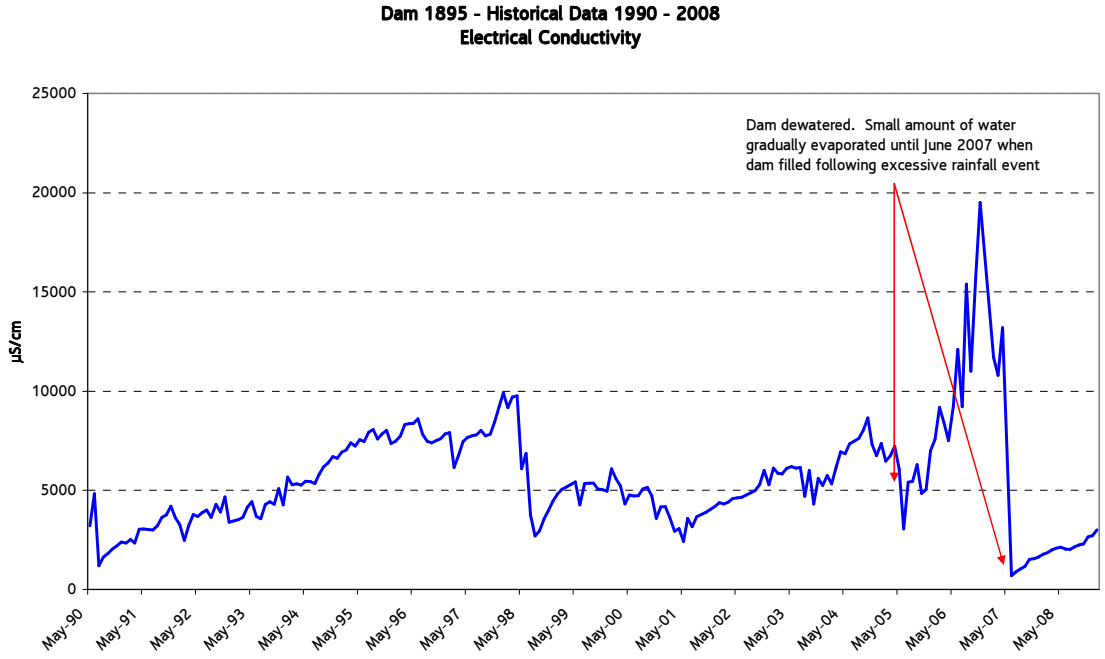
Surface water flows in these intermittently flowing creeks are rarely experienced. Further, any flows that are experienced are captured within the Bayswater Creek (Far East Tip) or Ramrod Creek (Access Rd Dam) which are part of the site water management system. Any flows at monitoring location Ramrod Creek (NW) would be minor given the lack of upstream catchment which has previously been disturbed by mining operations.

Table 3 : Catchment Baseline Data

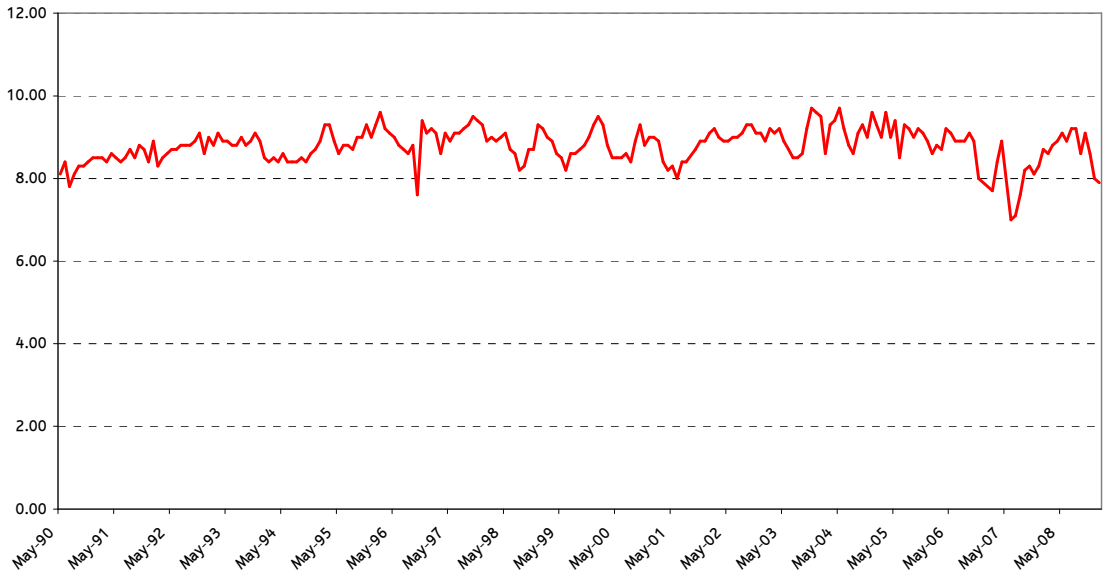
Ref	Description	pH	EC	TDS	NFR	Na	Mg	Cl	SO4	Data
			µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	Years
1895	Bayswater Creek (Far East Tip)	8.8	5466	4287	23	842	327	735	1890	1990 - 2008
2081	Ramrod Creek (Access Rd Dam)	8.3	4521	3474	20	486	247	751	1424	1993 - 2008
RR*	Ramrod Creek (NW)	7.8	5397	4507	19	671	421	775	1895	1990 - 2008

Note: sampled depending on availability of water

Figure 7: Dam 1895 Historical Electrical Conductivity and pH Levels

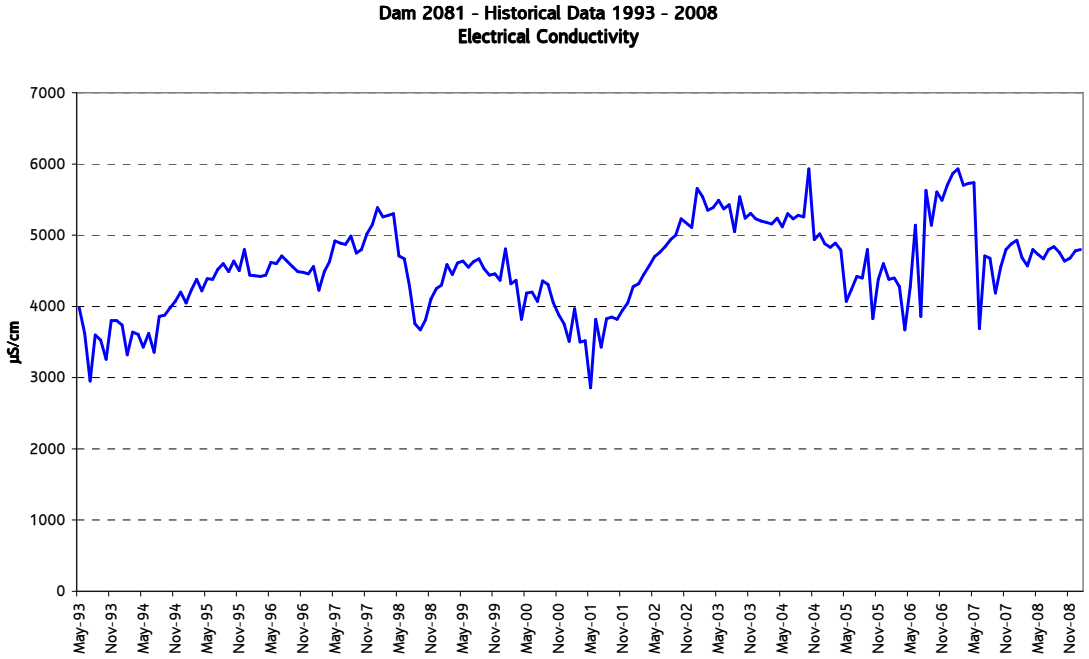


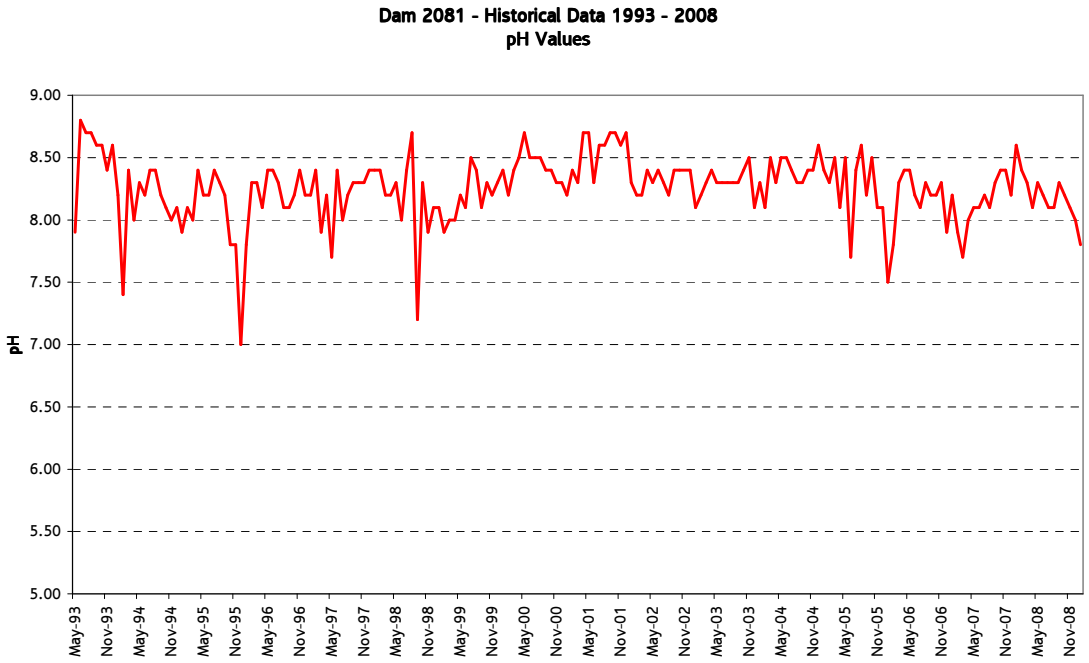
Dam 1895 - Historical Data 1990 - 2008
pH Values



Note: This dam was constructed in 1990 during the construction of the Far East Tip. It collected runoff from disturbed areas as the out of pit tip approached. Around 1999, the tip underwent final rehabilitation. Due to sedimentation and water quality being impacted on during the construction phase, the dam was pumped out and desilted in 2005, leaving the dam with a storage volume <5% of it's total volume. Drought conditions then prevailed, concentrating the existing salts to remain in an ever decreasing volume of water. During 2007, an extreme rainfall event was received, filling the dam with natural runoff from fully rehabilitated land. This returned water quality to below background levels, where it currently remains. This demonstrates that the rehabilitation process has been successful, with water quality returning to an acceptable level and no additional silt load being evident in the dam.

