

BALD HILL QUARRY PTY. LTD

ABN: 19 003 764 725

Environmental Impact Statement

Bald Hill Quarry Landfill, via Jugiong

Prepared by:



R.W. CORKERY & CO. PTY. LIMITED

BALD HILL QUARRY PTY LTD

ABN: 19 003 764 725

Environmental Impact Statement

Bald Hill Quarry Regional Landfill, via Jugiong

Prepared by:

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September 2001

In Conjunction with:

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Report No. 509/01

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FORM 2

**Submission of
Environmental Impact Statement (EIS)**
prepared under the Environmental Planning and Assessment Act,
1979, Section 78A (8)

EIS prepared by:

name: Mr Robert William Corkery
qualifications: B. Sc. (Hons), M. Appl. Sc.
address: 75 Kite Street
ORANGE N.S.W. 2800

in respect of: Construction and operation of a regional landfill facility for Class
1 Solid Waste; site rehabilitation and ancillary activities to all
project components.

development application:

applicant name: Bald Hill Quarry Pty Ltd
applicant address: Hume Highway
JUGIONG NSW 2726

land to be developed: Bald Hill Quarry, via Jugiong

lot no., DP/MPS, vol/fol etc proposed development Project Site: Lot 7, DP 133540; Lots 11 & 12, DP 439146.
Access: Portion 158, DP 268297 (Right – of – Way)

**Environmental Impact
Statement:**

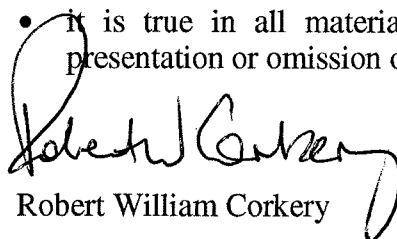
☒ an Environmental Impact Statement (EIS) is attached

certificate

I, Robert William Corkery, of 75 Kite Street, Orange, N.S.W.,
hereby certify that I have prepared the contents of this Statement
and to the best of my knowledge

- it is in accordance with clauses 72 and 73 of the
Environmental Planning and Assessment Regulation, 2000;
and
- it is true in all material particulars and does not, by its
presentation or omission of information, materially mislead.

signature:



name:

Robert William Corkery

date:

20 September 2001



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EXECUTIVE SUMMARY



INTRODUCTION

This proposal relates to the development of the existing Bald Hill Quarry void into a Class 1 Solid Waste Landfill. This landfill would accept approximately 17 800 tonnes of wastes per annum from eight surrounding Local Government Areas (LGA's). These eight LGA's are part of the South West Waste Group (SWWG). The development of the Bald Hill Quarry Regional Landfill would allow the SWWG to resolve waste issues regarding disposal sites common to all LGA's involved.

The development of a regional landfill would also allow numerous small existing landfills in the participating LGA's to be closed and in some cases replaced with transfer stations to separate recyclables and green waste prior to the disposable wastes being transferred to the Bald Hill Quarry Regional Landfill.

THE PROJECT SITE AND PROPOSAL

The Bald Hill Quarry is situated approximately 8km east of Jugiong with site access via old Hume Highway (**Figure A**). The Project Site is entirely owned by the Applicant, Bald Hill Quarry Pty Ltd, who also operate the adjacent North Ridge Quarry.

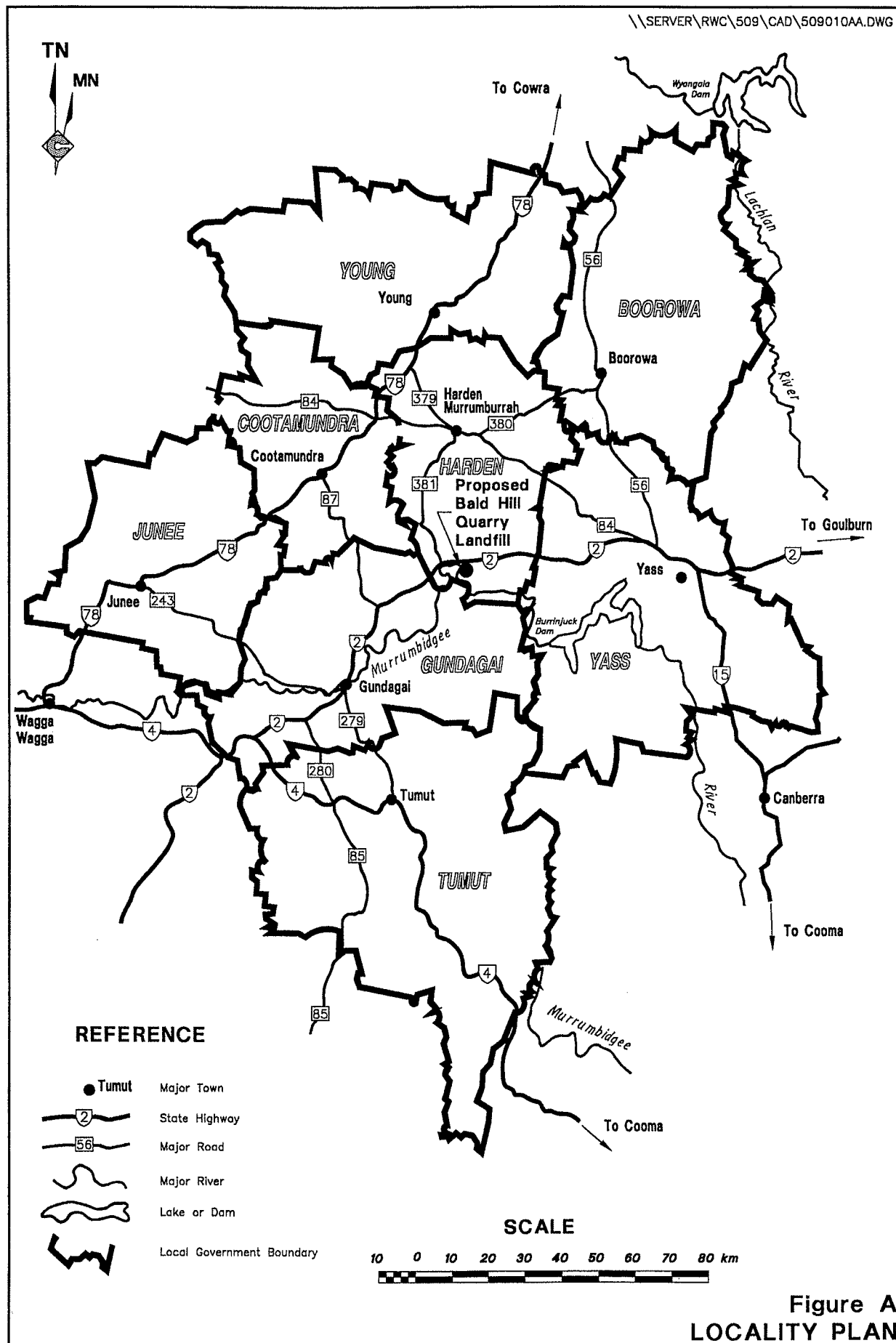
The Bald Hill Quarry void is a non-operating basalt quarry void approximately 80m deep in the shape of an inverted cone. Adjacent to the void is the processing and stockpile area for the North Ridge Quarry.

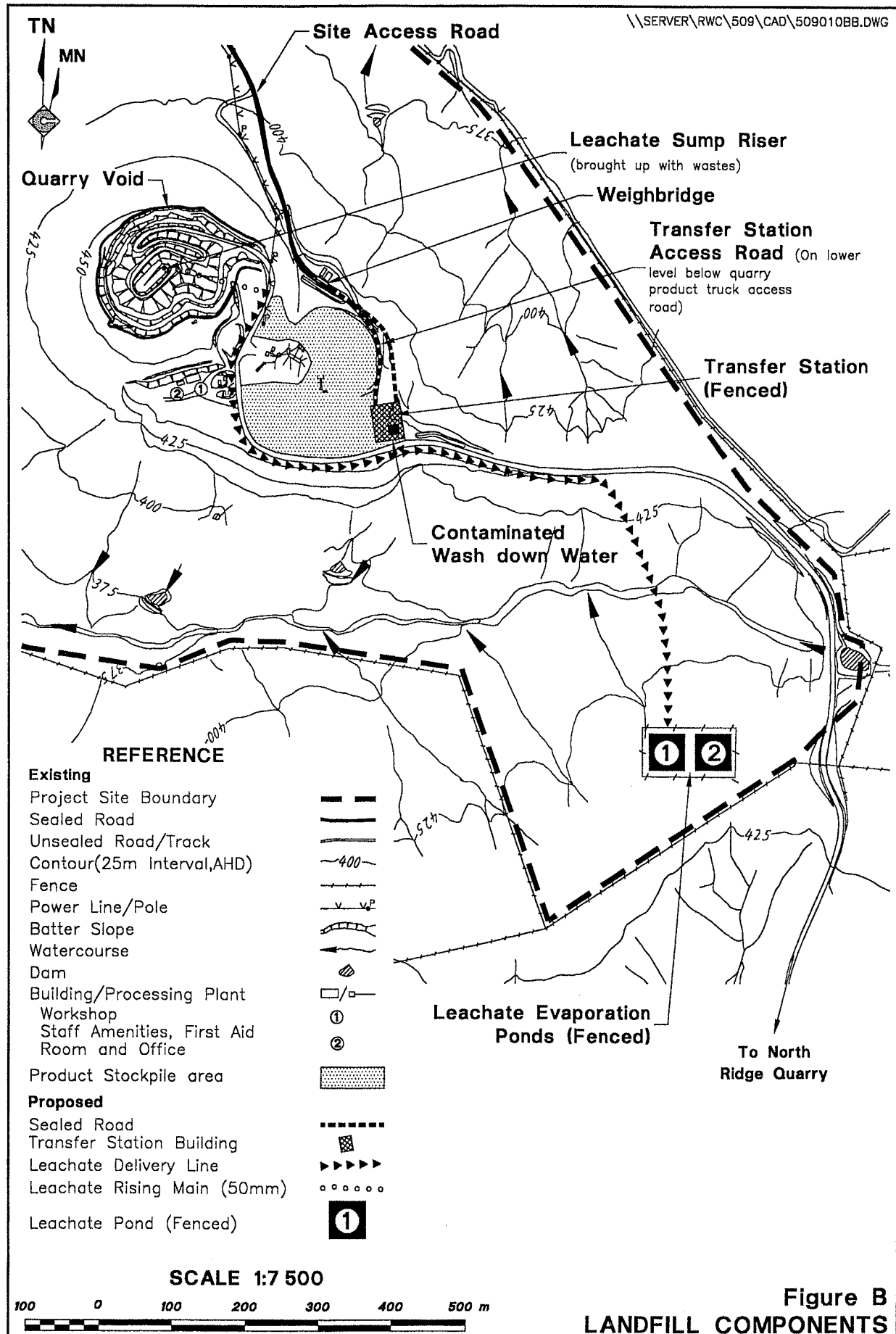
The establishment of the Bald Hill Quarry Regional Landfill would involve the construction of a transfer station for separating wastes, leachate management system, landfill gas management system, surface water management works and use of the existing weighbridge for accurate recording of wastes received.

The landfill has been designed adopting best practice techniques wherever possible to ensure the local environment is fully protected. Important components of the landfill design are as follows (**Figure B**):

1. The impervious nature of the fresh rock surrounding the quarry void meets the EPA permeability requirements and negates the need for a leachate barrier liner below approximately 430m, AHD. Above this level, additional hydrogeological work is required and would be completed prior to the wastes reaching this level. If required, a geonet drainage layer liner would be placed against the void wall above the 430m, AHD level to drain the leachate away from the void walls.
2. A central leachate sump and riser would be created rising from the deepest point in the quarry to collect leachate from the void. The sump riser would be constructed progressively as the wastes rise. This leachate would be irrigated over the wastes to accelerate degradation. Excess leachate would be pumped to the leachate evaporation pond. This pond would be lined and appropriately sized for the leachate volumes expected.
3. Landfill gas would be collected in a series of near-horizontal collection pipes radiating from the sump riser on different waste levels. Landfill gas will be reused where economically viable and any excess would be flared.







4. Wastes would be placed on the floor of the quarry void and progressively added in layers as the wastes level rises. All layers will slope outwards toward the void walls. The waste layers will be covered daily and compacted.
5. The final surface of the landfill would be constructed to a maximum level of approximately 10m above the rim of the void to allow for the expected waste settlement. A capillary cap would be constructed over the final landform to allow for rehabilitation as well as continued post-operation leachate and gas collection.

Wastes would be delivered to the Project Site via Council waste collection trucks and/or Council appointed waste contractors. There would be no private access to the landfill. These trucks would access the site over the weighbridge where the amount of waste, type and source of wastes would be recorded. Once leaving the weighbridge, the trucks would proceed to the transfer station and deposit the load on the transfer station tipping floor where it would be screened for non permitted wastes and/or recyclable material.

The disposable wastes would then be loaded onto the dedicated landfill transfer truck that would deposit the wastes at the active tipping face within the void. Here the wastes would be covered and compacted.

The Bald Hill Quarry Regional Landfill is proposed to receive wastes during the following hours:

- 7.00 am – 10.00 p.m. Monday to Friday
- 7.00 am – 5.00 p.m. Saturday, Sunday and Public Holidays

Landfill operations such as waste covering and compaction would only be conducted during daylight hours.

At a constant estimate wastes input of 17 800 tonnes per annum, the landfill would have a life of approximately 50 years.

EXISTING ENVIRONMENT

Topography The Project Site is situated amongst moderately steep to steep terrain. Local elevations range from 596m, AHD at Mt Bundarbo to the south, to 240m, AHD along the Murrumbidge River. The Project Site is situated on a topographical high of approximately 460m, AHD on Bald Hill.

Geology The Bald Hill Quarry void is part of a volcanic basalt plug that intrudes into the granodiorite country rock. The basalt is jointed for its full depth with the deeper joints very tight and the shallow joints slightly open. The surrounding granodiorite is massive at depth and slightly weathered above 430m, AHD.

Drainage The Project Site lies within the upper catchment of the Murrumbidgee River. On a local level, the Project Site encompasses four separate drainage areas:

1. runoff from around the transfer station and northern part of the processing area which runs to the northern sediment dam;
2. overland flow in the southern section runs to a small unnamed east-west flowing creek;
3. drainage to the west of the void is radial down the Bald Hill slopes; and
4. internal void drainage to the void floor.



Surface water on the Project Site is limited to the small unnamed creek which is slightly brackish and some small farm dams.

Groundwater in the area is estimated to occur, approximately 10m below the current floor of the void sloping to the north-west. The Applicant currently draws operational water from a licence groundwater abstraction bore on site.

Air Quality

Existing air quality is largely influenced by dust from the quarry processing/stockpile area, North Ridge Quarry, the nearby Hume Highway and surrounding agricultural land use. The Applicant's current deposited dust monitoring indicates that the existing deposited dust levels are below the Environment Protection Authority amenity levels.

Ecology

The bulk of the Project Site has been significantly disturbed by quarry related activities. The surrounding vegetation consists of predominately White Box (*Eucalyptus albens*) woodland over storey with an improved pasture understorey. The site where the evaporation ponds would be placed consists of pasture and some fruit trees.

The fauna survey conducted did not identify any amphibians or reptiles. Thirty six birds were observed and nine bat species were identified. The Superb Parrot and Great Pipistrelle bat are the only two species of conservation significance in the region and neither were identified during the survey.

Aboriginal Heritage

No areas of Aboriginal origin or significance were found during the Aboriginal heritage investigation. Existing noise levels are influenced by quarry related activities, Hume Highway traffic and rural farm activities.

Visibility

The Bald Hill Quarry void and associated activities are currently visible along a corridor of land on the northern side of the Hume Highway as well as from higher ground to the south and west. Only two residences have line of sight with the quarry void.

SAFEGUARDS AND IMPACTS

The Bald Hill Quarry Regional Landfill has been designed to best practice standards to ensure the protection of the surrounding environment. A brief summary of the main safeguards and procedures and the assessed level of the proposal's impact is set out below. The technical detail of these safeguards is presentation in the project's Landfill Environment Management Plan.

Air Quality

The principal source of air contamination on the Project Site would comprise dust, landfill gas and odour.

Dust would be managed through sealing the access road to the transfer station. Dust created within the void would be captured in the void and once wastes reached the top to the void, strategies to control dust such as wind deflection barriers and progressive rehabilitation would be implemented.



Landfill gas would be progressively collected and removed through horizontal gas collection pipes radiating from the central leachate sump riser. Landfill gas would be used if economical and if not, it would be flared off in a simple elevated candle flare fixed to the top of the control sum riser.

Odour would be managed through hygienic operation of the landfill including appropriate daily covering of wastes in the void covering of wastes during transport and washing of waste containers.

Once these safeguards are implemented, the impact from dust, leachate gas and odour would be minimal. Odour investigations have indicated odour would not impact on surrounding residents. The Landfill Environmental Management Plan details landfill gas monitoring to ensure effective management.

Investigations have also indicated that the operation of The Bald Hill Quarry Regional Landfill would result in a 65% saving in greenhouse gas emissions when compared to the current emissions from local landfills.

Surface Water Management

A storm water diversion system would be installed around the top benches of the quarry void to capture and divert storm water falling into the void. All storm water from this system as well as existing storm water management systems is diverted to existing site sediment dams.

Once the landfill is full and capped, a storm water diversion channel would be constructed around the perimeter of the void.

The Landfill Environmental Management Plan details surface water monitoring procedures – to ensure there is no impact on water quality.

Groundwater and Leachate Management

The geology of the void provides a naturally impervious barrier to protect groundwater from contamination. In addition to this, a leachate management system will aid in groundwater protection. A leachate sump and pump at the bottom of the void would collect the leachate and pump it up the leachate sump riser. The majority of the leachate would be irrigated back over the wastes to accelerate degradation of the wastes. The excess would be pumped through buried pipes to the leachate evaporation pond. This pond would be lined and sized appropriately.

Contaminated washdown water from the transfer station where waste containers and the tipping floor would be washed would also connect to the leachate collection system via a litter trap.

The Applicant has established four groundwater monitoring bores to confirm there is no impact to groundwater. The Landfill Environmental Management Plan details groundwater and leachate monitoring and remedial action, if required.



Flora and Fauna

No native flora or fauna would be impacted by this proposal. The safeguards that would be implemented to minimise or negate potential impact through the attraction and/or colonisation of weeds, pests and vermin include:

- covering of all waste loads during transport;
- daily covering of wastes in the landfill void;
- litter fences and regular litter collection to ensure all litter is contained; and
- regular inspections for weeds, pests and vermin and implementation of remedial action such as spraying, trapping or baiting if required.

Noise

The landfill operation would have a minimal impact on the local acoustical environment. Vehicles and equipment would be well maintained to ensure noise creation is minimised.

Transportation

The traffic involved in this proposal would be the current landfill traffic diverted from local landfills to the Bald Hill Quarry Regional Landfill. Most traffic routes would experience a traffic level increase of less than 1% while the Jugiong – Harden road would experience an increase in the order of 2.4%.

Visibility

The majority of the landfill activities would occur in the enclosed transfer building or within the confines of the void walls, thus presenting no visual impact. Once the accumulated wastes approach the top of the void, a litter fence would be erected to minimise visual impact through windblown litter.

Once the landfill is completed, the original shape of Bald Hill would generally be reinstated.

Aboriginal Heritage

There are no areas of identified Aboriginal heritage, thus no impact.

Services

The overhead power lines to the existing site would be extended underground to the transfer station. The current abstraction bore would be used to supply the estimated 50,000 L of water per year required for the landfill operation. All other services would not require extension.

Positive impacts arising from the proposal relate to the use of a central, environmentally sound, well operated landfill as opposed to the current situation of many, small, old landfills that may not be up to the currently expected environment standard.

CONCLUSION

The Bald Hill Quarry Regional Landfill is fully supported by the South West Waste Group (SWWG), a group formed by seven Councils with similar waste issues. The SWWG has established a justifiable demand for additional landfill space in the region and the central location of Bald Hill Quarry Regional Landfill makes it the preferred option.

With the safeguards against potential environmental impacts implemented, the Bald Hill Quarry Regional Landfill would provide a long term, environmentally acceptable regional waste disposal solution for the surrounding Local Government Areas.



SECTION 1

INTRODUCTION

P R E A M B L E

This section introduces the Applicant's proposal to develop and operate the Bald Hill Quarry Regional Landfill and outlines:

- the format of the document;
- details about the Applicant;
- background to the proposal;
- the need for a regional landfill facility;
- consultation undertaken with the local community and government authorities; and
- the proposed ongoing documentation.

The personnel involved in the design of the proposal and the preparation of this document and supporting documentation are also outlined.



1.1 SCOPE

This Environmental Impact Statement (EIS) has been prepared by R.W. Corkery & Co. Pty. Limited in conjunction with Bald Hill Quarry Pty Ltd (the "Applicant") to accompany a Development Application (see **Appendix 1**) to the Department of Urban Affairs and Planning for the development and operation of a regional landfill and associated on-site facilities together with the transportation of wastes to the landfill.

