



Prepared for:
**THE NEWCASTLE WALLSEND COAL
COMPANY PTY LIMITED**

ENVIRONMENTAL IMPACT STATEMENT

FOR

PROPOSED EXTENSION OF OPERATIONS

OF ELLALONG COLLIERY

INTO BELLBIRD SOUTH

Prepared by

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AUGUST 1995

FORM 2

SUBMISSION OF ENVIRONMENTAL IMPACT STATEMENT (EIS)
prepared under the Environmental Planning and Assessment Act 1979
Section 77

EIS prepared by
name:
qualifications:
address:

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in respect of
development application

applicant name:
applicant address:

THE NEWCASTLE WALLSEND COAL COMPANY PTY LIMITED
PO BOX 156 CESSNOCK NSW 2325

land to be developed: address,
lot no, DP/MP, vol/foi etc

Subsurface area of part of Consolidated Mining Lease No. 2 and surface areas either NWCC owned (Lot 1, DP 87087, Part Lot 1, DP 69968) or held under the following leases:
Part of Consolidated Coal Lease No. 728, part of Consolidated Mining Lease No. 2, Mining Purposes Lease No. 233, Mineral Lease No. 457, Mineral Lease No. 1283 and Mining Lease No. 1345, as shown on attached plan.

proposed development:

Extension of underground mining operations at Pelton/Ellalong Colliery.

environmental impact statement

an environmental impact statement (EIS) is attached

certificate

I certify that I have prepared the contents of this Statement and to the best of my knowledge

- it is in accordance with clauses 51 and 52 of the Environmental Planning and Assessment Regulation 1994, and
- it is true in all material particulars and does not, by its presentation or omission of information, materially mislead.

Signature:

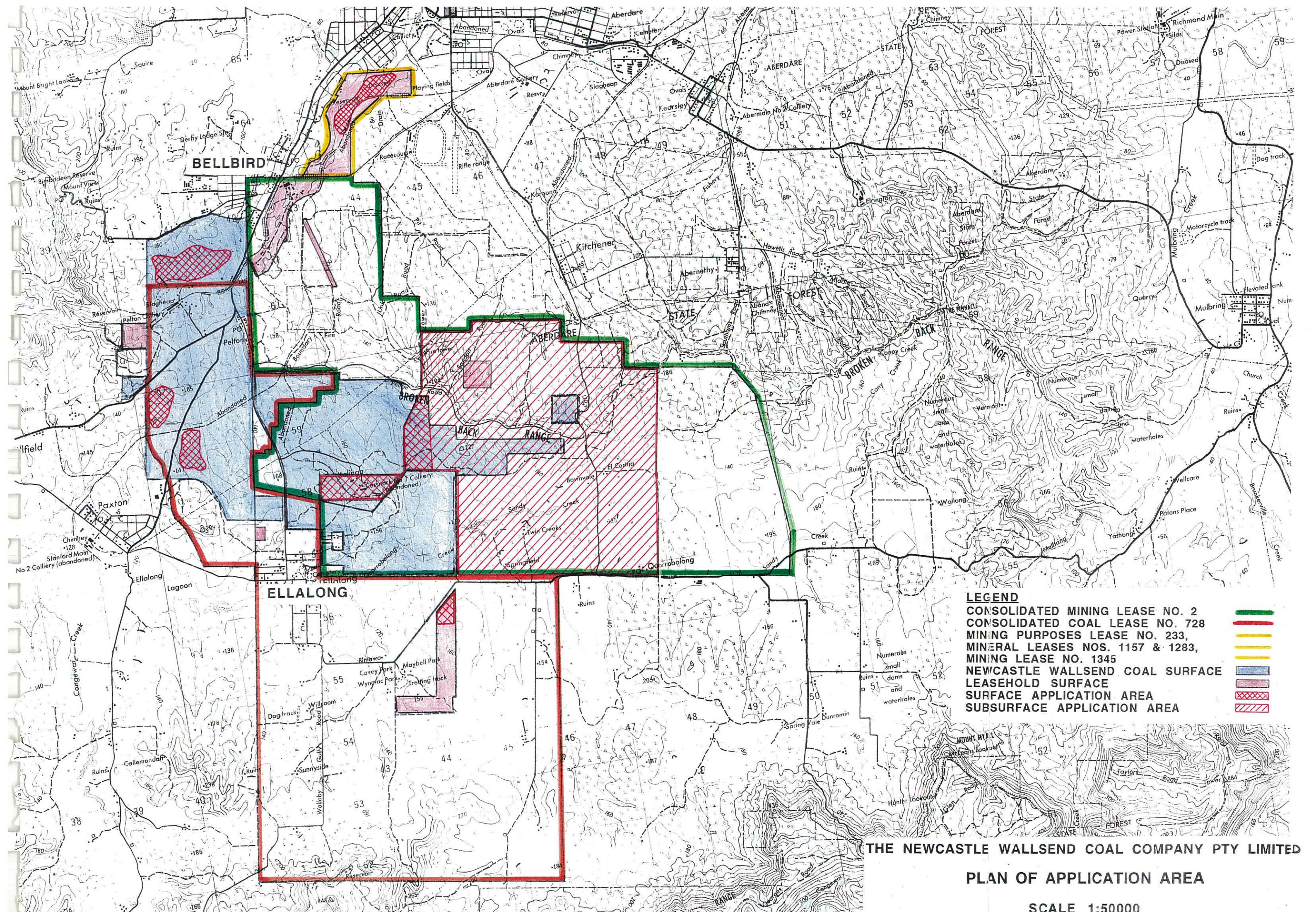
J Gouldstone

Name:

HLA-ENVIROSCIENCES PTY LIMITED

date:

24 / 8 / 95



LEGEND
 CONSOLIDATED MINING LEASE NO. 2
 CONSOLIDATED COAL LEASE NO. 728
 MINING PURPOSES LEASE NO. 233,
 MINERAL LEASES NOS. 1157 & 1283,
 MINING LEASE NO. 1345
 NEWCASTLE WALLSEND COAL SURFACE
 LEASEHOLD SURFACE
 SURFACE APPLICATION AREA
 SUBSURFACE APPLICATION AREA



THE NEWCASTLE WALLSEND COAL COMPANY PTY LIMITED

PLAN OF APPLICATION AREA

SCALE 1:50000

VOLUME 1

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EXECUTIVE SUMMARY



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EXECUTIVE SUMMARY

INTRODUCTION

The Newcastle Wallsend Coal Company Pty Limited (NWCC), a wholly owned subsidiary of Oakbridge Pty Limited, commenced coal mining of the Greta Seam from the outcrop at Pelton Colliery in 1916. Mining of the deeper reserves at Ellalong Colliery began in 1978 and new surface entries were sunk about this time. Underground mining ceased at Pelton Colliery in 1992 and a small open cut along the Greta Seam outcrop commenced at Pelton in early 1995.

Coal continues to be mined at Ellalong by longwall mining methods with the colliery normally producing about 2 Mtpa (million tonnes per annum) of run-of-mine (ROM) coal. The coal is delivered by overland conveyor from Ellalong to the Pelton Coal Preparation Plant, stockpiling, handling and train loading facilities. The washed product (about 1.7 Mtpa) is mainly sold on the export market to coking and steaming coal customers.

In early 1994, serious mining problems were encountered in the southern parts of Ellalong Colliery. The difficulties were mainly related to high seam gas levels (primarily carbon dioxide) which were of such magnitude as to prevent further development of the area with conventional development methods. As a consequence, a review of Ellalong's future was undertaken and it was determined that the only viable option, beyond the next two years, was to mine in the adjoining Bellbird South area to the north and northeast of Ellalong (refer to Figure 1.2).

Development consent was obtained from Cessnock City Council in June 1994 and approvals received from the Department of Mineral Resources to enable two longwall mining blocks to be formed up in a sub lease area within Bellbird South. Geological exploration work and development drivages within this sub-lease area are presently underway. Extraction of the first longwall block is expected to commence in mid 1996.

In the Statement of Environmental Effects which accompanied the Development Application (DA) for the sub-lease area it was mentioned that an Environmental Impact Statement (EIS) would be submitted with the DA for the remainder of Bellbird South. This EIS has been prepared to support the DA for the extension of Ellalong's longwall mining operations into the Bellbird South area as shown on Figure 1.3.

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This summary briefly outline the major features of the existing operation, the proposed development, its environmental and socio-economic implications and the operational safeguards proposed to minimise any adverse impacts.

The DA will be determined by the Minister for Urban Affairs and Planning under State Environmental Planning Policy No. 34 (SEPP 34). Additional supplementary approvals to be obtained are detailed in the EIS.

THE PROPOSAL

NWCC proposes to extend its existing Greta Seam underground longwall mining operation into the adjoining Bellbird South area. There are approximately 165 Mt of in situ coal reserves within Consolidated Mining Lease No. 2 (CML 2) of which approximately 98 Mt are within the application area which is the subject of this DA (refer to Figure 1.2). The remaining reserves would be the subject of a future, separate DA.

The extension area will provide an additional life for the mine of up to 21 years. Consent is sought for an annual production rate of up to 3 Mt of ROM coal, which is approximately the limits of existing coal preparation and handling infrastructure.

The extension of mining into Bellbird South will not alter the scale of operations already taking place at Pelton/Ellalong. The existing infrastructure (shafts, drift, mine ventilation fans, coal conveying and handling systems and preparation plant) will continue to be used. Productivity improvements may result in higher future production levels of up to 3 Mtpa. The present workforce of 360 will not change as a result of the transfer of mining operations to the Bellbird South area.

The results from geological exploration work and ventilation studies presently underway will be used to finalise the mining layout for the first area within Bellbird South. Also, the requirement for a possible ventilation shaft in the vicinity of Sandy Creek Road, within Consolidated Coal Lease No. 728 (CCL 728) will be determined (refer to Figure 1.3). Should such a need be indicated, the shaft may be required by late 1997.

In approximately seven years time, the abandoned Cessnock No. 1 (Kalingo) shafts may be re-opened and utilised for ventilation and possibly manriding or, alternatively, another shaft(s) sunk in the vicinity for the same purposes. The decision on the re-use of Cessnock No. 1 or on nearby new shaft(s) is dependent on the Sandy Creek Road shaft decision and the associated geological and ventilation investigations. This decision will also be influenced by the results of groundwater studies and the discovery of an environmentally



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satisfactory solution to the dewatering of the old flooded Kalingo Mine workings.

Washery reject will continue to be disposed of in accordance with current practices. Fines (tailings) will be pumped into the old underground Pelton Colliery workings as happens at present. There is estimated to be more than 50 years of available space in these old workings.

Coarse reject is presently being disposed of in the old Aberdare Extended Open Cut voids. It is estimated that this area will be filled by about the year 2002 at current rates. As each section is filled to its final level, the surface is treated with a bactericide (or other suitable treatment), capped with inert material, topsoiled, seeded and revegetated. The completion date of the Aberdare Extended site could be delayed by about two years depending on the volume of reject disposed of in the Pelton Open Cut which is expected to be completed about early 1997.

Following the completion of Aberdare Extended, it is proposed that reject be emplaced on NWCC's own surface land as shown on Figure 7.1. Site 1, adjacent to the Pelton coal preparation plant would be filled first, with Sites 3 and 4 to follow at a later date. The emplacement and rehabilitation procedures are fully described in the EIS.

EXISTING ENVIRONMENT

The surface land in the application area, above the proposed longwall operations, is comprised of the Broken Back Range in the north, alluvial flats and associated creeks in the south and the intervening undulating lands. Land use includes forestry (Aberdare State Forest), rural (hobby farms, some larger properties and rural residential) and NWCC's land at Cessnock No. 1 and surrounds. There are approximately 30 private properties within and immediately adjacent to the application area (refer to Figure 6.2). The rural area is very similar to the area presently being undermined by longwall at Ellalong Colliery.

The creeks within the application area include Quorrobolong Creek (and its subsidiaries) which flows to Ellalong Lagoon and then to Congewai Creek and other subsidiaries of Congewai Creek, all within the Wollombi Brook catchment. The northern portion of the area forms part of the Black Creek catchment. Quorrobolong Creek has been previously undermined by Ellalong's longwall.

Reject Emplacement Sites 1, 3 and 4 are all on NWCC's land. They are gullies which are proposed to be filled over time with coarse washery reject and rehabilitated. Site 1 is within the Black Creek catchment, whereas Sites 3



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and 4 are within the Wollombi Brook catchment. All sites have been disturbed over the years due to grazing, slashing and the removal of timber for pit props.

The possible shaft site at Sandy Creek Road is also in a disturbed bushland area, adjacent to a disused quarry.

Cessnock No. 1 Colliery operated from the 1920s until 1961. Old bathhouse and office buildings remain on site in a state of disrepair. The two shafts were capped, but appear to be still in reasonable condition. The underground workings are now flooded. The access road is in poor condition. The immediate area around the old pit top is cleared and three company cottages are rented out. Bushland surrounding the area has been affected by grazing, the removal of timber and, recently, by bushfires.

Pelton/Ellalong has a comprehensive operating Environmental Management Plan (EMP) which is updated annually and which details existing activities and environmental controls. Controls and ongoing monitoring are in place for the management of water, air quality, noise, oil, waste and subsidence. There is a reject disposal and rehabilitation plan for the Aberdare Extended site and plans will be developed in the future for new areas as they are required.

PELTON/ELLALONG

The mine operates within the Oakbridge framework of Environmental Policy and Management systems. The company is committed to striving for environmental excellence and to help achieve this end has a committee structure in place from site level through to Board level. Procedures and systems are regularly reviewed and improvement programmes implemented. Emphasis is placed upon the training of all employees to heighten environmental awareness and knowledge. An Environmental Engineer, with monitoring and management advisory responsibilities, is appointed to each operation.

Community liaison is given a high priority by the mine in respect of environmental matters. The company participates in the Black Creek Salinity Management Committee, whereby users are kept informed of the mine's water situation and plans. Local schools have been invited to view the operations, particularly from an environmental perspective. With respect to the current proposal, information brochures have been distributed to property owners in and near the current application area and in Ellalong and Pelton villages. A public meeting was held in Cessnock and an information booth and display set up and manned in Ellalong community hall for a four week period.



ENVIRONMENTAL IMPACT

HLA-Envirosciences and its sub-consultants have researched and surveyed the subject area and this has enabled a thorough evaluation of the possible impacts of the proposed development upon the natural and social environment to be conducted. The EIS describes these possible impacts and gives an evaluation of the likelihood of those impacts, actually occurring. Measures which could be employed to ameliorate or mitigate any adverse environmental impacts, and monitoring programmes which support these measures are proposed.

The possible sources of significant adverse environmental impacts are mining induced subsidence and vibration, longer term water management (in particular, dewatering of Cessnock No. 1 workings) and flora and fauna, noise, dust, soil and water impacts associated with coarse washery reject disposal. Other matters with smaller potential impacts include noise from a new fan installation at Sandy Creek Road, should this proceed, and the construction works associated with possible new shafts and surface installations.