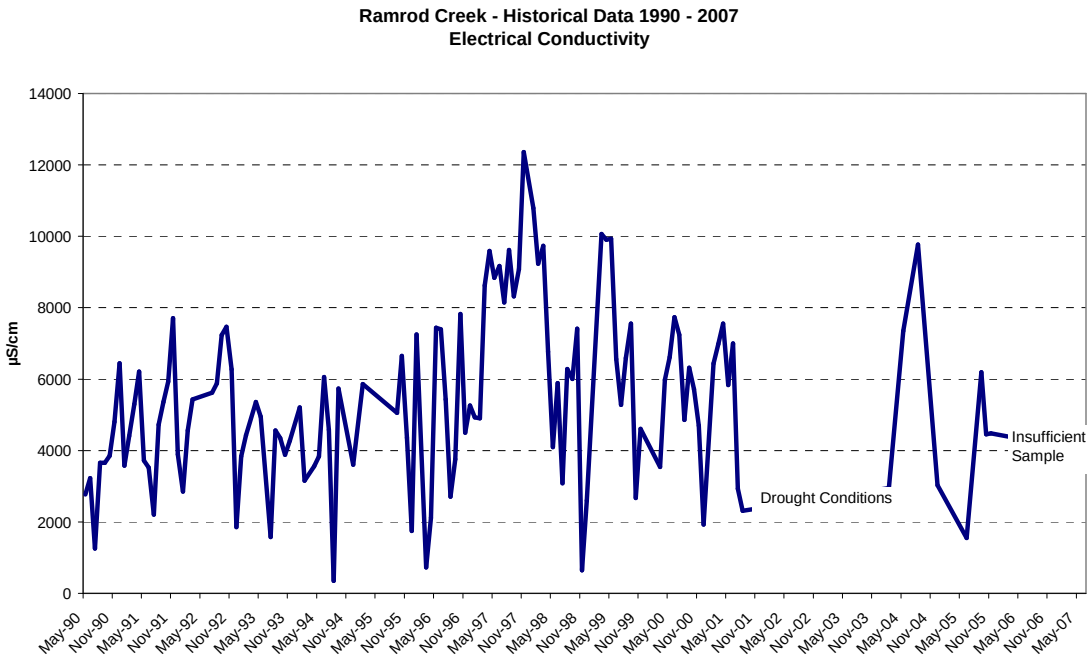
Figure 8: Dam 2081- Historical Electrical Conductivity and pH Levels

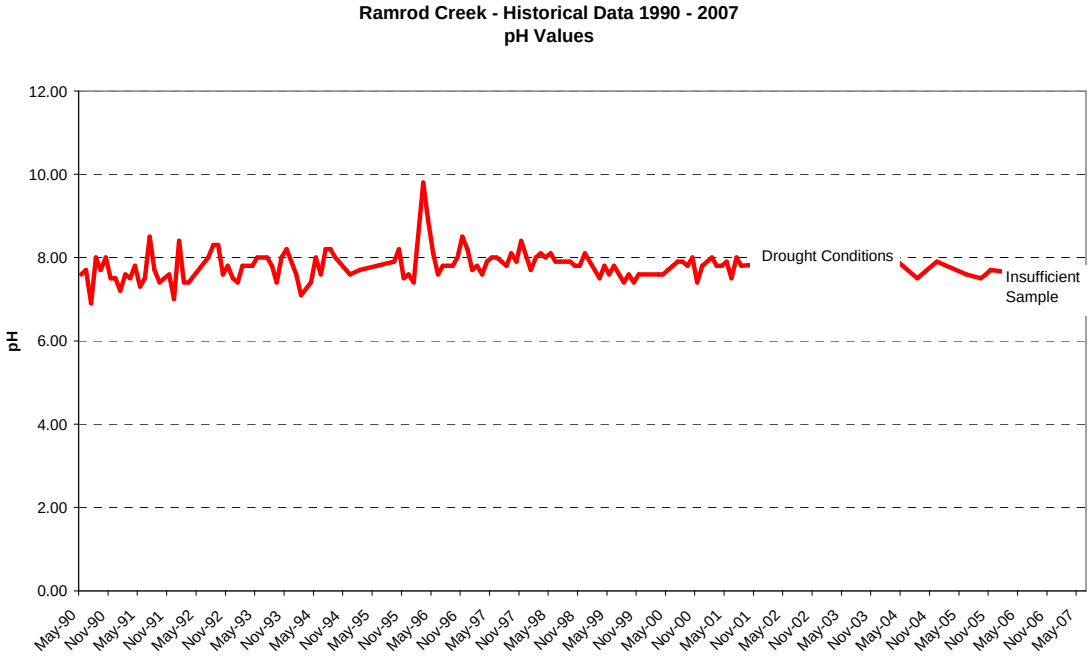




Note: This dam was constructed in 1993. It's purpose is to store mine water for use in the Coal Preparation Plant, dust suppression and industrial water use. It has a minimal catchment (15 hectares) and received water from Drayton's Industrial Dam. It is a mine water dam, thus electrical conductivity reflects saline conditions. This dam is also a prescribed dam and is under surveillance for the NSW Dam Safety Committee.

Figure 9: Ramrod Creek - Historical Electrical Conductivity and pH Levels





Note: This small creek lies to the north of the existing operation. It is naturally a saline catchment which is reflected in long term conductivity levels. Due to the location of this creek, it is highly dependent on rainfall for flows and as such on most occasions small ponds of water are sampled. Conductivity levels are highly variable due to the nature of the site. pH levels remain relatively stable throughout the historical data. During 2008, Ramrod Creek had no overland flows to monitor.

Based on the monitoring results, site water is typically similar to other mines in the area and is moderately saline. All mine water is contained within the internal mine water management system and is not discharged off site.

5.6.3.2 Surface Water Impact Assessment Criteria

Surface water monitoring occurs on a monthly basis and at locations listed in Table 2. Locations of these sampling sites are shown in Figure 10. Since Drayton is located at the headwaters of streams, surface water flows in creeks rarely occur. However, should excessive rainfall occur, that leads to surface runoff in streams, these will be sampled as per the normal regime of monitoring, with the same suite of analytes as normally sampled.

Analysis undertaken on these samples include pH, electrical conductivity, total dissolved solids, non filterable residue, sodium, magnesium, calcium, potassium, chloride, sulphate and bicarbonates.

Internal trigger levels have been established, where an internal investigation will be conducted to determine the factors which have led to a result which exceeds 8000µS/cm for electrical conductivity or pH levels are recorded outside of the range 6.0 - 9.0. Dependent upon the investigation findings, mitigation measures may be implemented as per Section 5.6.6.3 of this management plan. Any mitigation measures implemented will be detailed and assessed in the AEMR.

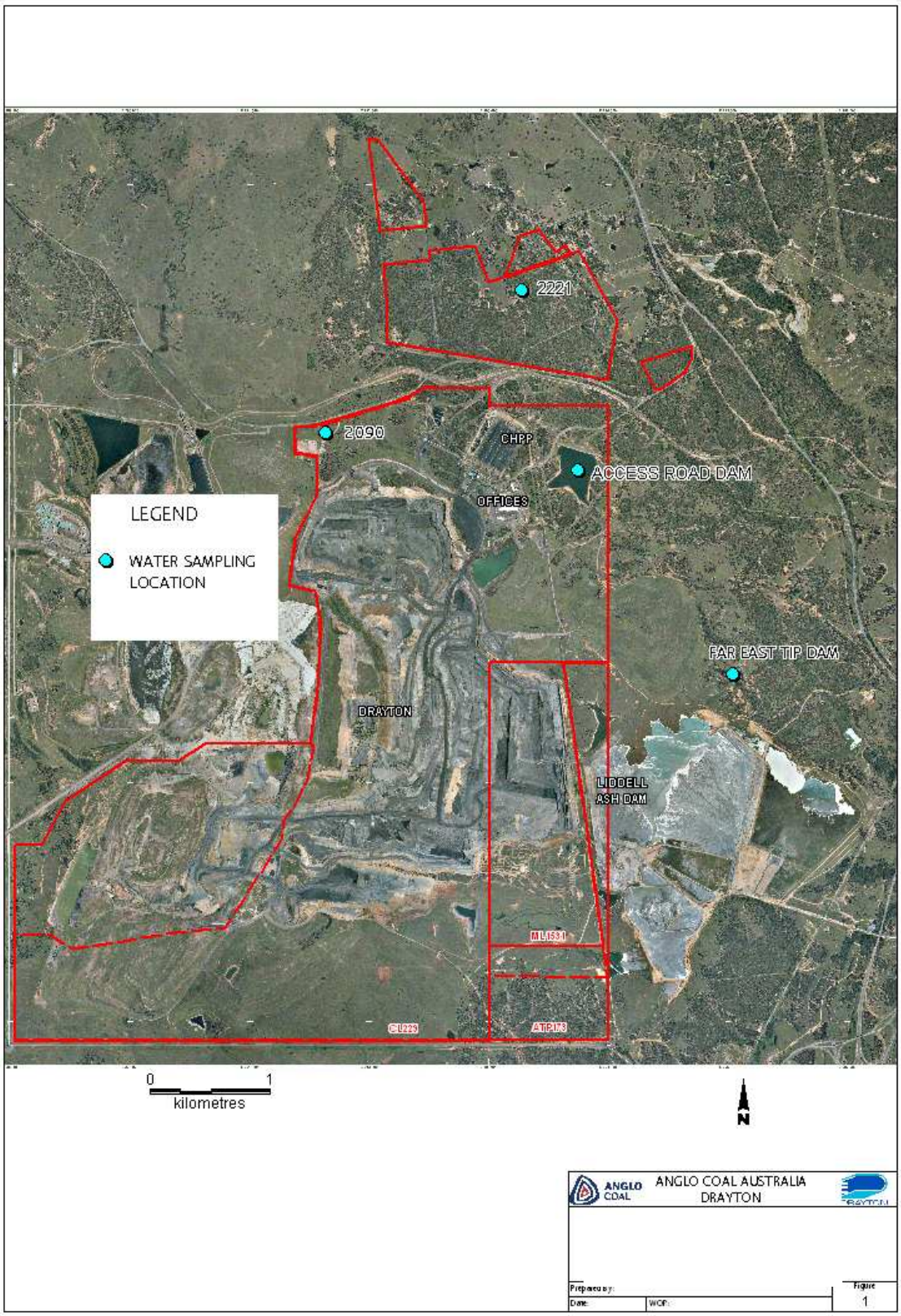


Figure 10 : Water Sampling Locations

5.6.3.3 Downstream Management

Since all mine water is contained within the internal mine water management system and is not discharged off site, downstream management is minimal. If a significant rainfall event occurs, regular inspections are undertaken of the water storages to determine that no mine affected water has left the site. These inspections are documented within the existing site environmental database and continued until the effects of the extreme rainfall event have subsided.