For the purposes of this document, the area which is the subject of the Development Application is referred to as the "Project Site". **Figure 1.1** shows the Project Site lies approximately 8 km east of Jugiong in southern NSW. The proposed landfill site is a void created within the first quarry operated by the Applicant at Bald Hill. Bald Hill Quarry has been operating and producing basalt products since 1984 and only very limited resource remains within the Stage 1 Quarry. The Applicant proposes to extract the remaining resource within the Stage 1 Quarry (in accordance with the existing Development Consent) while operating the landfill in the areas of the void where the basalt resource has been fully extracted. The proposed landfill is located approximately 1 km south of the Hume Highway and 2 km north of the Applicant's Stage 2 Quarry referred to as the "North Ridge Quarry". (**Figure 1.2**)

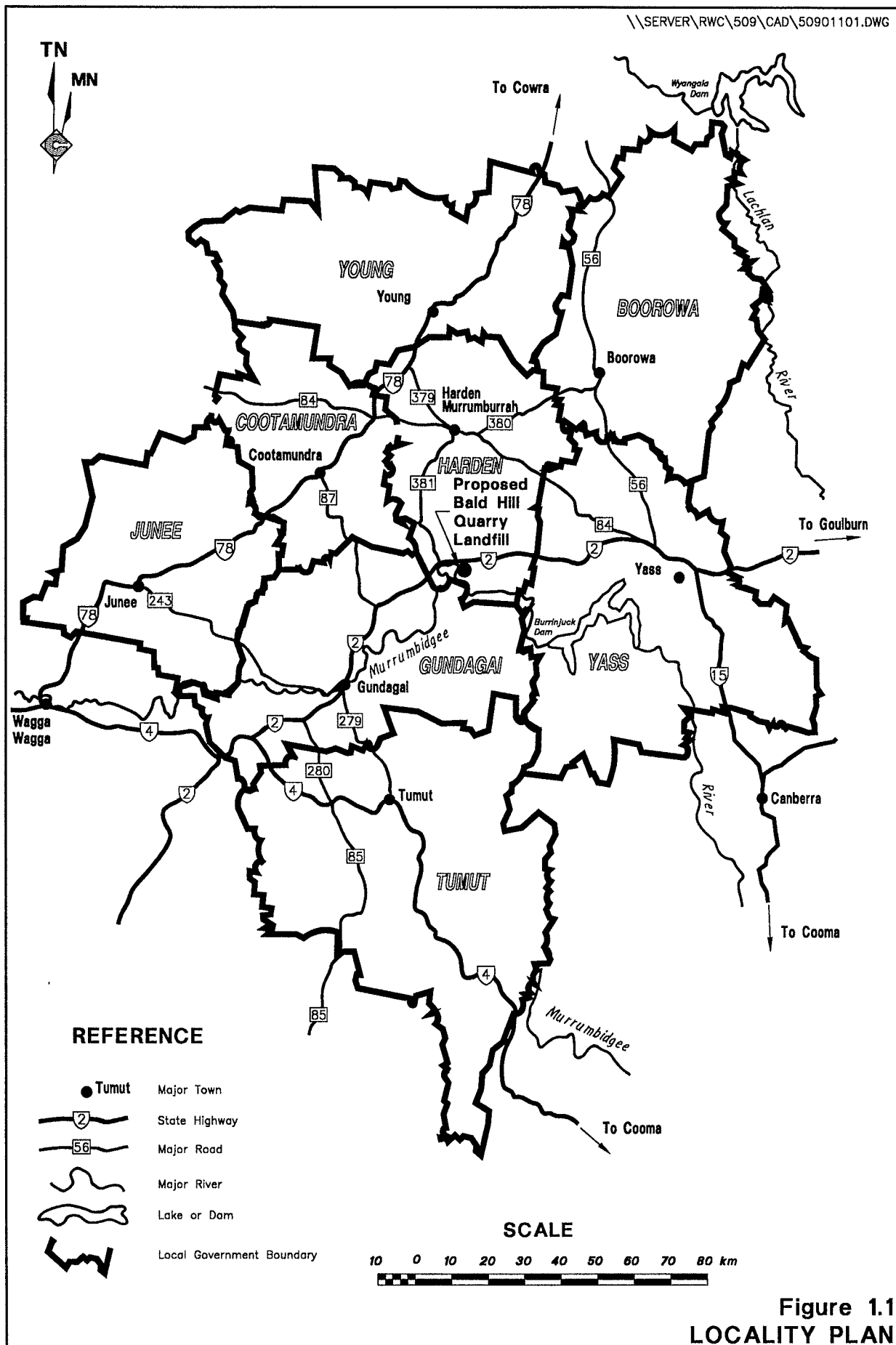
Since the development and operation of a landfill is considered a "Designated Development" within the meaning of Schedule 3 (Part 1) of the *Environmental Planning and Assessment Regulation 2000*, the preparation of an Environmental Impact Statement is required (under Part 4 of the *Environmental Planning and Assessment Act 1979*).

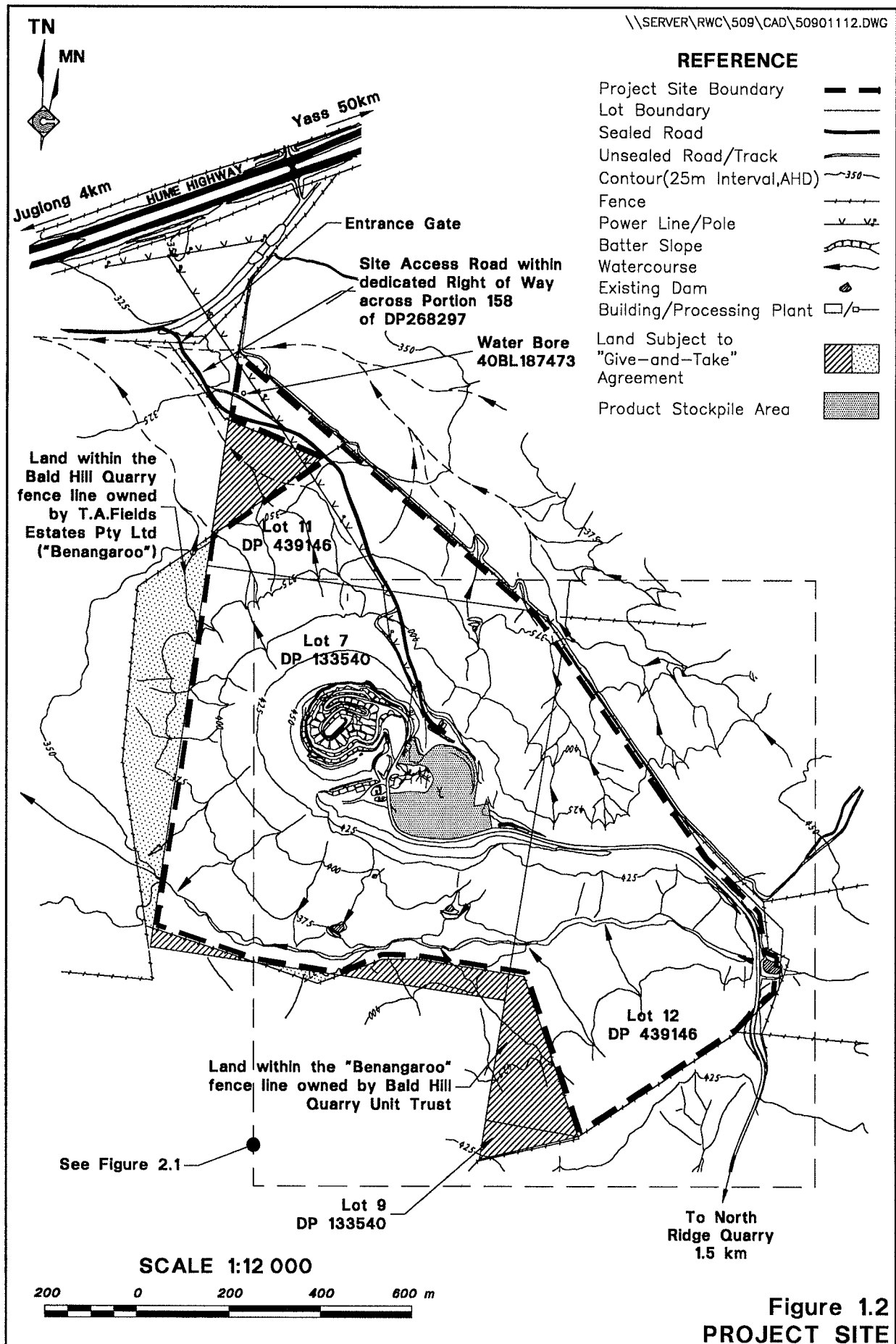
The proposal is also recognised under the provisions of the *Environmental Planning and Assessment Act 1979* to be "integrated development" as more than one approval is required for the development to proceed. Therefore, this document also serves to support the Applicant's application for an Environment Protection Licence from the Environment Protection Authority to operate the landfill. Furthermore, because the proposal is a major putrescible landfill site, the proposal is declared by State Environmental Planning Policy (SEPP) No. 48 – Major Putrescible Landfill Sites, to be State significant development, which automatically confers the Minister for Urban Affairs and Planning as the Consent Authority.

Apart from presenting the Applicant's justification of the proposal and information about the development and operation of the proposed Bald Hill Quarry Regional Landfill, this document also outlines the environmental safeguards and procedures that would be adopted throughout the proposed landfilling and associated activities, and waste transportation activities, together with the predicted impacts once those safeguards are adopted.

The information presented in this document covers all aspects of the planning, development, operation, environmental monitoring and rehabilitation of the proposed Bald Hill Quarry Regional Landfill at a level of detail consistent with industry standards. These aspects are presented in a manner that addresses the specific requirements of the Department of Urban Affairs and Planning, Harden Shire Council and other government authorities, together with those issues raised during the community consultation process. Apart from outlining the areas where ongoing basalt extraction is proposed (Section 1.4.3), this document does not cover the basalt extraction given that its extraction is permitted by the 1984 Development Consent.







The EIS has been prepared in conjunction with a Landfill Environmental Management Plan (LEMP) which to date has been compiled in draft form to accompany the Development Application and Environmental Impact Statement. The preparation of a LEMP is a requirement of the Environment Protection Authority for new landfills of the size proposed by the Applicant. The LEMP provides a greater level of technical details for some components of the proposed operations, specifically to meet the requirements of the document entitled "Environmental Guidelines: Solid Waste Landfills" (EPA, 1996).

Should the Development Application be approved, a final copy of the LEMP would be compiled incorporating any modifications / additions arising from the assessment process.

1.2 DOCUMENT FORMAT

The document has been written in four sections with a set of Appendices. The requirements of Clause 72 of the *Environmental Planning and Assessment Regulation 2000* and specific requirements of the Director-General of the Department of Urban Affairs and Planning (**Appendix 2**) and other Local and State Government Authorities (**Appendix 3**) have been incorporated in the appropriate section(s) of the document.

A complete copy of the correspondence received from the various Local and State Government Authorities is held by Department of Urban Affairs and Planning, Harden Council and the Applicant, and is available for review on request during normal business hours throughout the period of exhibition of the Development Application and this document.

This document has also been prepared with due regard to the Environmental Impact Statement Guideline for Landfilling issued by the Department of Urban Affairs and Planning (1996) and the matters identified in Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*.

The format of the document is outlined below:

- Section 1: introduces the proposal and the Applicant and briefly reviews the background to the proposal and the need for a regional landfill facility. Information on ongoing documentation for the proposed activities and the consultation undertaken with State and Local Government Authorities and the local community are also included.
- Section 2: describes the proposal in detail and outlines the Applicant's objectives and proposed plans for landfilling and the transportation of wastes. The Applicant's proposal for site rehabilitation and feasible alternatives to some activities are also outlined. It is noted that the description of the proposal has been compiled from information about the proposal detailed in the draft LEMP prepared concurrently for the proposal.
- Section 3: describes the components of the existing biophysical and the cultural/economic environment within and surrounding the Project Site that have been reviewed during the planning stages of the proposal. The constraints upon the proposal and the need for design of operational safeguards for each component of the existing environment are identified. The proposed safeguards, and where appropriate, management procedures that the Applicant has incorporated into the proposal, are outlined for each component of the existing environment. Many of these safeguards and management procedures are similarly outlined in the draft LEMP. The potential impact(s) the proposal would have on the environment within and surrounding the Project Site once the safeguards and



procedures are adopted, are also analysed, together with the proposal to monitor those impacts.

Section 4: evaluates the proposal in terms of Ecologically Sustainable Development, justifies the project in terms of biophysical, economic and social considerations and examines the consequences of not proceeding with the proposal.

References: list the various source documents for information and data used during preparation of the Environmental Impact Statement.

Appendices: a total of ten appendices are included in this document.

- Appendix 1: presents a copy of the Applicant's Development Application for the proposed development;
- Appendix 2: presents the requirements of the Director-General of the Department Urban Affairs and Planning and a table summarising the Department's specific requirements and where each requirement is addressed in the document;
- Appendix 3: presents a table summarising the requirements from a range of State and Local Government Authorities and where each requirement is addressed in the document;
- Appendix 4: presents a range of background documents relating to the waste profile and sources throughout the South West Region;
- Appendix 5: contains a letter from Harden Shire Council and a draft agreement between the South West Region Shire of Councils to support and use Bald Hill Regional Landfill.
- Appendix 6: reproduces an information brochure circulated widely throughout the communities;
- Appendix 7: presents technical information reflecting leachate and landfill gas quantity calculations and evaporation calculations related to landfill capping by Nolan ITU.
- Appendix 8: presents a traffic impact assessment;
- Appendix 9: presents an Energy Statement; and
- Appendix 10: presents a greenhouse gas assessment.

The EIS has been compiled with reference to a number of specialist consultant reports in the fields of hydrogeology, fauna, Aboriginal heritage, noise and odour. All of these reports are presented in a compendium of supporting documentation compiled for exhibition with the Development Application and Environmental Impact Statement. Any person who purchases a copy of the EIS is entitled to one or more of the individual specialist consultant reports or the entire compendium. Copies of the specialist consultant reports are available from the Applicant.



1.3 THE APPLICANT

Bald Hill Quarry Pty Ltd is a privately owned Company established in 1989 to manage and operate the Bald Hill Quarry. The Company's Managing Director is Mr J.P. Wilkinson, B.Sc.(Dip. Teach.), FIOQ, who is also the nominated Quarry Manager. The Company's other Director, Mr A.M. Willsallen, B.Ag.Ec. operates as the Company's Business Manager.

It is noted that whilst the Applicant for the Development Application is Bald Hill Quarry Pty Ltd, Harden Shire Council will be the Applicant for the Supervisory Licence under the *Protection of the Environment and Operations Act 1997*. A Supervisory Licence can only be held by a Local Government Authority for a facility receiving Class 1 solid wastes.

1.4 BACKGROUND TO THE PROPOSAL

1.4.1 Introduction

The Applicant has operated a hard rock quarry extracting, crushing and screening basalt at Bald Hill since 1989. During 1997, with the exhaustion of the original basalt deposit on Bald Hill imminent, the Applicant's investigations revealed a need for future landfill space within the South West Region and that the exhausted quarry void had significant attributes capable of meeting or exceeding the environmental guidelines required for licenced regional landfills. Following discussions with representatives from surrounding Local Government areas, the Applicant committed expenditure to examine the technical and economic feasibility of establishing a regional landfill within the former quarry void. Following the positive outcome from the feasibility studies, the Applicant determined to research, prepare and present an EIS is to accompany a Development Application seeking approval to use of the quarry void as a Class 1 solid waste landfill.

It is noted that the feasibility study identified that the Applicant's principal objective should be to provide a long term (that is up to 50 years) landfill site for the exclusive use of the surrounding Local Government areas.

1.4.2 Site History

The basalt deposit known as Bald Hill was approved for quarrying in 1984. Commercial extraction commenced in 1985 by the then owner being Solah Blue Metal Pty Ltd, to provide road construction materials to the local Hume Highway duplication roadworks.

In 1989, the Applicant purchased the assets of Solah Blue Metal Pty Ltd including the rights to extract, crush and screen basalt at the Bald Hill site. Following extensive plant upgrading, production increased such that by 1995 the need for an alternative deposit was recognised. By 1997, one such deposit was located and secured (North Ridge) along with the freehold purchase of approximately 120 ha encompassing the original quarry void, the processing plant and stockpile area and access to the Hume Highway (see **Figure 1.2**).

Development Consent was granted in April 1999 for the extraction of basalt from the new North Ridge Quarry. The quarried basalt is transported via an internal haul road to the crushing and screening plant adjacent to the Stage 1 Quarry. This plant continues to operate in accordance with the Development Consent issued by Council in 1984.



1.4.3 Ongoing Basalt Extraction

Within the existing quarry void, there remains approximately 20 000 m³ of basalt mostly in areas underlying the internal haul road to the floor of the void. If approval is granted for the landfilling of the void, alternative access roads could be constructed as the void progressively fills allowing for the possible staged extraction of this remaining basalt. This extraction would most likely be completed during the first half of the life of the landfill.

1.4.4 The Need for a Regional Landfill Facility

1.4.4.1 Regional Waste Profile

The South West Waste Group (SWWG) is a group created by seven local councils to deal with regional waste issues (Section 1.5.2). They reported in November 1999 that their Group covers an area of 18 821 km² and a population of 48 575. Cootamundra covers an additional 1 525 km² with a population of 7 463. The SWWG area includes nine major population centres where 29 520 people make up 60 per cent of the population. A further 13 per cent reside in 27 villages. The population is not expected to change significantly over the coming years.

There are currently ten major landfills in the SWWG area that accept in excess of 1 000 m³ of wastes each year. There are 23 smaller village landfills and five transfer stations which receive in total over 20 080 tonnes of wastes each year. Some 15 267 tonnes of additional wastes are diverted annually through recycling and green waste composting/mulching. The Cootamundra area expect to divert approximately 1 500 t per annum from local landfills to the Bald Hill Quarry Regional Landfill.

A full copy of the 1999 SWWG report is included in **Appendix 4**.

1.4.4.2 Available Landfill Space

The 1999 SWWG report concluded that five of the ten major landfills will be exhausted within eight years at the then current rates of waste disposal. At that time, four Shire Councils and 50 per cent of the population in the area would be without a landfill. Similarly 14 of the 23 village landfills would be full within five years. The remaining five large and nine small landfill sites face ongoing issues such as:

- location concerns;
- increasing operating costs;
- community pressure; and
- EPA regulations.

1.4.4.3 Justifiable Demand

As a result of investigations by the SWWG, it was determined that there was urgent justifiable demand for replacement landfill space and that the proposed Bald Hill Quarry Regional Landfill was the preferred option as it would be central to all eight Shires. The group also believes the use of a central facility would increase the standard of waste disposal and transfer station operations across all Shires (**Appendix 4**).



1.4.5 Rehabilitation of Stage 1 Bald Hill Quarry

The progressive filling of the Stage 1 Quarry void and capping with suitable materials would enable the profile of the original Bald Hill to be substantially re-instated. The revegetation and grasses of the final landform would:

- provide improved visual amenity;
- eliminate inherent dangers associated with the open void; and
- add to local area vegetative cover thereby encouraging fauna through improved habitat.

1.5 PLANNING ISSUES

1.5.1 State Planning Issues

State Environmental Planning Policy (SEPP) 48 – Major Putrescible Landfill Sites applies to landfills that are designed to accept putrescible wastes from more than one Local Government Area and have a capacity to receive:

- more than 75 000 tonnes per annum of total wastes; or
- more than 650 000 tonnes in total.

The proposed development would accept 650 000 tonnes of wastes over the life of the site and wastes would be provided by more than one surrounding Local Government Area, thus SEPP 48 applies to this development. Application of SEPP 48 makes the Minister for Urban Affairs and Planning the Consent Authority for this Development Application.

The requirements of SEPP 48 have been addressed throughout the document, particularly under the various impact assessments and safeguards in Section 3.

State Environmental Planning Policy (SEPP) 11 – Traffic Generating developments is also applicable to this development as it is an activity included in Schedule 1 of the SEPP namely “regional depot”. The requirements of this SEPP are addressed in **Section 3.13**.

1.5.2 Regional Planning Issues

There are no formal regional planning issues pertaining to this proposal. There is, however, an informal South West Waste Group (SWWG) with interest in the proposed landfill. This group consists of surrounding local Councils with similar waste issues. This group has been involved throughout the preparation of the EIS through local Council members.

The SWWG targeted the investigation of a regional wastes strategy with the advantage of economies of scale. This extended to consider improvement in waste disposal practices throughout the area. The group focused on a regional landfill facility and strategies to increase where possible the viability of recyclable materials recovery from the local government areas involved through resource sharing and a regional cooperative approach.



1.5.3 Local Planning Issues

The Project Site lies within land zoned Non-urban 1(a) and 1(b) under the Harden Shire Council Interim Development Order No. 1, 1976 and Rural 1(a) under the Harden Draft Local Environmental Plan 1999. This zoning permits landfill operations in these zonings with the consent of the Council. The portion of the Project Site within 400 m of the Hume Highway falls within Zone 1(b) while the rest of the Project Site is within Zone 1(a).

1.6 CONSULTATION

1.6.1 Government Consultation

During the preparation of the Environmental Impact Statement, the following Government Authorities were consulted and additionally were invited to attend a Planning Focus Meeting on 30 October 1998.

- Department of Urban Affairs and Planning (Sydney)
- Junee Shire Council (Junee)
- Tumut Shire Council (Tumut)
- Yass Shire Council (Yass)
- Boorawa Shire Council (Boorawa)
- Cootamundra Shire Council (Cootamundra)
- Gundagai Shire Council (Gundagai)
- Young Shire Council (Young)
- Harden Shire Council (Harden)
- NSW Health (Goulburn)
- National Parks and Wildlife Service (Queanbeyan)
- Roads and Traffic Authority (Goulburn)
- Department of Land and Water Conservation (Yass)
- Environmental Protection Authority (Queanbeyan)
- NSW Agriculture (Goulburn)

The key issues identified at the Planning Focus Meeting and/or in correspondence provided by each Government Authority consulted are outlined in **Appendix 3**. Reference is made after each issue to the section(s) of the EIS that contain text and/or figures related to each issue.



1.6.2 Community Consultation

1.6.2.1 Introduction

A significant effort has been made by the Applicant to ensure the community of Jugiong has been kept informed about the proposed regional landfill as it has evolved, and given every opportunity to have direct input. This has been achieved through a process of discussions with, and site visits by, the local community over the past few years on an informal basis, and through a formal multi-faceted approach.

1.6.2.2 Interviews with Adjoining Landholders and Residents

The following residents and landholders whose properties adjoin the Project Site or are line of sight (approximately 1 km) have been interviewed as part of the consultation process.

Owner	Property Name
T.A. Field Estates Pty Ltd	"Benangaroo"
A.J. Sharp	"Ellerslie"
D.A. Strong	"Tianna Park"
M. and B. Suthern	"Westlyn"
M. Suthern	"Westaroo"
J. Sheahan	"Akoona"

Issues raised by these residents and landholders included overall:

- odour
- windblown litter
- noise
- types of waste
- pests
- supervision and controls
- access
- land values

1.6.2.3 Public Meeting with Local Jugiong Community

A community information evening was held in the Memorial Hall, Jugiong on Wednesday, 15 November 2000. This meeting was advertised in the local press throughout the Local Government Areas for two weeks prior to the meeting. Twenty eight people attended this meeting to hear the details of the proposed regional landfill explained, and to have their questions answered. Matters raised from the floor of the meeting covered:

- impact of odour;
- likelihood of wind blown litter;
- noise;
- sources and types of wastes;
- pests;
- supervision and controls; and
- access.

1.6.2.4 Information Dissemination to Surrounding Local Government Areas

Consultation was extended further to encompass all participating Local Government Areas (LGAs) within an approximate radius of 100 km of the Project Site. This was achieved through the distribution of an information brochure to the 20 000 households within the LGAs. Distribution commenced on October 2000 and was completed by November 2000. A copy of the brochure is reproduced in **Appendix 6**.



Apart from outlining the landfill proposal, all recipients of the information brochure were invited to reply by free post to make comment, submit questions for clarification and /or register their interest to be kept informed of the proposal as it progressed. The responses are summarised in **Table 1.1**.

All respondents providing a return address have been sent an acknowledgement reply and a Frequently Asked Questions information sheet (see copy in **Appendix 6**). Matters raised relating to individual Local Government Areas have been referred to the appropriate Council.