Mining induced subsidence will affect topography and surface features including improvements. The largely rural area to be undermined is similar in nature to areas previously undermined by longwall at Ellalong. Little or no damage to surface features has resulted and, since similar levels of subsidence are expected, similar effects on the surface are expected in the subject area. Remedial works required to improvements are covered by the Mines Subsidence Board. The company's Subsidence Policy applies in other instances.

Mining induced vibration has been experienced from previous longwall mining at Ellalong. Superficial damage to a number of residences in the Ellalong area has resulted. Repairs and compensation have been provided by the Mines Subsidence Board. Although it is not possible to predict with certainty that the vibration events will occur when the subject area is being mined (it is quite possible that no vibration at all will occur) it has been assumed for the purposes of the EIS assessment that the history is likely to be repeated. In this event, it is predicted that no structural damage to improvements will occur and that any damage that does happen will be superficial.

A preliminary geohydrological study has indicated that water makes at Ellalong are unlikely to change significantly while the first area in Bellbird South is being mined. This would mean that for the first seven years at least, the existing Pelton/Ellalong water management system would be applied, with water being discharged from site and during heavy rain periods in 'wet' years

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and without adversely affecting water quality in Black Creek. There would be no discharges into Congewai Creek.

Geohydrological investigations are continuing to determine the likely longer term water make and to examine possible options for the dewatering of Cessnock No. 1 workings. Should any unexpected increase in water make occur (or the study indicate this is likely) the company will fully consult with the relevant authorities (Environment Protection Authority, Department of Mineral Resources, Department of Water Resources and the Hunter Catchment Management Trust) and the Black Creek Salinity Management Committee in the development of any upgraded water management plan. The company will also fully consult with the respective parties prior to any decision to dewater flooded workings at Cessnock No. 1 Colliery.

Reject emplacement activities will result in the creation of artificially contoured land surface which will be carefully revegetated to re-establish pre-disturbance vegetation assemblages. Emplacements will be designed and constructed so that no leachate contamination of surface or groundwater occurs. In the case of Emplacement Area 1, leachate protection dam(s) will form part of Pelton site's contaminated water management system with leachate being treated as required, prior to the water being used in the coal washing process. In Emplacement Areas 3 and 4 (should these be required during the life of the consent), any leachate will be collected at the low points of each site and be directed to old Pelton underground workings by vertical boreholes.

Archaeology and flora and fauna surveys were conducted as part of this EIS (and are detailed in the document). It is proposed that additional such surveys and a soil survey be conducted prior to the disturbance of each emplacement site. All aspects of the creation of reject emplacements will be regulated by the EPA and the Department of Mineral Resources to ensure environmental acceptability of activities. The proposed emplacement design and methodology, and rehabilitation and revegetation procedures are detailed in the EIS.

The impact of shaft and surface construction activities will be short lived. Air quality and the acoustic environment will be protected by EPA criteria, as will the possible mine fan installation at Sandy Creek Road. Any disturbance of heritage items at Cessnock No. 1 would occur within the context of a Heritage Management Plan which would be developed for the site following a detailed assessment of the significance of the site.

The proposed extension of Ellalong Colliery in the Bellbird South area will result in a continuation of the mine for approximately 21 years. Coal conveying, handling, preparation and transport to the Port of Newcastle will

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be unchanged from current practice, hence no changes in environmental impact will result.

Approval of the proposed extension will have a positive socio-economic impact on Cessnock and the surrounding community. Of the 360 personnel currently employed at Pelton/Ellalong, approximately 80 per cent reside in the Cessnock local government area. By maintaining direct employment, the mine will provide continued employment support in ancillary operations such as transport, maintenance and services. In addition to the direct economic benefits to the Cessnock area and surrounding region, the New South Wales Government will continue to receive income from the mine's operations via coal royalties, rail freight payments, port charges and various taxes. The Ellalong/Pelton Mine generates in the order of \$A90 million per year in export revenue according to the New South Wales Coal Industry profile (Department of Mineral Resources).

CONCLUSION

The EIS prepared for the proposed extension of Ellalong Colliery into Bellbird South presents an assessment of the likely environmental impacts on the surface above and nearby the subject area. The development is being proposed in order to prevent the premature closure of the colliery and would extend the mine for 21 years.

The proposal is for a continuation of the existing mining operation (albeit in a different location), using generally the same surface infrastructure, coal transport, handling and preparation facilities as at present. Similar levels of manning and outputs to those currently in place are envisaged, although productivity improvements could result in higher future production within the constraints of existing infrastructure.

The environmental impacts from the proposed development are assessed as relatively minor and are generally expected to be little changed from those experienced from the current operation. The company's commitment to ongoing community and statutory authority liaison should ensure that any potential environmental concern is addressed as the development progresses and before it becomes an issue.

Strong arguments exist, in social and economic terms, in view of the minor nature and extent of predicted adverse environmental impacts, in favour of the proposed development.

The proposed extension of Pelton/Ellalong underground mining operations into Bellbird South can be viewed as a development compatible with the principles of ecologically sustainable development. The mining operation will



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be a transient phenomenon which, when complete, will see all affected surface areas fully rehabilitated and integrated into the surrounding environment.

The Newcastle Wallsend Coal Company Pty Limited fully recognises the environmental implications of this project. It is committed to conducting its operations in an environmentally responsible manner and in consultation with government authorities and the local community.



SECTION 1 : INTRODUCTION

1.1

1.1 THE PROPOSAL AND ITS OBJECTIVES

The Newcastle Wallsend Coal Company Pty Limited (NWCC) presently operates the Ellalong Underground Mine within the Pelton/Ellalong Colliery Holding (Consolidated Coal Lease No. 728), which lies on the southern perimeter of Cessnock in the lower Hunter Valley of New South Wales (see **Figure 1.1**). NWCC proposes to extend its Ellalong underground mining operations into the existing Consolidated Mining Lease No. 2 area of Bellbird South (refer to **Figure 1.2**). The Company will mine part of Consolidated Mining Lease No. 2 from mid 1995 to early 1997, and proposes further development of the Bellbird South area commencing in early 1996. This further development is the subject of this Environmental Impact Statement (EIS).

The development for which consent is sought entails a 21 year mine plan with annual production of up to 3 million tonnes (Mt) of run-of-mine (ROM) coal per annum, which is the limit of the present infrastructure. Present mine planning is for an annual rate of production of approximately 2 Mtpa ROM coal, which yields approximately 1.7 Mtpa of saleable steaming and coking product for both export and domestic markets. The scale of operations is planned to continue at the current level.

The Bellbird South project will be an underground mining operation in the Greta Seam using the longwall extraction method. This seam contains measured in situ reserves of approximately 165 Mt of coal within CML 2, of which approximately 98 Mt are the subject of this Development Application (DA). This represents a resource suitable for a commercially viable longwall operation. The Greta Seam was previously worked in this area by the Bellbird and Cessnock No. 1 collieries from 1908 to 1977 and 1917 to 1961 respectively.

Also the subject of this DA are areas for the long term disposal of coarse washery reject at the old Aberdare Extended Open Cut site and on NWCC's own surface land as shown on **Figure 1.2**.

For the proposed development, Ellalong's existing surface infrastructure will be used. Coal

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will be brought out from underground via the Ellalong drift conveyor and then by the existing overland conveyor system to the Pelton site where stockpiling, washing and rail loading will continue as at present. Men and materials access will continue, initially, via the Ellalong drift and No. 1 and No. 2 shafts. Ventilation will continue in the early years as at present, with the fans at the No. 1 shaft, although a new ventilation shaft, possibly with fan(s), may be required adjacent to Sandy Creek Road in about 1997 (refer **Figure 4.10**). It is planned to either re-open the old Cessnock No. 1 Colliery shafts for ventilation and possibly manriding from about the year 2001, or to sink new shafts for these purposes.

Development of the new operation will involve the use of existing mining equipment initially. It is planned to progressively replace existing longwall roof supports, which have a working height of 4.1 metres (m), with new supports with a working height of 4.5 m. This is the maximum desirable working height of successful longwalls with present technology. In both cases, the tops of the coal seam, which usually has a higher sulphur content, will be left behind in the goaf.

It is proposed to commence mining in the southern longwall blocks, where access is currently available from Ellalong's 1 East workings, and to progressively mine this area from west to east (see **Figure 1.3**). Subsequently, it is planned that the Cessnock No. 1 shafts will be holed or new shaft(s) sunk, and the northern blocks worked again from west to east.

Finally, the area in the eastern part of the lease will be accessed and longwall blocks extracted. In this eastern area, depth of cover ranges up to 750 m and this presents new challenges. It is expected that it will be about 20 years before mining reaches this area, and that technological advancements will mean successful mining of this area is possible in the future. Further development consent would be required to mine this area.

The majority of product coal will be loaded onto trains to be transported some 65 km to the Port of Newcastle for export to overseas markets. Prior to export the coal will be blended with other coals to produce a range of products suitable for metallurgical use and energy generation. In addition to rail loaded coal, a small amount will be transported by road for special coals and

to service local domestic markets.

The objective of the Bellbird South development is to extend the current Ellalong underground operations as a profitable, technically sound and environmentally acceptable coal mining operation.

1.2 PROFILE OF NEWCASTLE WALLSEND COAL COMPANY

The Pelton/Ellalong Colliery is operated by The Newcastle Wallsend Coal Company Pty Limited, which is wholly owned by Oakbridge Pty Limited. NWCC is the oldest coal mining company in Australia, being founded in 1858, and was the first Australian owned company established to mine and sell coal. The major shareholders of Oakbridge Pty Limited are listed below:

Tomen Corporation	25.6%
Nippon Oil Corporation	23.6%
Kawasho Corporation	2.9%
Ban Pu Australia Pty Ltd	6.7%
Cyprus-Amax (USA)	41.3%

The Company has been producing coal continuously for more than 130 years in the Hunter Valley. In addition to the Pelton/Ellalong Colliery, NWCC currently operates the Gretley Underground Colliery where the Dudley and Young Wallsend Seams are mined. Coal is produced by the underground longwall and mini wall extraction method at NWCC operating coal mines. Unmined reserves of recoverable saleable coal from the Gretley and Pelton/Ellalong Collieries are estimated at 9 Mt and 46.0 Mt respectively (Department of Mineral Resources 1994 Coal Industry Profile).

Underground mining of the Greta Seam commenced in 1916 at Pelton Colliery and continued until September 1992. Since then coal has been produced exclusively from Ellalong Colliery.

Production at Ellalong Colliery commenced in 1978 with coal being delivered by overland conveyor to the Pelton surface facilities which include the coal preparation plant, raw and

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washed coal handling systems and train loading facilities. Longwall mining was introduced into Ellalong Colliery in 1983 and is the major source of production.

A small open cut operation commenced at Pelton Colliery in February 1995. This operation will mine a small amount of Greta Seam and Pelton Seam coal along the outcrop. It is expected that approximately 400,000 tonnes of coal will be recovered over an 18 month period.

NWCC has recently obtained development consent for three developments which are listed in **Table 1.1.**

TABLE 1.1 NWCC DEVELOPMENT APPROVALS	
Proposed Development	When development consent was granted
Pelton Open Cut Coal Mine	November 1992
Maitland Main Extension to Pelton Open Cut	November 1993
Bellbird South Sublease	June 1994
Source: Newcastle Wallsend Coal Company Pty Limited	

Bellbird South Consolidated Mining Lease No. 2 is held by Southland Coal Pty Limited, wholly owned by Devex Limited, a diversified Australian mining company. NWCC will mine this area as a sublease.

1.3 BACKGROUND TO THE DEVELOPMENT

The area which forms the subject of this Development Application represents the western portion of an area previously proposed to be mined by Southland Coal Pty Ltd in 1988, utilising longwall mining methods. The development proposed by NWCC differs from the Southland proposal in that no new coal handling, washery or rail transport infrastructure is proposed, and the Bellbird South coal will be mined as an extension of the existing Ellalong Colliery. This means that development of surface facilities under the current development application will be on a smaller scale than the Southland proposal.

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In February 1994, the development driveage for Longwall 12 block in the current workings at Ellalong Colliery encountered high levels of gas (primarily carbon dioxide) in the Greta seam. The magnitude of the gas levels prevented any further development of Longwall 12 maingate heading.

The then existing five year mine plan to the southeast of Longwall 12 did not appear possible with either longwall or continuous miner methods because of the likely increase in gas levels and increasing depth of cover. Investigations are in progress to ascertain the expected seam gas levels adjacent to current workings, however it will take some time, possibly years, before an overall picture is obtained. In the meantime, to maintain longwall production continuity it was necessary that the development units be used to form up another longwall block.

Development consent for mining under land subleased by NWCC from Southland Coal Pty Limited, immediately adjacent to the current Ellalong 1 East workings, was obtained in 1994 and the development units were transferred to this area. It is expected that this area contains low levels of gas. Depths of cover in the Bellbird South sublease area (referred to as "existing consent area" in **Figure 1.2**) are in the order of 400 m compared to 550 m in the area with gas problems. However, this sublease only covers an area of approximately 294 ha and longwall extraction of two blocks is forecast to take less than two years (see **Figure 1.2**). Hence to ensure the longevity of mining operations at Pelton/Ellalong, another development consent is being sought for mining outside the current sublease area into the remainder of the Bellbird South Colliery holding. If approved, it is envisaged that development into Bellbird South will begin in early 1996 and mining will continue until the year 2017 (21 year mining plan) and beyond (new development consent needed).

The large coal reserves will support long term supply of coal to the export market and to the domestic/local market.

1.4 LIAISON WITH GOVERNMENT AUTHORITIES

A Planning Focus meeting in relation to the Southland proposal was held in February 1987.

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The following Departments and Authorities were represented at this meeting:

Department of Mineral Resources	Cessnock City Council
Department of Environment & Planning	Electricity Commission of NSW
Department of Industrial Relations	Shortland County Council
Joint Coal Board	Energy Authority of New South Wales
Soil Conservation Service	Hunter District Water Board
State Pollution Control Commission	Department of Main Roads
Newcastle Mines Rescue Station	Hunter Valley Conservation Trust
Forestry Commission of NSW	Hunter Development Board
Water Resources Commission	Telecom Australia
Mine Subsidence Board	Premier's Department
Department of Lands	Maritime Services Board
Ministry of Transport	State Rail Authority
Department of Arts, Heritage & Environment (Commonwealth)	

In June 1994, NWCC entered into a sublease arrangement with Southland Pty Ltd to mine a part of Consolidated Mining Lease No. 2. A Statement of Environmental Effects in support of the sublease Development Application was presented to Cessnock City Council. Development Consent for the sublease proposal was granted in June 1994.

A briefing was held by the Company with the Department of Mineral Resources on 26 October 1994 concerning the Ellalong extension proposal. The Company has requested the Department's support through the Development Consent process. Information outlining the conceptual mine plan, land use above the proposed mining area, geological and coal quality data, and a resource recovery statement have been provided to the Department of Mineral Resources.

A meeting between NWCC and Cessnock City Council representatives was held on 8 November 1994. This meeting discussed the Development Application for the Bellbird South Extension of Ellalong Colliery. The Council advised the Company of its requirements regarding the content of the EIS (letter, **Appendix 1**).

The Director of Planning has been consulted regarding the required form and content of the EIS and a copy of the Director's requirements issued as a result of this consultation are given

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in **Appendix 1**. The Minister for Planning ruled that the Development Application would be determined under SEPP 34.