If a discharge of mine water has been detected, the incident would immediately be investigated and measures implemented to prevent a recurrence. The incident would also be notified to the relevant regulatory agency. If any off site damage has occurred as a result of the mine water discharge, Drayton would undertake any necessary work to remediate any damage.

Although Drayton is located at the headwaters of streams, surface water flows in creeks rarely occur. However, should seepage or spills be detected from dams to downstream creeks, water quality monitoring shall be commenced. This shall include chemical characteristics and physical characteristics of the water.

5.6.3.4 Reporting of Results

As a requirement of Drayton's project approval conditions and Drayton's environmental protection licence, all monitoring data must be presented in the AEMR to the Director General. A copy of this report is also forwarded to the following agencies: DII; NSW Office of Water (NOW); Muswellbrook Shire Council (MSC); Dam Safety Committee (DSC); Department of Environment, Climate Change and Water (DECCW); and Drayton's Community Consultative Committee members. A copy will also be placed on Drayton's website which is publicly available.

In addition, Drayton will regularly (at least quarterly) prepare a summary of monitoring results and make these publicly available on Drayton's website.

5.6.4 Groundwater Monitoring

Drayton has an established ground water monitoring plan, which has been in place for the life of the mine which addresses both standing water levels and water quality. As part of this plan, monthly standing water levels are monitored at sites located around the current mining operation as well as off site locations. Long term data is available for some locations with some data being available for in excess of twenty years.

The regional groundwater system at Drayton consists of three aquifer systems including:

- Colluvial sediments in creeks and alluvium along the Hunter River and Muscle Creek;
- Weathered bedrock near the natural surface; and
- Permian coal seam aquifers (Greta coal measures).

The aquifer system that is predicted to be impacted by Drayton's operations is the Permian coal seam aquifer. The Groundwater Impact Assessment undertaken as part of the Drayton Environmental Assessment confirmed that in the absence of a high-quality aquifer in the vicinity of Drayton, there is limited reliance on the groundwater resources in the area.

5.6.4.1 Baseline Data

Monitoring of groundwater levels has been undertaken at Drayton since the late 1970's and therefore an extensive historical database currently exists. As mining has progressed a number of bores have been destroyed over time, however several new sites have been installed in

conjunction with the exploration programs. Piezometers located both on and off site allow for groundwater impacts to be assessed.

The following piezometers will be utilised for baseline studies as extended historical data currently exists and some currently have an extensive life period before mining impacts on them. These include F1024, F1167, F1168, F1162, F1164, F1163, R4171, R4243, R4220, R4224, R4241 and W1102. Figure 11 shows the location of these piezometers which are monitored as part of the groundwater monitoring program at Drayton as described further in Section 5.6.4.4.

Figure 12 illustrates the baseline data available for these piezometers since their construction. This raw data (blue line) is illustrated in the following graphs, together with trend lines (red line).

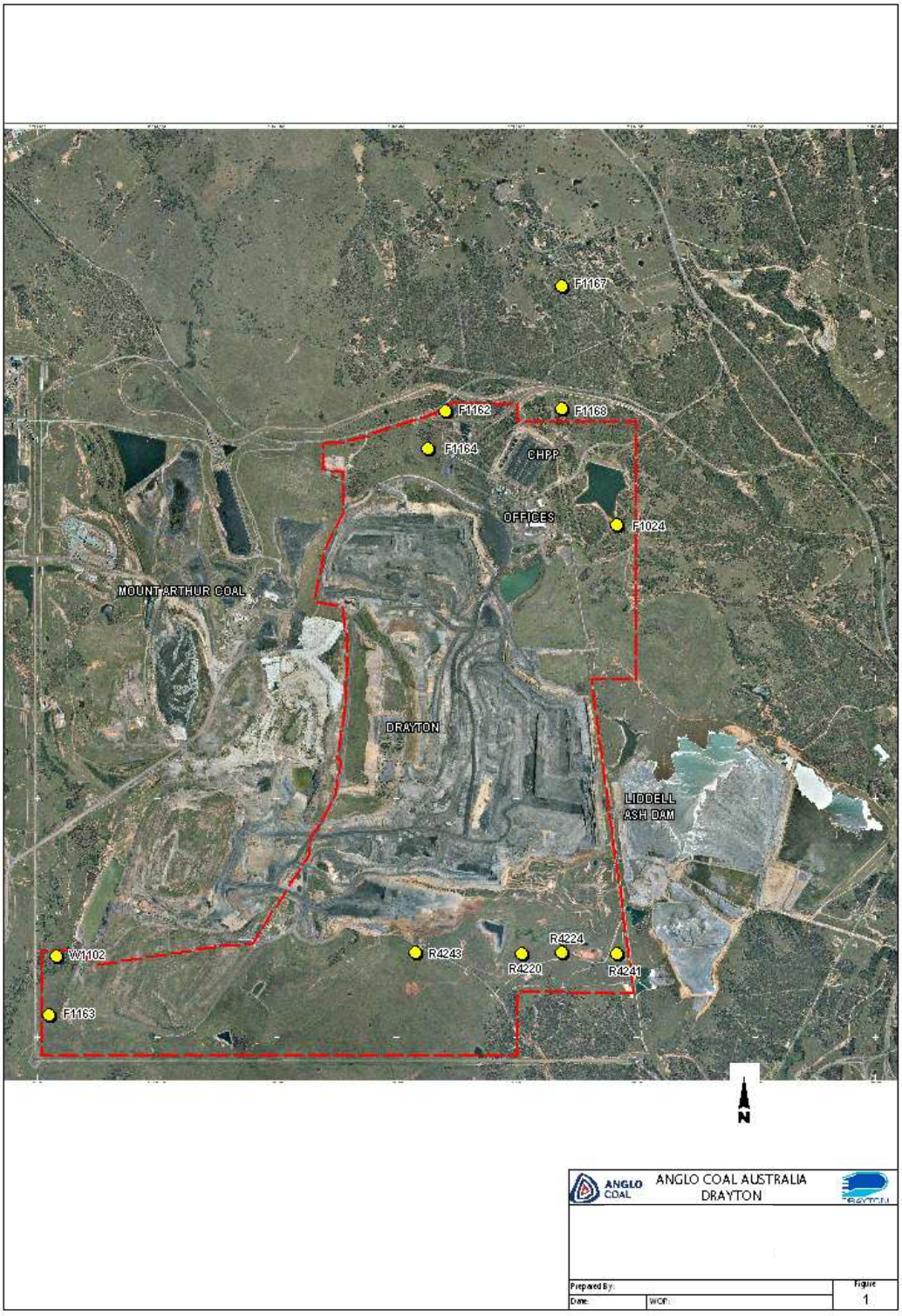
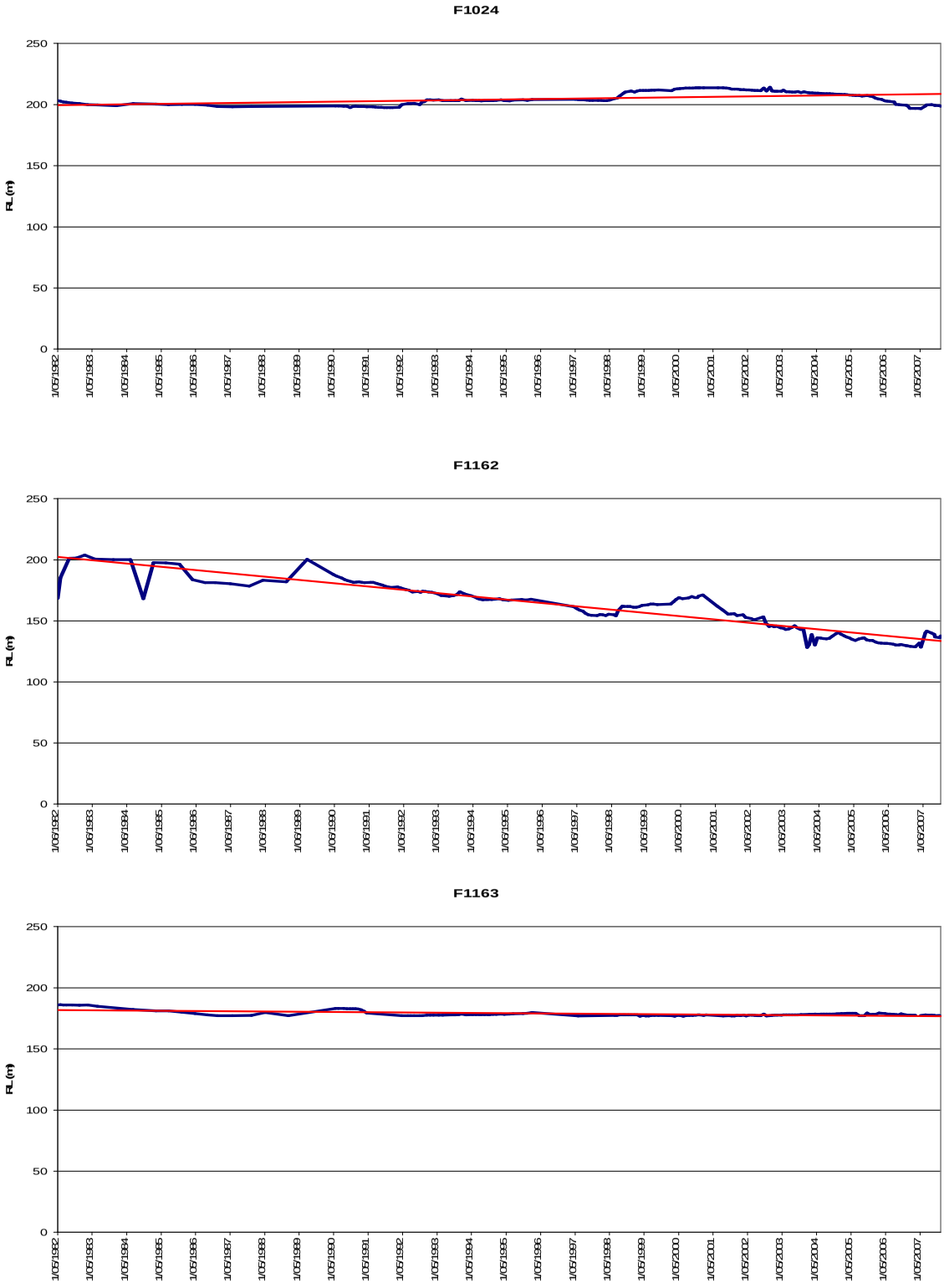
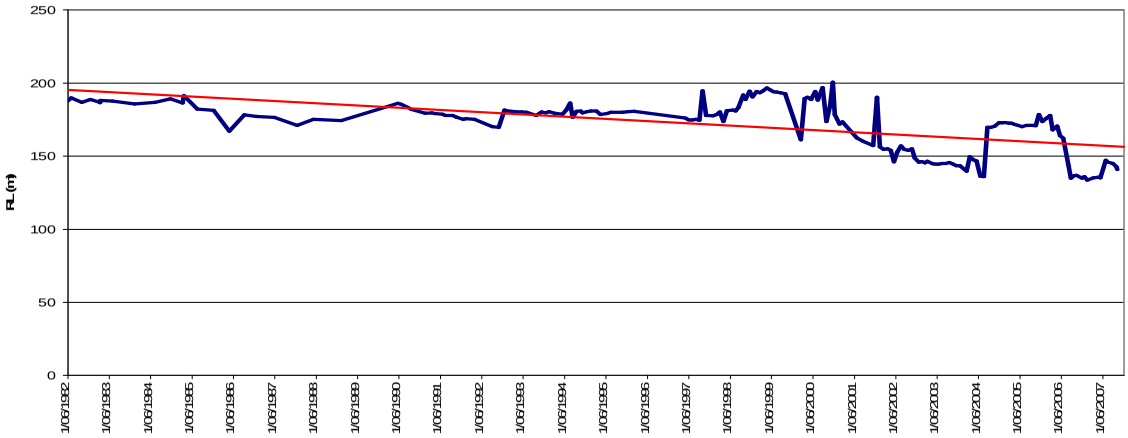