TABLE 1.1
Your Rubbish - Where Will It Go? Summary of Responses

Council	Respondents	Support	Against	No Comment	Comments
Boorowa	18	5		6	7
Gundagai	7	4		3	
Harden	19	4	1	7	7
Junee	0				
Tumut	34	6		22	6
Yass	24	3		16	5
Young	23	4	1	9	10
Total	125	22	2	63	35
%	100	17.5	1.6	50	28

Responses compiled as of 26 February 2001

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"Support" refers to expressions of support, (e.g. 'good idea').

"Against" refers to expressions of dissent (e.g. 'not a good solution').

"No Comment" refers to people wanting more information.

Some of the comments given through the survey included:

- 'will recycling be available?'
- 'we want recycling facilities'
- 'will the costs increase?'
- 'can we have wheely bins ? '(Young Township)
- 'maintain the Jugiong Harden Road'.

As a result of this information dissemination and consultation, eight surrounding Local Government Areas (Cootamundra, Boorowa, Gundagai, Harden, Junee, Tumut, Yass and Young) have indicated support and use of the proposed landfill (**Appendix 5**). It is acknowledged that not all local landfills will close immediately and some councils may require a local disposal area. The majority of the local landfills, however, will eventually close and be replaced by shire transfer stations if this proposal is accepted. This would result in inert wastes such as concrete, soil and timber greenwastes and recycables would be processed locally.



1.6.2.5 Ongoing Community Participation

The Applicant proposes that the ongoing management for the Landfill Site would involve the participation of a Community Consultative Committee formed in accordance with directives set out in a Development Consent.

1.7 ONGOING DOCUMENTATION AND MANAGEMENT

1.7.1 Landfill Environmental Management Plan

As outlined in Section 1.1, the Applicant has prepared a draft Landfill Environmental Management Plan (LEMP) for consideration by the Environment Protection Authority (EPA) in its application for an Environment Protection Licence to operate the landfill. Should the Development Application be approved by the Minister for Urban Affairs and Planning, the Applicant will finalise the LEMP for submission to the EPA and for use as a management tool for the ongoing operation of the landfill. The final LEMP will reflect the conditions of Development Consent issued for the landfill and any relevant submission made throughout the assessment process.

The Applicant proposes to update the LEMP every five years to reflect current planning and current waste industry technology.

1.7.2 Monthly and Annual Reporting

The Environment Protection Licence will require the submission of both monthly and annual returns with a wide range of information supplied to the Authority covering both operational and monitoring data.

1.7.3 Environmental Management

Ongoing environmental management at the Bald Hill Quarry Regional Landfill would be the ultimate responsibility of the Applicant's Managing Director. A training program would be implemented for each of the Company's employees to ensure that all relevant procedures incorporated in the LEMP are strictly followed.

The Applicant would work closely with Harden Shire Council, the holder of a Supervisory Licence, to ensure that all relevant issues are appropriately managed.

The Environment Protection Licence would require the Applicant to maintain a complaints register and a protocol for managing any complaints received. A copy of the complaints record form is included in the LEMP.

1.8 DOCUMENT PREPARATION

The preparation of this document has been managed by Mr Robert W. Corkery, B.Sc. (Hons), M.Appl. Sc., Principal of R.W. Corkery & Co. Pty. Limited. The Applicant's Managing Director, Mr John Wilkinson, has contributed a number of sub-sections of the text and has assisted in the preparation of the document's figures. Mr Corkery has been assisted in the preparation of



the document by Ms Kim Ferguson, B. Env. Sc (Merit Hons), Environmental Scientist with R.W. Corkery & Co. Pty. Limited.

The technical design component relating to the landfill has been compiled by Mr Sam Bateman, B.E, B.Sc(Hons), M.Eng.Sc., Waste Management Engineer, Nolan ITU. Geophysical work was completed by Geo. Eng. Australia Pty Ltd (Warwick Wood Geophysicist, and Geoff Pettifer, (Principal Geophysicist)).

A number of components of the existing environment and the project's impacts upon the environment have been the subject of specific studies undertaken by the following specialist consultants.

- Coffey Geosciences Pty Ltd (hydrogeology).
- Countrywide Ecological Service (fauna, weeds, and pests).
- Eric Taylor Acoustics Pty Ltd (noise assessment).
- Holmes Air Sciences Pty Ltd (odour assessment).

Consideration of the Aboriginal heritage of the proposed areas of disturbance has been undertaken by Mr Roland Williams, Sites Curator with the Wiradjuri Branch of the NSW Aboriginal Land Council.



SECTION 2

DESCRIPTION OF THE PROPOSAL

P R E A M B L E

This section presents a description of the proposal to develop and operate the Bald Hill Quarry Regional Landfill. Details of the Project Site and approvals required are provided together with the design and operational components of the landfill. A description is also provided of the transportation of wastes to the landfill.

This section concentrates upon describing the proposal in sufficient detail to provide the reader with an understanding of the proposal. Further details of some components are included in the draft Landfill Environmental Management Plan. Details of the specific design and operational safeguards to manage groundwater, air quality, noise and other components of the local environment are included in Section 3 of this document.



2.1 OUTLINE OF THE PROPOSAL

2.1.1 Objectives

The Applicant's principal objectives for the development and operation of the proposed landfill are to:

- (i) Provide a regional solution to a regional waste problem;
- (ii) construct and operate a fully licensed landfill exclusively servicing the surrounding Local Government Areas;
- (iii) gradually replace the existing unlicensed landfills within the surrounding Local Government Areas, thereby limiting the overall impacts of the disposal of the Region's solid wastes;
- (iv) provide a disposal area for surrounding Local Government Areas while complementing their local transfer stations and recycling efforts;
- (v) receive and place solid wastes into the landfill in a manner that complies with all statutory requirements and does not adversely impact the surrounding environment, land uses or adjoining/ nearby neighbours; and
- (vi) provide for the progressive re-instatement of the landform of Bald Hill.

2.1.2 The Project Site

For the purposes of this document, the area covered by the Development Application is referred to as the Project Site (see **Figure 1.2, Plate 2.1**). This area covers a total of 108.6 ha and comprises parts of three lots, namely Lot 7, DP 133540 and Lots 11 and 12, DP 439146, all of which are owned by Bald Hill Quarry Unit Trust.

The Project Site boundary has been positioned within these lots generally along fence boundaries which have been in place for many years and are the subject of a formal "Give-and-Take" agreement (see Section 3.11 – Land Ownership). The Applicant gains access to the Project Site from the Old Hume Highway via a dedicated right-of-way across Portion 158 of DP 268297.

The Project Site covers the exhausted Stage 1 Bald Hill Quarry void, the proposed transfer station, leachate evaporation ponds, the existing site access road and weighbridge complex and all other areas related to the crushing, screening and stockpiling of products produced from rock extracted within the North Ridge Quarry. Essentially, the ongoing operation of the crushing / screening operations and the landfill would be integrated using the same Project Site but managed separately.



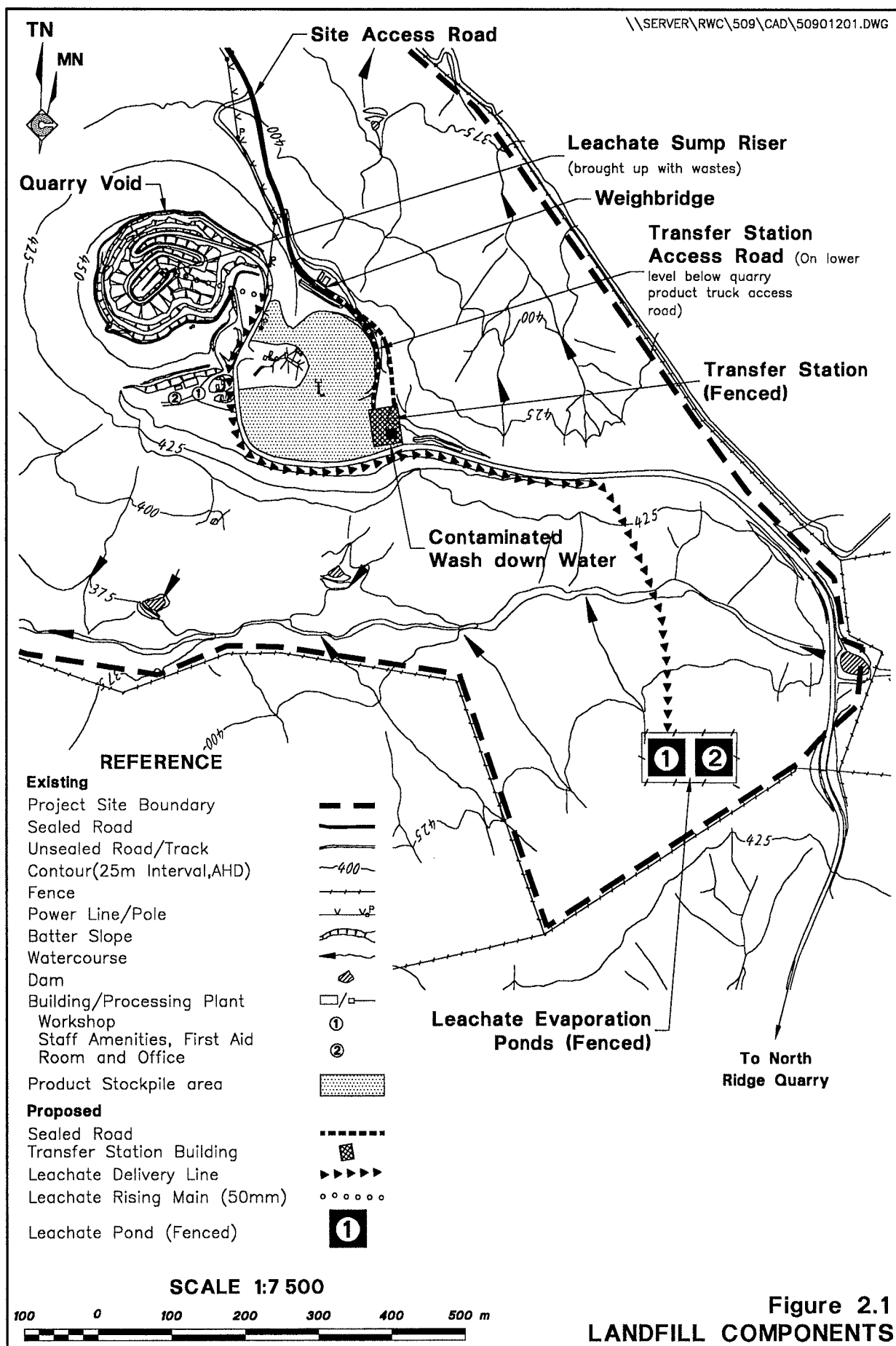




Plate 2.1 An oblique aerial view to the west across the Project Site (Ref: 490D/20)

2.1.3 Waste Characteristics

2.1.3.1 Waste Volumes

The Applicant has been advised by eight local Councils that collectively they ultimately expect to despatch approximately 17 800 tonnes of wastes annually to the Bald Hill Quarry Regional Landfill. This estimate is based upon the following individual contributions from each Local Government Area.

• Boorowa	400 t	• Junee	1 200 t
• Cootamundra	1 500 t	• Tumut	4 500 t
• Gundagai	1 200 t	• Yass	1 700 t
• Harden	1 300 t	• Young	6 000 t

Most of the Councils hold poor data on waste quantities. An independent assessment calculated that the waste quantities despatched to Bald Hill could be as much as 25 000 t per year.

The above quantities would vary annually in response to population growth / decline and production levels at regional industrial complexes. It is also recognised that each Council would periodically review available technologies and assess their economic viability for management of wastes in their Local Government Area. It would always be the intention of each Council to only despatch wastes to the Bald Hill Quarry Regional Landfill that cannot be re-used, recycled and/or economically treated at or near their source.



Throughout the life of the Bald Hill Quarry Regional Landfill, it is possible that some Councils may choose to direct some of their wastes to other facilities due to transport or related costs. Equally, some of the other regional Councils may choose to send some or all of their wastes to the Bald Hill Quarry Regional Landfill.

2.1.3.2 Waste Sources

The Applicant has agreed with representatives of the eight Local Government Areas that the authorised sources of wastes would be:

- regional transfer stations;
- special events e.g. local show, field days; and
- other locations as directed by each Council.

Additionally, it is anticipated that:

- (i) compactor trucks engaged in the collection of domestic household wastes in the closer towns (e.g. Gundagai, Harden) would deliver directly to the landfill; and
- (ii) some commercial waste contractors may deliver directly from the towns where they operate.

2.1.3.3 Permitted Wastes

It is proposed that the Bald Hill Quarry Regional Landfill would be licenced as a "Solid Waste Landfill – Class 1". This essentially provides for the disposal of all solid wastes including putrescible wastes and other wastes approved by the EPA (Source: EPA, 1996). Solid wastes are defined under the Protection of the Environment Operations Act 1997 – Schedule 1 (Part 3), as follows.

- "(1) Municipal wastes, being wastes consisting of:
 - (a) household domestic wastes that are set aside for kerb side collection or delivered by the householder directly to a waste facility; or
 - (b) other types of domestic wastes (e.g. domestic clean-up and residential garden wastes); or
 - (c) local council generated wastes (e.g. wastes from street sweeping, litter bins and parks).
- (2) Biosolids categorised as Restricted Use 2 or 3 in accordance with the criteria set out in the Biosolids Guidelines, manure and night soil.
- (3) Wastes contaminated with lead from residential premises or education or child care institutions.
- (4) Cleaned pesticide, biocide, herbicide or fungicide containers.
- (5) Drained and mechanically crushed oil filters, and rags and oil absorbent materials (not containing free liquids) from automotive workshops.
- (6) Disposable nappies, incontinence pads and sanitary napkins.



- (7) Food wastes.
- (8) Vegetative wastes generated from agriculture or horticulture.
- (9) Non-chemical wastes generated from manufacturing and services (including metal, timber, paper, ceramics, plastics, thermosets and composites)."

The Applicant recognises that the landfill facility could also provide a suitable repository / remediation site for smaller quantities of selected hazardous / industrial wastes generated within the Local Government Areas. These wastes would be restricted to various toxic, corrosive or poisonous substances. Appropriate application submissions would be made and approvals sought prior to any activity relating to hazardous / industrial wastes.

Contaminated soils from petroleum industry sites or petroleum spillage incidents are intended to be used as part of the daily cover for the landfill. This contaminated soil would be received into the transfer station and contained at all times within the environmental protection safeguards presented in Section 3.

2.1.4 Proposed Layout

The location of the main components of the landfill project are shown in **Figure 2.1**. A key objective in designing the layout was to keep the existing quarry operations of processing, stockpiling and product despatch, separated from the landfill operations. Where common use of a facility occurs e.g. weighbridge and site access road, it is considered that no change is required.

The proposed site layout with the following components related to the landfill proposal are identified below.

- Site access road (shared with all on-road vehicles).
- Weighbridge (shared with quarry product trucks).
- Transfer station access road (only 50 m shared with quarry product trucks).
- Transfer station.
- Quarry void haul road (shared with off-road trucks travelling to and from the North Ridge Quarry).
- Quarry void.
- Leachate Sump Riser and Rising Main.
- Leachate evaporation ponds and leachate delivery line.

Each of these components are described throughout this section of the document.



2.1.5 Landfill Design

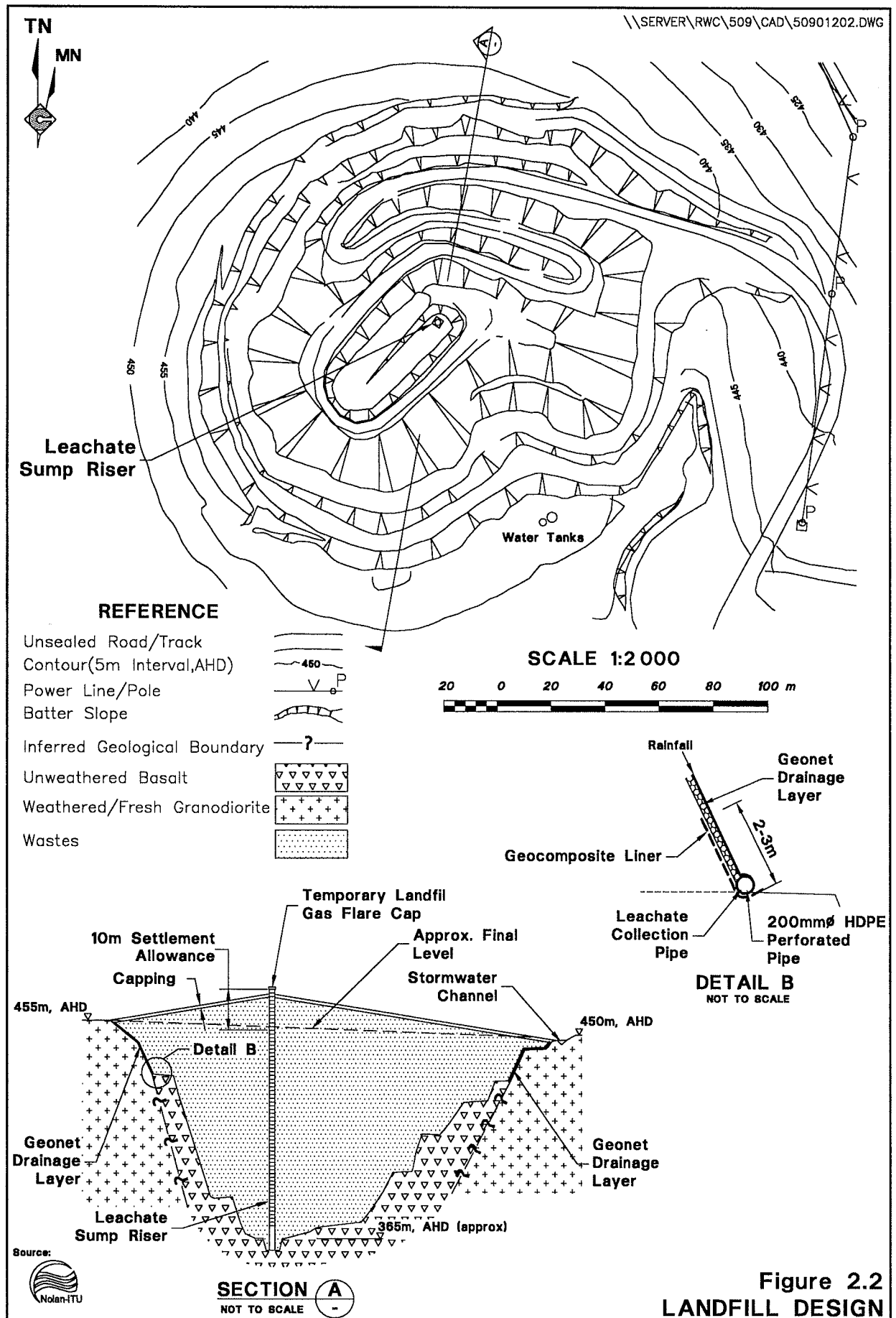
The landfill design has been prepared adopting best practice techniques whenever possible to ensure that the local environment is fully protected. **Figure 2.2** presents a cross-section of the quarry void and the features of the landfill design. The important components of the landfill design are set out below.

1. The virtual impervious nature of the fresh rock surrounding the quarry void negates the need for a leachate barrier liner for the landfill below approximately 430 m, AHD.

This was concluded from the hydrogeological testing conducted on the site. The rock mass was found to be effectively impermeable ($<10^{-7}$ cm/s), which satisfies to the EPA requirement for landfill liners (see Section 3.5.5 for details). Hence, wastes would be placed against the wall of the void between the floor and approximately 430 m, AHD. The permeability of the quarry walls above and below 430 m, AHD require additional testing, which would be undertaken prior to the waste fill reaching this level. Once the zone of permeability is established, it is proposed to use a geonet drainage layer (Geofabrics Australia – Geosheet or similar) directly against the permeable quarry wall prior to the placement of the wastes in this area. The geonet layer would cause leachate to rapidly drain down the steep internal slope of the void and would in effect prevent the leachate from seeping into the weathered materials. A leachate collection pipe would be positioned at the base of the geonet to drain the leachate into the overall leachate collection system. If, during the investigation of the quarry walls in the weathered zone, a layer of saturation is found, it would be sealed with a geocomposite liner (GCL) behind the geonet (**Figure 2.2**).

2. A central leachate sump would be created at the deepest point of the quarry void together with a leachate sump riser that is constructed progressively as the level of wastes rise within the quarry void. A leachate collection layer and pipe would be placed on the benches formed by the access road. This would enhance the collection of leachate draining down the quarry walls as the quarry void is progressively filled. The leachate collection pipe at the base of the geonet would be connected to this system.
3. Wastes would be placed on the floor of the quarry void (above the coarse drainage material around the leachate well). The wastes would be progressively added in layers as the level of wastes rise within the void. All layers would be sloped outwards from the leachate sump rise toward the void walls, typically at $<5^\circ$ (1:12 / V:H).
4. The final surface of the landfill would be constructed to a maximum level approximately 10 m above the rim of the quarry to provide for the expected settlement.





2.2 APPROVALS REQUIRED

Schedule 2(5)(e) of the *Environmental Planning and Assessment Regulation 2000* requires that this document list the approvals that must be obtained under any other act or law to enable the proposed activity to be lawfully carried out. The Applicant requires the following two approvals to develop and operate the Bald Hill Quarry Regional Landfill.

- (i) Development Consent from the Minister for Urban Affairs and Planning under the *Environmental Planning and Assessment Act 1979*.
- (ii) An Environment Protection Licence from the Environment Protection Authority under the *Protection of the Environment Operations Act 1997*.

The Applicant already holds an Environment Protection Licence for the existing quarrying operations. The Environment Protection Authority advise that a single licence applies to a site irrespective of the number of scheduled activities. Hence, it would be the intention to substantially amend the existing licence to accommodate the Authority's requirements for the waste disposal operation.

The requirement for more than one approval for this landfill to proceed means the proposal is recognised to be "integrated development" under the provisions of Section 91 of the *Environmental Planning and Assessment Act 1979*. The integration of the Development Consent and the modifications to the Environment Protection Licence is designed to assist new projects to commence as early as possible with consistent conditional requirements between the Development Consent and the Environment Protection Licence.

It is noted that the groundwater observation bores drilled as part of the hydrogeological investigations for the landfill have already been licenced by the Department of Land and Water Conservation. These bores would continue to be used as observation / monitoring bores for the life of the landfill.

In the event that limited periodic extraction of basalt is undertaken within the quarry void, it would be undertaken in accordance with the Development Consent issued for the quarrying activities first issued in 1984.

2.3 SITE DEVELOPMENT

2.3.1 Introduction

A number of the components of the existing quarry infrastructure would be able to be used for the proposed landfill. Additional construction would be limited to:

- (i) preparatory works within the quarry void;
- (ii) the transfer station and its access road; and
- (iii) the leachate management system.



2.3.2 Quarry Void Preparatory Works

Prior to the receipt of any wastes, the following works would be undertaken within the quarry void. Each of these components are shown on **Figure 2.3**.