The Company has provided information regarding the proposed development to the Commonwealth Department of Primary Industries and Energy. The Commonwealth Environment Protection Authority will examine the proposed project as the Ellalong Extension proposal has been designated by the above Department.

Other government departments and statutory authorities have been consulted as part of the Planning Focus process (refer **Section 1.5**).

1.5 PLANNING FOCUS MEETING

The Planning Focus process has been followed to present the Bellbird South Extension to Statutory Authorities and Government Departments. The Planning Focus Meeting and site inspection took place on 8 February 1995. This meeting was co-ordinated by the Department of Mineral Resources. The proposed project was explained and environmental issues outlined. Participants in the Planning Focus provided written comments regarding the proposal and these have been considered in the preparation of this Environmental Impact Statement.

The following government departments and statutory authorities were represented at the Planning Focus Meeting:

- Department of Planning (now Department of Urban Affairs and Planning)
- Department of Water Resources (now Department of Land and Water Conservation)
- Department of Conservation and Land Management (now Department of Land and Water Conservation)
- Shortland Electricity (now Orion Energy)
- Mine Subsidence Board
- Cessnock City Council
- Department of Mineral Resources
- Hunter Catchment Management Trust.
- Hunter Valley Conservation Trust
- Coal Compensation Board

Copies of the Planning Focus document and supporting material were forwarded to:

Heritage Council of NSW
Environment Protection Authority
Land Information Centre
Department of Agriculture
National Parks and Wildlife Service.

A separate meeting was subsequently held with the Environment Protection Authority.

Planning Focus Meeting responses are included in **Appendix 2**.

1.6 COMMUNITY LIAISON

As part of its programme of community liaison, relating to its existing mining operations at Ellalong Colliery, the Company participated in a Public Meeting on 30 June 1994. The purpose of this meeting was to discuss existing vibration, subsidence and noise issues. NWCC made a presentation and answered residents' questions relating to these issues. Further, at this meeting the Company announced its plans to extend Ellalong Colliery operations into Bellbird South. A plan was displayed which indicated the area proposed to be mined and residents present at the meeting were informed that an Environmental Impact Statement would be prepared. NWCC offered to provide more information as the project progressed.

The Company maintains ongoing liaison with local residents, Wollombi Landcare Group, and Black Creek Water Salinity Management Committee. It is anticipated that future meetings with these groups will be utilised as a basis for discussion and information regarding the proposed project and the EIS during the Development Application process. Should development consent be obtained and new areas opened up for mining, this liaison process would continue.

Subsequent to the Planning Focus the Company distributed to all local residents a community information sheet regarding the Development Application. **Appendix 3** contains information distributed to local residents.

1.9

A public meeting was held in Cessnock on 1 March 1995 after being advertised in the Cessnock Advertiser. Company personnel outlined all aspects of the proposed development, and a representative of the Mine Subsidence Board addressed the meeting. Consultants in the field of vibration and environment were available and answered questions where required. Twenty-eight people attended this meeting. The Minutes of this meeting are included in **Appendix 3.**

Since the public meeting, an Information Centre has been established at Ellalong Community Hall which provided an opportunity for interested community members to discuss the proposed development with NWCC representatives. The Information Centre was promoted via advertising in the Cessnock Advertiser, and by a notice in the local Ellalong shop. The centre was open for three days per week over four weeks, between 20 March and 13 April 1995. Fifteen people visited the centre, all being local residents: thirteen from Ellalong and two from Bellbird.

The wider community was also informed about the proposed development by means of a number of media releases published in the Cessnock Advertiser.

1.7 FORMAT OF THE IMPACT STATEMENT

The Environmental Impact Statement for the proposed extension to Pelton/Ellalong Colliery is presented in one volume. The Text has been compiled in 13 sections, as outlined below, with a set of Appendices. The document covers the requirements of the Environmental Planning and Assessment Act and Regulations, 1994.

- Section 1** : **Introduction** - Outlines the scope of the proposal. Describes the background of the proposal and details consultation with government authorities.
- Section 2** : **Approvals Held And To Be Obtained** - Describes the relevant legislation and approvals required.
- Section 3** : **The Coal Resource - Geology** - Describes the coal geology, exploration, reserves and coal quality of the project area.

1.10

- Section 4** : **Existing Environment** - Describes the physical and biological background to the Pelton/Ellalong Colliery lease area.
- Section 5** : **Existing Mining Operations** - Describes the current underground mining operations at Pelton/Ellalong as well as the coal handling, preparation, transportation of product coal and handling and disposal of reject material. Current water management and environmental monitoring programmes are discussed.
- Section 6** : **Land Use Zoning and Ownership** - Describes current land use, zoning and ownership and socio-economic factors.
- Section 7** : **Proposed Extension of Mining Operations** - Details the nature of the proposed extension of the underground mine. Proposed water management strategies and rehabilitation are also discussed.
- Section 8** : **Assessment of Impact Due to the Extension** - Predicts the potential impacts of the proposed extension of the underground mine on the environment.
- Section 9** : **Measures to Mitigate Adverse Effects** - Details water management and subsidence vibration policies and mitigatory measures.
- Section 10** : **Justification of the Development** - Describes the justification of the proposal in economic, social and ecological terms.
- Section 11** : **Energy Statement** - Briefly quantifies the energy requirement for the proposal and measures to be implemented to conserve energy.
- Section 12** : **Alternatives to the Development** - Discusses viable alternatives to the proposed development and explains the consequences of not proceeding with the project.
- Section 13** : **Conclusion and Summary** - This section ties all pertinent issues of the proposal together in a conclusion.

1.8 STUDY TEAM

This report has been prepared by HLA-Envirosciences Pty Limited.

The following Sub-Consultants also contributed to this study:

- Renzo Tonin and Associates - Vibration Assessment;



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- Graham Holt and Associates - Subsidence Assessment;
- J. Hetherington Mining Services Pty Limited - Coarse Washery Reject Disposal and
- Insearch Ltd - Geohydrological Report.

The following staff provided information related to the project on behalf of Newcastle Wallsend Coal Company Pty Limited:

- Michael Simes - Manager Mining Services
- Robert Lenton - Environmental Engineer
- Kevin Price - Chief Surveyor
- Russell Rigby - Senior Geologist



SECTION 2 : APPROVALS HELD AND TO BE OBTAINED

2.1

2.1 INTRODUCTION

2.1.1 The Control Framework

The Ellalong Colliery operations are regulated by the planning, mining and environmental legislation of New South Wales which includes:

- Environmental Planning and Assessment Act 1979;
- Mining Act 1992;
- Coal Mines Regulation Act 1982;
- Protection of the Environment Administration Act 1992;
- Pollution Control Act 1970;
- Dangerous Goods Act 1975;
- Noise Control Act 1975;
- Ozone Protection Act 1989;
- Environmentally Hazardous Chemicals Act 1985;
- Environmental Offences and Penalties Act 1989;
- Clean Waters Act 1970; and
- Clean Air Act 1961.

Relevant Commonwealth legislation includes:

- Export Control Act 1982
- Environment Protection (Impact of Proposals) Act 1974.

The proposed extension of Ellalong Colliery operations into Bellbird South will fall under the same legislative regime as does the current operation.

2.1.2 The Relationship Between the Controls

Responsibility for environmental protection is shared between the Commonwealth, State and local governments.

The Commonwealth exercises jurisdiction over environmental matters of national and international significance, and over international investment and trade by means of the legislation outlined in **Section 2.1.1**.

2.2

The Environment Protection (Impact of Proposals) Act 1974 applies to the granting of export licences and to Foreign Investment Review Board approvals. Proposals of considerable environmental significance may also be subject to Commonwealth Environmental Impact Assessment under this legislation. The proposal to mine and export coal from Bellbird South does not involve any alteration to existing export licence conditions, nor does it involve any new foreign investment.

The New South Wales legislation (refer to **Section 2.1.1**) and related measures form the most significant environmental controls affecting the current Ellalong Colliery operations and the proposed extension. Within this framework, Local government performs a major role with respect to land use planning, while the major responsibilities for environmental quality, conservation and resource management devolve upon the State Government authorities. Direct Ministerial supervision is exercised through relevant Departments, notably the Department of Urban Affairs and Planning, and the Department of Mineral Resources.

Pollution control legislation in New South Wales involves both planning and protection, and complements the environmental planning system embodied in the Environmental Planning and Assessment Act 1979.

2.2 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

Under the Environmental Planning and Assessment Regulation 1994, Schedule 3, the proposed development of underground coal mining in the Bellbird South area is a designated development. This requires that a development application for this development must be accompanied by an EIS which describes the mining operation for which consent is sought.

The Minister of Urban Affairs and Planning has advised that the Development Application will be determined under State Environmental Planning Policy 34.

Under the Environmental Planning and Assessment Act 1979, the Hunter Region Environment Plan 1989 and the Cessnock Local Environmental Plan 1989 contain provisions which affect the proposed development.

2.3 MINING ACT 1992

The Mining Act makes provision with respect to mining titles. The existing mining lease over the extension area, Consolidated Mining Lease No. 2, will control the conduct of the Bellbird South extension with provisions to protect the environment and procedures for rehabilitation. The Minister for Mineral Resources has the power to vary the terms of the Mining Lease.

Section 65 provides that a "special purpose condition" (which is defined in clause 15 of the 1st Schedule as condition dealing with mining methods, rehabilitation and safety measures) in a development consent is void and the development consent is taken to have been given free of that condition.

2.4 POLLUTION CONTROL LEGISLATION

Responsibility for the administration of the numerous pollution control statutes in New South Wales is concentrated with the Environment Protection Authority under the Pollution Control Act 1970. The Environmental Offences and Penalties (EOP) Act 1989 supplements this legislative scheme. The EOP Act creates additional offences relating to the unauthorised disposal of waste, and the spillages and escape of substances from containers, by which harm is or is likely to be caused to the environment.

Pollution Control Act 1970: The mine is "scheduled premises" within the meaning of the Noise Control Act and the Clean Air Act and operates within the terms of an "approval" granted by the EPA. The proposed extended mine will be required to hold annually renewable licences each of which must be complied with at all times.

Clean Air Act 1961: Emissions of dust from the mine may only occur in accordance with the approval of, and licence issued by, the EPA.

Clean Waters Act 1970: Approval is required from the EPA to install, construct or modify any equipment which will lead to the discharge (by whatever means) of pollutants into any waters.

2.4

Dangerous Goods Act 1975: Explosives are dangerous goods, as defined, and licences are required for premises upon which they are stored, carried and used. The provisions and controls of the Coal Mines Regulation Act are relevant in this context.

Ozone Protection Act 1989: This Act applies to CFCs and Halons where they are used other than in articles which use those substances in their operation.

Environmentally Hazardous Chemicals Act 1985: A licence is required in respect of the storage, transport and use of prescribed chemicals.

Environmental Offences and Penalties Act 1989: Any breach of the Environmental Protection Legislation is an offence for which there are penalties for the company and its officers which range from \$1 million downwards. In addition, orders may be made for:

- the prevention, control or mitigation of the harm;
- reimbursement of loss or damage to property; and
- reimbursement of expenses incurred by a public authority.

2.5 LICENCES AND APPROVALS HELD

2.5.1 Lease Details

Consolidated Mining Lease No. 2 is held by Southland (Bellbird South). A sub-lease over 294 hectares of Consolidated Mining Lease No. 2 is held by NWCC and gives the Company the right to mine in the sub-lease area. The current Development Application relates to part of the remainder of Consolidated Mining Lease No. 2 outside the sub-lease area.

Pelton/Ellalong Colliery operates under the terms of the Consolidated Lease referred to as "Pelton Colliery". The list of leases covering "Pelton Colliery" are listed below:

CONSOLIDATED COAL LEASE NO. 728 (Act 1973)

Gives the right to mine in the 3,251 hectares of the Pelton Colliery Holding.

2.5

PRIVATE LANDS LEASE NO. 150 (Act 1906)

Gives the right to mine in 46.54 hectares as Pelton Open Cut. Transferred on 25 November 1992 from Maitland Main Colliery.

SUB-LEASE FROM SOUTHLAND COAL (dated 20 November 1988)

For parts of Mineral Leases Nos. 325, 1,149 and 1,158 (C&S Act 1906) and Mining Purposes Lease No. 305 (Act 1906) - Lease for haul road to Aberdare Extended Colliery Open Cut.

MINING PURPOSES LEASE NO. 1,364 (Act 1906)

Part of Pelton Railway (4,527 m²)

MINING PURPOSES LEASE NO. 23 (Act 1906)

Part of Pelton Railway (2.42 hectares)

MINING PURPOSES LEASE NO. 217 (Act 1906)

Part of Pelton Railway (6,298 m²)

MINING PURPOSES LEASE NO. 89 (Act 1901)

Part of Pelton Railway (3.96 hectares)

MINING PURPOSES LEASE NO. 269 (Act 1906)

Part of Pelton Railway (2.66 hectares)

MINING LEASE NO. 1347 (Mining Act 1992)

Gives right to mine from surface to depth of 15.24 m in 16.95 hectares for Pelton Open Cut.

MINING LEASE NO. 1345 (Mining Act 1992), MINING LEASES NOS. 1283, 1157 and MINING PURPOSES LEASE NO. 233

Aberdare Extended - part of haul road and reject disposal area.

2.5.2 Development Approvals (Cessnock City Council)

- DA No. D74/75/79 for a Coal Mine at Ellalong - Cessnock Council approval (Ref: BM.D74/75/79). Includes approval for creation of a reject emplacement. Approved 17 December 1975.
- DA 118/680/93 for a Downcast Ventilation and Man Access Shaft, Bathhouse and Offices on Portion 249, Parish of Ellalong - Cessnock Council approval dated 10 October 1980.
- Development Consent dated 7 January 1993 for Raw Coal Handling Facility, Washed Coal Handling Facility and Water Management System - Approval Number 118/691/229.

2.6

- Development Consent 26 November 1992 for Open Cut Mine - Approval Number 118/691/181 and Development Consent 26 November 1993 for Maitland Main Extension to Open Cut Mine - Approval Number 118/693/42. Pelton Open Cut Mine commenced operations in February 1995.
- Bellbird South Sublease Area - Development Consent granted in June 1994.

2.5.3 Environment Protection Authority

Pollution Control Licence

The operations of Pelton Ellalong Colliery are generally covered by the Environmental Protection Authority Licence Number 00416 which is included as **Appendix 12**. This licence is issued under the provisions of the Pollution Control Act 1970.

Radioactive Substances Licence

The use of Radioactive Substances at the Pelton Colliery Coal Preparation Plant, used for Density Determination, is covered by Licence Number R1, 7 10845. This licence is issued by the Environment Protection Authority, under the Radioactive Substances Act 1957.

Pollution Control Approval - Handling Systems

Under the provisions of Section 17K of the Pollution Control Act 1970, approval number 92/257H has been granted for to allow the extension and modification of the Coal Handling Systems at Pelton Colliery Coal Preparation Plant.

Pollution Control Approval - Water Management Systems

Under the provisions of Section 17K of the Pollution Control Act 1970, approval number 92/249H has been granted to allow the extension and modification of the Water Management System at Pelton Colliery.