Figure 11 : Piezometer Locations

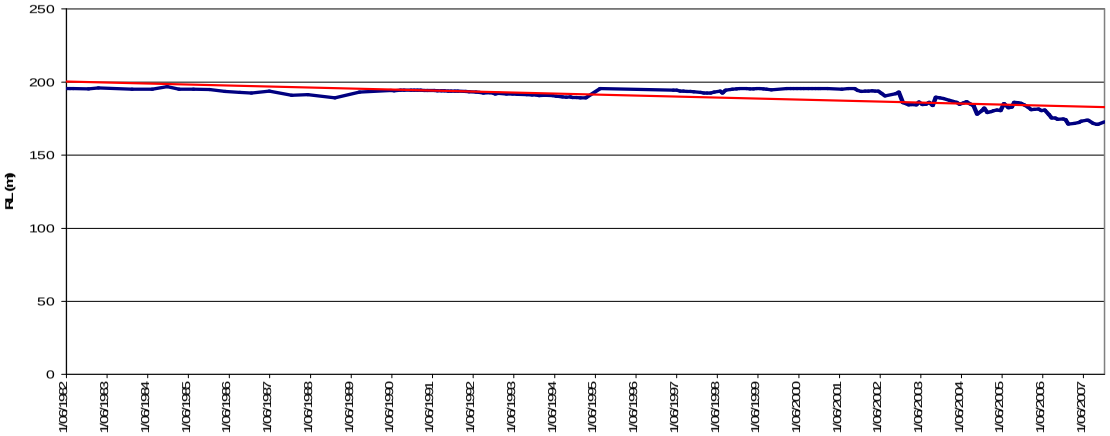
Figure 12 : Collaborative trend diagrams for selected piezometers