- (i) Excavation of leachate collection sump.

The leachate collection sump would effectively be created within the lowest point of the quarry void with localised shaping, if necessary, with a hydraulic hammer. The sump would have a void volume of approximately 80 m³ and cover an area of approximately 180 m². The collection sump is approximately 6 m wide, 30 m long and the base slopes to a maximum of 2 m deep at the leachate sump riser. The void volume of 80 m³ would be sufficient to hold 85 per cent of the peak daily leachate volume predicted by the Hydrologic Evaluation of Landfill Performance (HELP) model.

- (ii) Construction of leachate collection sump and riser.

The construction of the leachate collection riser within the collection sump would involve placement of a re-inforced concrete base and a cast in-situ concrete sump well for the initial section of the leachate sump riser (5 m high, 2.2m diameter). The cast in-situ section would be fully encased in a HDPE protective layer. Once completed, the leachate sump would be filled with coarse rock and covered with a heavy duty geotextile filter.

- (iii) Construction of stormwater diversion system.

The Applicant proposes to construct small diversion banks around the edges of the uppermost quarry benches to divert stormwater out of the void. These banks would be constructed with material recovered from in-situ during the construction process. The extent of diversion banks constructed would depend upon the safety considerations involved in their construction.

- (iv) Installation of leachate pump and extraction system.

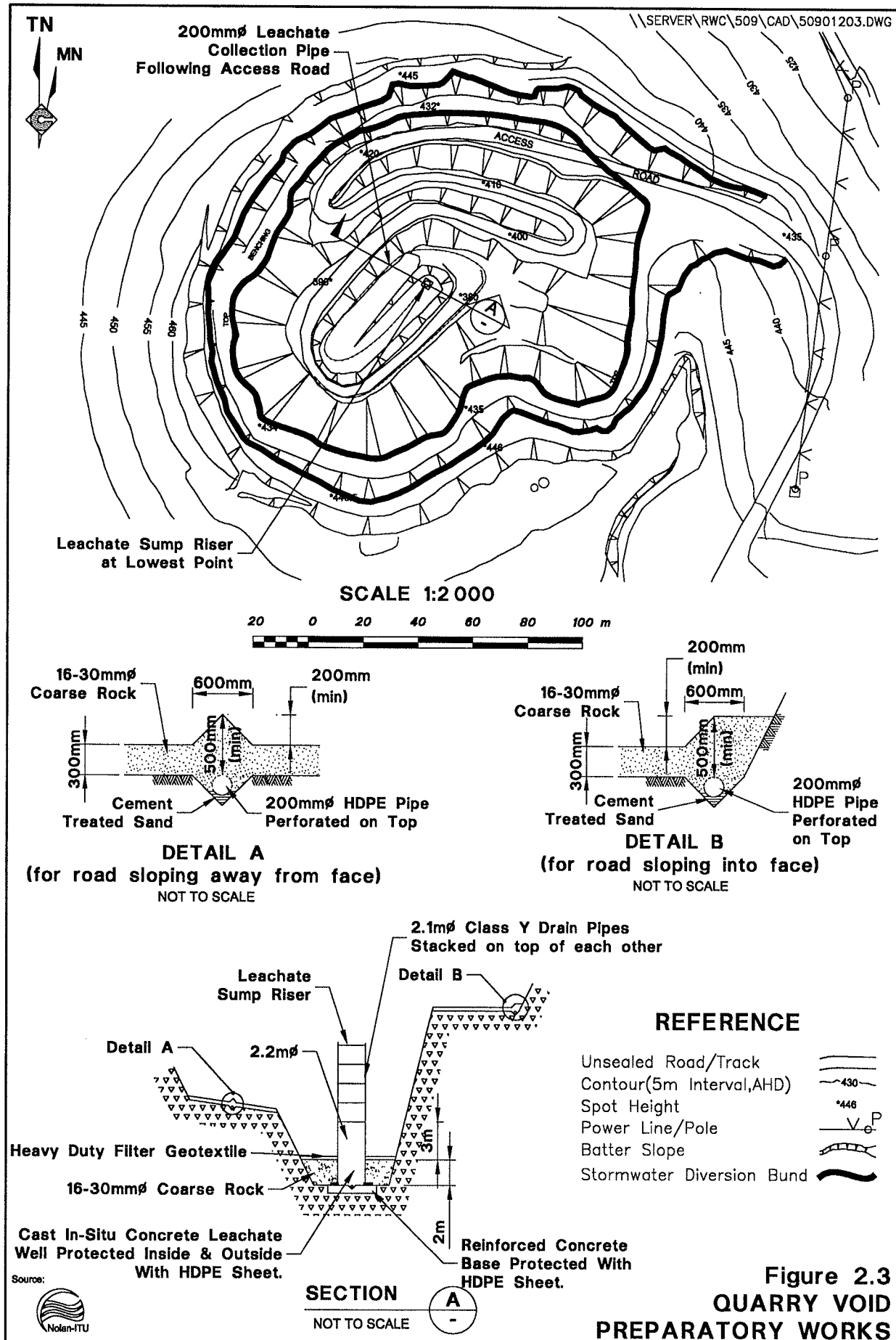
A leachate extraction system would be constructed to enable leachate collected in the leachate sump to be pumped to the leachate evaporation ponds. This would involve the installation of a pneumatic leachate pump at the base of the leachate sump riser and the provision of an air compressor. A leachate rising main would be installed from the pneumatic pump up the leachate well riser to beyond the edge of the quarry void.

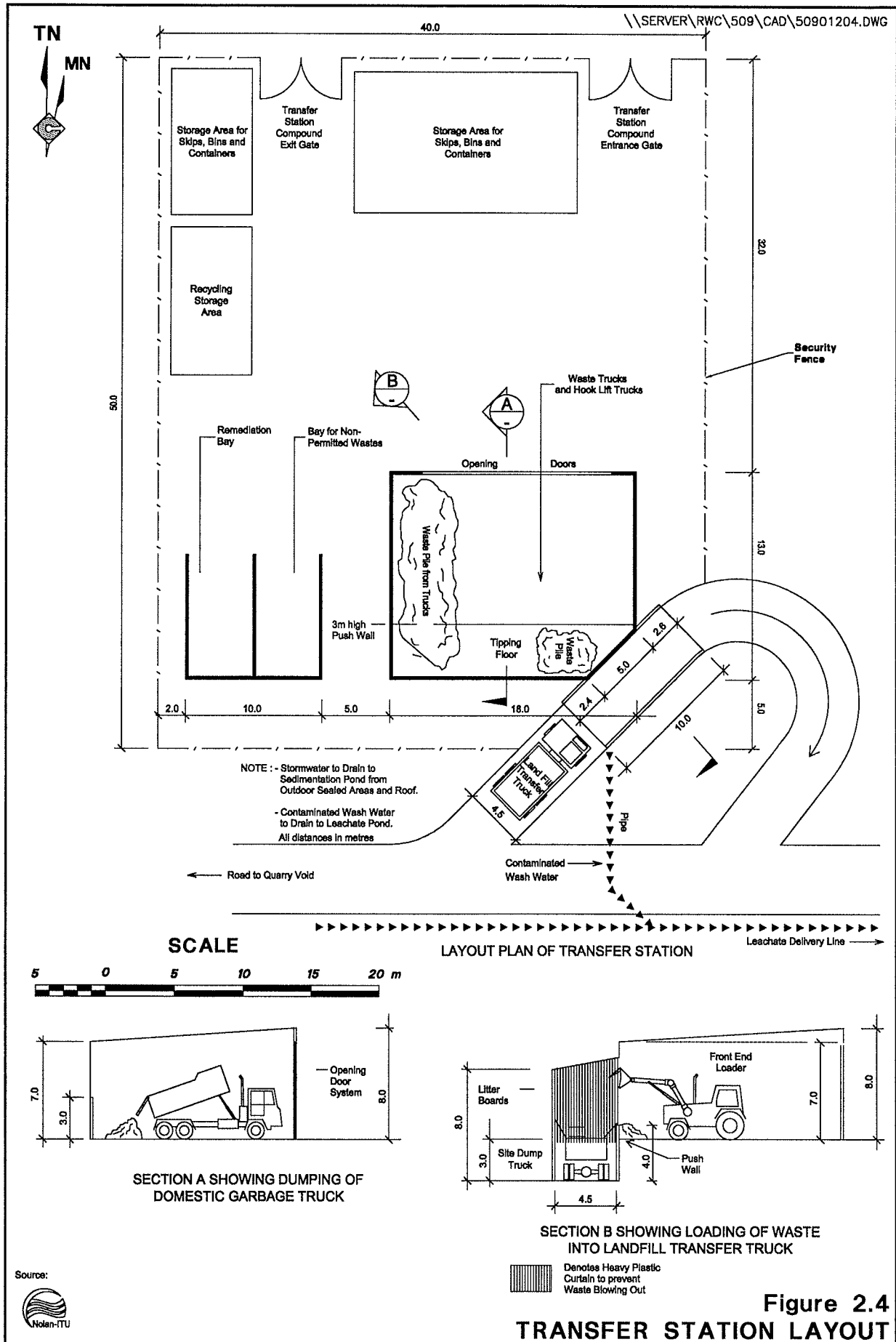
2.3.3 Transfer Station

Figure 2.4 shows the design concept of the transfer station building and associated compound. The main components of the building are:

- an enclosed building with an opening door system for truck access;
- a tipping floor for receipt and inspection of wastes;
- a wash down facility;
- a lower section for the landfill transfer truck to enter the building;
- contaminated water collection and discharge to leachate management system; and
- a 2.0 m high litter collection fence.







A dedicated access road would be constructed to the transfer station to separate quarry trucks from waste trucks travelling beyond the weighbridge towards the transfer station building. The access road is illustrated in **Figure 2.1**.

Outside the transfer station building but within the fence compound, provision would be made for manoeuvring areas for trucks, storage of bins and recyclable materials.

Construction would involve the following activities:

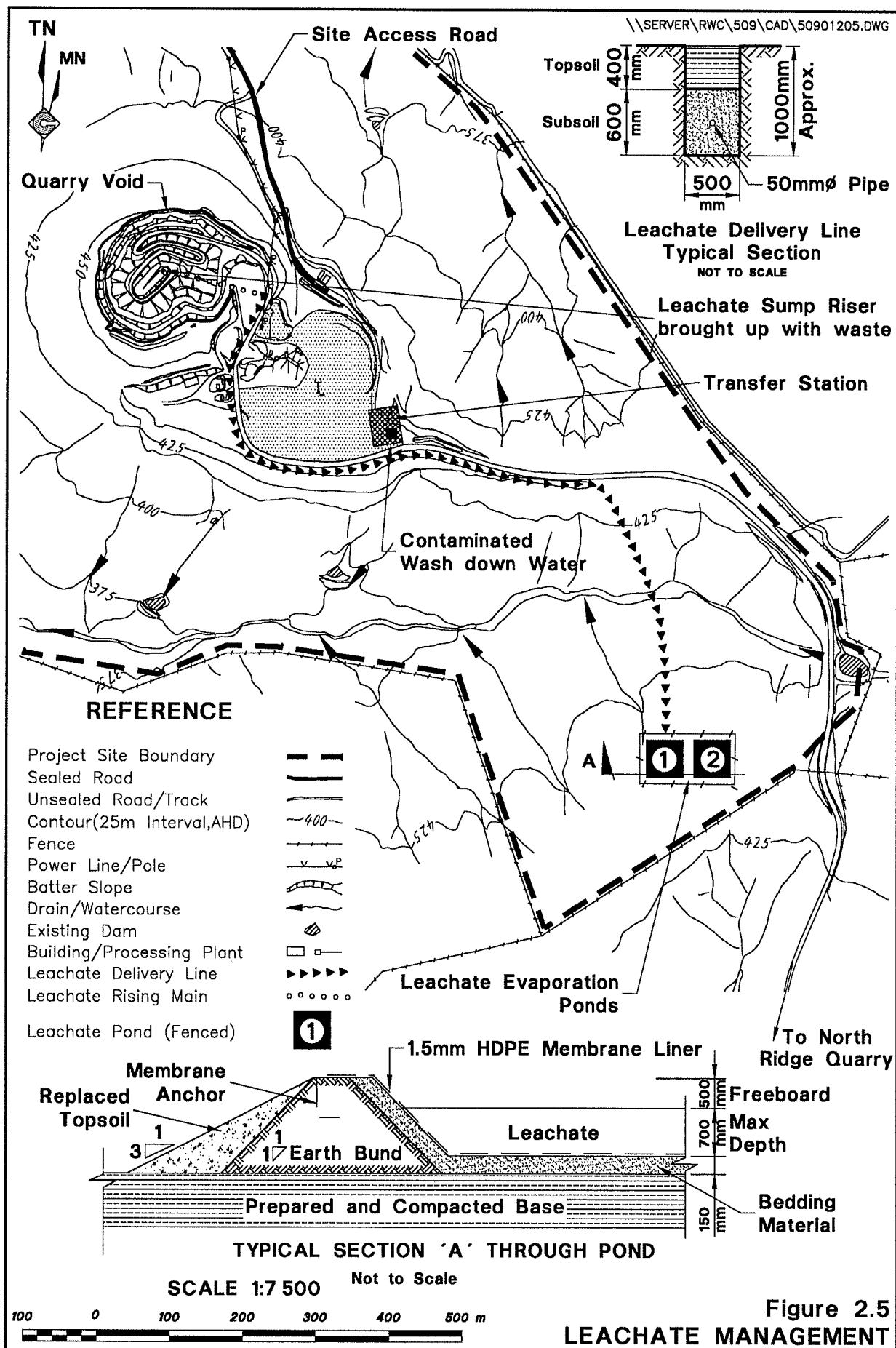
- site earthworks – levelling and foundation preparation;
- construction of transfer station access road;
- construction of transfer station building;
- construction of associated facilities;
 - wash down bay;
 - fluid collection system;
 - hardstand area and litter fence; and
 - concrete lined bay for remediation activities.

2.3.4 Leachate Management System

Figure 2.5 shows the components of the leachate management system beyond the quarry void, namely:

- the rising main (50mm diameter) from the leachate pump which would be progressively constructed as the waste level rises;
- the leachate delivery pipe – the pipe will transport surplus leachate from the void to the leachate evaporation ponds. The majority of the leachate would be irrigated over the landfill (refer to Section 3.5.5.4). The leachate delivery pipe (50 mm diameter) would be buried at least 0.45 m deep. The delivery pipe would be placed within 10 m of the access road between the quarry void and the leachate evaporation ponds for the initial 600 m and then diverted in a direct line to the ponds; and
- the initial leachate evaporation pond (Pond No. 1) and compound – the pond would have a capacity of approximately 2 200 m³ (56m x 56m and 0.7m deep). The volume of leachate cannot be determined accurately due to the conical shape and the fact that low waste inputs could lead to a leachate surge if a large storm event occurs within the first 12 months. The leachate evaporation pond can be easily and quickly extended to double the size if this occurs. Once the landfill has a significant depth of wastes, leachate generation will reduce because of absorption into the waste mass.





Construction of the leachate evaporation ponds would involve the following activities:

- vegetation clearing and the cut-and-fill earthworks to shape the initial leachate evaporation pond and achieve the required compaction;
- placement of and shaping of a sand bedding layer, approximately 150 mm thick and the 1.5 mm HDPE membrane liner. Old tyres may be used to weigh down the liner while the pond is empty;
- replacement of topsoil on the outer edge of the pond perimeter; and
- construction of a compound fence around the initial leachate evaporation pond.

2.3.5 Landfill Gas Management

Landfill gas would be managed during the filling of the quarry void by progressive gas collection and a temporary flare cap fixed to the top of the leachate riser shaft. This is shown in **Figure 2.6**. Landfill gas will be extracted under vacuum and vertical collection pipes into the leachate riser through a network of near horizontal pipes radiating from the central riser. The flare would only operate if the gas cannot be used economically. This is only expected to occur after some years of operation.

Once the backfilling of the quarry void is completed, the progressive gas collection system installed will continue to collect gas. Details of the gas management are presented in Section 3.6.5.2.

2.3.6 Equipment

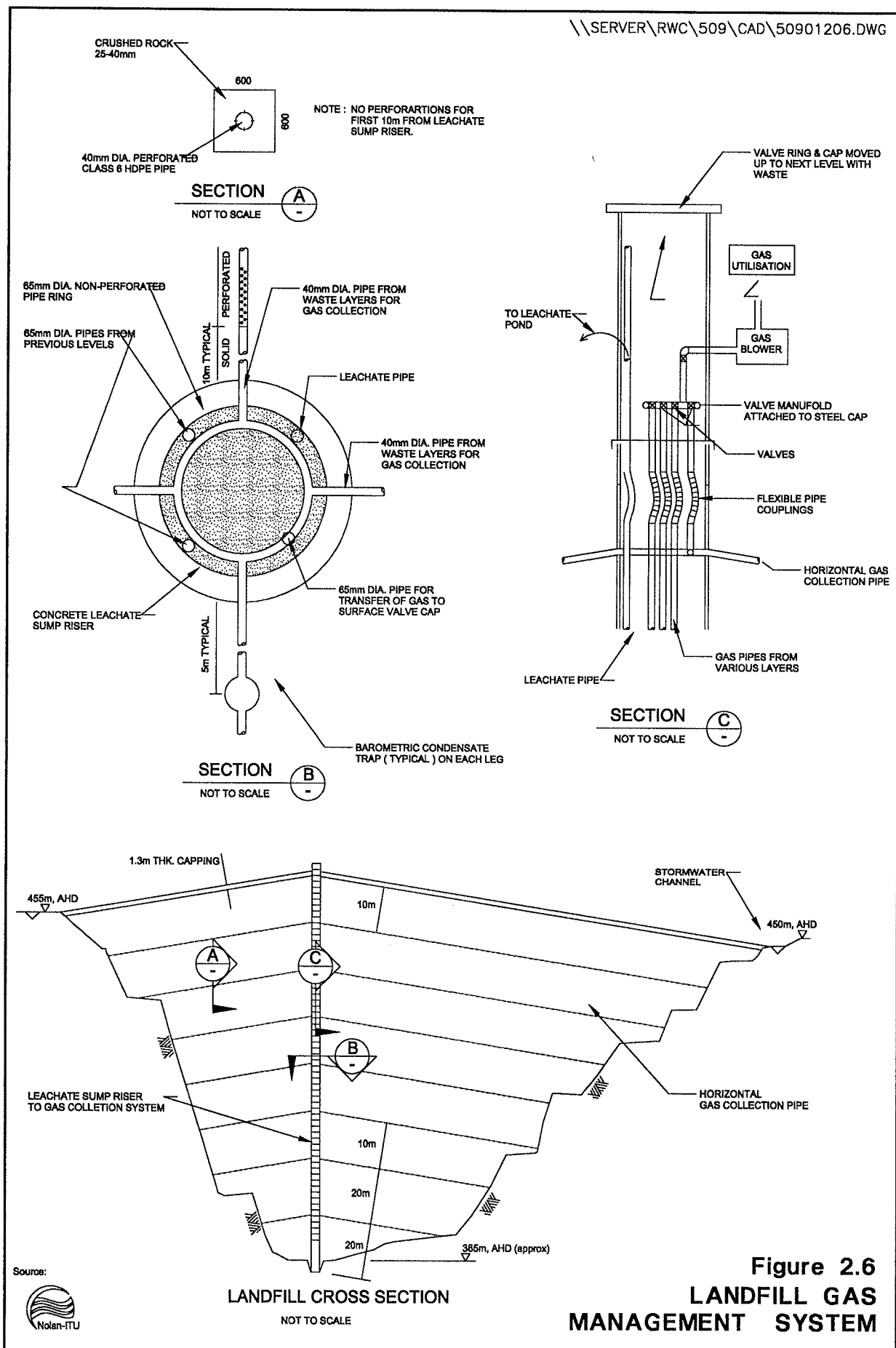
The earthmoving and other equipment required (or an equivalent) for the development of the landfill-related components include the following.

- Cat 120G Grader.
- Komatsu PC300-5 Excavator.
- Komatsu WA500-1 Front-end loader or equivalent.
- Komatsu HD325-5 Dump truck or equivalent.

2.3.7 Development Timetable and Hours of Operation

The Applicant estimates that the site development works described would be undertaken during a three month period within the working hours of 7.00 am to 5.00 pm, Monday to Saturday.





2.4 SITE OPERATIONS

2.4.1 Waste Receival

2.4.1.1 Weighbridge

All wastes would be delivered to the Project Site via the site access road in covered trucks or enclosed garbage compactors. Access to the Project Site would be restricted to authorised trucks transporting wastes from the nominated transfer stations within the participating Local Government Areas or the direct delivery by commercial waste contractors. No wastes would be received from the general public. At the weighbridge, the following information would be recorded:

- time of arrival / truck registration number; and
- source (municipal, commercial, building etc.) weight and type of wastes.

Once all of this information is collected, each truck would travel directly to the transfer station along the sealed transfer station access road.

2.4.1.2 Transfer Station

Trucks would reverse into the building through the northern open side of the building where the wastes would be tipped onto the tipping floor within the transfer station building. The purpose-built waste bins would be washed out on an as needs basis with high-pressure hoses at the tipping floor – after the wastes have been removed, prior to re-deployment to a regional transfer station or short-term storage adjacent to the building.

2.4.1.3 Screening and Re-loading

The tipped wastes would be inspected by the operator for non-permitted wastes. Any non-permitted wastes would be removed and stored and regularly transported from the site to a facility approved to receive such wastes and source Councils notified. Where practical, recyclable materials would be separated and stored for periodic collection by contractors. A front-end loader would then load the remaining wastes onto the landfill transfer truck for delivery to the quarry void.

2.4.2 Waste Placement

2.4.2.1 Transportation to Landfill Void

The purpose built landfill transfer truck would travel via the existing haul road (see **Figure 2.1, Plate 2.2**) to enter the quarry void. This access road would be upgraded and maintained.

With a fully enclosed wastes compartment to ensure no litter escapes, the truck would make the short journey to reach the active tipping face and unload the wastes.