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Under the provisions of Section 19 of Clean Waters Act 1970, approval number 270160C3 was granted to allow the extension and modification of the Water Management System at Pelton Colliery. This approval has upgraded the Approval 92/249H detailed above.

Pollution Control Approval - Pelton Colliery Open Cut

Under the provisions of Section 17K of the Pollution Control Act 1970, approval number 92/816H has been granted for to allow the construction of an Open Cut Mine at Pelton Colliery.

Pollution Control Approval - Ellalong Drift Site

Under the provisions of Section 19 of Clean Waters Act 1970, approval number 270160C8 was granted for installation of Oily Waste Collection and Treatment System at Ellalong Colliery Drift Site.

Pollution Control Approval - No.2 Shaft

Under the provisions of Section 27 of Noise Control Act, approval number 270896C6 and 270896C7 were granted for the construction of Ellalong Colliery No. 2 Shaft.

2.5.4 WorkCover Authority

The storage of Explosives at Pelton/Ellalong Colliery is covered by WorkCover Authority Licence No. 35/020295. This licence is for the 500 kg of explosives approved under the Coal Mine Regulation Act, and 4,000 detonators.

2.5.5 Agreements

There is an agreement in place between The Newcastle Wallsend Coal Company Pty Limited and Coal and Allied Operations for the operation of the reject emplacement area referred to as "Aberdare Extended". This agreement is for the continued emplacement of coarse washery

2.8

rejects in the disused open cut and the subsequent rehabilitation of the area. The leases for this reject emplacement area have been recently transferred from Coal and Allied Operations to NWCC.

2.5.6 Mining Extraction Approvals

The Colliery has approval for the extraction of Longwall 12A, the next block to be mined.

The extraction of future longwall blocks is subject to application and determination by the Minister, Department of Mineral Resources, which is made on the recommendation of the Chief Inspector of Coal Mines, under the Coal Mines Regulation Act, 1982.

Each longwall block (or group of blocks) is the subject of a separate application prior to extraction. A detailed assessment of subsidence effects on surface natural features and improvements is required at the time each application is submitted.

2.6 LICENCES AND APPROVALS TO BE OBTAINED

- Development consent for extension of Ellalong's coal mining operations into Bellbird South.
- Development consent for creation of washery reject emplacements.
- Other development consents could be required should decisions to proceed with the following be made:
 - * upgrading surface facilities at Cessnock No. 1 Colliery, including construction of bathhouse, winder, ventilation fan(s), upgrading of private roadway;
 - * sinking of new ventilation and manriding shaft(s).
- Mining extraction approvals for longwall panels.

2.9

- EPA licences for continuance of existing pollution control and waste management systems upon granting of consent for extension of mining operations into Bellbird South.
- Water management systems related to the dewatering of Cessnock No. 1 Shafts and noise control measures related to the commissioning of new ventilation fan(s) will require approvals and licences from the EPA under the Pollution Control Act 1970.
- EPA approval for activities associated with the sinking of new shaft(s), should this option be pursued.
- Approval from the Minister for Mineral Resources for the creation of coarse washery reject emplacements and related procedures, under the Coal Mines Regulation Act 1982, and from the EPA.

2.7 SUMMARY

The current and proposed operations at Ellalong Colliery will be regulated predominantly by New South Wales legislation, under which State Government departments, local government and statutory authorities perform planning and regulatory roles.

The Development Application will be determined by the Minister for Planning under State Environment Planning Policy No. 34, as required under the Environmental Planning and Assessment Act 1979. Mining activities will be approved and regulated under the Mining Act 1992 and the Coal Mines Regulation Act 1982. Pollution generated by the proposed development will be controlled by the EPA via numerous statutes under the Pollution Control Act 1970. The Environmental Offences and Penalties Act 1989 provides for penalties for breaches of the State Environmental Protection Legislation.

Current mining operations are occurring within a sub-lease of Consolidated Mining Lease No. 2, the lease being held by Southland (Bellbird South). The Development Application relates to part of the remainder of Consolidated Mining Lease No. 2.

2.10

The operations of Pelton/Ellalong Colliery are covered by the EPA Licence No. 00416, issued under the provisions of the Pollution Control Act 1970. This licence affects coal handling systems, water management systems, Pelton Open Cut, and other surface operations. Storage of explosives is controlled by a WorkCover Authority Licence.

Longwall extraction of coal and construction of reject emplacements is regulated by the Minister for Mines under the Coal Mines Regulation Act 1982.

Licences and Approvals which will be required to facilitate the proposed development are shown in **Table 2.1**, below.

TABLE 2.1		
Approval Required	Activity	Determining Consent Authority
Development Consent	Extension of coal mining into Bellbird South including creation of washery reject emplacements	Minister for Planning
Development Consent*	Sinking of new shaft adjacent to Sandy Creek Road, and new ventilation fan(s)	Minister for Planning
Development Consent *	Upgrading Surface Facilities at abandoned Cessnock No. 1 Colliery (bathhouse, car park, winder, fan(s), private roadway)	Cessnock City Council
Mining Extraction Approval	Extraction of longwall panels	Minister for Mineral Resources
EPA Licences and Approvals	<ul style="list-style-type: none"> • Pollution control systems in extended colliery operation • Waste management systems, Cessnock No. 1 Shafts • Noise control measures, new ventilation fan(s) • Creation of coarse washery reject emplacement 	EPA
Approval	Washery reject emplacement creation and procedures	Minister for Mineral Resources
Development Consent	Emplacement of washery reject at Aberdare Extended	Minister for Planning
* Consent required should decision be taken to proceed		



SECTION 3 : THE COAL RESOURCE GEOLOGY



3.1

3.1 COAL GEOLOGY

The strata in the Bellbird South project area are situated on the eastern flank of the Lochinvar Anticline, in the northern part of the Sydney Basin. The strata dip to the southeast and south at 3 to 6 degrees. The seam to be mined is the Greta Seam, a stratigraphic unit of the Greta Coal Measures, occurring at depths from 400 to 680 m in the Application area, with marine sandstones and siltstones of the Maitland Group extending from the coal measures to the surface (refer to **Figure 3.1**).

Within the Application area, the Greta Seam ranges in thickness from 3.9 m to 6.8 m, with minor non-coal bands. The seam floor is usually sandstone with some areas of mudstone forming the immediate floor, whilst the seam roof is usually coarse pebbly sandstone to conglomerate. The top-most sections of Greta coal commonly contain high levels of pyrite ("Brassy Tops"), a result of marine conditions prevailing during and after the deposition of the upper sections of the seam. These "Brassy Tops" where possible will not be mined for coal quality reasons.

Faulting has been recorded from adjacent colliery workings, and seismic surveys in the study area have identified structurally disturbed zones. One such disturbed zone forms the eastern limit of Longwall extraction proposed in this study. Faults in the project area are believed to be less than 10 m.

Experience at Ellalong has indicated that mining conditions are improved when development driveage is oriented parallel to the major stress direction. The stress direction has been determined in exploration work and has been used in the layout of the proposed mining panels.

3.2 COAL EXPLORATION

Exploration in the area was originally conducted by Bellbird and Cessnock No. 1 Collieries. Southland Coal Pty Limited acquired additional leases from Coal and Allied adjacent to the Bellbird leases in 1985. In 1986 Southland Coal drilled three cored holes and conducted 44 km

3.2

of seismic reflection survey. An additional 16 cored holes were drilled in 1990-91 and a further 30 km of seismic survey undertaken. During this period the lease boundaries were modified to enlarge the area and to exclude an area of seam splitting and faulting in the east.

In 1994, NWCC conducted a high resolution seismic survey of 5.4 km in the area planned to be initially mined from Ellalong, across a suspected fault structure. Two non-cored holes were drilled to confirm the results of the survey.

Figure 3.2 indicates borehole locations and Figure 3.3 the location of seismic survey lines.

3.3 COAL RESERVES

Measured in-situ resources of underground coal in the mining lease total 165 Mt. The coal is contained within the Greta Seam. A tabulation of these resources, together with the underground in-situ mineable reserves is given in Table 3.1.

TABLE 3.1 IN-SITU RESOURCES AND RESERVES IN CONSOLIDATED MINING LEASE NO. 2 AND BELLBIRD SOUTH UNDERGROUND MINING AREA					
Area (see Figure 3.4)	Resources In-Situ (Mt)	Reserves Mineable* In-situ	Underground Reserves West of Structural Zone		
			Mineable In-Situ*	Recoverable**	Saleable
Bellbird South Lease	165	120			
EIS area	98	70			
EIS Area + Sublease	115	85	61	32	29
Sublease	17	15			
* Maximum mining height 4.5 m ** based on mine plan (refer to Figure 1.3) Resource and reserve status: Measured and Indicated Source : Newcastle Wallsend Coal Company Pty Limited					

The reserves to be mined under the current Development Application are located to the west of the structural zone. Figure 3.4 delineates the resource and reserve blocks.

3.4 COAL QUALITY

Bellbird South coal is classified as a high volatile low ash bituminous coal, with high specific energy, high fluidity and medium to high sulphur content. These characteristics make it suitable for application as an export coking coal. Typical product coal quality is shown in Table 3.2.

TABLE 3.2 BELLBIRD SOUTH PRODUCT COAL INDICATIVE QUALITY - GRETA SEAM	
Component	Unit
Moisture (%)	2.5
Ash (%)	5.0
Volatile (%)	41.0
Fixed Carbon (%)	51.5
CSN	6
Sulphur (%)	1.50
Specific Energy (MJ/kg)	32.7
Washery Yield Range	80 - 95

Source: Newcastle Wallsend Coal Company Pty Limited



SECTION 4 : EXISTING ENVIRONMENT

4.1

4.1 REGIONAL SETTING

Consolidated Mining Lease No. 2 is located in the Lower Hunter Valley, approximately 12 km south of Cessnock and northeast of the village of Ellalong (refer to **Figure 1.2**). The mining lease area is also located in close proximity to the town of Bellbird and villages of Pelton and Kitchener, and covers a section of the Broken Back Range and Aberdare State Forest at the northern end of the lease boundary. The area lies to the south of the Hunter River.

The region is underlain by rich coal resources supplying both domestic and export markets, with many coal mines operating in the Upper Hunter Valley. Pelton/Ellalong Colliery is the only coal mine still operational in the Cessnock area.

The area to the perimeter of Cessnock is largely held under existing mining leases with some private individuals and the Forestry Commission through its holding of the Aberdare State Forest, complementing the coal industry as landholders. Apart from coal mining, other co-existing activities within the region include viticulture and associated country resorts, agriculture and grazing.

4.2 TOPOGRAPHY AND SLOPES

The topography of the project area comprises three main morphological units (Epps and Associates, 1988). These are:

- the Broken Back Range
- alluvial flats and associated creeks; and
- the intervening, undulating lands.

The Broken Back Range is a major landform extending from west of Pokolbin to Mulbring. It is characterised by steeply sloping land reaching a height of RL 228 m at the Howard Horizontal Control Point southwest of Kitchener. The Broken Back Range traverses the northern part of the project area from west to east.

The alluvial flats occur adjacent to the major creeks draining the area. This landform occurs

4.2

in the southern section of the project area between Cony Creek and Sandy Creek Road.

Creeks draining the northern slopes of the Broken Back Range flow north to form part of the Black Creek catchment. The southern slopes of the range are drained by creeks flowing generally southwards into Quorrobolong-Cony Creek and thence into Ellalong Lagoon.

Topography of the project area is indicated in **Figures 4.1 and 4.1a**. Slopes range as follows:

- Broken Back Range contains slopes of generally 5 per cent to 20 per cent, with an isolated area on the northern flank of the Range sloping in excess of 20 per cent.
- Slopes in the undulating lands range between 1 per cent and 5 per cent.

In the vicinity of Cessnock No. 1 shafts, which are planned to re-open about 2001, slopes range between 5 per cent to 10 per cent.

In the proposed coarse washery reject emplacement areas, slopes range predominantly from 5 per cent to 10 per cent.

4.3 CLIMATE

4.3.1 Meteorological Data Sources

Meteorological data was obtained from the Bureau of Meteorology Station (No. 061242) situated at Cessnock (Nulkaba) and the Newcastle Wallsend Coal Company Pty Limited weather station, situated within the Pelton/Ellalong Colliery Holding. The Colliery's weather station has been operational since 28 May 1993. Data collected from this station includes temperature, relative humidity and rainfall statistics, and a limited amount of wind data. Wind data for this station has been recorded since December 1994. Prior to the commissioning of the weather station, rainfall data was collected for a number of years.

Climatic data recorded at the Bureau of Meteorology Station at Nulkaba includes temperature, relative humidity, rainfall, evaporation and wind speed and direction data. Twelve years of

4.3

data have been used for temperature. Rainfall data compiled is for the periods 1966 to 1993, whereas wind data records date from 1973 to 1993.

4.3.2 Rainfall and Evaporation

The mean monthly rainfall and mean number of raindays per month for the period 1966 to 1993 from data recorded at the Bureau of Meteorology's Nulkaba station are given in **Table 4.1**. The annual average rainfall is 780 mm occurring on an average of 109 raindays per year with the highest rainfall generally occurring in the summer months.

Mean monthly evaporation rates recorded from Nulkaba are also outlined in **Table 4.1**. The average annual evaporation rate is 1400 mm, with the highest evaporation rates recorded for the summer months.

Mean monthly rainfall and mean number of raindays per month for the period January 1987 to September 1994 inclusive, from data from the Pelton/Ellalong Colliery records are given in **Table 4.2**. The annual average rainfall is 896 mm, occurring on an average of 80 raindays.

4.3.3 Temperature and Humidity

Mean monthly maximum and minimum daily temperatures and relative humidity at the Nulkaba Meteorological Station and the Pelton/Ellalong weather station are given in **Tables 4.1 and 4.2**, respectively.

On average December and January are the warmest months, with a mean maximum temperature of approximately 30°C from data obtained from the Nulkaba station, with July being the coolest month having mean maximum and mean minimum temperatures of 17.4°C and 3.9 C respectively. Temperature data collected from the Pelton/Ellalong weather station^{747X} indicates that January has the highest mean maximum temperature of 32°C and a mean minimum temperature of 17.3°C. June is the coolest month, with mean maximum and mean minimum temperatures of 17.2°C and 5.5°C respectively.

4.4

TABLE 4.1 CLIMATIC DATA, CESSNOCK AREA (1966 to 1993)							
Month	Temperature (°C)		Relative Humidity (%)		Rainfall (mm) 1966-1993		Evaporation (mm)
	Mean Max.	Mean Min.	9 a.m.	3 p.m.	Mean	No. of raindays	
January	29.9	17.4	70	47	102	10	180
February	29.1	17.5	75	51	98	10	146
March	27.2	15.5	74	53	92	11	127
April	24.2	11.8	75	52	63	9	93
May	20.7	8.2	81	54	56	9	62
June	17.6	5.7	81	54	57	9	51
July	17.4	3.9	76	49	30	7	59
August	19.3	4.2	71	43	40	8	84
September	21.9	7.5	63	42	39	7	111
October	24.3	10.7	61	45	61	9	133
November	27.2	13.6	65	44	72	11	162
December	29.9	15.8	62	40	72	9	192
Annual Average	24.1	11.0	71	48	780	109	1400

Source: Cessnock (Nulkaba) Bureau of Meteorology Station No. 061242

Results from the Bureau of Meteorology station indicate that early morning humidity is greatest in May and June and lowest in October. Data collected from the Pelton/Ellalong weather station illustrates that maximum relative humidity occurs in February and April with the lowest relative humidity occurring in January. Afternoon humidity for both meteorological data sources is consistently lower than for the morning.