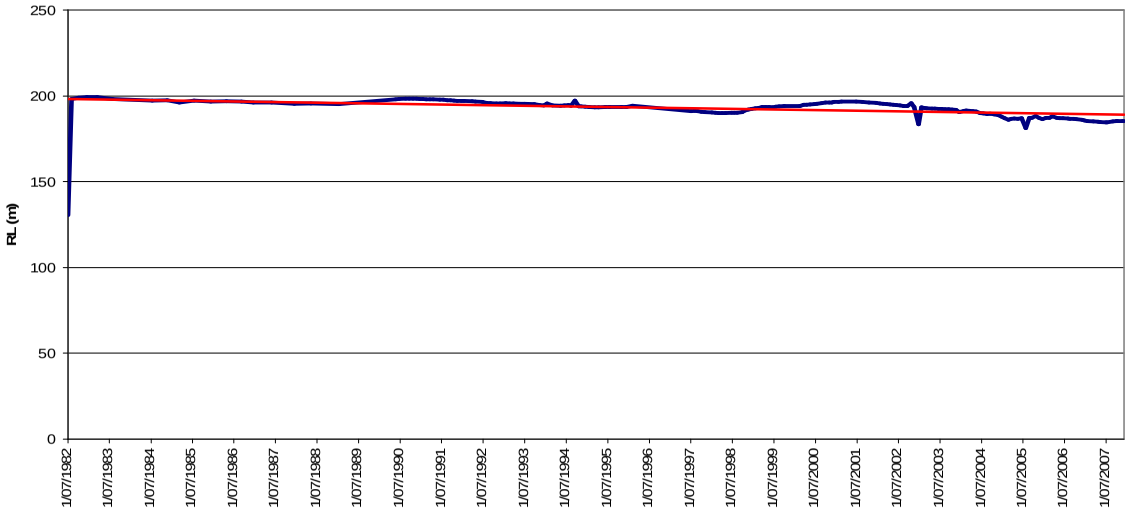
F1164



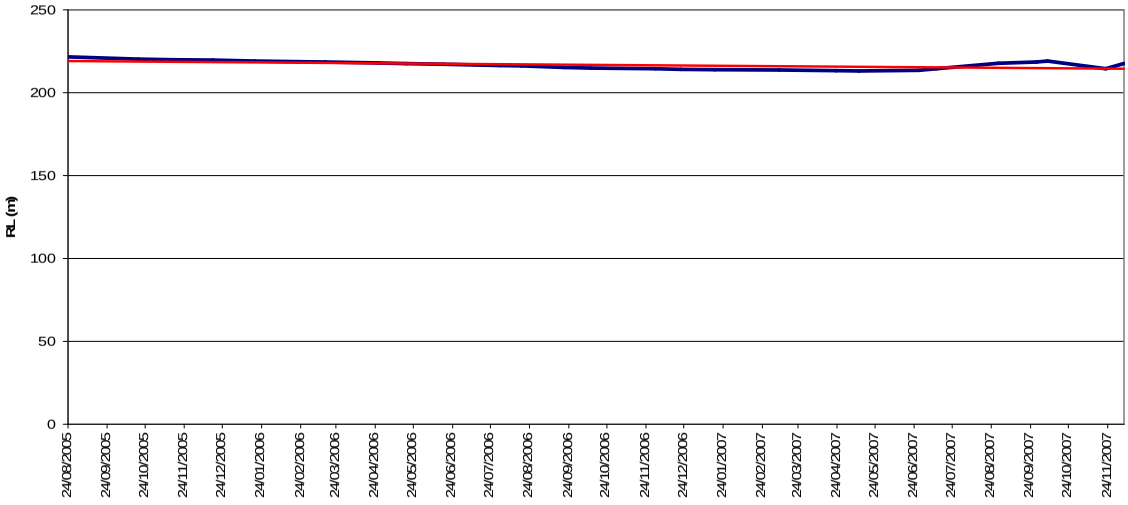
F1167



F1168



R4220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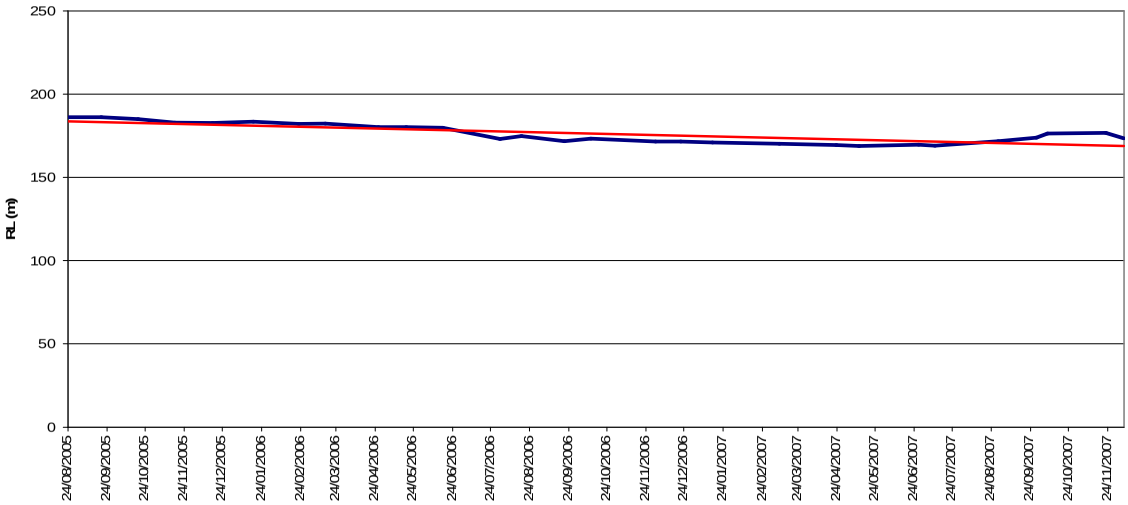
R4224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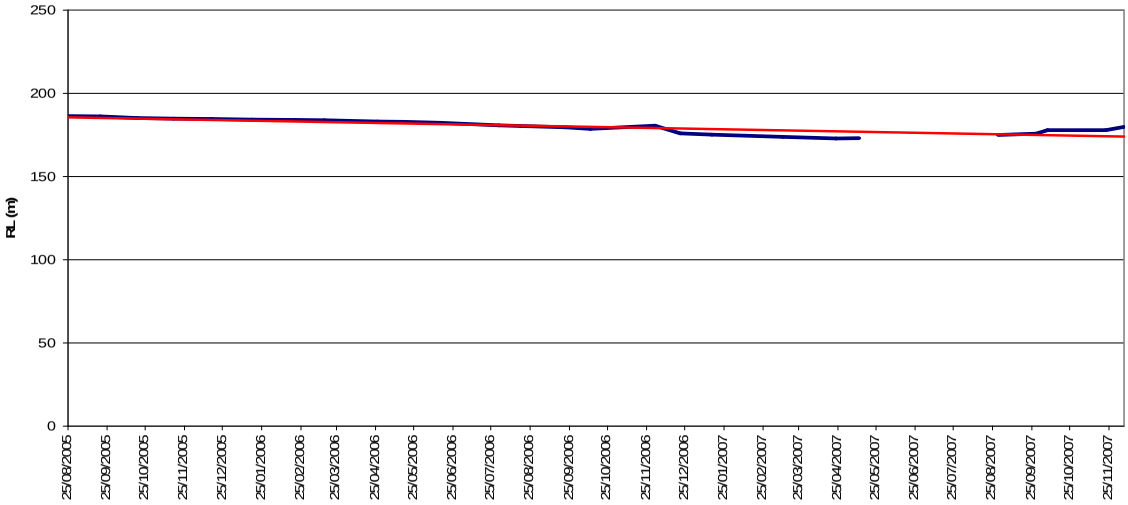
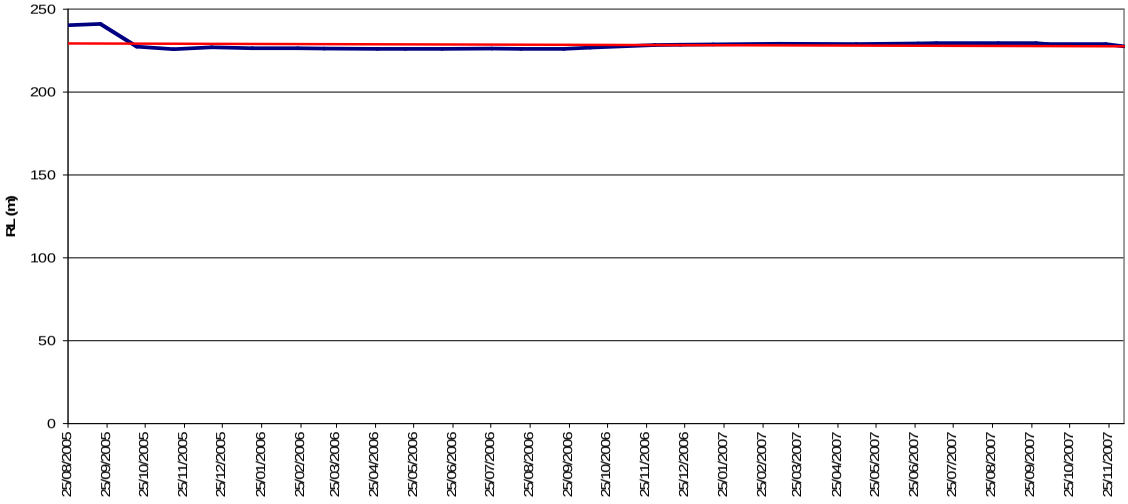
24/11/2007

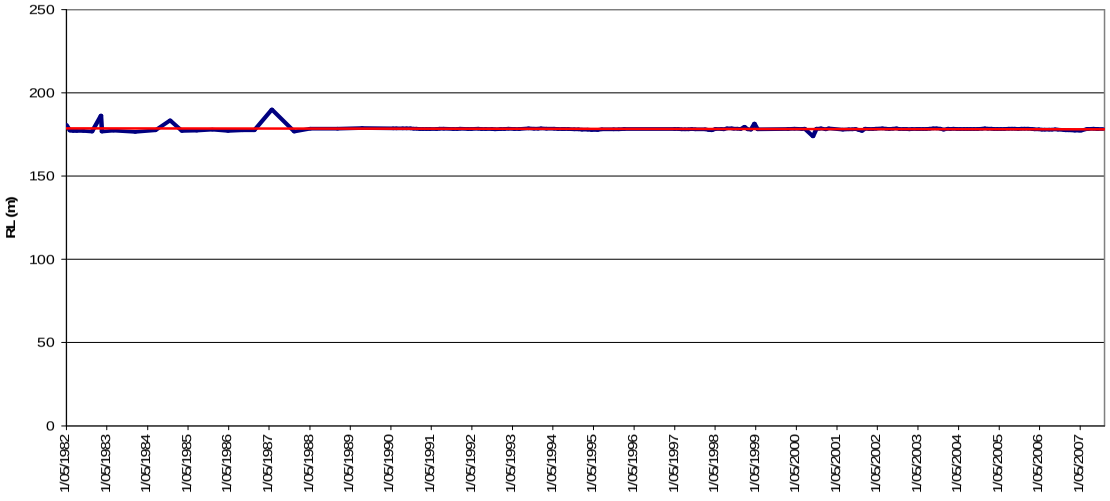
R4241



R4243



W1102



Since these monitoring sites are piezometers and that there is minimal known usage of water from the Permian aquifer within the region, yield and quantity information is deemed not relevant.

Figure 13 illustrates the pre mining groundwater level contours within and around Drayton as identified during the monitoring program up until 2005.

Figure 14 illustrates the drawdown within the Permian coal seam aquifer as predicted within the Drayton Environmental Assessment. As illustrated in this figure, the drawdown in the Permian coal seam aquifer will occur over time. However it has been identified that there are no active privately owned bores located within the vicinity of the mining operation to be adversely affected.

Four off site registered bores were identified within the Drayton Environmental Assessment to be impacted as a result of the depressurisation of the coal seam aquifer by mining operations at Drayton. Attempts to locate these bores which have previously been registered with NOW have been unsuccessful.

Review, assessment and long term trend analysis of the bores that are monitored at Drayton are included as a component of Drayton's AEMR. The monitoring results are compared to the assessment criteria (as per Section 5.6.4.3), baseline data (Section 5.6.4.1) and an assessment of comparisons with EA predictions (Section 5.6.4.1) will be incorporated into Drayton's AEMR.

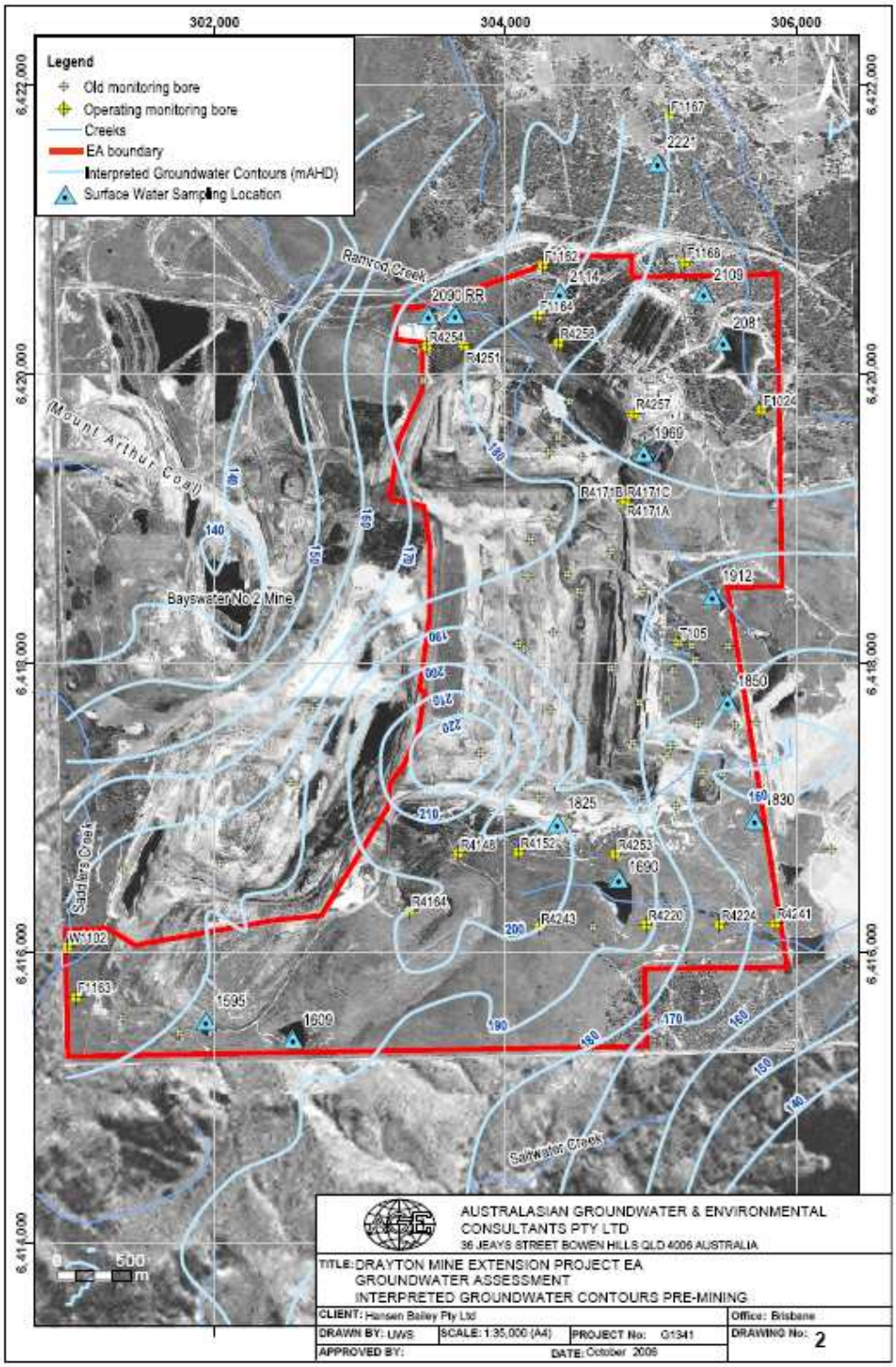
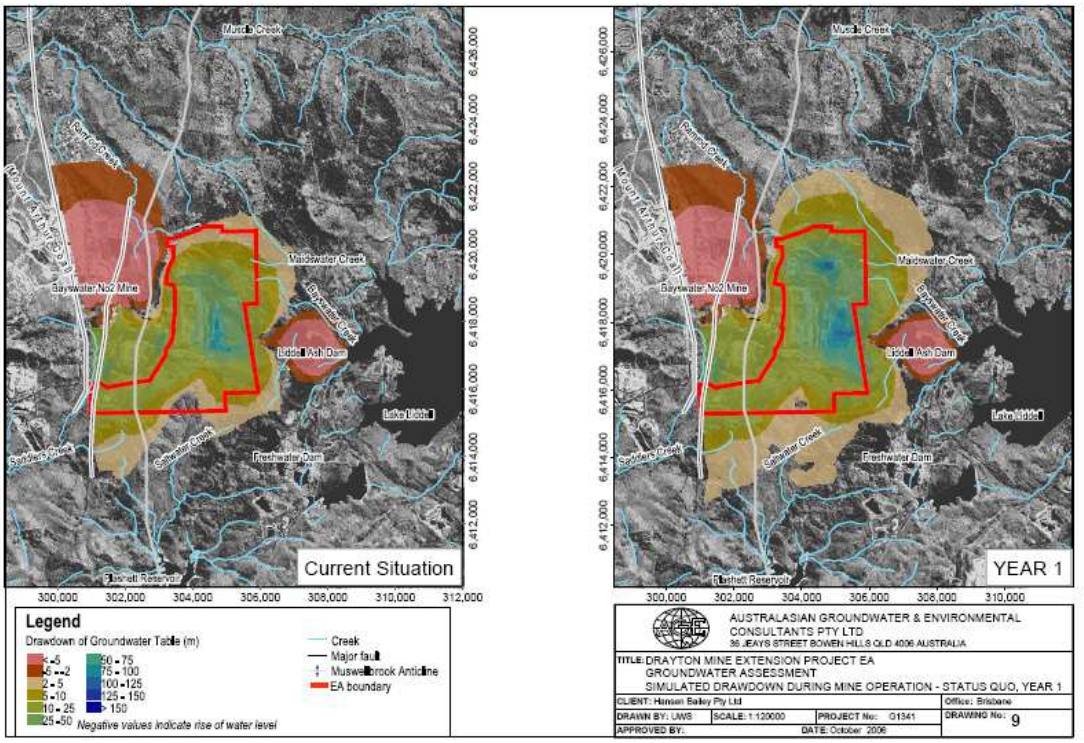