Plate 2.2 Existing Bald Hill Quarry void access road (Ref: 509B/23)

2.4.2.2 Waste Compaction

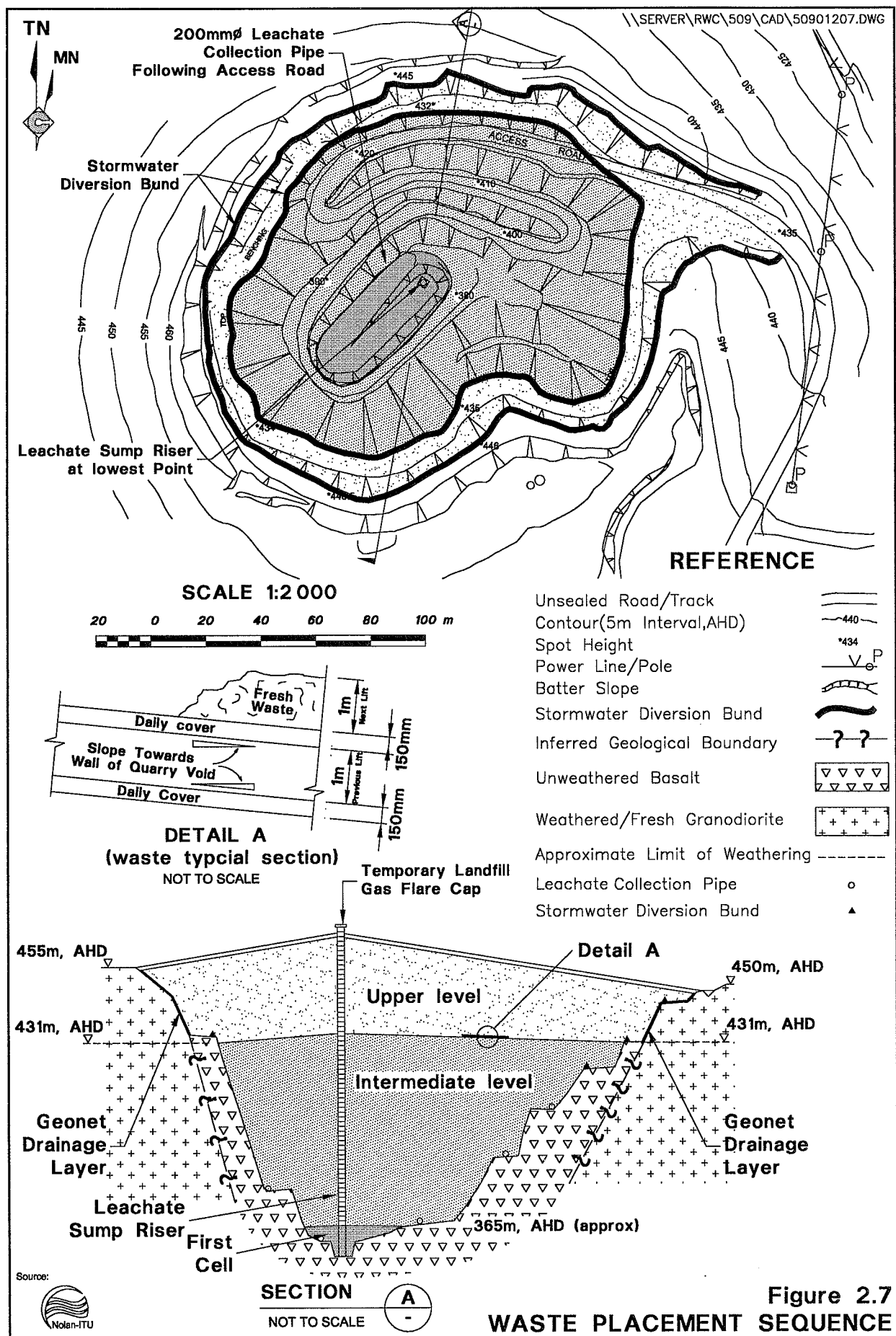
Once unloaded at the active tipping area within the quarry void, the wastes would be compacted with a CAT 963 Traxcavator or equivalent as it spreads the wastes up a 1:3 (V:H) slope. The machine tracks would shear and compact the wastes as the machine moves up and down the slope. Maximum compaction is likely to be achieved by compaction of layers of approximately 1 m. The Applicant expects to achieve a density of greater than 650 kg/m^3 with this method of compaction. Increases in density would also be expected over time as compaction is achieved by the surcharge created by the weight of the wastes.

2.4.2.3 Waste Placement Sequence

Figure 2.7 shows the proposed sequence of filling the quarry void. The void would be initially filled around the leachate riser as a single cell. As the surface area near the base of the void increases, filling would occur in several cells increasing in number as the filling surface rises. The first cell would only have a capacity for approximately $6\,000 \text{ m}^3$ ($5\,000 \text{ t}$ of wastes).

Figure 2.7 also shows an intermediate level of filling between the initial cell and the final level which would need to be filled after the placement of the geonet drainage layer. The quantity of wastes placed in the intermediate level would be approximately $320\,000 \text{ t}$ ($490\,000 \text{ m}^3$), i.e. assuming the geonet drainage commences at the 430 m, AHD level. A further $325\,000 \text{ t}$ ($500\,000 \text{ m}^3$) of wastes would be placed in the upper level of the landfill.





2.4.3 Covering Operations

2.4.3.1 Covering Procedures

Following the conclusion of each day's waste placement and compaction, a layer of cover material with a minimum thickness of 150 mm would be spread. If any area of the landfill is to be left for more than 3 months, 300 mm of cover would be spread over the compacted wastes.

2.4.3.2 Sources of Cover

Inert materials from the adjoining processing operations would be used for the life of the landfill. These materials are essentially the residual fine basalt materials screened from the saleable products generally with a size range from 75 μm to 5 mm. Based upon annual waste receipts of 17 800 t, an estimated 3 500 m^3 (7 000 t) of fine basalt material would be required annually for cover material. The Applicant would maintain a stockpile of at least 30 m^3 of this cover material adjacent to the active tipping area in the void. Fine materials stockpiled from current and future production would be used, ensuring adequate cover material is available well beyond the 20-30 year operating life of the quarry. At present, the Applicant accumulates approximately 10 000 tonnes of this material annually.

An additional source of daily cover would be contaminated soils from petroleum sites.

2.4.4 Equipment

The equipment to be used on site for the operation of the landfill would include the following.

- Komatsu HD325-5 Dump truck or equivalent – landfill transfer truck.
- Cat 963 Traxcavator – for compaction and placement of cover materials.
- Komatsu WA400-1 front-end loader or equivalent – for loading the landfill transfer truck.

2.4.5 Hours of Operation

The delivery of wastes to the Project Site would be undertaken during the following hours:

- 7.00 am to 10.00 pm – Monday to Friday.
- 7.00 am to 5.00 pm – Saturday, Sunday and Public Holidays.

These hours of operations would provide the maximum flexibility for the transport contractors to achieve economic efficiencies for all Councils and rate-payers within the participating Local Government Areas. Weekend and public holiday usage of the facility would be expected to be low, however, the flexibility offered would enable contractors to economically remove wastes from special events, or seasonal activities.

Landfill operations such as covering and compacting would only be conducted during daylight hours.



2.4.6 Life of the Project

The life of the project is comparatively difficult to predict, as it is possible that the size of the waste stream could increase should population increase. Conversely, if the extent of re-use, recycling and wastes treatment increase, the residual wastes destined for a landfill could decrease. Also, the quantities of wastes obtained from participating Councils are estimates only and actual waste quantities could vary considerably.

Theoretically, if the Project Site received 17800 tonnes of waste annually (equivalent to a compacted volume of approximately 26 000 m³), the life of the landfill would be in the order of 40 years. For the purposes of this proposal, a 50 year operational period is suggested with a further 10 years for decommissioning and post-operational management.

2.5 SITE CLOSURE AND REHABILITATION

2.5.1 Introduction

The Applicant has designed the landfill to effectively “fill” the void created by the previous quarrying of basalt. Emphasis would be placed upon constructing a final capping on the surface, revegetation and long term management.

2.5.2 Design of Final Capping

The final capping proposed would be a capillary cap (Koerner and Daniel, 1997). Details of the final capping are shown in **Figure 2.8**. This type of capping was chosen because:

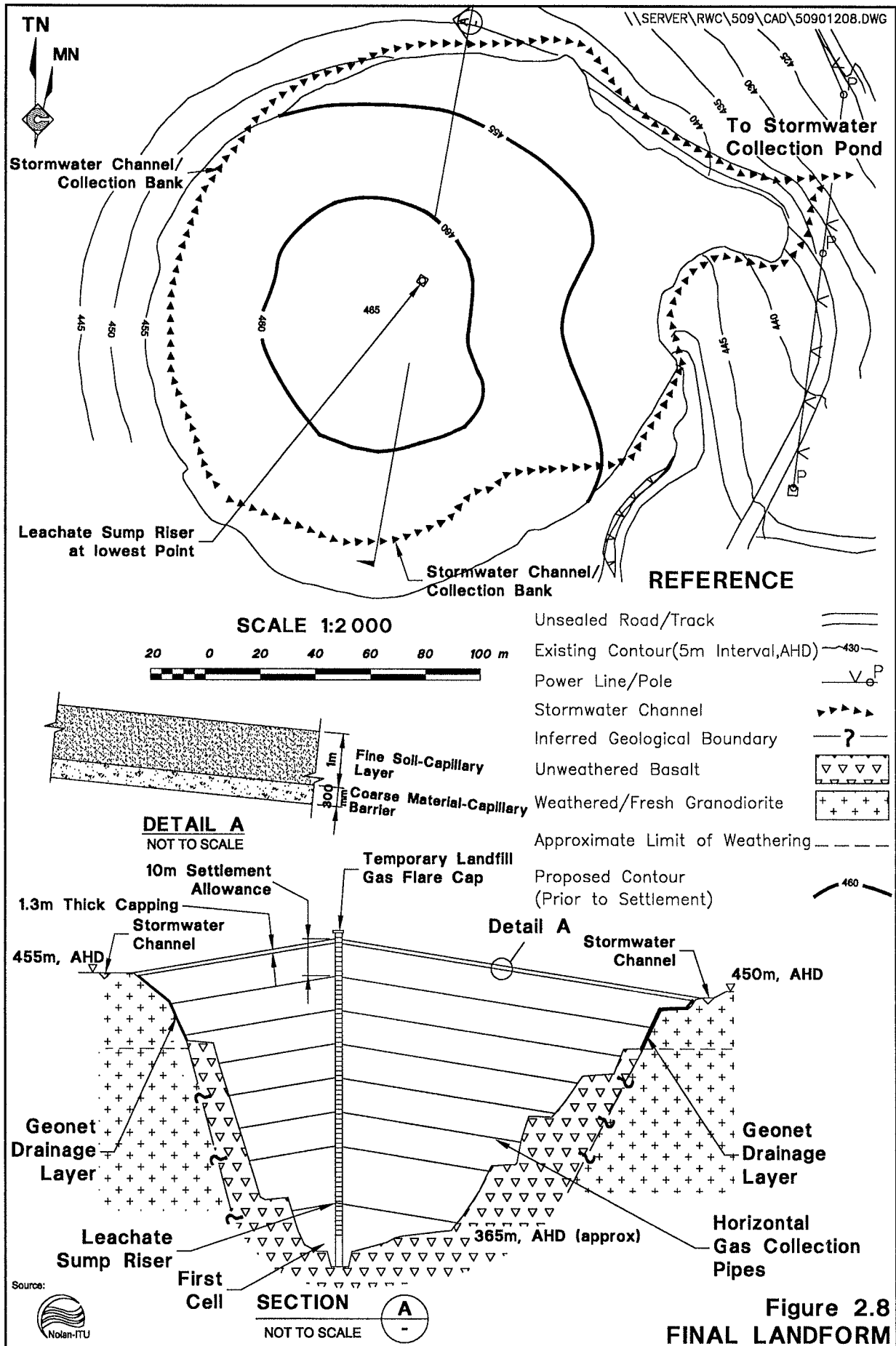
- there is a shortage of clay on the site; settlement of the waste mass would be up to 10 m and could disrupt the integrity of a compacted clay capping;
- high evaporation rates make a capillary capping viable – (calculations presented in Appendix 7); and
- the materials needed for a capillary capping are readily available.

The capillary capping would use the effect of capillary suction in fine-grained materials. The uncompacted fine grained material would sit on top with high porosity. The rain would infiltrate this layer and be held in the pore spaces during winter and evaporates out during summer. The fine grained layer would be positioned above a coarse material layer. This forms a capillary break as the unsaturated hydraulic conductivity of this layer would be much lower than the top layer. This coarse grained material would also perform the function of a gas drainage layer. The fine-grained layer performs the function of a growing layer because it is not compacted.

The 10 000 m³ coarse grained materials 3 mm to 5 mm would be sourced from the 5 mm materials produced at the adjoining processing plant. The 35 000 m³ of fine grained materials (<2 mm) would be sourced from surplus fines production at the quarry. This fine material would be mixed with fertilizer and a growth medium to enhance vegetation cover but would not compromise the capillary action.

The capillary capping would not need to maintain a drainage slope if differential settlement causes dips in the cap because the rainwater infiltration does not need to drain laterally. Therefore it would accommodate local differential settlement.





The lower part of the fine-grained layer above the capillary break would remain saturated and therefore provide a gas barrier. This technique is used widely on acid mine tailings dumps to prevent oxygen reaching the tailings through the capillary cap.

Laboratory tests and a trial capping layer in the landfill would provide data used to determine the required thickness of the fine grained and coarse grained layers.

2.5.2.1 Contingency Capping

If for any reason, the landfill was required to be closed prior to being filled to capacity, the wastes would be capped with the capillary layer at the level they reach. The capillary cap would then be revegetated with pasture species to encourage evapotranspiration.

Laboratory tests and a trial capping layer in the landfill would provide data to determine the required thickness of the fine-grained and coarse-grained layers for the contingency capping. Drill holes would also be drilled above the capping layer through the quarry wall to the perimeter stormwater diversion drains. This will allow gravity flow of stormwater out of the void. All 'clean' stormwater would be diverted to the existing site sedimentation pond.

2.5.3 Revegetation

The Applicant proposes to progressively revegetate the final landform as it is formed with the following pasture grass mix (**Table 2.1**) demonstrated to be effective in the stabilisation of the roadside batters and areas of disturbance associated with the North Ridge Quarry.

TABLE 2.1

Proposed Pasture Mix and Fertiliser Application

Seed Type	Spring Sowing (kg/ha)	Autumn Sowing (kg/ha)
Ryecorn	20	20
Victorian Perennial Ryegrass	6	6
Cocksfoot	8	8
Phalaris	6	6
White Clover*	2	2
Red Clover*	4	2
Sub Clover*	4	6
Fertiliser		
Starter 15	300	300
Mo Super	200	200
* All clover seed is to be lime pelleted and inoculated		
50901T2.1		



The pasture grass mix would be sown with conventional tractor and sowing equipment and supplemented with fertiliser as indicated in the table. Annual follow-up applications of fertiliser, and if necessary seed, would be undertaken if required.

2.5.4 Other Decommissioning Activities

In the event that the receipt of wastes ceases, the use of the transfer station building would be reviewed and discussed with the operating quarry company. If appropriate, the building would be demolished. Alternatively, the building may be used for an ancillary purpose to the other activities on site or used as a transfer station for the backfilling of the North Ridge Quarry, should that be approved to accept similar wastes.

The leachate evaporation ponds, if not required for any ongoing use would be decommissioned. This would involve removal, if necessary, of any residual water and/or placement of dried sludge in an approved facility. The HDPE membrane liners would be removed and similarly placed in an approved facility. The residual bedding beneath the liners and earth bunds would be ripped and shaped to form a landform comparable with the pre-existing natural landform. The topsoil stockpiled around the edge of the earth bunds would be pushed back across the final landform and the surface established with the pasture grass mix referred to in Section 2.5.3.

All other rehabilitation activities of other site components would be the subject of a separate rehabilitation program arising from the conditional requirements of the Development Consents issued by Harden Shire Council for the Bald Hill Quarry and the North Ridge Quarry.

2.5.5 Post-Operational Management

Following site closure, ongoing management would be necessary to:

- respond to settlement;
- monitoring environmental criteria;
- manage / use the landfill gas; and
- maintain the soil / grass cover on the surface of the final landform.

The Applicant and the Councils of the SWWG have determined that the Councils, through Harden Shire Council (the holder of the Supervisory Licence) would continue to manage the completed landfill site beyond the closure of the facility.

In the event that the recovery of the methane (or other gases) from the landfill gas collection system is economic, the Councils would establish a gas recovery facility on site and either operate or contract its operation for the appropriate duration for the facility.

Monitoring of groundwater and surface water quality would continue in accordance with the prevailing Environment Protection Licence together with monitoring of settlement and the integrity of the capillary capping.

The Councils would also be responsible for remedial earthworks arising from settlement and/or erosion of the capping.



It is proposed that all of the above activities would be funded from a trust fund established at the outset of the operation of the landfill facility. Monies would be placed in the trust fund on an annual basis and be effectively set as an agreed amount per tonne of wastes delivered to the site. This would be reviewed every five years to ensure the amount accumulating is appropriate.

2.6 SITE ACCESS AND TRANSPORTATION

2.6.1 Site Access

The Project Site is well located immediately adjacent to the Hume Highway. Access to the Project Site is via a section of the old Hume Highway. The Applicant has approached Harden Shire Council to name this section of road "Bald Hill Road". **Figure 2.1** shows the site access road within the Project Site from the site entrance to the weighbridge.

Vehicle access would be restricted to vehicles authorised by the participating Councils to transport wastes to the Project Site. Light vehicles and local residents would not be permitted direct access to the regional landfill. Local residential wastes would be directed to the nearest local transfer station for disposal.

2.6.2 Transport Routes

Figure 2.9 shows the State and regional roads over which the wastes would be transported to the Project Site. The road network comprises two State Highways (Hume and Snowy Mountains Highways) and nine main roads. In addition to these roads, a number of local roads would be used to gain access to and from some of the regional transfer stations established near some of the smaller villages scattered throughout the participating Local Government Areas.

2.6.3 Traffic Types and Levels

Wastes from the regional transfer stations and other authorised locations would be transported by a combination of truck and trailer carrying purpose built waste containers of a capacity of approximately 20 tonnes and existing garbage compactor trucks. The exact design of the bins or containers would be determined in conjunction with the operating contractor. The participating Councils would select a contractor to undertake the waste collection from the nominated locations and deliver the wastes to the regional landfill. The contractor would be required to operate late model well-maintained trucks based either at the Project Site or an approved location within the participating Local Government Areas.

Table 2.2 lists the average weekly number of truck movements to transport the estimated quantity of wastes from each regional transfer station to the regional landfill. The Applicant recognises that the truck levels listed in **Table 2.2** would occur when all Councils are participating. Lesser levels would occur until this situation occurs.

It is anticipated that as an average, based on a five-day week, 52 weeks per year, approximately six loads of wastes would be delivered to the landfill creating 12 movements per day on the road network to the landfill. During some weeks, the number of truck movements may rise in response to specific events or seasonal factors. For the purposes of the impact assessment, a maximum number of ten loads of wastes or 20 truck movements per day is proposed.



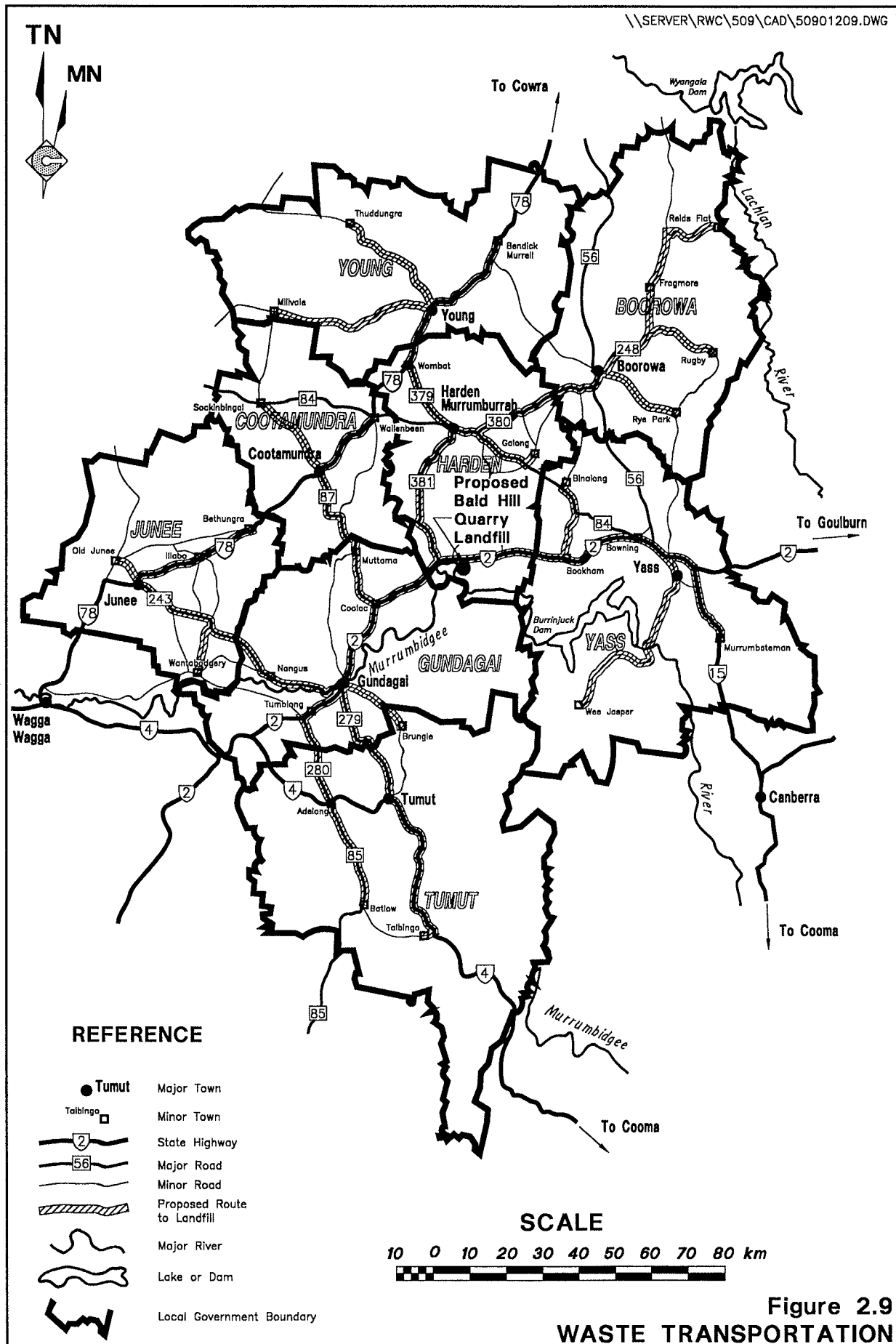


TABLE 2.2
Indicative Weekly Truck Movements to the Jugiong Regional Landfill

Local Government Area	Total Wastes to Landfill (tonnes/week)	10 t Bins ⁺	Vehicle Movements per week [*]	Garbage Compactors	Total Vehicle Movements per week	AADT [#]
Boorowa	12	2	2	Nil	2	1
Cootamundra	14	2	2	Nil	2	1
Gundagai	24	3	4	8	12	8
Harden	24	3	4	10	14	9
Junee	24	3	4	Nil	4	2
Tumut	90	9	10	Nil	10	7
Yass	32	4	4	Nil	4	4
Young	120	12	12	Nil	12	8
TOTALS	340	38	42	18	60	40
⁺ Note: 2 bins can be carried on one truck [*] One truck movement is defined as one journey either inward or outward [#] Average annual daily traffic equivalent. Traffic figures include employees on site.						
[#] Source: Bald Hill Quarry Pty Ltd						

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2.7 SERVICES

Figure 2.10 shows the location of existing services within the Project Site, and extensions required for the regional landfill.