4.5

TABLE 4.2
 CLIMATIC DATA, PELTON/ELLALONG COLLIERY
 (JANUARY 1987 TO SEPTEMBER 1994)

Month	Temperature (°C)		Relative Humidity (%)		Rainfall (mm)	
	Mean Max.	Mean Min.	9 a.m.	3 p.m.	Mean Monthly	Mean No. of raindays
January	32.0	17.2	90	37	100	7
February	29.3	17.4	100	52	129	6
March	24.0	14.1	98	55	50	7
April	24.1	10.6	100	51	118	7
May	21.3	7.6	97	51	45	13
June	17.2	5.5	97	58	74	7
July	17.3	5.1	99	59	53	7
August	18.4	4.9	94	44	73	4
September	21.5	7.4	88	39	36	3
October	23.9	11.8	87	42	34	4
November	25.0	13.2	96	52	61	6
December	28.3	15.9	91	44	123	9
Annual Average	23.5	10.9	95	49	896	80

Source: Pelton/Ellalong records

4.3.4 Wind Data

Seasonal and annual wind data recorded at the Bureau of Meteorology's Nulkaba station are presented in Figure 4.2. These wind roses indicate that the prevailing winds are from the southeast in summer and the northwest in winter for both morning and afternoon. The winds are predominantly less than 20 km/h but may exceed 30 km/h in both summer and winter.

4.4 SOILS AND LAND CAPABILITY

4.4.1 Soils

Soil mapping was undertaken by the Department of Conservation and Land Management (CaLM) in 1982 for the City of Greater Cessnock as part of a Land Resources Study.

4.6

Figures 4.3 and 4.3a illustrate the soil types of the area to be affected by the proposed development as mapped by the 1:25,000 Quorrobolong and Cessnock Soil Sheets.

Four soils units were identified from this survey:

- Wallaby Gully brown podzolic,
- Kutting yellow podzolic,
- Quorrobolong yellow podzolic, and
- Millfield red podzolic soil.

Wallaby Gully brown podzolic soils occur along the border of part of the Broken Back Range and on undulating country nearby to Quorrobolong Creek. These soils are moderately deep with poorly structured dark brown loamy sand to clayey sand A horizons overlying dark brown light clay subsoils. A₂ horizons are absent and soil reaction is acid. This soil type covers approximately 15 per cent of the total project area.

Kutting yellow podzolic soils occupy a large proportion of the area covered by the proposal, spanning undulating to rugged terrain and also including reject emplacement areas. These soils are shallow to moderately deep with medium textured, dark coloured A₁ horizons overlying sandy clay to medium clay, grey, yellow brown or brownish red B horizons. A₂ horizons are present and bleached. Soil reaction is acid. Also occurring with this soil unit are brown podzolic soils, earthy sands, red podzolic soils, yellow earths and sands (Hunt et al, 1982).

Yellow podzolic soils of the Quorrobolong soil unit are found along and adjacent to Quorrobolong and Cony Creeks, to the south of the development site. These deep soils have dark brown, loamy sand A horizons overlying brown, sandy clay B horizons. A₂ horizons are present and bleached. Alluvial and brown podzolic soils also occur within this soil unit.

The fourth soil unit, Millfield red podzolic soils are found at the proposed reject emplacement Area 1 only. These moderately deep soils have sandy loam to clay loam A horizons overlying greyish brown to reddish brown, light medium clay B horizons with a smooth ped fabric. A₂ horizons are present and bleached and soil reaction is acid. Earthy sands and yellow podzolic soils are also found within this unit (Hunt et al, 1982).

4.7

A soil survey was conducted by Wayne Perry and Associates Pty Limited in 1988 over an area of 74 ha to the north of the abandoned Cessnock No. 1 Colliery and included the area around Ellalong Colliery. The soil survey data are presented in **Appendix 4**. The soils were identified and mapped using the Northcote classification system.

Two groups of soils were identified, these being duplex and uniform. The former consisted of coarse duplex and fine duplex soil types, both red and yellow podzolics. Three uniform soils were also identified. All three uniform soils were described as siliceous sand and were mapped according to depth of occurrence (Wayne Perry and Associates, 1988).

Soil samples from varying depths were analysed to determine particle size distribution, dispersivity, pH and electrical conductivity as a measure of salinity. The soils show low dispersion characteristics, except for the coarse duplex sample where sodium domination resulted in clay dispersion. Other results indicate low salinity and low pH levels. The pH levels were below the range acceptable for revegetation (pH 6.5 - 8.5). This, together with a low cation exchange capacity of the A horizon, low amounts of calcium, phosphorus, nitrogen and other essential nutrients suggest that the soils surveyed are low in fertility and possess acid induced effects. In addition, results from the particle size analysis indicate that the A horizon has a low water holding capacity (Wayne Perry and Associates Pty Ltd, 1988).

4.4.2 Land Capability

The CaLM rural land capability assessment system consists of eight classes based on increasing soil erosion hazard and decreasing versatility. Three land use types are recognised:

- Land suitable for cultivation (Classes I to III)
- Land suitable for grazing (Classes IV to VI)
- Land not suitable for rural production (Classes VII and VIII).

The capability classifications identify the limitations for the use of land as a result of the interaction between the physical resources and a specific land use.

Figures 4.4 and 4.4a illustrates the rural land capability of the area to be mined as mapped by

4.8

the 1:25,000 Quorrobolong rural land capability sheet. The majority of the project area assessed by the Soil Conservation Service of New South Wales (now CaLM) has been categorised as Classes IV and V, land best suited to grazing. Neither land class is suited for cultivation on a regular basis owing to considerable limitations including gradient, soil erosion, shallowness or rockiness, climate or a combination of these factors.

The remainder of the study area consists of Classes II, VI, VII and VIII lands. Class II land is suitable for regular cultivation. This class of land is gently sloping and suitable for a wide range of agricultural uses with some soil conservation practices necessary. Class II land covers a small area (approximately 10% of total development area) to the east of Ellalong village along the tributaries of Quorrobolong and Cony Creek.

Class VI is suitable for grazing with cultivation not recommended. This class comprises the less productive grazing lands. This unit occurs just south of the Broken Back Range where the maximum height is 228 metres (Howard Control point) above sea level at the Cessnock No. 1 Colliery abandoned mine site.

The land surrounding the abandoned Cessnock No. 1 Colliery is Class IV and V with a very limited area of Class VIII (approximately 1 per cent of total project area). Class VIII land encompasses cliffs, lakes or swamps and other lands unsuitable for agricultural and pastoral production. The dam at the abandoned Cessnock No. 1 Colliery consists of Class VIII land.

A very small area of Class VII land also exists bordering the Broken Back Range in the western part of the development area (approximately 2 per cent of total development area). Class VII land is best protected by green timber due to steep slopes and shallow soils.

Part of the Aberdare State Forest lies within the project area, however state forests are excluded from land capability assessment.

Land capability was also investigated for the proposed washery reject emplacement areas to the north and west of the village of Pelton. These areas of land are categorised as Classes IV, V, VI and VII.

4.9

Generally, the project area is unsuitable for cultivation (apart from a small area of Class II land), has low productivity and requires soil conservation practices if the existing vegetation cover is removed.

4.5 FLORA AND FAUNA

Much of the natural fauna and flora within the area has been disturbed by human activities including cattle grazing, land clearing and logging. These disturbances have had a significant impact on the natural distribution and concentration of some species within the area.

The Aberdare State Forest, in the northern part of the study area, represents the least disturbed habitat but has been extensively logged for timber over the years.

Devastation by bushfires in September 1994 affected the Bellbird South area. Regeneration has been retarded by dry conditions which prevailed up to January 1995.

A detailed flora and fauna study has been carried out by Envirosciences and is included in **Appendix 9**. This study conforms with National Parks & Wildlife Service requirements. This study revealed the presence of no rare or endangered fauna within the study area. One specimen of *Grevillea montana*, listed by Briggs and Leigh (1994) as a rare or threatened Australian plant, was observed on the steeply sloping, northern flank of Broken Back Range, as indicated on **Figure 4.5**. However, at the time of the flora and fauna survey, recent severe bushfires had destroyed much of the vegetation over the study area and had reduced the occurrence of many species. Habitats within the study area were found to be well represented in areas adjacent to the study area. **Figure 4.5** indicates the vegetation types within the study area.

State Environmental Planning Policy No. 44

The policy aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for Koalas, to ensure permanent free-living populations over their present range and to reverse the current trend of population decline. SEPP 44 applies to

the Bellbird South area and is discussed in **Appendix 9**.

Endangered Microchiropterans

Habitat likely to support populations of endangered microchiropteran species occurs within the study area. **Appendix 9** contains a discussion of this habitat.

4.6 HYDROLOGY

4.6.1 Surface Water Drainage

The Ellalong extension project area occurs within the drainage catchment of the Hunter River. **Figure 4.6** shows the regional drainage pattern.

The principal watercourses are Quorrobolong - Cony Creek in the south of the project area and Black Creek in the northeast. **Figure 4.7** shows the drainage catchments in the project area.

Quorrobolong - Cony Creek flows roughly east-west and drains into Ellalong Lagoon, a significant freshwater wetland, approximately 2.5 km to the west of the project area. The catchment area upstream of the lagoon is approximately 87 km², comprising state forests and cleared farming land. Near the village of Paxton, Quorrobolong Creek joins Congewai Creek, which has a catchment of 107 km². The combined watercourse then flows to Wollombi Brook, one of the largest tributaries of the Hunter River. The Brook has some of the better quality water in the Hunter Valley and its lower reaches are used extensively for agricultural production (Epps and Associates, 1988).

The Broken Back Range forms the watershed between Quorrobolong Creek and Black Creek. Black Creek flows north through the township of Cessnock to join the Hunter River north of Branxton.

At the time of the site inspection, during drought conditions, the majority of the watercourses observed were dry with only occasional pools observed.

4.11

In the area proposed for emplacement of coarse washery reject material, streams flow in a west-east direction, draining off the Broken Back Range which runs in a north-south direction in this area. In the northern proposed emplacement areas, streams converge to form Bellbird Creek, which flows northeast through the township of Bellbird and joins Black Creek in the northern part of Cessnock. In the southern proposed emplacement area, streams draining off the Broken Back Range converge and flow southwest to drain into Congewai Creek.

4.6.2 Surface Water Quality

In 1987, a water monitoring programme of the Quorrobolong Creek/Congewai Creek system (part of the Wollombi Brook catchment) in the vicinity of Pelton/Ellalong Colliery, was undertaken by Epps and Associates. The results of this monitoring are included in **Appendix 5**. All watercourses were found to have very good quality water, with Congewai Creek marginally better than Quorrobolong Creek.

Pelton/Ellalong Colliery currently monitors surface water at 25 sites, both upon the Company's own land and along the Bellbird Creek/Black Creek system. The locations of these sampling sites are shown in **Figures 4.8** and **4.9**. Surface water was also sampled at six locations between June and November 1994. **Figure 1** in **Appendix 5** shows the location of these sampling points.

Each site is analysed monthly for pH and electrical conductivity, and most sites for total suspended solids (non-filtrable residue) and total dissolved solids. The results of this monitoring programme from 1 January 1994 to 31 December 1994 inclusive are presented in **Table 4.3**. **Table 4.4** presents results of additional surface monitoring conducted by the Company.

Table 4.5 indicates the results of surface water monitoring by the company along Bellbird and Black Creeks.

The results of water monitoring indicate that surface waters sampled in the Pelton site are highly saline and alkaline. Regional monitoring of Bellbird and Black Creeks at the township

TABLE 4.3
WATER MONITORING STATIONS 1 TO 10,
1 JANUARY 1994 TO 31 DECEMBER 1994

Station No.	pH			Conductivity $\mu\text{S}/\text{cm}$			NFR mg/L			Filtrable Iron mg/L			TDS mg/L			Comments
	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	
W1	8.7	7.4	8.2	12600	8200	10903	4	18	8	0.7	<0.1	n/a	11719	9000	9711	
W4	7.9	6.2	7.4	12400	7600	10683	130	3	39	40.0	<0.1	n/a	9024	11926	10091	
W5 (Pelton Main Dam)	8.5	7.7	8.1	10900	6800	9092	20	4	8.2	3.5	<0.1	n/a	9618	5146	8071	
W6			7.8			100			468			23.0			296	One reading only taken due to nil flow at other times
W7	No flow during reporting period															
W8	No flow during reporting period															
W9	7.9	7.3	7.7				31	4	11.5	12	0.3	2.3	9057	6423	7675	Six readings only take due to nil flow at other times
W10	No flow during reporting period															
Source: Pelton/Ellalong Colliery Annual Environmental Report, 1994.																

4.13

TABLE 4.4 ADDITIONAL SURFACE WATER MONITORING RESULTS JUNE - NOVEMBER 1994				
Site Number	EC μS/cm	pH	TDS mg/L	TSS
Creek near Ellalong DDH27	6200	7.3	4120	-
Greenmount Lagoon (western side)	560	7.2	275	-
Kalingo Dam (East end of dam wall)	120	7.2	110	-
Quorrobolong creek (At Sandy Creek Road Bridge)	1480	6.6	745	-
DDH27 sump (some oil contaminants drill cuttings & additives)	1960	11.1	1140	-
Creek near DDH27	10500	8.1	6900	-
Kalingo Dam #	152	6.9	150	9
Source: Pelton/Ellalong Colliery				
# taken by HLA-Envirosciences November 1994				

TABLE 4.5 ELECTRICAL CONDUCTIVITY - SURFACE WATER MONITORING SITES					
1994 Month	Average Monthly Conductivity μS/cm				
	W9	W21	W23	W24	W27
	Bellbird Creek			Black Creek	
July	No flow	6450	980	1846	940
August	No flow	4709	915	1552	879
September	No flow	3325	758	1780	940
October	No flow	6233	641	1555	977
November	No flow	665*	1241	1336**	823
December	No flow	486	1169	1520**	817
* flow on 2 days only					
** flow on 4 days only					
Source: Pelton/Ellalong Colliery					

of Ellalong and at Cessnock also indicated high salinity, which is a characteristic of the Black Creek catchment.

4.6.3 Groundwater Occurrence, Yields and Usage

Appendix 5 provides information regarding historic and current groundwater investigations.

4.14

The Greta Seam occurs in the Greta Coal Measures, which are overlain up to surface level by marine sedimentary strata. Water in these strata is expected to have high levels of soluble salts, and is generally of poor quality. Coal seams are generally the principal aquifers in such strata.