Figure 13: Interpreted groundwater contours – pre mining

(Drayton Environmental Assessment, Appendix G, Australian Groundwater & Environmental Consultants, 2006)



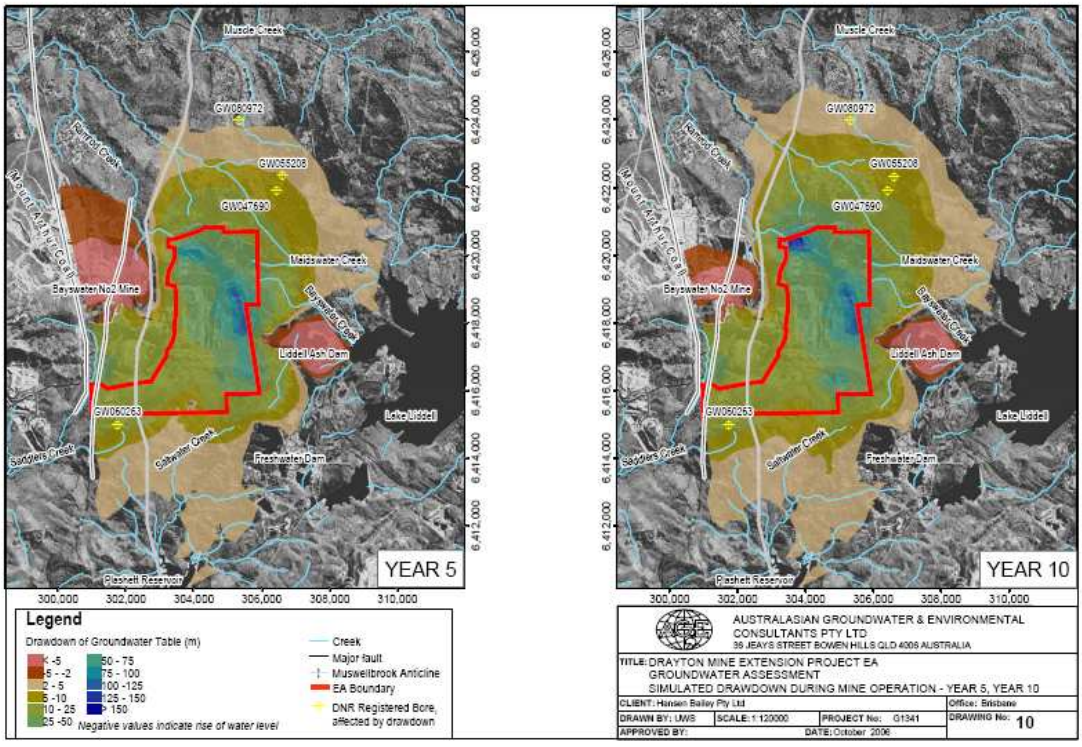


Figure 14: Simulated Drawdown during mining operations

(Drayton Environmental Assessment, Appendix G, Australian Groundwater & Environmental Consultants, 2006)

5.6.4.2 Augmenting Baseline Data

Monthly monitoring of standing water levels, quarterly water quality and six monthly speciation analysis will supplement baseline data and will indicate potential or actual changes in either standing water level or water quality.

Table 4 below provides detail of the identified off site registered ground water bores that are identified to lie within a cone of depression and may be affected by mining.

As explained in Section 5.6.4.2 above, attempts have been made to identify the actual locations of these bores, however they have not been successfully located. Further, discussions with the landholders and NOW has confirmed that these bores are no longer utilised.

Should these bores (or any other bores located within the predicted cone of depression be identified) Drayton will conduct monthly monitoring for standing water level and water quality, where possible. An investigation on the current use will also be conducted to assist in impact assessment for future consideration.

Table 4: Registered Bores Impacted by Mining

Table 12: REGISTERED BORES IMPACTED BY MINING							
Bore	Location		Depth (m)	SWL (mbns)	Yield (L/s)	Salinity	Aquifer
	mE	mN					
GW060263	301750	6415000	58.5	35	0.25	"fair"	fractured rock
GW047690	306440	6421915	6.70	2.4	0.02	3000-7000 (µS/cm)	fractured rock
GW055208	306620	6422340	53.0	13.0	1.32	N/A	fractured rock
GW080972	305328	6423975	24.0	15.0	1.0	N/A	fractured rock

Note: i) SWL = static water level
ii) mbns = metres below natural surface

Ongoing monitoring will determine if mining is impacting on the groundwater supply of any known privately owned bores as discussed in Section 5.6.4.4. Results of this monitoring and impacts will be included in Drayton's AEMR.

5.6.4.3 Groundwater Assessment Criteria

Should the ongoing monitoring program implemented at Drayton discover variations in standing water level at groundwater monitoring sites F1167, F1163 and other off site registered bores (representing non mined owned landholders) vary more than 10% of the longer term pre-mining average as depicted in Figure 13 for that location and parameter, an additional repeat analysis will be conducted.

The Groundwater Impact Assessment undertaken for the Drayton Environmental Assessment explained that typical groundwater quality in the Permian coal seam aquifer is typically between 490 and 5000 uS/cm and within a range of 6.5 to 8. Should groundwater monitoring result in levels outside of these ranges, an additional repeat analysis will be conducted.

If it is discovered that the repeat analysis confirms the original results, a comprehensive investigation will be implemented over a period of twelve months to determine if longer term adverse impacts are occurring. If it is found that adverse groundwater impacts occur, a

management program will then be implemented to further manage and assess the issue against the predictions provided in the Drayton Environmental Assessment.

5.6.4.4 Monitoring Program

Table 5 provides a list of the past and existing groundwater monitoring program that has been in place at Drayton since the commencement of mining.

Table 5 " Groundwater Monitoring Program

Bore ID	Easting	Northing	Collar Elevation	Bore Depth	Water Level Elevation	Installation Date	Monitoring Frequency	Comments
	(m)	(m)	(mAHD)	(m)	Median (mAHD)			
AGC1	304879	6417458	200.00	71	187.36	1983		Removed by mining 2004
AGC3	305118	6417372	188.00	99	179.59	1983		Removed by mining 2004
BC102	304157	6418605	239.26	100	186.26	1982		Removed by mining 1984
BC99	304096	6418134	250.80	111	182.70	1982		Removed by mining 1986
C3067	292061	1420424	219.00	115	194.75	2000		Removed by mining 2004
F1024	293875	1420221	236.70	236	204.62	1982	Monthly	
F1030	290100	1417156	215.20	26	204.20	1982		Removed by mining 1983
F1057	302529	6417182	188.50	124	183.90	1982		Removed by mining 1986
F1152	293802	1418063	168.40	178	166.58	1982		Removed by mining 1997
F1154	305326	6417588	187.30	250	177.25	1982		Removed by mining 2005
F1160	306243	6416717	195.50	371	174.85	1982		Inundated by Liddell Ash Dam 1988
F1162	292389	1421249	228.20	274	158.09	1982	Monthly	
F1163	289085	1416250	194.70	384	177.63	1982	Monthly	

Bore ID	Easting (m)	Northing (m)	Collar Elevation (mAHD)	Bore Depth (m)	Water Level Elevation Median (mAHD)	Installation Date	Monitoring Frequency	Comments
F1164	292350	1420900	220.80	191	167.89	1982	Monthly	
F1167	305124	6421791	230.50	314	190.54	1982	Monthly	
F1168	305235	6420775	212.90	189	194.40	1982	Monthly	
F1171	303497	6420406	228.74	66	175.47	1982		Removed by mining 1998
GT001	293129	1417787	205.72	114	167.39	2001		Removed by mining 2004
GT002	293426	1417651	192.47	89	153.95	2001		Removed by mining 2004
GT003	293427	1417728	192.18	106	154.34	2001		Removed by mining 2004
GT005	293655	1418047	181.07	142	148.10	2003		Removed by mining 2004
L1123	293238	1417492	204.20	95	151.73	2003		Removed by mining 2004
L1153	292480	1420060	222.62	95	146.08	2003		Removed by mining 2003
R2277	301363	6415552	231.95	96	184.60	1986		Removed by mining 1990
R2282	304179	6418853	231.63	101	178.94	1986		Removed by mining 1991
R2285	304488	6419200	230.22	127	181.60	1986		Removed by mining 1989
R2293	303718	6419899	221.43	125	179.65	1986		Removed by mining 1992