Power: The existing overhead power line would be extended underground to the transfer station building for lighting and to operate pumps. Additional annual consumption would be negligible.

Telephone: No additional services would be required. On-site communications would remain focussed on the use of two-way radios.

Water: The existing quarry process water is currently abstracted from a licenced groundwater bore (Licence N° 40BL187473). No additional water sources would be required. The Applicant estimates approximately 50 000 L of water from the bore would be used annually for the washing out of skips, containers etc. and washing down the tipping floor. This water will be recirculated for re-use as much as possible. Heavily contaminated wash water will pass through a litter trap to the leachate collection system, as detailed in Section 3.5.5.4.

2.8 EMPLOYMENT

Table 2.3 lists the proposed additional employment at the Bald Hill Quarry site. In total, 12 persons would be employed at the site (2 full-time positions in addition to the current 10 people employed at Bald Hill Quarry).



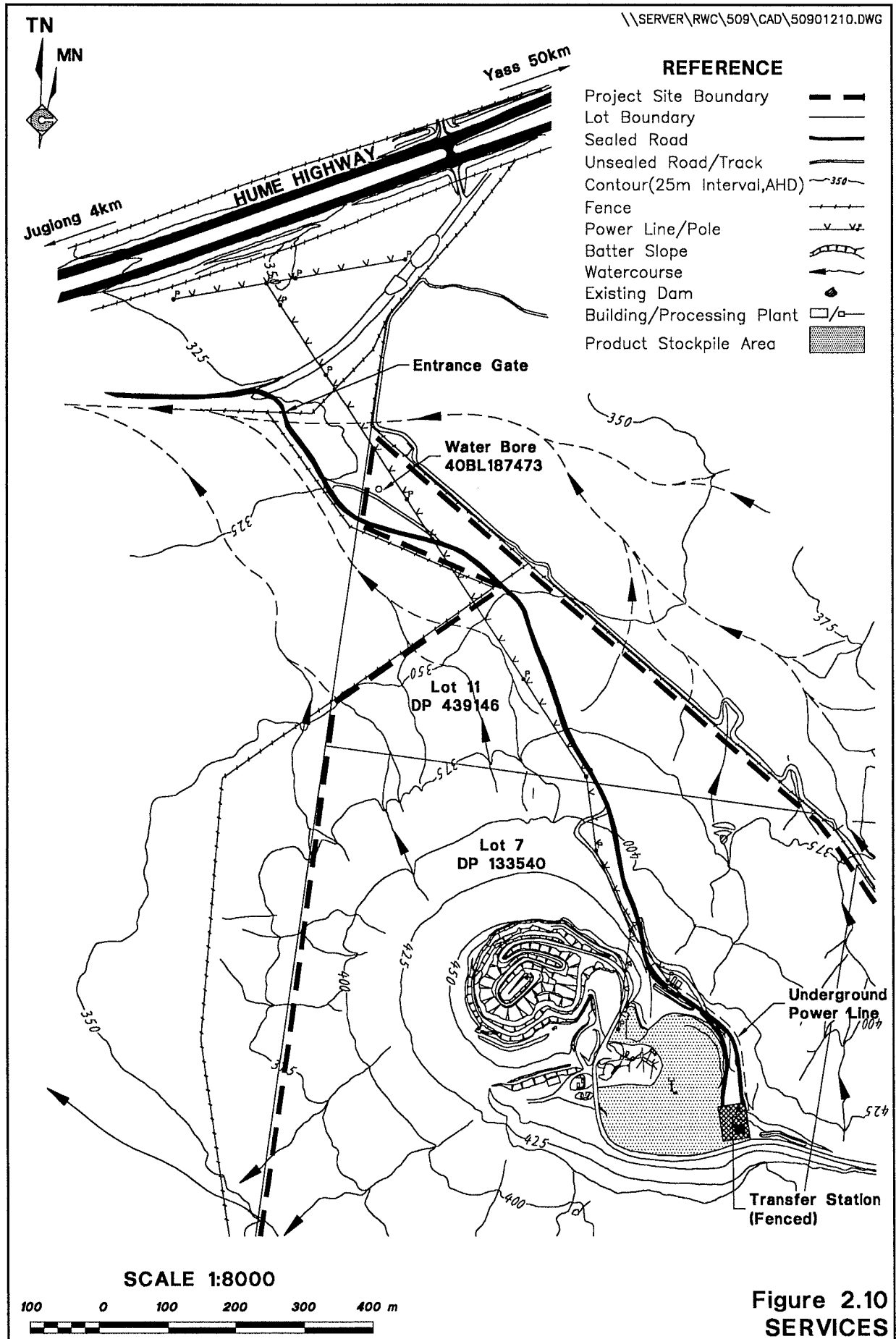


TABLE 2.3
Proposed Employment - Regional Landfill

Location	Position	Duties
Weighbridge	1 part time position *	Weighbridge operation. Office / clerical / reporting.
Transfer Station and Landfill	1 full time shared with landfill	Screening of waste, loading onto landfill transfer truck, compacting waste, covering wastes.
Regional Waste Transport	1 full time person	Deliver empty and collect full waste bins from regional transfer stations.
* This position would not be additional. It would be filled by the clerk currently employed at Bald Hill Quarry.		

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The regional transport network (at similar tonnage levels) is expected to be within the capacity of one truck combination, servicing eight Local Government Areas. This is in addition to the other services collecting wastes in compactor trucks for special events and localised industry wastes.

2.9 SAFETY AND SECURITY

Access to the regional landfill would be:

- (a) restricted to approved personnel and vehicles that must report to the weighbridge office; and
- (b) via a dedicated road from the weighbridge to the fully enclosed transfer station compound (see **Figure 2.1**) ensuring segregation from quarry-related traffic.

As the site is already a fully operational and approved quarry, existing safety procedures and occupational health and safety standards apply. Facilities such as first-aid room, staff amenities already exist, and safety procedures are documented and continually implemented. Amendments to incorporate items specific to a landfill operation would be undertaken as part of the initial training process, and prior to accepting wastes.

Security after hours would be by way of locked gates at the transfer station compound, and (when not conflicting with quarry operations) locked access gates at the site entrance (see **Figure 2.1**).

Special staff training in work procedures relating to landfill management, waste handling and related health issues would be undertaken by all staff prior to the first waste receives. Induction training would be in place for all new staff and visitors.



2.10 DEVELOPMENT ALTERNATIVES

2.10.1 Introduction

The changing nature of waste management and the increasing awareness of 'environmental consequences' emanating from unsophisticated waste management, fluctuating economics and a rural regional setting are the background to consideration of alternatives to a regional landfill near Jugiong.

2.10.2 Design Alternatives

The site has been designed to be in conformance with all the Benchmark Techniques stipulated in the NSW EPA's Environmental Guidelines for Solid Waste Landfills except in two aspects. These are:

- the leachate barrier; and
- the final capping.

The leachate barrier options considered included conventional clay liners and geosynthetic liners. The former were expensive for this site because of the lack of suitable low permeability clays on site and the latter was also technically difficult because of the steep sides and rough surface of the quarry walls. Extensive geophysical and hydrogeological investigations have shown that the unweathered basalt and granite surrounding the quarry void has a low natural permeability and that lining is unnecessary. Further more the regional groundwater is deep below the base of the quarry and isolated from the basalt of the volcanic plug.

The final capping options were again affected by the lack of local clay sources and the large settlements expected. The use of a capillary cap depends on the availability of local materials and the climate. In both instances there are suitable conditions at Bald Hill. The active quarry can provide the coarse and fine grained materials needed and the local climate is dry enough and has enough net evaporation to make a capillary cap a workable solution.

2.10.3 Alternative Disposal Methods

At present in a rural regional setting, alternatives to landfilling wastes that cannot be recycled economically do not exist. Landfilling is a comparatively inexpensive, superficially benign method of waste disposal that in a rural environment, with large open spaces and smaller population concentrations has to date been considered an acceptable disposal method. However, as time progresses, the cumulative environmental impact of poorly sited and managed rural landfills is becoming more clearly understood, with the likely long term costs of rehabilitation of the resulting environmental stress accruing rapidly.



2.10.4 Alternative Disposal Locations

The only other large landfill location in the vicinity is the Woodlawn landfill. There are two main reasons why this was not considered a feasible alternative.

1. The Woodlawn facility is managed only to accept wastes from the North Sydney area.
2. The Woodlawn facility is located in an area where the Aphid Lice insect (*Phylloxera*) occurs. Use of this facility could enhance the spread of this insect pest to currently 'clean' areas.

Distance from the eight Local Government Areas to Woodlawn would also impose considerable economic restrictions.

2.10.5 'Do Nothing' Alternative

If a cooperative regional approach to landfill waste management is not adopted over the next five to ten years, the wastes of in excess of 40 000 people would continue to be spread over 40 unlicensed sites.

The proposed Bald Hill Quarry Regional Landfill offers an opportunity to minimise the future environmental impact of landfill over eight Local Government Areas. The proposed landfill void is an excellent location for landfill waste containment, providing minimum impact potential to the local environment.



SECTION 3

ENVIRONMENTAL SETTING, SAFEGUARDS AND IMPACTS

P R E A M B L E

This section describes the components of the existing environment within and surrounding the Project Site with respect to biological, physical and social aspects. The existing environment is then analysed to determine if any aspects pose constraints on the proposal and associated activities.

This section then details the design and operational safeguards specifically developed for the proposal. These safeguards are included to ensure that there are minimal or no adverse impacts on the surrounding environment.

With the design and operational safeguards in mind, an impact assessment of the proposal on each environmental component is presented.



3.1 TOPOGRAPHY

3.1.1 Regional Topography

Regional topography in the Jugiong district comprises moderately steep to steep terrain with slopes becoming more gentle along major watercourses. The Project Site is located in a hilly area approximately 8km east of Jugiong on the South West Slopes of the Great Dividing Range. The village of Jugiong is situated on the banks of the Murrumbidgee River, just west of the junction of Jugiong Creek and the Murrumbidgee River.

3.1.2 Local Topography

The local topography in the vicinity of the Project Site is shown on **Figure 3.1**. Prominent features of the topography are Mount Bundarbo to the far south of the Project Site, and the Murrumbidgee River Valley to the south and west. Local elevations range from 596 m, AHD at Mt Bundarbo to approximately 240 m, AHD along the Murrumbidgee River with slopes ranging from 20° to 1° respectively. A small unnamed east/west creek also runs to the south of the landfill site. This flows northwards beneath the Hume Highway and then westwards to Jugiong Creek.

3.1.3 Project Site Topography

The Project Site (See **Figure 3.1, Plate 2.1**) is located on the topographical high of Bald Hill. The existing site access road runs south-easterly from the Hume Highway to Bald Hill, the site of the existing quarry and processing operations. The highest points within the vicinity of the Project Site are the North Ridge Quarry site to the south, with an elevation of approximately 510 m, AHD and Bald Hill itself (approximately 460 m, AHD). Bald Hill slopes range between approximately 16° and 19°.

Previous quarry operations at Bald Hill have created a void approximately 80 m deep in the shape of an inverted cone. The existing quarry processing area has been built up to create a flat area adjacent to the quarry void. This is where the transfer station would be situated.

The leachate evaporation ponds would be located on a small topographic high of approximately 435 m, AHD.

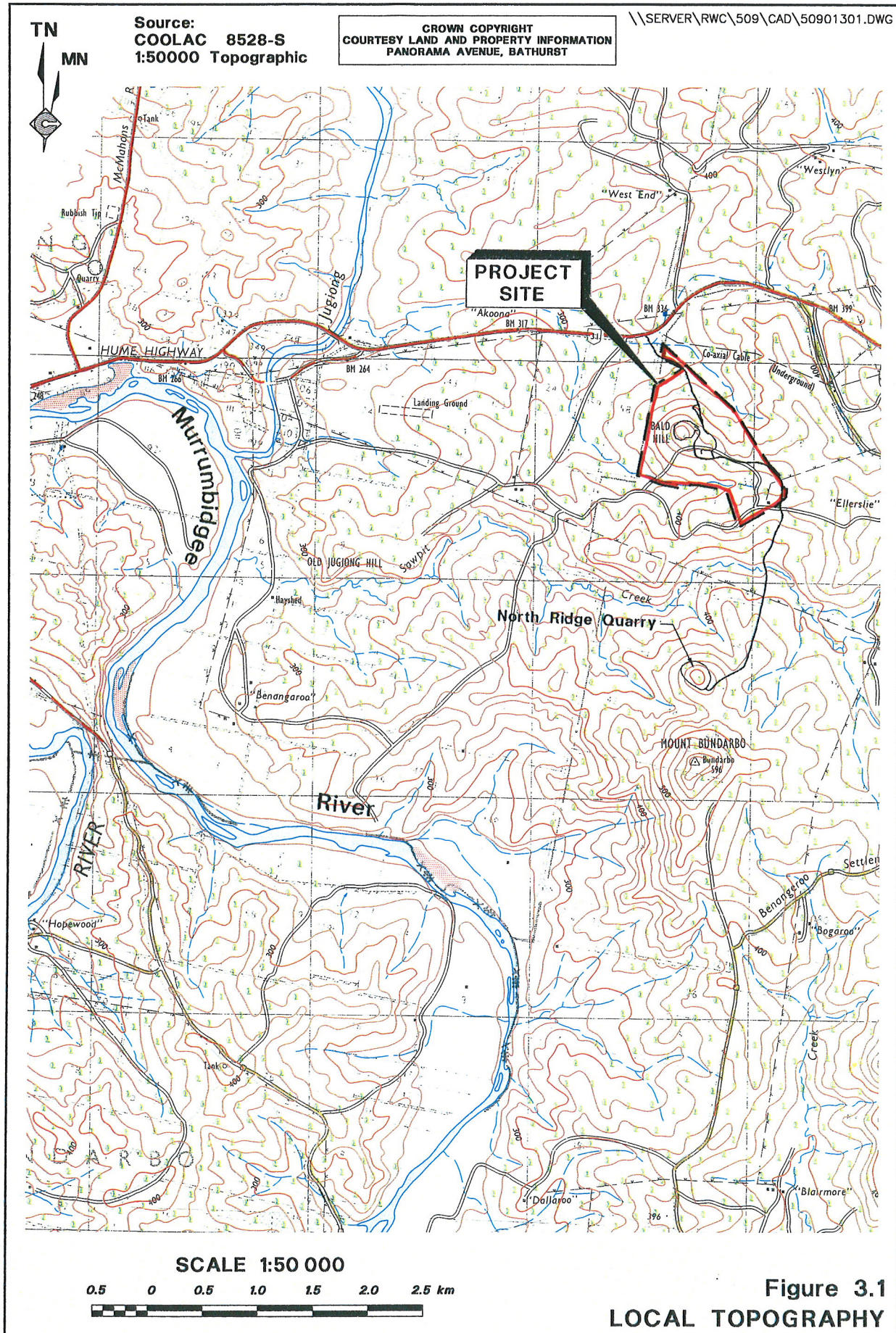
3.1.4 Constraints Assessment

The topography of this site poses no constraint to the project.

3.1.5 Proposed Modifications

It is proposed to backfill the exhausted quarry void with solid wastes. Once the void is completely backfilled the ground level would be approximately 10m above the natural ground level to allow for the wastes to settle. It is envisaged that the final landform would be comparable to the natural landform that existed at Bald Hill prior to quarrying, thus also comparable to the natural surrounds.





3.1.6 Assessment of Impacts

The impact of the proposal on the immediate topography of Bald Hill would be a positive one. Backfilling of the exhausted quarry void would result in the re-establishment of the original topography, allowing the area to visually blend with the naturally hilly surrounds.

3.2 GEOLOGY

3.2.1 Geological Setting

According to the Cootamundra 1:250 000 Geological Sheet (SI55-II), the Bald Hill quarry void is situated on a basalt plateau of Tertiary age (approximately 20 million years old) surrounded by the Young Granodiorite of the mid to late Silurian age (approximately 420 million years old). However, it is now recognised that the basalt actually comprises a volcanic plug that has intruded the granodiorite country rock. To the east of the Project Site is the Duoro Volcanics of Middle Silurian age comprising mainly dacite, rhyodacite, tuffaceous sandstone and shale.

3.2.2 Geological Investigations

The Applicant's geological investigations have confirmed that the basalt forming Bald Hill is a plug with steep sides with the surrounding granodiorite (Figure 3.2). The basalt is jointed for its full depth with the deeper joints identified to be very tight whereas the upper joints are slightly open and clay filled. The surrounding granodiorite is massive at depth but highly weathered generally above 430 m, AHD within the quarry void.

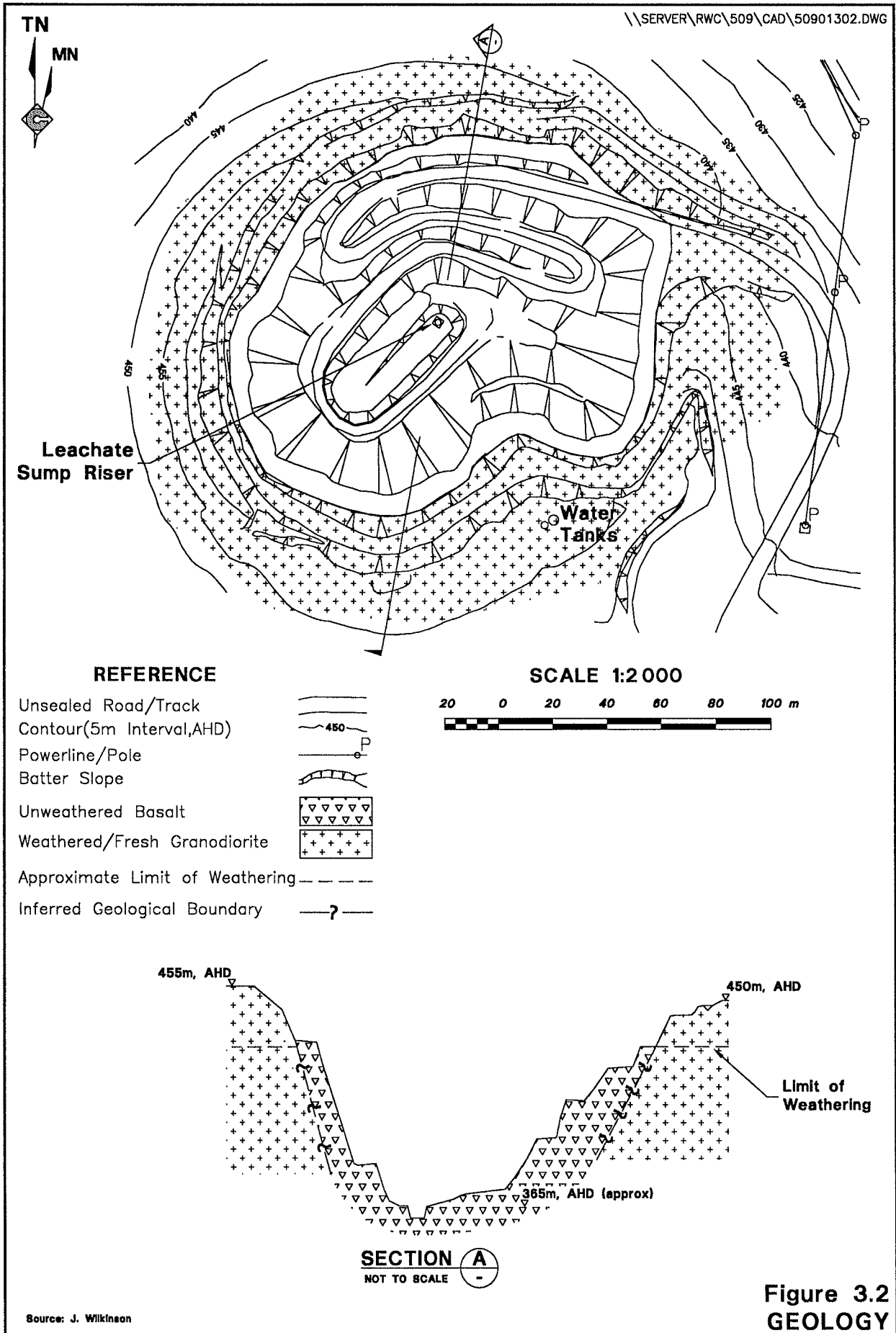
3.2.3 Remaining Resource

Approximately 60 000 tonnes of basalt remains within the quarry void beneath the internal access road.

3.2.4 Constraints Assessment

The very tight nature of the basalt plug, particularly at depth, provides an ideal repository for waste materials. The upper section of the basalt and the weathered granodiorite is moderately permeable and requires specific design safeguards to ensure rainfall / leachate is directed towards the internal leachate management system rather than to infiltrate into the surrounding weathered materials.





3.3 METEOROLOGY

3.3.1 Introduction

Meteorological data for the Project Site is available from the following sources:

- Bureau of Meteorology Site No. 073128, Ridge Street, Gundagai between 1976 and 1995;
- Bureau of Meteorology Site No. 073141, William Street, Gundagai, 1995 to March 2001;
- Bald Hill Quarry Weather Station: intermittent data between November 2000 and January 2001. Regular data February and March 2001; and
- neighbouring “Ellerslie” property – rainfall data only 1976 to end 2000.

The wind data for February and March 2001 from the site weather station was compared with both Bureau of Meteorology sites. While there was little obvious correlation, the Ridge Street data was believed to be the more similar data and had the longest term of recording. This monitoring site is located approximately 32 km south-west of the Project Site at an elevation of 232 m AHD, similar to the village of Jugiong.

Due to the close location and length of record, the “Ellerslie” rainfall data was used for the impact assessment.

The data collected comprises:

- temperature;
- rainfall;
- relative humidity;
- fog and frost frequency; and
- wind.

Data relating to temperature, rainfall, relative humidity and fog and frost frequency are presented in **Table 3.1**. Wind speed and direction as measured at Gundagai are presented as wind roses in **Figure 3.3**.

The comments on climate have been sourced, in part, from the Soil Conservation Service of NSW, Yass District Technical Manual (1994).

3.3.2 Regional Climatic Characteristics

The regional climate is dominated by eastward moving low pressure cells and associated frontal systems on the southern margins of the continent. During the summer months, these systems move south causing their influence on the region to decrease (Soil Conservation Service of NSW – 1974).