Saline mine water is currently being pumped from underground via the Ellalong drift at an average rate of 0.8 ML/day for the past 8 months. This inflow may vary in future years depending on the location of mining operations and local geological conditions. Historically, the Ellalong Mine has pumped water at an average rate of about 0.5 ML/day (1988-1993), which increased to an average rate of about 1.2 ML/day from early 1993 to mid 1994, when the rate of dewatering reduced to the current average of 0.8 ML/day. The saline water is derived from formation water held in the pores of the coal seam and the surrounding rocks. Groundwater that accumulates in the mine is pumped to dams as part of the site's water management system.

The most useful indication of coal seam associated groundwater occurrence and yields in the Bellbird South area will be gained from sampling water from workings when mining in the sublease area commences. Sampling of groundwater in that area will provide more reliable indicators of likely groundwater conditions in the proposed Ellalong extension into Bellbird South.

The water levels in the abandoned Cessnock No. 1 shafts have been observed to rise over the past 7 years. Between February 1987 and December 1991, the level rose 31 m, with a further rise of 7 m up to August 1994. Currently the water level in both shafts is 252 m below the surface.

Department of Land and Water Conservation records indicate that all registered groundwater bores in the EIS study area are shallow bores or wells intersecting surface alluvials in creek beds. These are separated from deep aquifers in the coal seams by large thicknesses of intervening rock strata. Existing groundwater users are unlikely to be affected by the extended mining operations due to the depth of cover of the seam ranging from approximately 450 m to over 600 m.

4.6.4 Groundwater Quality

Groundwater data are presented in **Appendix 5**.

Water from the Cessnock No. 1 Shafts has been sampled by Envirosiences to gain information regarding groundwater quality. Water samples were taken at the water surface (252 m below ground surface) and at depths of 270 m, 290 m and 310 m below the ground surface, to obtain a quality profile. These samples have been analysed for a range of parameters including polychlorinated biphenyls (PCBs), sodium, sulphates, alkalinity, total iron and oil and grease among others. The results of this analysis are set out in **Table 4.6**. Sampling was also conducted in current underground workings and the results are presented in **Tables 4.7** and **4.8**.

The Kalingo Shaft water was alkaline and highly saline, but salinity varied little with depth.

Water sampled from underground was highly saline and slightly to highly acid. In some samples, high sulphate levels occurred. These results reflect the high level of pyritic sulphur which is present in the Greta Seam.

TABLE 4.6
KALINGO SHAFT WATER SAMPLING DATA

Characteristic	Kalingo Upcast Shaft Surface	Kalingo Downcast Shaft Surface	Kalingo Downcast Shaft 270 m	Kalingo Downcast Shaft 290 m	Kalingo Downcast Shaft 310 m
Acidity pH 3.7	Nil	Nil	NA	NA	NA
Acidity pH 8.3	Nil	Nil	NA	NA	NA
Alkalinity CaCO ₃	68	194	NA	NA	NA
Alkalinity HCO ₃	642	770	NA	NA	NA
Alkalinity OH	Nil	Nil	NA	NA	NA
Ammonia - N	0.16	0.05	NA	NA	NA
Arsenic	0.007	0.005	NA	NA	NA
Calcium as CaCO ₃	26.5	20.2	NA	NA	NA
Chlorides	455	850	NA	NA	NA
Conductivity μ S/cm	3,350	4,820	4,800	4,770	4,790
Copper	0.03	0.01	NA	NA	NA
Fluorides	0.62	0.72	NA	NA	NA
Iron - Total	0.35	0.98	NA	NA	NA
Iron - Filtered	0.35	0.88	NA	NA	NA
Langelier Index	NA	NA	NA	NA	NA
Lead	0.08	0.04	NA	NA	NA
Magnesium as CaCO ₃	33.0	27.1	NA	NA	NA
Manganese	0.03	<0.01	NA	NA	NA
Mercury	0.001	<0.001	NA	NA	NA
Nitrate - N	0.51	0.22	NA	NA	NA
Nitrite - N	<0.01	<0.01	NA	NA	NA
Oil and Grease	3	2	NA	NA	NA
Organic Nitrogen	Nil	0.29	NA	NA	NA
PCB	ND	ND	NA	NA	NA
Phenols	<0.001	<0.001	NA	NA	NA
Potassium	7.96	11.0	NA	NA	NA
Sodium	775	1,100	NA	NA	NA
Sulphates	416	NA	NA	NA	NA
Sulphides	0.1	<0.1	NA	NA	NA
Total Dissolved Solids	2,120	2,830	NA	NA	NA
Total Hardness	59.5	47.3	NA	NA	NA
Total Phosphorus	0.06	0.05	NA	NA	NA
Total Suspended Solids	1	2	NA	NA	NA
Zinc	0.07	0.10	NA	NA	NA
pH	8.5	8.6	NA	NA	NA
NA = Not Applicable ND = Not Detected All analyses in mg/l unless noted. pH unitless					

TABLE 4.7
ADDITIONAL SURFACE WATER MONITORING RESULTS
JUNE - JULY 1994

Site Number	EC $\mu\text{s}/\text{cm}$	pH	TDS mg/L
LWI2 Development Heading	13400	6.9	9700
1 East	12800	6.7	11050
16 Cut through	11500	4.7	10300
Pelton Rib	9600	6.2	No Result

TABLE 4.8
 ELLALONG WATER QUALITY MONITORING
 (refer to Figure 2, Appendix 5 for sample locations)

Sample	1	2	3	4	5	6	7	8	9
pH	5.1	5.9	6.4	7.1	6.4	6.9	7.6	7.4	2.7
Acidity to pH 3.7									730
Acidity to pH 8.3	350	460	250	◆	◆	90	130	140	2,650
Alkalinity due to CO ₃									
Alkalinity due to HCO ₃	60	80	140	640	200	540	4,050	1,800	
Alkalinity due to OH									
Chloride	1,530	940	975	815	850	880	1,170	1,150	960
Sulphate	3,380	5,600	5,230	3,980	6,770	7,360	2,520	3,920	9,910
Sodium	1,880	2,020	2,220	2,260	2,780	3,600	3,340	2,800	2,520
Potassium	60	68	58	40	31	33	86	80	42
Iron (total)	130	205	160	◆	◆	35	1.4	49	1,640
Calcium (as Ca)	180	345	305	60	135	175	52	130	410
Magnesium (as Mg)	155	300	245	37	100	145	37	105	205
Total Hardness (Ca,Mg)	1,080	2,100	1,760	300	750	1,040	280	760	1,860
Total Dissolved Solids	7,550	9,750	9,500	8,600	10,900	12,800	9,800	9,500	17,750
Conductivity (uS/cm)	9,900	11,100	11,200	10,500	13,300	15,000	13,100	12,300	15,500
◆ - Denotes insufficient sample for analysis					All analysis in mg/l unless noted. pH unitless				

4.7 AIR QUALITY

4.7.1 Dust Monitoring Programme

The Company has maintained a dust monitoring programme since 1991, with standard funnel and bottle type deposition gauges collected and analysed by Oakbridge Pty Limited Coal Technology's NATA registered laboratory on a monthly basis. Three dust deposition gauges were established in July 1991. Monthly dust deposition rates are presented in **Appendix 5**.

The locations of the dust monitoring sites are shown in **Figures 4.8 and 4.9**. Descriptions of the monitoring sites are as follows:

- P1 - Pelton Village
- P2 - Pyne Residence - to the west of existing Pelton Colliery surface facilities
- P3 - O'Hearn Residence - northwest corner of Pelton/Ellalong Colliery Holding

One high volume air sampler was established (monitoring site P2) and began monitoring total suspended particulates over 24 hours every six days from October 1993. The concentrations of total suspended particulates (TSP) measured since October 1993 are given in **Appendix 5**.

Sources of dust associated with Pelton/Ellalong Colliery are coal handling, reject emplacement, and general traffic movements.

4.7.2 Existing Air Quality

Generally dust fallout levels are low, between 0.2 to 2.7 g/m²/mth (long term average) for all three monitoring sites. The results are well within the EPA's criteria of 4.0 g/m²/mth, except for gauge P2 (Pyne Residence) where one abnormal result of 6.4 g/m²/mth was recorded in October 1992.

Perceptible degradation of air quality occurs if a specific activity causes dust fallout levels to increase by a certain margin. The increment in fallout level before the nuisance level is

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reached depends on the existing dust fallout levels.

For areas experiencing dust fallout levels of about 2.5 g/m²/mth (the approximate highest recorded result in this instance) dust fallout levels would be allowed to increase by 1.5 g/m²/mth before it would be considered that a significant degradation in air quality had occurred.

The 24-hour TSP concentrations have been between 6 µg/m³ to 31 µg/m³. The National Health and Medical Research Council annual average goal is 90 µg/m³ for TSP.

4.8 ACOUSTIC ENVIRONMENT

Figures 4.8 and 4.9 shows the locations of noise monitoring stations.

A background noise level survey was carried out to quantify the existing acoustic environments at Ellalong and Bellbird. Monitoring at Ellalong took place from 14 November to 23 November 1994 at 5 Glennie Street, one of the nearest residences to the proposed mine ventilation fan location at Cessnock No. 1 Shaft.

A noise logger was placed at 79 Kendall Street from 27 January to 3 February 1995, the nearest residence to proposed reject emplacement area No. 1.

Noise logging also took place at Lot 3 Sandy Creek Road from 21 April to 28 April 1995.

Monitoring was not undertaken at Wollombi Road, Bellbird, or at the nearest residences to reject emplacement areas 3 and 4. The data collected at Kendall Street, Bellbird is considered representative of the Wollombi Road, Bellbird area. The EPA minimum background level of 30 dB(A) has been conservatively adopted for day and night-time for the nearest residences to emplacement areas 3 and 4.

Monitoring procedures were in accordance with AS1055 "Acoustics - Description and Measurement of Environmental Noise" and the EPA document "Background Noise

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Measurement - Interim Policy".

Background noise levels determined for these locations are:

Ellalong	-	daytime	30 dB(A)
	-	night-time	30 dB(A)
Sandy Creek Road	-	daytime	30 dB(A)
	-	night-time	30 dB(A)
Kendall Street, Bellbird	-	daytime	35 dB(A)
	-	night-time	31 dB(A)

NWCC have provided background noise data for the Bimbadeen Road area. This information has been obtained as part of their monitoring programme. Background noise levels determined for this area are:

Bimbadeen Road	-	daytime	31 dB(A)
	-	night-time	33 dB(A)

Full details of monitoring procedures and data collected are contained in an HLA-Envirosciences' report "Acoustical Assessment of Proposed Extension of Operations of Ellalong Colliery into Bellbird South" included with this EIS as **Appendix 7**.

4.9 TRANSPORT SYSTEMS

Since the proposed development involves the use of existing Pelton/Ellalong infrastructure, the existing transport systems will remain in operation. **Figures 4.10** and **4.10a** show the existing local transport systems in the Pelton/Ellalong area. **Figure 4.11** depicts the regional transport routes between the project area and the Port of Newcastle.

4.9.1 Road Network

The Bellbird South EIS area is serviced by five roads: Quorrobolong Road, which runs

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through the project area, roughly parallel to the eastern boundary; Sandy Creek Road, which runs east-west and forms the southeastern boundary of the project area; Wollombi Road, adjacent to the outlying washery reject emplacement areas of the study area; Ellalong Road running north-south outside the western boundary of the main project area and the unformed Pelton Road along the crest of the Broken Back Range in the northern part of the study area. The locations of these roads are shown in **Figures 4.10 and 4.10a**.

No RTA Average Annual Daily Traffic figures are available for the abovementioned roads.

Wollombi Road (Main Road 218) runs south-west from Cessnock to Wollombi via Bellbird and Pelton. This road carries the bulk of the Ellalong Colliery traffic, and is the route taken by coal haulage trucks moving Ellalong coal. Wollombi Road is a sealed two lane road.

Ellalong Road is a sealed road which carries predominantly localised traffic. It also carries a percentage of traffic to the No. 2 Shaft.

Pelton Road, which traverses along the Broken Back Range, is a rough unsealed road with very localised usage. Sandy Creek Road is unsealed for part of its length in the project area. Quorrobolong Road is sealed. Quorrobolong Road and Sandy Creek Road are used for access to Ellalong No. 2 Shaft.

The private road which leads from Ellalong to the Cessnock No. 1 abandoned mine site is unsealed and in poor condition. Substantial upgrading will be necessary should the re-opening of the Cessnock No. 1 shafts takes place.

Bimbadeen Road which runs along Broken Back Range as a single-lane sealed road descends to the north of the proposed No. 1 coarse washery reject emplacement area and runs into Bellbird as a dual-lane sealed road.

A dual-lane sealed road runs from the township of Paxton, past the southern proposed washery reject emplacement areas, to join Wollombi Road west of Pelton.

4.23

The Port of Newcastle is the nominated coal export terminal for mines in the Hunter Valley. Minor volumes of the coal to be won from the Bellbird South area will be dispatched from the Colliery using road transport.

Currently, approximately 20 to 30 truck loads of coal are hauled from the Colliery per week. Each truck carries from 25 to 28 tonnes of coal, depending upon the make of truck and the possession of a permit which allows an extra 2 tonnes to be carried. Total gross weight of trucks with a permit is 42 tonnes.

The carrier contracted to NWCC has implemented environmental protection measures including fitting of air suspension to all trucks, introduction of lift-up axles, and establishing of procedures for tidying up any spills promptly.

It is anticipated that the number of truck movements would continue at existing levels, from the extended mine. The coal products transported by road are restricted to coal of sizes which are not usually handled by the port rail receival facilities or which cause problems for the State Rail Authority (SRA). Some special sized products require road haulage to protect their sizing integrity. Some specialist end users are supplied with minor volumes of coal by road transport owing to their location and facilities.

Prior notification is given to Cessnock City Council whenever coal haulage by truck is required.

Haulage of coal by truck takes place between the hours of 6.00 a.m. and 5.00 p.m. The route taken when transporting coal by road to Newcastle generally consists of the use of the following main roads and highways: Wollombi Road, Maitland Road, John Renshaw Drive, New England Highway and the Industrial Highway (refer **Figure 4.11**).

4.9.2 Rail Network

Rail transport currently accounts for approximately 98 per cent of coal transported from Pelton/Ellalong Colliery.

4.24

The Pelton rail system was upgraded in 1988 and this allows the use of unit trains of four SRA 48 Class diesel Locomotives and 38 wagons, making up a unit train of 2,200 tonnes. Currently 15 to 20 unit trains run from Pelton washery per week.

The rail system comprises a section of NWCC owned and maintained railway, a section owned and maintained by South Maitland Railways which joins the State owned and operated Main Line at East Greta Junction. The SRA line leads to the Port of Newcastle. **Figure 4.11** indicates the rail transport system serving the Pelton Coal Washery.

4.10 SCENIC QUALITY OF THE AREA

The natural environment of the study area and local environs has moderate to high scenic value. There are several forested areas, these being in particular the Broken Back Range, the Aberdare State Forest (which in part are located on the surface of proposed mining activities) and the Myall Range and Watagan State Forest to the south. Although clearing for grazing and other purposes has occurred in the area there are extensive areas of natural woodland and rolling grasslands dissected by meandering creeks, which enhance the scenic quality of the area.