Bore ID	Easting (m)	Northing (m)	Collar Elevation (mAHD)	Bore Depth (m)	Water Level Elevation Median (mAHD)	Installation Date	Monitoring Frequency	Comments
R2296	292184	1417659	255.01	105	198.80	1986		Removed by mining 1991
R2303	304310	6417680	214.22	144	190.06	1986		Removed by mining 1991
R2312	304723	6417967	231.14	121	181.75	1986		Removed by mining 2001
R2325	304427	6418622	206.95	121	181.61	1986		Removed by mining 1993
R2335	304954	6418515	189.08	136	181.65	1986		Removed by mining 2004
R2338	305534	6418123	195.07	130	175.38	1986		Removed by mining 2004
R2339	305159	6417952	200.21	142	182.53	1986		Removed by mining 2005
R2342	305133	6417617	216.39	116	183.89	1986		Removed by mining 2005
R2346	293215	1417914	189.41	106	165.40	1986		Removed by mining 2004
R2347	293564	1417712	183.94	111	148.60	1986		Removed by mining 2004
R2350	301370	6416582	228.43	116	183.65	1986		Removed by mining 1999
R2451	304364	6417133	207.33	86	189.67	1989		Removed by mining 1995
R2547	304505	6418501	231.28	96	190.90	1988		Removed by mining 1990
R2555	292415	1418708	243.21	111	205.14	1988		Removed by mining 1989

Bore ID	Easting (m)	Northing (m)	Collar Elevation (mAHD)	Bore Depth (m)	Water Level Elevation Median (mAHD)	Installation Date	Monitoring Frequency	Comments
R2568	292599	1418103	220.98	135	190.90	1989		Removed by mining 1989
R2583	292400	1419485	231.28	96	182.74	1989		Removed by mining 1991
R2820	292561	1420305	228.40	146	193.52	1990		Removed by mining 1992
R2922	292101	1417495	245.98	74	191.50	1986		Removed by mining 2005
R2923	291808	1417483	263.65	62	203.58	1990		Removed by mining 2004
R2929	292291	1417300	253.68	84	211.76	1991		Removed by mining 1991
R2930	292297	1417571	226.64	109	193.72	1991		Removed by mining 1991
R2932	292502	1417396	231.59	101	198.11	1991		Removed by mining 1991
R2951	292099	1420256	220.24	101	181.55	1989		Removed by mining 1991
R2962	291557	1420468	236.23	100	178.23	1991		Removed by mining 1991
R2981	293189	1418237	198.11	139	153.15	2000		Removed by mining 2005
R4148	291735	1417196	327.78	101	229.42	2001		Removed by mining 2008
R4152	292147	1417197	298.70	113	221.50	2000		Removed by mining 2008
R4164	291392	1416806	312.45	77	246.77	2000		Removed by mining 2008

Bore ID	Easting (m)	Northing (m)	Collar Elevation (mAHD)	Bore Depth (m)	Water Level Elevation Median (mAHD)	Installation Date	Monitoring Frequency	Comments
R4171A	292924	1419612	229.62	138	218.39	2000	Monthly	
R4171B	292924	1419611	229.62	138	160.58	2000	Monthly	
R4172	292830	1419665	231.16	124	173.44	2001		Removed by mining 2001
R4173	292413	1419955	227.07	91	158.95	2001		Removed by mining 2002
R4181	293384	1418503	178.11	107	145.10	2003		Removed by mining 2005
R4206	293520	1417185	202.47	114	119.58	2005		Removed by mining 2008
R4214	292653	1416668	257.89	136	224.21	2005	Monthly	
R4220	293016	1416678	228.42	119	217.11	2005	Monthly	
R4224	293521	1416671	202.98	133	173.03	2005	Monthly	
R4241	293901	1416670	195.98	150	181.90	2005	Monthly	
R4243	292279	1416675	290.41	142	229.74	2005	Monthly	
R4251	291837	1420702	216.39	162	192.46	2005		Removed by mining 2009
R4253	292815	1417170	257.64	131	187.56	2005		Removed by mining 2009
R4254	291583	1420702	223.57	150	184.82	2005		Removed by mining 2008

Bore ID	Easting (m)	Northing (m)	Collar Elevation (mAHD)	Bore Depth (m)	Water Level Elevation Median (mAHD)	Installation Date	Monitoring Frequency	Comments
R4257	292996	1420208	240.86	187	190.61	2005		Removed by mining 2007
R4258	292487	1420709	225.10	176	189.02	2005	Monthly	
T105	293270	1418623	181.60	91	161.30	1982		Removed by mining 2005
W1	293280	1418620	183.00	88	173.74	1983		Removed by mining 2005
W101	293370	1418600	183.00	88	161.48	1982		Removed by mining 2005
W1102	289030	1416600	186.70	23	178.18	1982	Monthly	
W201	292220	1418600	252.00	106	180.53	1982		Removed by mining 1989
W302	292835	1419265	218.00	90	183.84	1982		Removed by mining 1985

Monthly standing water levels will continue to be recorded for each of sites listed in Table 5. Figure 11 shows the location of these sites. Groundwater Levels monitored will be assessed and reported against EA predictions. In addition pH, electrical conductivity, salinity and total dissolved solids will continue to be recorded on a quarterly basis.

Further to this, speciation analysis of a select group of groundwater sites will be conducted on a six monthly basis. Analysis will consist of pH, electrical conductivity, total dissolved solids, alkalinity, dissolved major anions (sulphate, sulphur, silica and silicon), chloride, major cations (calcium, magnesium, sodium and potassium), dissolved iron, target minerals (aluminium, arsenic, beryllium, barium, cadmium, caesium, chromium, cobalt, copper, lead, lithium, nickel, rubidium, selenium, silver, strontium, zinc, boron and iron.

Regional groundwater standing water levels will be monitored both on site at existing locations and off site in bores identified in Drayton's Environmental Assessment on a monthly basis to assess any impacts to the groundwater supply of potentially affected landowners. Attempts have been made to locate the off site bores in consultation with the NSW Office of Water, however to date this has been unsuccessful. Should these bores be identified in the future, Drayton will monitor these bores in accordance with the above.

Volumes of groundwater seepage into the mining operation were predicted in the Groundwater Impact Assessment undertaken as part of the Drayton Environmental Assessment. It has been assessed that the average inflow into the active mining areas will be up to 2.7ML/day (at Year 10 or 2017) from surrounding aquifers. Table 6 below (extracted from Drayton's environmental assessment 2007) details predicted inflows.

Table 6: Predicted Average Inflows to Pits (Extracted from EA07)

Table 10: PREDICTED AVERAGE INFLOWS TO THE PITS				
Project Year	**North Pit**	**East Pit**	**South Pit**	**Average Inflows (ML/day)**
Year 1	0.55	1.10	0.45	2.1
Year 5	0.66	1.18	0.39	2.2
Year 10	1.07	1.27	0.35	2.7

Annual volumes of water extracted from pit sumps will be estimated and will be included as part of the water balance included in the AEMR. Groundwater seepage volumes will be calculated from pumping records obtained during the mining operation.

The environmental assessment identified that depressurisation of the coal seam aquifer will not impact on the flow in the Hunter River or other creeks and associated alluvial aquifers.

Groundwater pressure response in surrounding coal measures can be monitored utilising the existing groundwater bores located in close proximity to the mining operations. A network of piezometers exist around future mining areas, and will continue to be monitored on a monthly basis. Changes will inevitably occur as mining encroaches allowing for groundwater responses in coal seam aquifers to be assessed. Results of these piezometers will be included in the AEMR and will be compared with long term averages for trend analysis.

All major dams on site are monitored for water quality and water storage levels monthly. In addition, at present, Drayton has only one active mine void which is being utilised for long term water storage. A storage volume is calculated on a monthly basis for this void in addition to pumping details when pumping is being conducted. Drayton does not have any large tailings dams on site. During monthly inspections, water storages, structural and seepages are noted if they are observed. To date, no major dams or mine water voids have indicated seepages are

occurring. This will however continue to be monitored on a monthly basis. If seepages are detected, a management plan including increased inspection and monitoring will be commenced to further assess the occurrence.

5.6.4.5 Groundwater Model Verification

Pumping records obtained from Drayton's data collection system will be used to determine water volumes being extracted from mining operations. This will further be separated from rainfall runoff via calculation.

In addition, standing water levels will be compared to the steady state calibration results as detailed in the environmental assessment.

5.6.4.6 Reporting of Results

Results of the above analysis will be included in the AEMR.

As a requirement of Drayton's project approval conditions all monitoring data must be presented in the AEMR to the Director General. A copy of this report is also forwarded to the following agencies: DII; NOW; Muswellbrook Shire Council (MSC); Dam Safety Committee (DSC); Department of Environment, Climate Change and Water (DECCW); and Drayton's Community Consultative Committee members. A copy will also be placed on Drayton's website which is publicly available. This shall also include a review against the groundwater model predictions in the environmental assessment.

Water usage is also a component of annual reporting and as such water usage will be compared to predictions in the environmental assessment.

These assessments will be included in the AEMR.

In addition, Drayton will regularly (at least quarterly) prepare a summary of monitoring results and make these publicly available on Drayton's website.

5.6.5 Surface and Ground Water Response Plan

Should an exceedence of the monitoring criteria detailed in Section 5.6.4.3 be detected, the following measures or procedures would be implemented by the Drayton Environment Coordinator, within a period of seven days, as required by PA_06_0202.

5.6.5.1 Handling Exceedences

Steps to be taken	Process to be followed
1	Confirm the time of the exceedence(s)
2	Confirm the location of the exceedence(s)
3	Confirm the weather conditions at the time of the exceedence(s) - if relevant
4	Identify the contributing factors to the exceedence(s)
5	Assess any monitoring results and/or observations recorded
6	Develop an appropriate mitigation and management strategy in consultation with NOW and DoP
7	Implement mitigation and management measures
8	Review any follow up results
9	Report the exceedence within 7 days in accordance with PA 06_0202 conditions

5.6.5.2 Mitigation Measures

If Drayton receives a request from a landowner whose primary water supply is extracted from a licensed bore and believes the bore to be affected by Drayton's mining, the following measures would be implemented by the Drayton Environment Coordinator in the timeframes specified. The independent review process shall be undertaken by a suitably qualified expert.