TABLE 3.1
Climatic Summary

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
TEMPERATURE*													
Mean Daily Maximum (°C)	31.6	31.4	27.8	22.8	18.0	13.6	12.8	14.9	17.6	21.7	25.8	29.2	22.3
Mean Daily Minimum (°C)	15.0	15.6	12.9	8.7	6.0	3.2	2.1	3.1	5.1	7.5	10.4	13.1	8.5
RAINFALL**													
Mean Monthly Rainfall (mm)	50.2	28	35	41.6	56	51.2	64.8	52.6	58.3	56.1	52.3	50.2	596.3
Highest Monthly Rainfall (mm)	133	78	139	154	125	148	190	122	149	148	132	141	
Lowest Monthly Rainfall (mm)	3	0	0	0	6	3	5	5	12	22	0	1	
FROST FREQUENCY*													
Mean number of days with frost	Nil	Nil	Nil	0.4	4.1	11.3	13.2	9.5	4.4	1.0	0.1	0.1	44.0
FOG FREQUENCY*													
Mean number of days with fog	0.1	0.2	0.1	1.3	6.2	9.9	9.4	4.3	2.6	0.8	0.1	0.1	35.0
* Source: Bureau of Meteorology Ridge Street Station 073128, Gundagai 1976 to 1995													
** Source: "Ellerslie" Station, 1976 - 2000													

50901T3.1

In general, weather characteristics are also influenced by topography. Temperature decreases while frost occurrences and rainfall generally increase with altitude (Soil Conservation Service of NSW – 1974).

3.3.3 Temperature

Average daily maximum and minimum temperatures recorded over 19 years at Gundagai (Ridge Street) are presented in **Table 3.1**. January and February are the hottest months with mean daily maximum temperatures of 31.6°C and 31.4°C and mean daily minimum temperatures of 15.0°C and 15.6°C respectively. July is the coldest month with a mean daily maximum and minimum temperature of 12.8°C and 2.1°C respectively.



3.3.4 Rainfall

The annual rainfall distribution for the Project Site is shown in **Table 3.1** and is based on 24 years of records at a neighbouring property. July is generally the wettest month of the year with February having the least rainfall. On average, the Bald Hill area has a mean annual rainfall of approximately 596mm.

There are generally two main causes of precipitation in the Jugiong Area.

- The eastward movement of low pressure cells and associated frontal systems along the southern margins of the continent, gives rise to widespread rains of long duration in the winter months.
- During the summer months convectional lifting of moist air during the hottest part of the day, results in the formation of cumulus or cumulo-nimbus clouds, which produce showers and thunderstorms. These usually occur towards evening and are of short duration and intensity and do not occur over large areas (Soil Conservation Service of NSW – 1974).

3.3.5 Wind

The recorded wind speed and direction are graphically represented on a monthly basis on **Figure 3.3**. During the summer and autumn months, north-easterly winds dominate in the morning with westerly and south-westerly winds becoming more prevalent in the afternoons. In winter, the dominant winds come from the south-west in the mornings and swing further to the west later in the day. Spring winds are generally from the north-east in the morning and from the west and south-west in the afternoon.

It should be noted that the winds recorded at Bald Hill rarely come from the south or south-east. This may be due to localised factors near the recording station and therefore may not necessarily be true for the Project Site which is some distance away.

3.3.6 Temperature Inversions

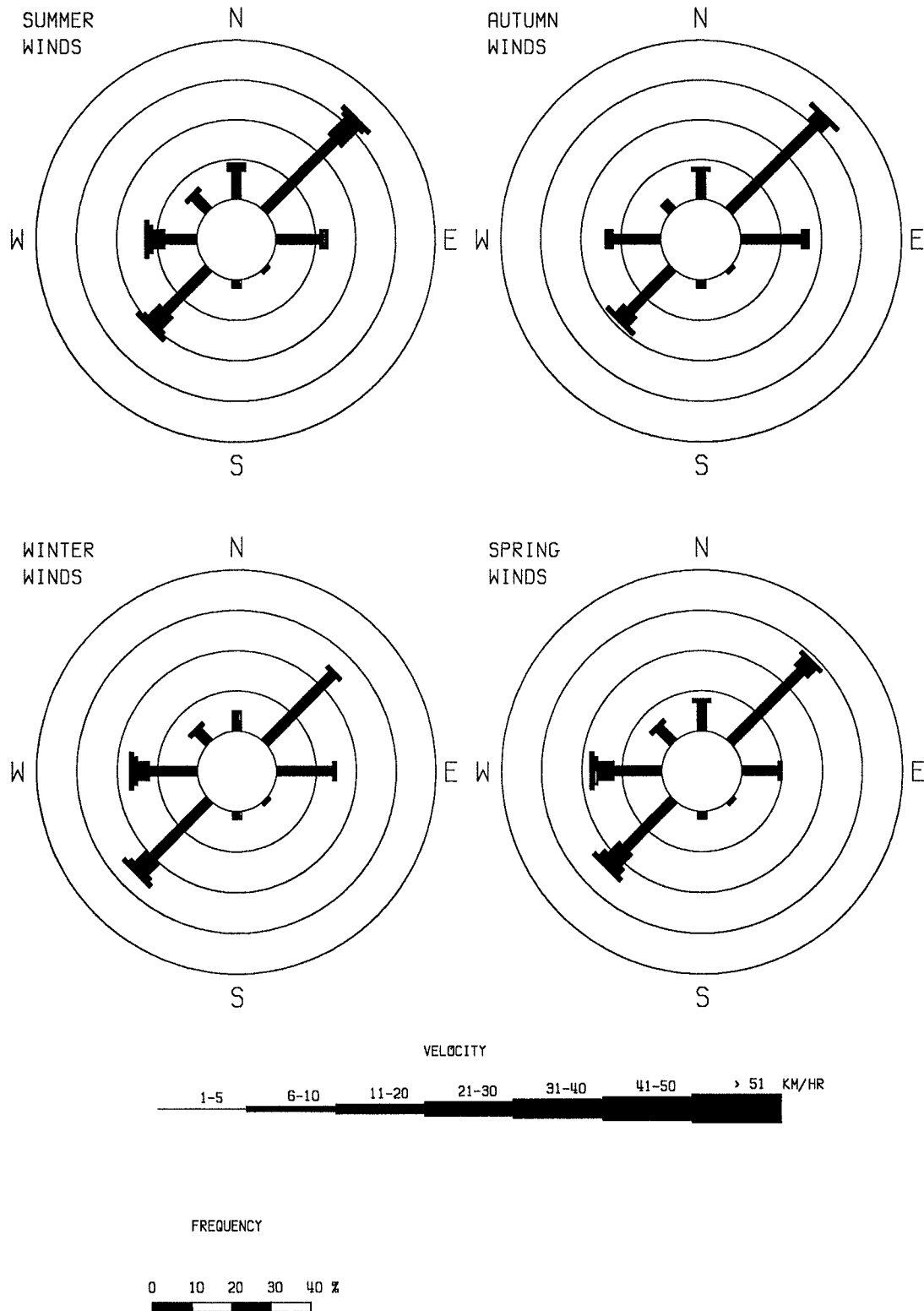
Temperature inversions are significant noise and odour enhancing phenomena and are often expressed as fogs and/or frosts. They invariably occur of an evening with clear skies and when wind speeds are low or calm conditions prevail. The inversions normally disappear the following morning.

Fog and frost frequencies at Ridge Street, Gundagai are presented in **Table 3.1**. Frosts generally occur between May and October, with July having the greatest mean number of frosts per month at 13.2 per month; annual mean number of frosts is 44.

Records kept over 19 years show that Gundagai experiences an average of 35 fog days per year. **Table 3.1** shows that while fogs may potentially occur at any time of year, they are far more likely to do so during the colder months, from April to September. June and July have the highest mean number of fogs per month with 9.9 and 9.4 respectively.



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Source:
NSW Bureau of Meteorology
Ridge Street, Gundagai, NSW (1976 - 1995)

Figure 3.3
WIND SPEED
AND DIRECTION



3.4 SOILS AND LAND CAPABILITY

3.4.1 Soil Distribution and Characteristics

According to the Yass District Technical Manual (Soil Conservation Service of New South Wales, 1974) Red Podzolic Soils are the dominant soil type present across much of the Project Site. These soils grade into Lithosols on the hill tops and often occur in close association with Yellow Solonetzic Soils, with Red Podzolic Soils on the hill slopes and Yellow Solonetzic Soils in the drainage lines.

In general, the soil profile around the perimeter of Bald Hill comprises Shallow Lithosols derived from the underlying basalt. Rock outcrops or subcrop (covered by a thin skeletal soil) and basalt floaters are common and where present, a thin dark coloured silt topsoil overlies a red brown silty clay subsoil.

Soils developed on the granodiorite within the Project Site are characteristically infertile and are moderately erodible when stripped of vegetation, potentially suffering from sheet erosion and moderate gully erosion. All land that is proposed to be used for the landfill and associated operations such as the transfer station has already been disturbed through quarrying operations. The granodiorite-derived soils beneath the proposed leachate evaporation ponds have not been noticeably disturbed. Visible erosion in these areas and around the quarry void is minimal to negligible (**Plate 3.1**).



Plate 3.1 View of soil condition surrounding the quarry void (Ref: 490C/24A)



3.4.2 Land Capability

The former New South Wales Soil Conservation Service developed an eight class system for evaluating rural land. The classification system is described in a publication entitled "Rural Land Capability Mapping" (Emery, undated). The evaluation of the rural land is based on an assessment of the biophysical characteristics of the land, the extent to which these limit a particular type of land use and the current technology that is available for the management of land. The capability classes categorise the land in terms of its limitations such as climate, topography, geomorphology, soils, geology and drainage.

An extract from a summary table within Emery's publication, which defines each of the eight classes together with interpretations and implications of each class, is presented in **Table 3.2**. The classification presented in **Table 3.2** has a hierarchical sequence, ranging from Class I land, i.e. land with the greatest potential for agricultural or pastoral use, to Class VIII land, i.e. land which is entirely unsuitable for either. It is also worth noting that the classification recognises land that has been disturbed by past or current mining and quarrying activities.

On the basis of the classification presented in **Table 3.2** much of the land within the Project Site would be classified as Class V or VI land, whilst areas disturbed by the existing processing plant and stockpile area would be classified as Class M land. The main limitations of the land are steep slopes and shallow rock and/or rock outcrop, which limits the agricultural and grazing potential.

In addition to land capability, the Project Site may also be classified in accordance with the five class system utilised by NSW Agriculture. The five class system, developed for the Rural Land Evaluation Manual (Department of Environment and Planning, 1981) provides a ranking of lands according to their productivity for a wide range of agricultural activities. The classification is based upon attributes similar to that of land capability as well as cultural and physical requirements for cropping, and existing socio-economic factors including local infrastructure and geographic location which combine to determine the productive potential of the land and determine the capacity to produce crops, pasture and livestock. In accordance with this system, the Project Site can be classified as Class 4 and Class 5 land, whereby agricultural production is low as a result of environmental constraints.

TABLE 3.2
Land Use Capability

Classification	Soil Conservation Practices	Interpretations and Implications
I	No special soil conservation works or practices.	Land suitable for a wide variety of uses on fertile soils, with the highest potential for agriculture. Include "prime agriculture land".
II	Soil conservation practices such as strip cropping, conservation tillage and adequate crop rotation.	Usually gently sloping land suitable for a wide variety of agricultural uses. Has a high potential for production of crops on fertile soils similar to Class I, but increasing limitations to production due to site conditions. Includes "prime agricultural land".
III	Structural soil conservation works such as graded banks, waterways and diversion banks, together with soil conservation practices such as conservation tillage and adequate crop rotation.	Sloping land suitable for cropping on a rotational basis. Generally used for the production of the same type of crops as listed for Class I, although productivity would vary depending upon soil fertility. Individual yields may be the same as for Classes I and II, but increasing restrictions due to the erosion hazard would reduce the total yield over time. Soil erosion problems are often severe. Generally fair to good agricultural land.
IV	Soil conservation practices such	Land not suitable for cultivation on a regular basis



	as pasture improvement, stock control, application of fertilizer and minimal cultivation for the establishment or re-establishment of permanent pasture. • Occasional cultivation. • Suitable for grazing.	owing to limitations of slope gradient, soil erosion, shallowness or rockiness, climate, or a combination of these factors. Comprises the better classes of grazing land of the State and can be cultivated for an occasional crop, particularly a fodder crop, or for pasture renewal.
V	• Structural soil conservation works such as absorption banks, diversion banks and contour ripping, together with the practices as in Class IV. • Occasional cultivation. • Suitable for grazing.	Land not suitable for cultivation on a regular basis owing to considerable limitations of slope gradient, soil erosion, shallowness or rockiness, climate, or a combination of these factors. Soil erosion problems often severe.
VI	• Soil conservation practices including limitation of stock, broadcasting of seed and fertilizer, prevention of fire and destruction of vermin. May include some isolated structural works. • No cultivation. • Suitable for grazing.	Productivity would vary due to the soil depth and the soil fertility. Comprises the less productive grazing lands.
VII	• Land best protected by green timber.	Generally comprises areas of steep slopes, shallow soils and/or rock outcrop. Adequate ground protection must be maintained by limiting grazing and minimising damage by fire. Destruction of trees is not generally recommended.
VIII	• Cliffs, lakes or swamps and other lands unsuitable for agricultural and pastoral production.	Land unusable for agricultural or pastoral uses. Recommended uses are those compatible with the preservation of the natural vegetation, namely: water supply catchments, wildlife refuges, national and state parks and scenic areas.
M	• Mining and quarrying areas.	

Source : Emery (Undated)

3.5 WATER MANAGEMENT

3.5.1 Introduction

Groundwater investigations in and around the quarry void were undertaken by hydrogeological consultants, Coffey Geosciences Pty Ltd. These investigations are presented fully in the report Coffey Geosciences Pty Ltd (2001) and were strongly reliant upon a geophysical assessment by Geo-Eng Australia Pty Ltd (2000). The results of this report combined with input from Nolan ITU has resulted in proposed water management strategies for the site that encompass drainage, surface and groundwater. These hydrological systems are interlinked, thus the safeguards have been designed to manage both surface and groundwater impacts.



3.5.2 Drainage Network

3.5.2.1 Regional and Local Drainage

The Project Site lies within the upper catchment of the Murrumbidgee River, near the junction of Jugiong Creek and the Murrumbidgee River (**Figure 3.4**). This upper catchment covers approximately 84 000 km² in southern NSW, west of the Great Dividing Range and incorporates major centres such as Canberra, Wagga Wagga, Leeton and Griffith. The Murrumbidgee River, one of the major tributaries of the Murray-Darling River system, flows into the Murray River approximately 30 km west of Balranald.

3.5.2.2 Project Site Drainage

The Project Site boundary encompasses four separate drainage areas (see **Figure 3.5**).

The first is the area around the transfer station site access road and the northern section of the processing plant area and stockpile area. Runoff from this area drains northwards into an existing stormwater sedimentation dam within a tributary of Creek B.

The second drainage regime is in the south of the Project Site. All overland flow in this area drains to the small unnamed east-west flowing creek (Creek A). The proposed leachate evaporation ponds are situated just inside the crest of this sub-catchment.

Drainage to the west of the quarry void is radial down the slopes of Bald Hill. There is currently one small contour bank approximately 5 m from the rim of the quarry void to slow this radial runoff flow and minimise erosion.

The fourth drainage regime onsite is the internal drainage within the exhausted quarry void. This currently collects in a pool at the bottom of the void.

3.5.3 Surface Water

Surface water resources on the Project Site are limited to Creek A and some small farm dams. There are no permanent springs or soaks around the Project Site.

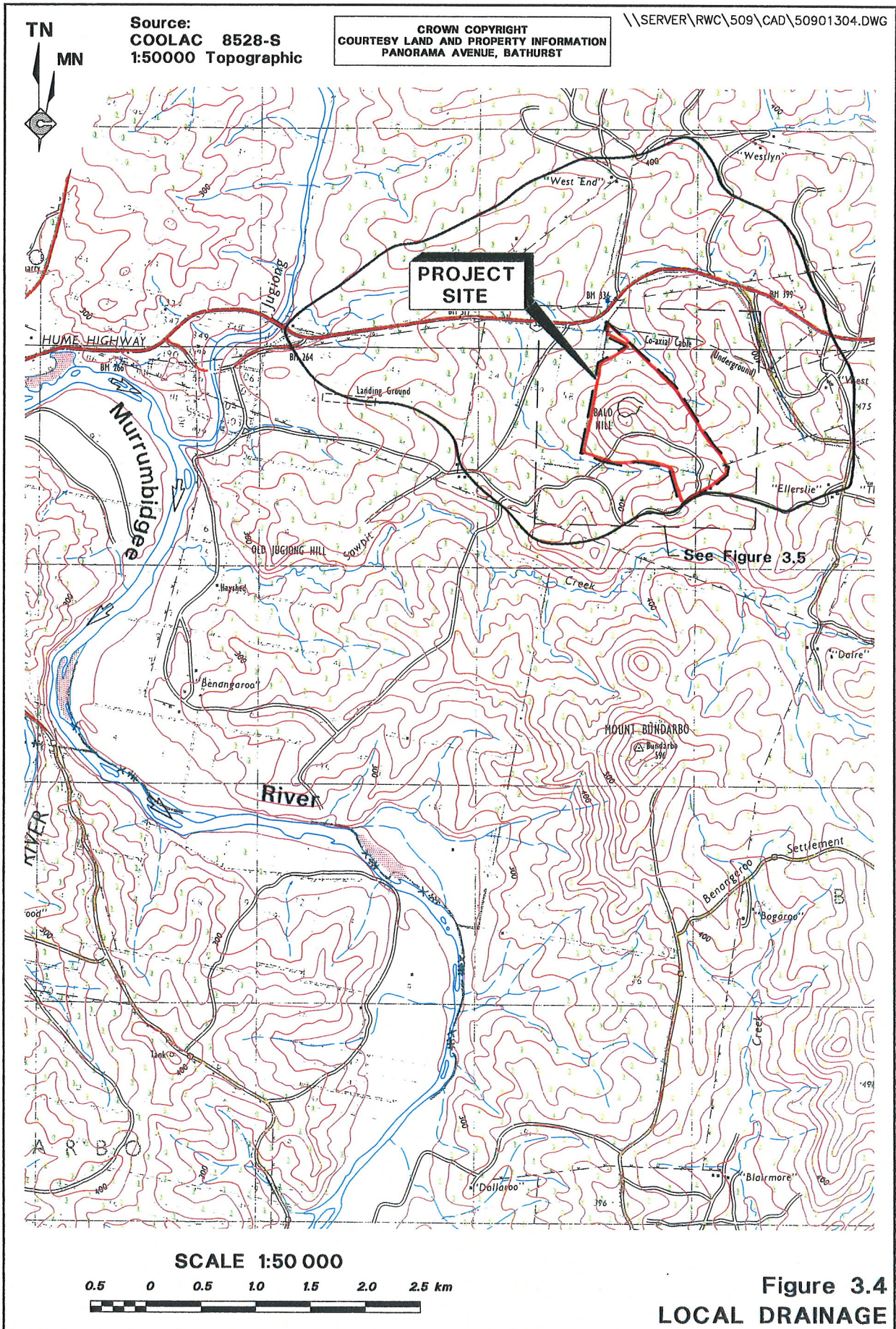
Regional surface water resources include:

- the Murrumbidgee River located approximately 4 km to the west of the Project Site;
- rainfall run-off contained in small farm dams which are often dry in summer; and
- spring fed creeks with groundwater derived from weathered granodiorite.

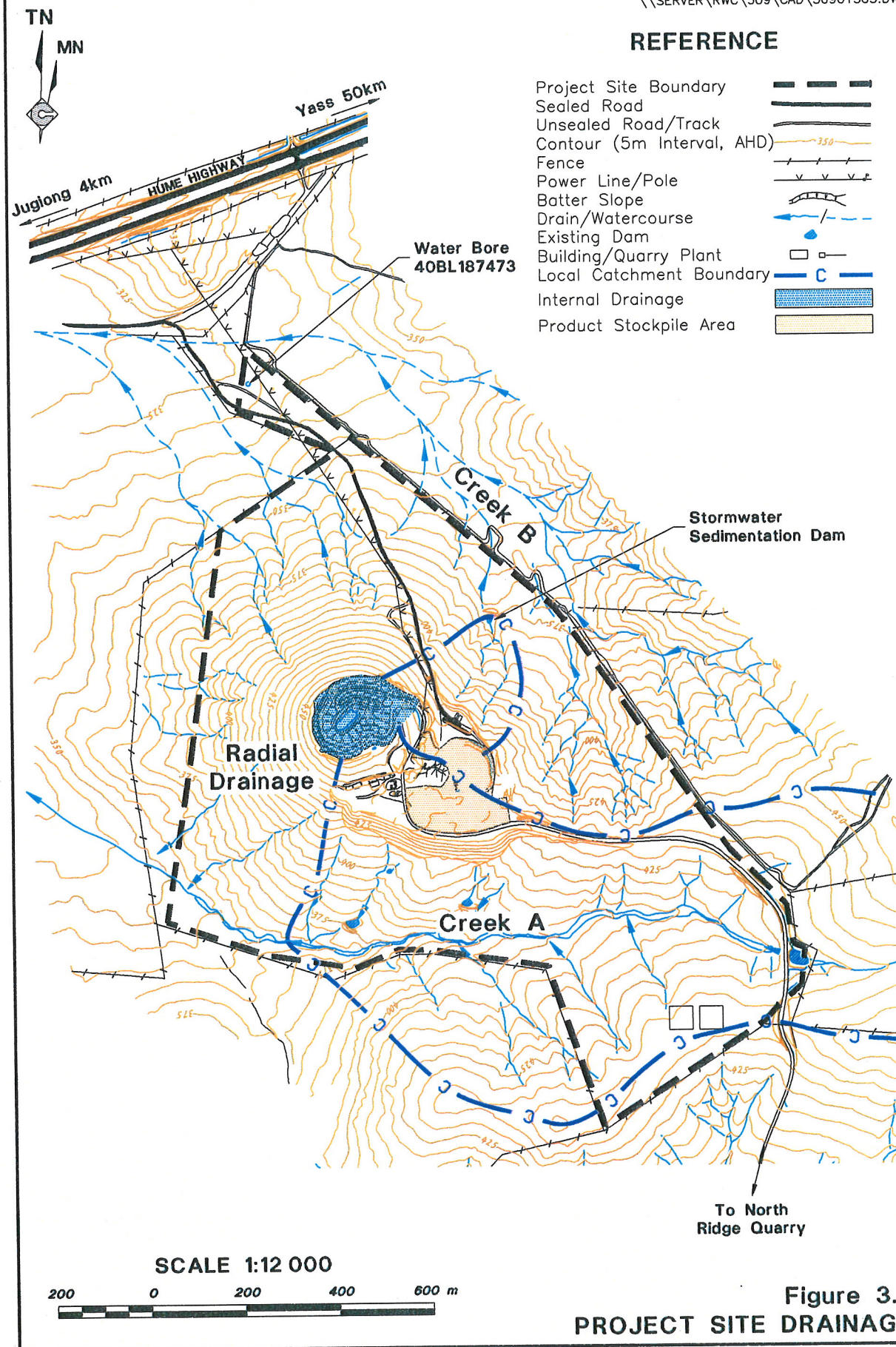
3.5.3.1 Surface Water Quality

As a component of a hydrological assessment undertaken for the now existing North Ridge Quarry by Coffey MPW Pty Ltd (1998), one surface water sample was collected in Creek A. At the time of the sampling, the creek had a flow rate of approximately 3 to 5 L/min and the water derives from shallow alluvium/residual soils and overlying weathered granodiorite and disappears into alluvium further down the gully. Water quality was slightly brackish with a pH of 7.7 and an electrical conductivity of 4 300 µS/cm.