Ellalong Lagoon covering an area of 250 ha located directly west of the village of Ellalong can be viewed from the majority of the surrounding higher land. The waters of this wetland support aquatic vegetation which contrasts with the surrounding drier areas.

A previous study regarding landscape character types in the area was undertaken by Epps and Associates in 1988. Five landscape character types were identified within the area based upon variations in landform, vegetation and land use. These are:

Forested Ridgelines and Lower Slopes: This unit comprises the Broken Back Range and shallower sloping lands to the north and south. It is characterised by elevated and predominantly steep to moderately sloping landforms, covered by Open Eucalypt-forest varying in height from 10 m to 15 m.

Cleared Valleys and Lower Slopes: This unit which generally occupies northwestern and southern portions of the study area is characterised by cleared, shallow sloping land and

4.25

alluvial flats which are used largely for rural activities.

Water Bodies: Ellalong Lagoon, Congewai Creek, Quorrobolong Creek and Cony Creek represent the main water bodies which are recognisable as landscape units.

The creeks are characterised by numerous ponds and are lined with riverine vegetation. Ellalong Lagoon is a relatively wide expanse of water, surrounded by and containing swamp vegetation.

Urban: This unit comprises the large settlement of West Cessnock and Bellbird and the smaller, confined rural villages of Pelton, Paxton, Ellalong and Kitchener. The settlements are characterised by low scale housing and the lack of significant vegetation.

Extractive: Characteristics of this unit include disturbed land; surface facilities structures; coal and reject stockpiles. (Epps and Associates, 1988).

The relative scenic quality of landscape character units is based upon an assessment of the diversity which exists within each unit. Higher scenic quality ratings are normally assigned to units with the highest degree of diversity.

Based upon the criteria the *water bodies* unit has been rated as being of high scenic quality whilst the *forested ridgelines* and *lower slopes*, and the *cleared valleys and lower slopes* units are considered to be of moderate scenic quality. The *urban* and the *extractive landscape* units have been rated as having a relatively low scenic status (Epps and Associates, 1988).

The existing Pelton/Ellalong surface facilities are situated within the *extractive* landscape unit.

Recent bushfires in the area have meant a decline of the visual character of the area, however, regeneration in the future will restore some of the area's visual amenity.



SECTION 5 : EXISTING MINING OPERATIONS



5.1

5.1 THE OVERVIEW

Pelton/Ellalong Colliery is an underground longwall mining operation, employing 360 workers. The mine produced 1.5 Mt of saleable coal in 1994, a year characterised by lower production due to difficult mining conditions being encountered. Coal is presently mined in the Ellalong Colliery Holding and is transported by overland conveyor to Pelton Colliery for processing and dispatch via rail to the Port of Newcastle for export, and a small proportion via road to local customers. The small Pelton Open Cut Mine commenced operations in February 1995. Reject material from the processing of coal is disposed of in abandoned underground workings (tailings or fine rejects) and in the void of Aberdare Extended Open Cut (coarse rejects). A thorough system of water management ensures that saline water is not discharged from the premises during dry weather and that local watercourses are not degraded by water discharges from the mine sites. Acidic waters are treated to neutralise them prior to re-use or discharge. Drainage of reject emplacement areas is controlled to prevent leachate contamination of watercourses. Solid and liquid wastes are also carefully managed to avoid pollution or contamination of the site. Rehabilitation and prevention of erosion in coarse reject disposal sites is being carried out successfully.

5.2 THE PRESENT MINING OPERATIONS AT ELLALONG

5.2.1 Present Mining Areas

Ellalong Colliery operations currently involve mining in Consolidated Coal Lease No. 728, known as the Pelton Ellalong Colliery Holding. This area lies to the southwest of the Bellbird South area.

Longwall panel 12 was completed in April 1995. Extraction of the next panel, Longwall 12a, commenced in June 1995.

Planned development of additional longwall panels to the southeast has been abandoned, due

5.2

to high carbon dioxide gas levels encountered in the Longwall 12 development driveage early in 1994, and the expectation of further increases in gas levels with increasing depth of cover.

Once extraction of Longwall 12a has been completed, it was planned to move the longwall to the Bellbird South sub-lease area to extract Longwall 13, originally expected to commence in late 1995. Longwalls 13 and 14 will be located in the sublease area within the southwest part of Bellbird South Consolidated Mining Lease No. 2. Entry to Longwall panels 13 and 14 is being developed from the Ellalong 1 East headings. During the preparation of this EIS, larger than expected faulting has been encountered in the Longwall 13 development headings which will delay the completion of these headings. The decision has been taken to extract a small longwall block adjacent to Longwall 9 (Longwall 9a block) before transferring to Longwall 13. This will allow Longwall 13 to be developed to its planned full extent. It is now expected that extraction of Longwall 13 will start in the first half of 1996.

Depth of cover above the Greta Seam in the Ellalong Colliery is in the vicinity of 550 m in present workings. Depth of cover in the sub-lease area is in the order of 400 m to 450 m.

Within the Pelton Colliery Holding, a small coal resource is being extracted by open cut methods. An estimated 400,000 t of coal will be extracted over approximately 18 months. This was commenced in February 1995.

5.2.2 Mining Method

The Ellalong underground mine is accessed via a drift, which transports men and materials to the underground workings and two shafts. The underground workings are ventilated by two fans located at the No. 1 Shaft which is to the south of the Ellalong Drift surface facilities.

The Greta Seam is mined utilising a retreating longwall system. The longwall blocks are oriented approximately northeast to southwest, which approximates the direction of principal horizontal stress and provides better mining conditions than other orientations.

5.3

Two pairs of parallel headings are driven to the furthest limit of the longwall panel using continuous miners, shuttle cars and mobile boot ends. The pairs of headings are linked by a connecting roadway at the end furthest from the main access roadway. This becomes the site for installing the longwall mining equipment. Steel roof supports known as "chock shields" systematically retreat as coal is won from the longwall face using a drum shearer. As the coal face and supports progressively retreat towards the main access roadways, the roof strata, above the mined-out area or "goaf", collapse into the area from which coal has been extracted.

The full thickness of the Greta Seam (which ranges from 3.0 m to 3.8 m) is extracted in the currently worked area in Ellalong Colliery Holding. In the Application area, where the Greta Seam ranges in thickness from 3.9 m to 5.5 m, a working section of 3.5 m to 4.5 m will be extracted. The limit of the working height of the existing longwall roof supports is 4.1 m. It is planned to replace these roof supports in the future with supports capable of operating to 4.5 m.

The mining machinery used in current Ellalong underground operations is listed in **Table 5.1**.

TABLE 5.1 EQUIPMENT CURRENTLY USED AT ELLALONG UNDERGROUND MINE	
Item	Number
Dowty longwall unit with 4 legchock shields	1
Anderson Strathclyde AM 500 DERD Shearer	1
Continuous Miners	5
Shuttle cars	9
Mobile boot ends	3
Source : Pelton/Ellalong Colliery	

Coal which has been extracted is transferred to the underground conveyor system either by conveyor from the longwall unit or via shuttle cars and/or mobile boot ends from the continuous miners. The underground conveyor transports the coal to the surface. This raw coal is transported to the 2,000 t surface storage bin at the Ellalong Drift site.

5.4

5.2.3 Coal Handling and Preparation

Coal is delivered from the Ellalong surface storage bin to the Pelton Colliery Coal Preparation Plant via the overland conveyor at a maximum rate of 1,000 tph. Prior to entering the Coal Preparation Plant, the raw coal from Ellalong is passed through a sizer which breaks the coal to -150 mm. Coal may then be sent either directly to the Coal Preparation Plant, the raw coal surge bin or the Primary or Secondary stockpile, depending on the requirements of the coal preparation plant.

The Raw Coal Storage and Handling System is illustrated in **Figure 5.1**.

The raw coal stockpile has a live capacity of 5,000 t, and an overall capacity of 300,000 t in an emergency situation. The maximum amount of coal to be stored is approximately 100,000 t under normal conditions. All coal stored in excess of the live storage capacity of the system is handled using tracked bulldozers.

The Coal Preparation Plant at Pelton Colliery is a 600 tph heavy medium cyclone system. This system utilises cyclone circuits and spirals to separate coal and impurities. Heavy medium cyclones treat the 40 x 0.8 mm fraction and spirals treat the -0.8 x 0 mm fraction. The major product from the Coal Preparation Plant is sized -50 x 0 mm.

5.2.4 Coal Storage

Washed coal from the Coal Preparation Plant is delivered at a rate of 500 tph to the washed coal stockpile as shown in **Figure 5.2**. The major product from the Coal Preparation Plant is stored on the primary stockpile.

The secondary products from the Coal Preparation Plant are sized coal products which are handled through the 300 t sized coal bin, located to the east of the Coal Preparation Plant. These represent a very small proportion of the total product. The secondary product coal is normally dispatched direct from the bin into trucks and thereafter to the Port of Newcastle.

5.5

Coal from the primary washed coal stockpile is recovered via the vibratory feeders in the reclaim tunnel onto the rail loading system. The reclaim capacity of the conveyor system is 1,200 tph.

The Washed Coal Handling Plant Layout is shown in **Figure 5.2**.

5.2.5 Coal Production and Transportation

The product of Ellalong Colliery is high volatile, low ash, high specific energy, high fluidity coal which can be utilised in a range of blends for the soft coking, semi coking and thermal markets. The majority of Pelton/Ellalong saleable output is exported to Asia.

Pelton Colliery has a 3 point star rail loading facility on site from which coal is loaded onto trains via a tunnel reclaiming system. This coal is transported to the Port of Newcastle for export. Currently on average, 15 to 20 trains service the Colliery weekly, each train having a 2,200 t capacity.

The remainder of product coal is loaded by front-end loader into trucks of 25 t capacity for road transport to special use customers. A very small amount of coal is transported in small loads of between 1 and 2 tonnes.

Pelton/Ellalong Colliery normally produces approximately 2 Mtpa of run-of-mine coal amounting to a saleable production rate of 1.7 Mtpa.

5.2.6 Water Management

The Water Management Plan for Pelton/Ellalong Colliery sets out design criteria and capacity details for all components of the system.

The current Water Management Plan at Pelton/Ellalong Colliery has been designed to eliminate the discharge of saline mine water from the premises during dry weather and to reduce saline

5.6

mine water wet weather discharges to a level which will not cause degrading of the waters of Black Creek below that which naturally occurs. Acidic water is contained, treated, re-used or discharged in a controlled manner. The control systems employed to achieve these objectives are shown in **Figure 5.3**. **Figure 5.4** is a flow chart for the operation.

The Pelton/Ellalong Colliery water management system comprises three separate but interconnected sub-systems:

- the Ellalong Drift System which handles saline mine water and limited surface runoff at Ellalong Drift;
- the Clean Water System which manages uncontaminated water from undisturbed surface areas of the site;
- the Contaminated Water System which controls contaminated runoff from disturbed areas and process water at the Pelton site.

Ongoing water management at Pelton/Ellalong Colliery involves regular liaison by Colliery personnel with local water users, government and statutory authorities, through the Black Creek Committee. The company provides the Committee with information which includes water quality data collected from monitoring along Black Creek.

Water Sources

Major sources of water at Pelton/Ellalong Colliery are saline mine water which is pumped out from Ellalong Drift, potable water from the Hunter Water Corporation, and rainfall upon various catchments and dams. Pelton Open Cut is also a source of water, however its contribution to the dirty water system is negligible. Any water surplus from Pelton Open Cut is used for dust suppression or disposed of underground.

Water Storages

Major water storages in the Ellalong/Pelton System are:-

5.7

- **Ellalong Dam**, which has a storage capacity of 47 ML, currently receives saline mine water and treated contaminated water from the Ellalong Colliery surface workings catchment and a limited clean surface catchment, prior to transfer by pump to Pelton Process Water Dam;
- **Pelton Main Dam**, with a storage capacity of 73 ML, stores water from a large clean catchment;
- **Contaminated Water System** containing: Process Water Dam (71 ML storage capacity); Coal Preparation Plant Pollution Control Cell 1 (12.9 ML) and Cell 2 (4 ML); Acid Dam (30 ML storage capacity); Precipitation Dam (flow through) with a storage capacity of 2 ML; additional storages comprising disused No. 7 and No. 9 Tailings Dams (both full of tailings) and the Emergency Pollution Control Dam (capacity 6 ML) which is kept empty. The acid dam contains all acidic water and incorporates an acid treatment plant which restores a neutral pH. Treated water is discharged through the Process Dam, in wet weather conditions, as described below.

Water Discharges

Water is currently discharged from the Pelton/Ellalong site at:

- Licensed Discharge Point No. 001, on the overflow from the Pelton Main Dam. This is the only point at which any mine or process water may be discharged, and it flows into Bellbird Creek which joins Black Creek on the northern side of Cessnock. There have been no discharges from the Pelton site into Bellbird/Black Creeks since early 1994.
- Discharge of rainwater at Doyle Street near the northern boundary of Company owned surface land, where uncontaminated water from runoff in the northern catchment enters Bellbird Creek.

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- Uncontaminated rainfall runoff from the Ellalong Drift site, outside the Ellalong Dam controlled catchment, which flows off site as normal uncontrolled (non-licensed) runoff, and is not included in the Ellalong/Pelton Water Management Plan.

The current water management plan provides for changing the quality of water in the Pelton Main Dam (presently saline) to fresh water over the next 12 months, dependent on rainfall patterns. Thereafter, the Pelton Main Dam will be maintained as a clean water storage.

Short term water management involves pumping all saline water from Ellalong Dam to the Process Water Dam at Pelton. During current weather and mine water conditions, the system is a net water user, necessitating the drawing of water from Pelton Main Dam at approximately 1.5 ML per week for process uses. Under this management strategy, water will be discharged from the Pelton site only in the event of an extreme storm event, in which case water leaving the site would be diluted with fresh rain water. Discharges from the Process Water Dam will occur below the spillway of Pelton Main Dam and upstream of the Licensed Discharge Point No. 001 at a specially constructed turbulent mixing zone in Bellbird Creek. Water quality in Pelton Main Dam will improve provided modelled rainfall events occur, and water discharged from Pelton Main Dam will be further diluted with clean water discharged from the northern catchment prior to leaving the site, then by runoff from the Bellbird and Black Creek catchments and discharge from the Cessnock Sewage Treatment Plant.

In the medium term, water quality in Pelton Main Dam will continue to improve under average rainfall conditions to reach the equivalent of background salinity levels over a period of about 12 to 15 months. Careful management of water levels in the contaminated water dams is expected to provide at least 44.2 ML of nominal storage capacity, which is manipulated to allow for adjustments within the water management system. Saline water discharges will be made only during periods when excess water is flowing from Pelton Main Dam in order to provide the maximum dilution with water which will steadily improve in quality. In a dry year there should be no discharge of saline water, and in an average year saline discharge should be minor. In a wet year, 149 ML may be discharged from the Process Water Dam and 714 ML of water rapidly improving in quality may be discharged from Pelton Main Dam.