Steps to be taken	Process to be followed	Timing
1	Receipt of a written request from the landowner in regards to adverse impact of a water supply	N/A
2	Provide a copy of the request to the DoP and inform the DoP of Drayton's intention to conduct an independent review	7 days
3	Commission an independent review. This review to include • All relevant standing water levels and water quality results • Consider any changes in land use that may have affected the groundwater level or data over a period of time • Meteorological conditions relevant to standing groundwater levels • Impacts from Drayton Mine • Impacts from other industrial sites	28 days from landowner request
4	Provide a copy of the independent report to the DoP and the landowner	28 days from commission
5	Review response from DoP as to whether bore has been adversely affected by mining at Drayton	7 days from DoP response
6	If DoP conclude that the bore has been adversely affected by Drayton mining operations, Drayton shall replace the water supply with water of equivalent quality and volume	28 days from DoP conclusion
7	If appropriate, develop mitigation and management strategies	As required
8	Implement the mitigation and management strategy	As required
9	Review and follow up the results	As required

5.6.5.3 Incident Management

In the event of any other unforeseen surface or groundwater impacts occurring, the following shall apply.

Steps to be taken	Process to be followed
1	Review the unforeseen impact or incident including any relevant monitoring results and current mining activities that may influence the event
2	Commission an independent investigation into the unforeseen impact, if it is considered relevant by the S&SD Manager
3	Develop appropriate mitigation measures based on the results of the investigation and in consultation with the relevant authorities
4	Implement these measures and additional monitoring to measure their effectiveness giving due consideration to the predicted drawdown impacts as defined in the EA.

All environmental incidents recorded and tracked at Anglo Coal Drayton are entered into the ACA Corporate Cintellate system, which captures all site incidents.

5.6.6 Prescribed Dams

The NSW Dams Safety Committee issues a list of the prescribed dams in NSW. There are two Drayton structures listed with this committee. These dams are Drayton WS (Access Rd) Dam,

and the Liddell Ash Dam Levee. Surveillance reports are completed on these structures as required by the DSC.

5.6.7 Integration with Adjacent Mining Operations

Anglo Coal Drayton Mine have previously supplied the Mt Arthur Coal (formerly Bayswater Coal Company) with additional mine water. This arrangement ensured excess water available at Anglo Coal Drayton Mine was utilised in mining operations. This arrangement continues to operate and has had no adverse impacts to date. Water is transferred by enclosed pipe from Drayton's Rail Loop Dam direct to water storage tanks at Mt Arthur Coal's washery.

All volumes of water transferred to other mining or industrial facilities is recorded and reported in Drayton's AEMR.

6 APPENDICES

Appendix 1 - Environmental Signoff
Appendix 2 - Regulatory Correspondence
Appendix 3 - Expert Endorsement

Environmental Signoff

PROCEDURE TITLE: Water Management Plan

NAME: Peter Forbes

POSITION: Safety and Sustainable Development Manager

SIGNATURE FOR SIGNOFF: .....

DATE: .....

NAME: Pam Simpson

POSITION: Environment Coordinator

SIGNATURE FOR SIGNOFF: .....

DATE: .....

NAME: Dallas Core

POSITION: Mining Manager

SIGNATURE FOR SIGNOFF: .....

DATE: .....

NAME: Darren Pisters

POSITION: Technical Services Manager

SIGNATURE FOR SIGNOFF: .....

DATE: .....

Mitchell Bennett
Head Regional Operations Unit - Hunter Region
Department of Environment and Climate Change NSW
PO Box 488G
NEWCASTLE NSW 2300

Anglo Coal (Drayton Management) Pty Ltd

Direct Fax +61 (0)2 6542 0369
Direct Line +61 (0)2 6542 0298

27th July 2008

Dear Sir

It is a requirement of Drayton's Project Approval Conditions as issued by the Department of Planning for the Drayton Mine Extension (Ref 06_0202) to prepare a Water Management Plan in consultation with the Department of Environment and Climate Change (DECC) and the Department of Water and Energy (DWE).

Drayton request that the DECC review the attached Water Management Plan and respond accordingly with any comments.

Comments would greatly be appreciated by 21st August 2008, to enable finalisation and submission of the plan for approval by the Department of Planning.

If you wish to discuss the attached document please feel free to contact me on 6542 0298 or by email to pam.simpson@anglocoal.com.au

Yours sincerely

Pam Simpson
Environment Coordinator

Our reference : DOC08/ 31846 & DOC08/35968 LIC08/570
Contact : Mitchell Bennett , 02 4908 6806

1 1 AUG 2008

Anglo Coal (Drayton Management) Pty Ltd
PMB 9
MUSWELLBROOK NSW 2333

Attention: Ms Pam Simpson

Dear Ms Simpson

Water Management Plan and Air Quality Management and Monitoring Plan

I refer to your letters dated 7 and 27 July 2008 and the attached copies of the subject Plans.

The Department of Environment and Climate Change (DECC) encourages the preparation of strategies, programs and plans as useful tools for industry to ensure that it meets the environmental objectives specified in conditions of Environment Protection Licences. As a regulatory authority DECC does not review or comment on these plans.

Please contact Mitchell Bennett on 02 4908 6806 if you wish to discuss this matter.

Yours sincerely

MITCHELL BENNETT
Head Regional Operations Unit – Hunter Region
Environment Protection and Regulation

The Department of Environment and Conservation NSW is now known as the Department of Environment and Climate Change NSW

PO Box 488G, Newcastle NSW 2300
117 Bull Street, Newcastle West, NSW 2302
Tel: (02) 4908 6800 Fax: (02) 4908 6810
ABN 30 841 387 271
www.environment.nsw.gov.au

Department of **Environment and Climate Change** NSW

DRAYTON

Fergus Hancock
Department of Water and Energy
PO Box 2213
DANGAR NSW 2302

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27th July 2008

Dear Sir

It is a requirement of Drayton's Project Approval Conditions as issued by the Department of Planning for the Drayton Mine Extension (Ref 06_0202) to prepare a Water Management Plan in consultation with the Department of Environment and Climate Change (DECC) and the Department of Water and Energy (DWE).

Drayton request that the DWE review the attached Water Management Plan and respond accordingly with any comments.

Comments would greatly be appreciated by 21st August 2008, to enable finalisation and submission of the plan for approval by the Department of Planning.

If you wish to discuss the attached document please feel free to contact me on 6542 0298 or by email to pam.simpson@anglocoal.com.au

Yours sincerely

Pam Simpson
Environment Coordinator

NSW Government

DEPARTMENT OF WATER AND ENERGY

Contact: Fergus Hancock
Phone: (02) 4904 2532
Fax: (02) 4904 2503
Email: Fergus.Hancock@dnr.nsw.gov.au

Director, Major Projects Assessments
NSW Department of Planning
GPO Box 39
SYDNEY NSW 2001

File: NEW0003722-1

Attn. Nick Hall

18 December 2008

Dear Mr Hall

Subject: Anglo Drayton Coal Water Management Plan

The Department of Water and Energy (DWE) has reviewed the Water Management Plan (WMP) for the Anglo Drayton mine extension. The revised WMP was submitted on 23 October 2008. I apologise for the time is has taken to finalise DWE's review of the document.

The WMP addresses several DWE's key concerns. However, limitations as to the effectiveness of the WMP still exist. The WMP continues to refer solely to storage volumes within site dams, without differentiating between sources of water which are captured within the site water management system.

The WMP would benefit by inclusion of a water source assessment methodology and risk assessmet based on sensitivity criteria defined within DWE Groundwater Monitoring Guidelines attached.

For your reference, also find attached draft Water Reportiong Requirements for Mines developed by Major Projects Unit, DWE. This document assists in the development of water management plans and requirements under Water Act 1912 or Water Management Act 2000 access licences.

DWE will impose conditions in an aquifer access licence for the entirety of the Drayton Coal mining operation, requiring Anglo Coal Drayton operations to follow these guidelines in its monitoring and reporting relationships.

If you require any clarification of the above, please contact Fergus Hancock on (02) 4904 2532.

Yours faithfully

Per Mark Mignanelli
Manager, Major Projects, Mines Assessments and Planning

Major Projects, Mine Assessments and Planning Branch Level 3 26 Honeysuckle Drive Newcastle PO Box 2213 Dangar 2309
Telephone (02) 4904 2500 Facsimile (02) 4904 2503 Website naturalresources.nsw.gov.au

WATER MANAGEMENT PLAN

General Comments:
Condition 28(a) of Schedule 3 of the Project Approval states that the Site Water Management Plan must "*be prepared in consultation with DECC and DWE by a suitably qualified expert/s whose appointment/s have been approved by the Director-General.*"

The Department approved Mr Lindsay Gilbert of Gilbert and Associates as the suitably qualified expert to prepare the Water Management Plan, however notes that the Water Management Plan has been prepared only in consultation with him. The Department requires Mr Lindsay Gilbert as the approved suitably qualified expert to formally endorse the final version of this Plan.

Specific Comments:

Section 5.6.3.2 Surface Water Impact Assessment Criteria
- Location of sites should reference Table 3 not Table 2.
- All sampling sites are not shown in Figure 6.
- All surface water impact assessment criteria should be stated as should all internal trigger levels.

Section 5.6.4.1 Baseline Data
- Locations of piezometers R4251 and R4171 are not shown on Figure 8.
- A map of the four offsite monitored bores should be included.

Section 5.6.4.3 Groundwater Assessment Criteria
- No parameters are included in Figure 9. Groundwater parameters including long term averages could be specified in a table.

Section 5.6.4.4 Groundwater Assessment Criteria
- No reference is made to monitoring the impacts on the groundwater supply of potential affected landowners. (If this will be done through offsite bore monitoring it should be stated within the WMP).

Section 5.6.5.1 Handling Exceedances
- This section should include a clear indication of who will be responsible for carrying out actions and on what authority.
- This section should give specific timeframes indicating when specific management measures will be implemented in the event of an identified exceedance.

Section 5.6.5.2 Mitigation Measures
- This section should include a clear indication of who will be responsible for carrying out actions and on what authority.
- This section should give specific timeframes indicating when specific mitigation measures will be implemented in the event Drayton receives a written request from a landowner to conduct an independent review.

Section 5.6.5.3 Incident Management
- To facilitate on-site use, a copy of the Incident Management Form should be included in an Appendix.