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The long term outcome of the water management system will be to eliminate discharge of saline water in dry or average years. The only discharge from the site would be clean water from the Pelton Main Dam which will have reached background salinity levels. In a wet year, 89 ML of saline water may be discharged at various times depending on weather patterns and available water storages, resulting in occasional wet weather discharges down Bellbird Creek. These discharges will be diluted by water from the northern catchment, Bellbird and Black Creek catchments and Cessnock Sewage Treatment Plant.

Computer models are maintained as an ongoing water management tool, ensuring that the system is assessed at all time so that necessary adjustments in dam levels and water usage can be made. The water management system, and water quality in Bellbird and Black Creeks, are monitored to ensure the availability of accurate data for use in computer models.

Site personnel are trained to ensure the continuance of correct management and maintenance practices. A full risk analysis has been conducted to address a failure of any part of the system.

The management plan has been modelled assuming an underground daily average pumping rate of 1.2 ML/day. Over recent months, the rate has averaged approximately 0.8 ML/day. Should rates increase significantly beyond those which have been considered by the management plan, a review of the system shall be undertaken. However, this is not expected to happen, because long term historical makes at Ellalong have been of the order of 0.5 to 1 ML/day and available groundwater data suggest that the situation should be no worse at Bellbird South (refer to **Appendix 8**).

Water Balance

Typical dry weather daily flows are given in **Figure 5.4**. These show that, under dry weather conditions, the mine is a net water user. During these periods, water is taken from the on site dams for use in the Coal Preparation Plant. In times of rain, the dams are refilled.

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Discharge from the site would only be needed in a wet weather year. The effects of such discharge on water quality in Black Creek (at Lomas Lane) show that water quality will remain at background levels.

5.2.7 Mine Infrastructure

Pelton Colliery ceased underground mining operations in 1992. Approval has been granted for future extraction of the remaining accessible resources by open cut methods. However, the surface infrastructure of Pelton Colliery remains in operation for processing of Ellalong Colliery coal, and consists of the overland conveyor system, raw coal stockpiles, coal preparation plant, washed coal stockpiles, rail siding and loading system, the structures of the Water Management System and the associated workshops, office buildings and bathhouse.

At the site of Ellalong Colliery No. 2 Shaft, the predominant surface infrastructure comprises the bathhouse-office complex, the winder building and car parking area.

The surface infrastructure at the Ellalong Drift area consists of the Drift portal and conveyor system, the 2,000 t storage bin, the Drift haulage system, bathhouse complex, the workshop store building, the bulk stores buildings and associated structures and buildings. The main ventilation fans for the Colliery and the No. 1 Shaft winder are located approximately 1,200 m south of the Drift Portal.

A private washery reject haul road connects the coal preparation plant at Pelton with the Aberdare Extended Open Cut reject emplacement area.

Figure 1.2 indicates mine surface infrastructure.

5.2.8 Environmental Monitoring Programmes

Figures 4.8 and 4.9 show the locations of air quality, acoustic quality and water quality monitoring sites.

Air Quality

Pelton/Ellalong Colliery maintains a dust monitoring programme for the mine. Samples are analysed by the NWCC Coal Technology Laboratory personnel from three dust deposition gauges located within and adjacent to the lease. Suspended dust is also recorded in a high volume air sampler on a monthly basis. Results of the monitoring programme appear in **Appendix 5** and are discussed in **Section 4.7.2**.

Water Quality

The water monitoring programme is maintained by the Colliery with samples analysed by the Company's Coal Technology Laboratory personnel. A total of 25 sites are now monitored on a monthly basis. The results of this sampling are given in **Appendix 5**.

Acoustic Quality

Caleb Smith Consulting Pty Ltd maintain a noise monitoring programme for the mine. A total of four sites are monitored on a 3 monthly basis. Each site is monitored continuously for a period of 72 hours. The results of this monitoring are discussed in **Appendix 7**.

Subsidence and Vibration

Subsidence monitoring is carried out by the mine's surveyors in accordance with parameters laid down by the DMR. Grids are set up on the surface above longwall panels and periodic readings are taken to measure subsidence, strain and tilt.

The mine has its own equipment to record vibration events, located at the Ellalong No. 2 Shaft. The equipment is continuously operational and is monitored periodically by mine personnel. The Mine Subsidence Board also conducts vibration monitoring in the area and currently has three monitors in operation.

5.2.9 Mine Working Hours

Pelton/Ellalong Colliery currently operates 24 hours per day. Workers are rostered on three shifts, 6.30 a.m. to 2.30 p.m., 2.30 p.m. to 10.30 p.m. and 10.30 p.m. to 6.30 a.m., 7 days per week.

5.2.10 Workforce

The workforce on the three shifts at Pelton/Ellalong Colliery is set out in **Table 5.2**.

TABLE 5.2 PELTON/ELLALONG COLLIERY WORKFORCE				
	Shift			Total
	Night	Day	Afternoon	
Tradespersons	24	45	41	110
Miners/labourers	54	76	50	180
Deputies	7	10	11	28
Staff	5	27	10	42
	90	158	112	360

Source: Pelton/Ellalong Colliery

5.2.11 Waste Management

Waste management systems at Pelton Colliery are under review and until an integrated waste management system is formalised and implemented, an interim system has been introduced which is described below. The Pelton/Ellalong Environmental Management Plan details waste management systems.

Liquid Waste

Waste waters generated on site consist of domestic waste waters from the bathhouse and associated amenity areas. This is treated in approved septic systems or collected and removed

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on a needs basis by contractors.

Currently waste oil from waste oil tanks and the empty drum compound is collected by a licensed removal contractor. Should large quantities of waste oil be generated outside the above areas, it is decanted into drums and transported to storage areas or special arrangements made to collect the oil as it is generated.

Solid Wastes

Solid waste generated at the Pelton/Ellalong site comprises crushed oil drums and other types of heavy and bulky waste, and trade waste from the workshop.

All scrap metal, except for non-ferrous metals are deposited directly into scrap bins provided. These bins are front-lift waste bins or heavy waste lugger bins. The material stored in the bins includes ferrous scrap generated by the coal preparation plant and workshop. The solid waste bins are emptied by a licensed contractor. The small quantities of non-ferrous metal scrap generated by the electrical department are collected and stored in a secure area of the electrical workshop for later disposal.

5.3 REJECT HANDLING AND DISPOSAL

5.3.1 Quantities and Composition of Rejects

Reject material is generated from the washing of coal and consists of coarse and fine (tailings) fractions.

Washery reject for Greta Seam coal from current operations constitutes approximately 20 per cent of the run-of-mine (ROM) production. This is lower than for coal from other seams in the Hunter Valley which can contain up to 50 per cent waste.

Currently approximately 215,000 m³ of reject material is disposed of each year. Of this,

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approximately 70 per cent (150,000 m³) is coarse reject (greater than 2 mm diameter) while the remaining 30 per cent (65,000 m³) is fine reject.

A sample of recently deposited coarse reject material was analysed as part of this study. Important chemical characteristics are shown in **Table 5.3**.

TABLE 5.3 IMPORTANT CHEMICAL CHARACTERISTICS OF COARSE REJECT MATERIAL	
Moisture (%)	1.0
Ash (%)	65.1
Total Sulphur (%)	10.5
Pyritic Sulphur (%)	8.04
Sulphate - S (%)	0.056
Organic Sulphur (%)	2.40
Neutralisation Potential tonnes CaCO ₃ /1,000 tonnes	12.81
pH	5.9
Source: Sample collected and analysed by HLA-Envirosciences Pty Limited	

5.3.2 Coarse Reject Disposal

Section 5.2 describes current coal washing and separation techniques.

Coarse reject material from the coal preparation plant is delivered to the 80 tonne refuse bin, from where it is taken by trucks along a private haul road to the reject emplacement area at the old Aberdare Extended Open Cut. The location of the reject emplacement areas is shown in **Figure 5.5**. Following completion of reject emplacement, the Aberdare Extended reject emplacement area will be rehabilitated and revegetated as outlined below in **Section 5.3.4**. The Pelton/Ellalong Environmental Management Plan gives full details of rehabilitation procedures.

In order to minimise the acoustic impact on residences adjoining the old open cut area, two separate sites have been established for dumping. The first site for day time is located at the eastern end of the old pit. The night time dumping area is located at the western most limit of the area and further away from residences.

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Coarse reject material is dumped and evenly spread to an approximate thickness of 200 to 300 mm. The material is compacted to suitable in situ densities.

Two emplacement areas have been capped with nearby soil/overburden and revegetated using grass and/or trees. Details of these two sites are provided below in **Section 5.3.4**.

Spontaneous Combustion

The spontaneous combustion characteristics of coarse reject material has been assessed on the basis that the ash content is high, and although the sulphur content is in the order of 10 per cent, carbon content and fines distribution within the coarse reject material, together with the manner in which the reject is deposited and compacted, would minimise the rate of oxidation and inhibit spontaneous combustion.

Maintenance of minimal grades, and spreading and compaction of reject, have been successful in preventing spontaneous ignition at the Aberdare Extended emplacement. Regular and frequent monitoring by NWCC personnel have detected minor heating events and rapid response to these has prevented spontaneous combustion.

Leachate Control

All water deposited or falling upon the Aberdare Extended site filters into the old underground workings underlying the emplacement area. However in 1987, as part of monitoring at a previous reject disposal test site, water samples were taken and analysed prior to rehabilitation and these results are shown in **Table 5.4**.

Sample ID	pH	Conductivity (umhos/cm)	Acidity (mg/L)	Sulfates (mg/L)	Iron (mg/L)	Manganese (mg/L)	Aluminium (mg/L)
A	4.1	825	4.5	370	6.8	3.7	6.2
B	2.3	3600	12.40	1850	160.0	14.0	90.0

Sample A = runoff from area
 Sample B = runoff after surface area ripped
 Source: Pelton/Ellalong Colliery

5.3.3 Drainage and Erosion Control

The manner of disposal of both coarse and fine rejects provides minimal opportunity for erosion. Seepage from current emplacement areas is minimal and maintenance of low grades within the Aberdare Extended emplacement prevents erosion. Since emplacement is within old open cut voids, any leachate can make its way into underground workings. The majority of water content migrates to the surface and evaporates while rainfall water moves underground. Drainage systems have been constructed around the perimeter of the existing Aberdare Extended Open Cut voids to divert rainwater flows away from the void. Fine reject drainage is discussed below in **Section 5.3.6**.

5.3.4 Revegetation

Three main coarse reject emplacement areas have been revegetated to date. These sites have all had a strong experimental component - the objective being to develop sound rehabilitation techniques which will address environmental requirements.

These sites are all located on old workings at Bellbird and Aberdare Extended Collieries. The location of these sites is shown in **Figure 5.5**.

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- Site 1 :** Recontoured coarse reject material treated with a bactericide and capped with inert material. Established in November 1992.
- Site 2 :** Surface treatment trial examining the effect of applying lime and topdressing materials to coarse rejects on tree establishment. Established in May 1987.
- Site 3 :** Broadacre tree seed sowing trial. Established on 1.5 ha of land in August 1988.

Details of these trials are available in relevant reports held by the Company. **Figure 5.6** illustrates the proposed final surface contours for the rehabilitated Aberdare Extended site, as well as water management features.

5.3.5 Air Quality Control

Air quality in the vicinity of the Aberdare Extended coarse washery reject emplacement area is maintained at acceptable levels by means of:

- maintaining reject material in a moist condition during dumping, spreading and compacting;
- prompt compaction of reject material to reduce wind dispersal;
- watering of roadways to maintain a damp condition and so suppress dust.

5.3.6 Tailings Disposal

Tailings from the coal preparation plant are disposed of by pumping into the disused workings of Pelton Colliery. Currently tailings are pumped into workings through a borehole located in the east of old workings as shown in **Figure 5.7**. A nearby emergency borehole is available should the flow be impeded at the current site. The borehole is approximately 30 m deep. Approximately 1.2 ML of water containing 30 per cent solids is disposed of daily in this manner.

The water gravitates its way to the deeper workings at Ellalong from where it is pumped from underground via the Ellalong Drift.

5.3.7 Spontaneous Combustion

Spontaneous combustion occurs as a minor issue at Pelton/Ellalong Colliery. Monitoring and response procedures currently in use have minimised the problem in the past and will continue to be used in the future. Heating events have occurred in the raw coal stockpiles but these have been minor. No major heating has occurred in any stockpile. No heating of any significance has been detected in the washed coal stockpiles.

Temperature is monitored routinely in the coal stockpiles by Pelton Colliery laboratory staff using temperature probes and infra-red detection. The frequency of monitoring varies depending upon a number of conditions. If heating is detected, the volume of coal affected is dug out and put through the Coal Preparation Plant, or spread out to dissipate the heat.

5.4 POLLUTION CONTROL LICENCE COMPLIANCE

Appendix 12 contains the EPA Licence currently held by NWCC for the Pelton/Ellalong Colliery operations which was reviewed in July 1994 and finalised in December 1994. The review included alterations to water discharge conditions applicable to the site and operating conditions of the Pelton Open Cut Mine. The Company is presently developing a revised Environmental Management Plan which will reflect the changes to the licence and further improve the performance of the operations.

5.4.1 Environmental Monitoring Results

Environmental monitoring was carried out on site in 1994 in accordance with the Environmental Management Plan and the revised Pollution Licence.

- *Water Quality*

All water discharges from the licensed discharge points were within the limits of the licence for that point.

- *Air Quality*

Results indicate that Colliery operations have minimal impact on the surrounding environment and community. **Appendix 5** contains details of 1994 monitoring data.

- *Acoustic Monitoring*

The independent consultant's report included in the Pelton/Ellalong Colliery Annual Environmental Report for 1994 indicates that while the Pelton Colliery operations were audible at each of the monitoring locations at different times throughout the survey period, at no time was the 40 dB(A) criterion exceeded as a result of the Colliery operations. The report concludes that the mining operations and activities associated with Pelton Colliery have minimal impact upon the surrounding residential locations.

- *Summary*

The environmental monitoring results indicate that the Company maintains compliance with the conditions imposed under EPA Licence No. 000416.

5.4.2 Complaints

- *Water Management*

During 1994, the Company received notification through the EPA of concern from landholders along the Congewai Creek. This concern stemmed from waters discharged under the Pollution Licence from Ellalong Dam into the Congewai Creek catchment.

Being saline minewater, the water which overflowed the spillway of Ellalong Dam, allegedly made the water flowing and ponding in a length of the creek unsuitable for irrigation purposes.

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This complaint was handled by Colliery Management with assistance from Agricultural experts from the University of Sydney.

The Colliery undertook to assist affected landholders by trucking in domestic water, and assisting with stock feed when required.

To inform the community of the status of the quality of the water flowing in the stream, a comprehensive monitoring programme and information dissemination network was implemented.

- *Air Quality*

No complaints were received from the community or neighbours during 1994 in regard to air quality.

- *Noise Control*

No complaints were received from the community or neighbours during 1994 in regard to noise quality.

Complaints were received in regard to vibrations believed to be associated with goaf falls.

Officers of the Company attended a public meeting held at Ellalong in June 1994 to discuss this issue. The meeting was also attended by Mines Subsidence Board officers who are investigating the complaints within the scope of their legislation.

Monitoring of the vibration events is being continued by both the Colliery and Mines Subsidence Board.