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3.5.3.2 Surface Water Constraints Assessment

There is limited surface water within and immediately surrounding the Project Site. Creek A has low flow and water quality was tested to be brackish. There are no protected wetlands or water bodies in the vicinity of the Project Site. The distant proximity of the Murrumbidgee River (4 km) is potentially a minor constraint requiring a high standard of surface water and groundwater controls.

In terms of water use for the proposal, water for the wash down of the tipping floor and the cleaning of the waste bins would be sourced from the existing groundwater bore adjacent to the site access road (see Section 3.5.4), thus would not be constrained by surface water availability.

3.5.4 Groundwater

3.5.4.1 Occurrence

A search of the Department of Land and Water Conservation database indicates that there are no registered groundwater bores within a 2 km radius of the Project Site other than the Applicant's own bore.

Regional groundwater bores beyond 2km from the Project Site are generally low yielding, extracting groundwater for stock and domestic purposes. Aquifers are typically limited to shallow granodiorite derived alluvium and deeper fractured granodiorite. Department of Land and Water Conservation borehole records indicate yields are generally less than 1 L/second.

The Applicant's bore is located approximately 500 m north of the Bald Hill Quarry void, adjacent to the site access road. This bore is used to supply office and operational water to the processing plant. This includes water for dust suppression. The Applicant has received a licence for this bore (Licence No 40BL187473). The bore details are as follows:

<i>Total depth</i>	20 m
<i>Constructed</i>	1991
<i>Lithology</i>	0 – 20 m; sands, gravels and clays (granodiorite derived) 20 m; weathered granodiorite (0.5 m) grading to fresh granodiorite
<i>Construction</i>	casing; 150 mm PVC casing screen; slotted 150 mm PVC
<i>Equipment</i>	electrosubmersible
<i>Water level</i>	beginning of spring; approx. 5 m below ground level End of summer; approx. 10 m below ground level
<i>Quality</i>	pH – 6.7 (neutral) Electrical Conductivity – 1 700 µS/cm
<i>Flow</i>	more than 5 000 plus gallons / hour (approximately 6.3 L/s)



The water supply from the bore is of sufficient volume and quality for present and estimated future needs. This bore would be used to supply the landfill operation for the transfer station tipping floor and waste bin wash downs.

It is estimated that washing of the bins and tipping floor would require approximately 50 000 L of water per annum.

The results of the groundwater assessment undertaken by Coffey Geosciences Pty Ltd, indicate that the quarry void is hydraulically isolated from the surrounding groundwater system as there was no seepage out of the void at the foot of Bald Hill. This conclusion was reinforced by the fact that surface water collected within the void since extraction operations ceased does not seep out.

A small amount of groundwater seepage within the void (<0.1L/s) was observed. It was inferred that rain falling on the internal quarry access road above percolated through blast fractures and loose fill and seeped out on the wall below. Observations over many years confirmed that after rain, seepage commenced and in dry weather seepage ceased altogether. It was concluded this would not compromise the permeability of the main basalt plug.

Although testing suggested the presence of some low permeability fractures within the impermeable basalt and granodiorite, the void is unlikely to be recharged nor seep via these fractures.

The groundwater level was extrapolated to be approximately 10 m below the current floor of the quarry void, sloping from the south and east of the void to the north and west. Groundwater level measurements were made difficult in that four of the eight drill holes did not intersect water and no groundwater was intersected in the packer test holes 20 m below the floor level.

3.5.4.2 Groundwater Chemistry

Due to the lack of groundwater being intersected in the various groundwater investigation holes, groundwater chemistry was only analysed when available for sampling. Samples from the four monitoring bores and the abstraction bore indicate comparative water quality at all five locations. The groundwater on site generally has the following characteristics:

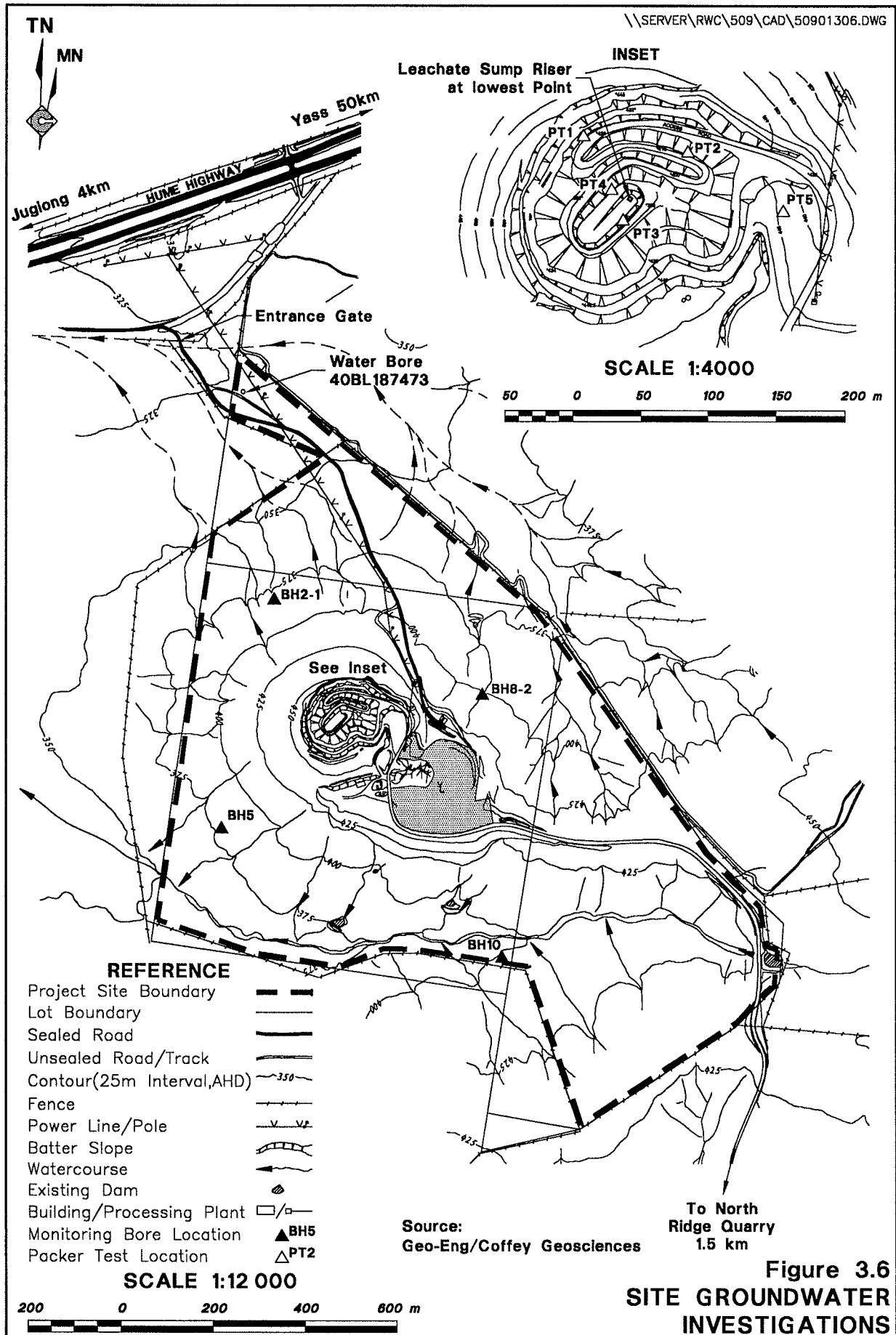
- neutral pH (7.0 to 7.8);
- total alkalinity ranging from 367 mg/L to 576 mg/L; and
- low ammonium (<0.01 mg/L to 0.17 mg/L) and dissolved iron (<0.005 mg/L).

Monitoring bore BH10 (**Figure 3.6**), located to the south-south-east of Bald Hill, exhibits higher chloride (980 mg/L) compared to the three other monitoring bores and abstraction bore (range 35 mg/L to 140 mg/L).

3.5.4.3 Constraints Assessment

Groundwater occurrence of supply do not pose a constraint on the proposed landfill. Presence of groundwater would require stringent safeguards with respect to leachate management to ensure no groundwater contamination occurs.





3.5.5 Water Management

3.5.5.1 Potential Issues Requiring Management

From the various site investigations, the following issues would require active site management:

- stormwater ingress into the quarry void, thus potentially creating greater volumes of leachate;
- potentially higher permeability of the upper levels of the walls of the quarry void;
- management of leachate in terms of:
 - minimising creation and accumulation of leachate; and
 - capture, transport and enclosure of leachate through a leachate recovery system, transfer pipes and leachate evaporation ponds;
- potential contamination of surface water / groundwater from leachate or transfer station tipping floor washdown water; and
- management of surface water diversion and runoff once the landfill level reaches the rim of the void.

Proposed safeguards and management options for these issues is discussed in the remainder of Section 3.5.5.

3.5.5.2 Surface Water Safeguards

A stormwater diversion system would be installed around the top benches of the quarry void where it is safe to do so, to minimise rainwater ingress to the landfill (**Plate 3.2**). Storm water diversion into existing surface water drainage would minimise safety issues arising from slippery descent roads as well as aid in the minimisation of leachate. As mentioned in Section 3.5.2.2, once the wastes reach the surface level and are capped, stormwater channel would be constructed around the filled void perimeter, and the stormwater would be drained into a peripheral drainage channel and into the existing stormwater sedimentation dam to the north of the weighbridge office. Runoff is expected to be minimal however, most rainwater would be retained in the surface soils above the capillary barrier in the capping layer.

Stormwater falling within the void would be collected within the leachate collection system. Stormwater from the external roads, turning areas and roof of the transfer station would be drained to the existing sedimentation dam north of the weighbridge office (see **Figure 3.5**). Water from the transfer station tipping floor arising from waste bin and tipping floor washing would be drained to the leachate system.





Plate 3.2 Current stormwater diversion around the top benches of the void (Ref: 509B/15)

3.5.5.3 Groundwater Safeguards

The groundwater investigations undertaken by Coffey Geosciences Pty Ltd (2001) established that it is not necessary to line the quarry void below 411 m, AHD and possibly 430 m, AHD due to the impermeable granodiorite / basalt. This natural barrier would ensure groundwater is not contaminated with leachate developed within the wastes. The upper levels of the void would be lined with a geonet drainage system as detailed in Section 2.1.5.

As an additional safeguard, a leachate management system would be installed which would minimise the potential for groundwater pollution principally through minimising the accumulating of leachate. This system is detailed in Section 3.5.5.4.

3.5.5.4 Leachate Management System

Leachate generated within the wastes and from rainfall percolating through the wastes would be collected and treated in compliance with EPA guidelines. The leachate would be collected at the base of the landfill and pumped, via a leachate sump riser, to the surface where it would be stored and evaporated.

Hydrologic Evaluation of Landfill Performance (HELP) modelling has been used to calculate the leachate quantity expected in the landfill. Details of this modelling by Nolan ITU are presented in Appendix 7. In a wet year, the leachate quantity may be expected to be 4 000 m³. The conditions whereby 4 000 m³ of leachate could be generated are:

- the depth of wastes in the base is less than 10 m, i.e. the first year of filling; and
- the rainfall is above average, i.e. 25 per cent more than the average rainfall.



While these two conditions are possible, they are unlikely to occur. Once the waste depth is 10 m or more the absorptive capacity of the waste mass would rapidly increase and leachate volumes would be significantly reduced.

Leachate Sump Riser and Rising Main

Leachate within the landfill would be collected at the base of the quarry void and pumped via the leachate sump riser to the surface from where it would be gravity fed (and pumped when required) via a 50 mm diameter pipe to the leachate evaporation pond(s). The leachate collection system is shown in **Figure 2.5** and described in Section 2.3.4.

The leachate sump riser would be positioned near the centre of the quarry void with a cast in-situ base encased in HDPE. The shaft would then be gradually built up with standard drainage pipe rings. A thick coarse stone drainage blanket (approximately 2 m depth) would be placed around the base of the shaft. This would provide a large leachate storage volume and would be protected from fine material by a geo-fabric filter.

As the quarry void fills, the wastes would bury the internal access road. The road would act as a leachate drainage bench to collect leachate moving down the near-vertical walls of the void. **Figure 2.5** shows the details. A HDPE leachate collection pipe would be laid in a 300 mm bed of coarse rock placed on the access road bench, and would be positioned to collect leachate seeping through the wastes or off the rock batters and directing it rapidly down to the base of the site. The pipe of 200 mm diameter, which allows for future inspections, would be placed in a shallow "V" trench on supportive cemented sand bedding. In order to protect the pipe from vertical loads, the drainage blanket would be mounded over a pipe at a depth of twice the pipe diameter. The leachate collection pipe runs into the sump riser, along with pipes draining the base layer.

A pneumatic pump, powered by compressed air, would pump leachate out of the sump. This type of pump would be capable of significant flows and heads and does not suffer in the hot humid environment at the bottom of the quarry void. An additional advantage would be that pneumatic pumps are intrinsically safe in a landfill gas atmosphere. The pump would be set to start pumping once leachate in the sump reaches 300mm depth.

Once there is sufficient surface area of wastes in the landfill to allow sprinkler construction, the majority of the leachate would be recirculated and irrigated back over the wastes in the void. This irrigation causes the landfill to act as a bio-reactor, that is, it would aid in the acceleration of the decomposition of the putrescible wastes. Faster decomposition would cause the bulk of the soluble contaminants and gas to be produced in a shorter timeframe, thereby minimising long-term management issues. Irrigation of the leachate would also result in faster leachate evaporation due to being spread over a greater surface area.

Leachate would be irrigated over the wastes whenever possible, leaving only surplus leachate to be pumped to the leachate evaporation ponds.

Leachate Delivery Line

Leachate pumped from the landfill would be fed into a 50 mm diameter pipe, which initially follows the road to the North Ridge Quarry but then traverses natural ground immediately north of the leachate evaporation ponds. The leachate would flow mainly by gravity through this pipe to the outlet at the pond. A pump would also be available to aid the movement, if required. Contaminated wash-down water from the transfer station would also enter this pipe via a litter trap. **Figure 2.5** shows the route of the pipeline. The pipeline would be buried as shown on **Figure 2.5** within a 1 m deep trench and buried to a depth of at least 0.7 m.



Leachate Evaporation Ponds

The leachate delivered from the quarry void and transfer station washdown would not require treatment and disposal. Rather, the ponds design allows for the evaporation of up to 4 000 m³ of leachate annually in two separate ponds. Designed specifically for the site conditions and climate, the initial pond would be 56 m by 56 m and 0.7 m deep, allows for the evaporation of the average rainfall and 2 200 m³ of leachate. Each leachate evaporation pond would be lined with a HDPE liner. Given the maximum of 4 000 m³ of leachate is based upon conservative scenarios, the Applicant proposes to construct Pond 1 and review the need for a second pond. Once the wastes build up over 10 m of depth, the absorptive capacity of the wastes and the ability to spray leachate over the wastes would eliminate the need for a second evaporation pond.

3.5.6 Assessment of Impacts

3.5.6.1 Surface Water

Potential adverse impacts on surface water may arise from runoff from areas containing wastes, a spill / leak from the leachate management system, or contaminated groundwater seepage reaching the land surface.

The proposed safeguard to manage surface water runoff would primarily be a stormwater diversion system as detailed in Section 3.5.5.2. With good engineering design with respect to stormwater flow capacity, this diversion system would ensure minimal stormwater comes into contact with the wastes in the landfill, thus minimising impact.

The leachate evaporation ponds would be lined to negate potential seepage and the leachate system would be fitted with a device such as a telemetry system which would alarm and automatically shut off if a leak in the system is detected. These safeguards ensure that the risk of potential impact to surface water is very low.

The designed controls to contain and manage leachate would ensure that adverse impacts upon the local surface streams and the Murrumbidgee River area avoided.

3.5.6.2 Groundwater

The leachate management system detailed in Section 3.5.5.4 would remove leachate from any areas that could potentially contaminate groundwater. The geonet drainage layer placed against the upper quarry walls would supplement the leachate management system to ensure no contamination of groundwater occurs.

A combination of these proposed safeguards and groundwater monitoring would ensure minimal potential for groundwater impact and fast and effective action should any contamination be detected.

3.5.7 Monitoring

3.5.7.1 Surface Water

A program of baseline monitoring would be commenced in the non-perennial streams near the Project Site to gain information on water quality following substantial runoff events. Once baseline water quality data is obtained, surface water monitoring would only be conducted on



an “as-needs” basis. That is, if a spill / leak was to occur or be detected, potentially affected surface water would be monitored for contamination.

Also, in the event of any unforeseen surface water discharge due to large storm events, any uncontrollable discharge would be monitored.

3.5.7.2 Groundwater

Four groundwater monitoring wells were installed in the granodiorite surrounding the void by Coffey Geosciences Pty Ltd. Two wells are located up-gradient and two are located down-gradient (**Figure 3.6**). Two of the wells were located on geophysical anomalies which may correspond to fracturing in the granodiorite.

Groundwater levels in these wells would be recorded at three monthly intervals and when water is encountered, it would be sampled for water quality according to strict procedures every six months. All monitoring results would be recorded and the monitoring regime would be reviewed regularly for appropriateness. The groundwater from the abstraction well would also be sampled for water quality every six months.

3.6 AIR QUALITY

3.6.1 Introduction

The Project Site is located in a rural environment where the main air quality concerns arising from the proposal would be dust and odour.

An assessment of potential impact arising from dust is presented in Section 3.6.6.

Potential odour has been assessed by Holmes Air Sciences using a worst case scenario detailed in Holmes Air Sciences (2001). The assessment of odour impact drawn from this report is presented in Section 3.6.6.3.

3.6.2 Existing Air Quality

The Project Site is located in a rural area where dust would be the main air contaminant. The principal sources of dust in the vicinity of the Project Site include activities at the existing North Ridge Quarry, all processing and product stockpiling and despatch, agricultural activities and vehicular movements on adjoining properties and rural roads. Mobile equipment used at the existing quarry and vehicle exhausts from the surrounding road network, particularly the Hume Highway, would also influence air quality to a limited degree.

The Applicant has undertaken monitoring of dust deposition in the vicinity of the existing quarry since July 1998 using three deposited dust gauges (L1, L2 and L3). An additional gauge (L4) was installed in August 1998 to provide greater coverage. Dust gauges L1, L2 and L3 were discontinued due to unrepresentative data. Three new dust gauges were installed in November 1998 (L5, L6 and L7). The location of current and former dust gauges are shown on **Figure 3.7** and the deposited dust monitoring results recorded to March 2001 are presented in **Table 3.3**.



The data presented in **Table 3.3** indicates that, on the whole, the levels of dust deposition in the vicinity of the Bald Hill Quarry are low. There are three isolated events recorded on dust gauge L4 and one event on L5 where the insoluble solids content was abnormally high. These events have been discounted from the mean calculations as natural dust events not related to the quarrying activity. The mean total insoluble solids for all dust gauges are consistently under 5 g/m²/month and generally below 2 g/m²/month. For comparative purposes, the EPA identifies that amenity from dust fallout generally begins to diminish above levels of 4 to 5 g/m²/month.

TABLE 3.3
Dust Deposition* near Bald Hill Quarry

Monitoring Period	L4			L5			L6			L7		
	Total Insolubles	Ash		Total Insolubles	Ash		Total Insolubles	Ash		Total Insolubles	Ash	
		Content	%		Content	%		Content	%		Content	%
26/07/99 -19/08/99	0.28	0.11	39.29	0.12	0.01	8.33	0.19	0.02	10.53	0.36	0.14	38.89
19/08/99 -21/09/99	1.31	0.77	58.78	0.72	0.35	48.61	0.86	0.54	62.79	0.84	0.48	57.14
21/09/99-26/10/99	1.85	1.43	77.30	1.15	0.08	6.96	0.53	0.29	54.72	0.75	0.41	54.67
26/10/99-07/12/99	4.60	2.50	54.35	2.6	1.10	42.31	0.55	0.23	41.82	0.78	0.31	39.74
07/12/99-18/01/00	1.40	0.91	65.00	0.74	0.39	52.70	0.85	0.55	64.71	0.35	0.21	60.00
18/01/00-03/03/00	8.80	4.50	51.14	1.1	0.66	60.00	0.97	0.62	63.92	1.10	0.80	72.73
03/03/00-04/04/00	1.00	0.79	79.00	0.75	0.41	54.67	1.30	1.00	76.92	3.90	1.20	30.77
04/04/00-22/05/00	0.90	0.74	82.22	13	7.80	60.00	1.40	1.10	78.57	1.90	1.40	73.68
22/05/00-20/06/00	1.10	0.92	83.64	0.91	0.68	74.73	0.71	0.49	69.01	2.90	1.20	41.38
20/06/00-17/07/00	0.76	0.55	72.37	0.81	0.52	64.20	0.79	0.52	65.82	1.60	1.00	62.50
17/07/00-17/08/00	0.64	0.47	73.44	0.73	0.46	63.01	0.52	0.30	57.69	0.72	0.46	63.89
17/08/00-22/09/00	19.60	17.00	86.73	0.69	0.38	55.07	0.71	0.36	50.70	0.74	0.46	62.16
22/09/00-18/10/00	0.40	0.21	52.50	0.5	0.23	46.00	0.43	0.27	62.79	0.52	0.24	46.15
18/10/00-15/11/00	5.70	2.40	42.11	0.79	0.29	36.71	1.80	0.55	30.56	2.10	1.10	52.38
15/11/00-15/12/00	1.10	0.67	60.91	1	0.58	58.00	1.00	0.53	53.00	1.20	0.81	67.50
15/12/00-16/01/01	1.40	0.92	65.71	0.51	0.34	66.67	0.48	0.32	66.67	0.57	0.42	73.68
16/01/01-15/02/01	0.00	2.80	100.00	0.00	1.20	100.00	0.00	1.20	100.00	0.00	1.00	100.00
15/02/01-15/03/01	4.20	2.60	61.90	1.30	0.93	71.54	1.30	0.90	69.23	3.80	2.00	52.63
Mean of Samples	2.35	1.47	65.86	0.85	0.51	53.50	0.80	0.54	59.97	1.34	0.76	58.33
Shading												

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indicates a value higher than normal due to natural dust events. These figures are not included in mean calculations

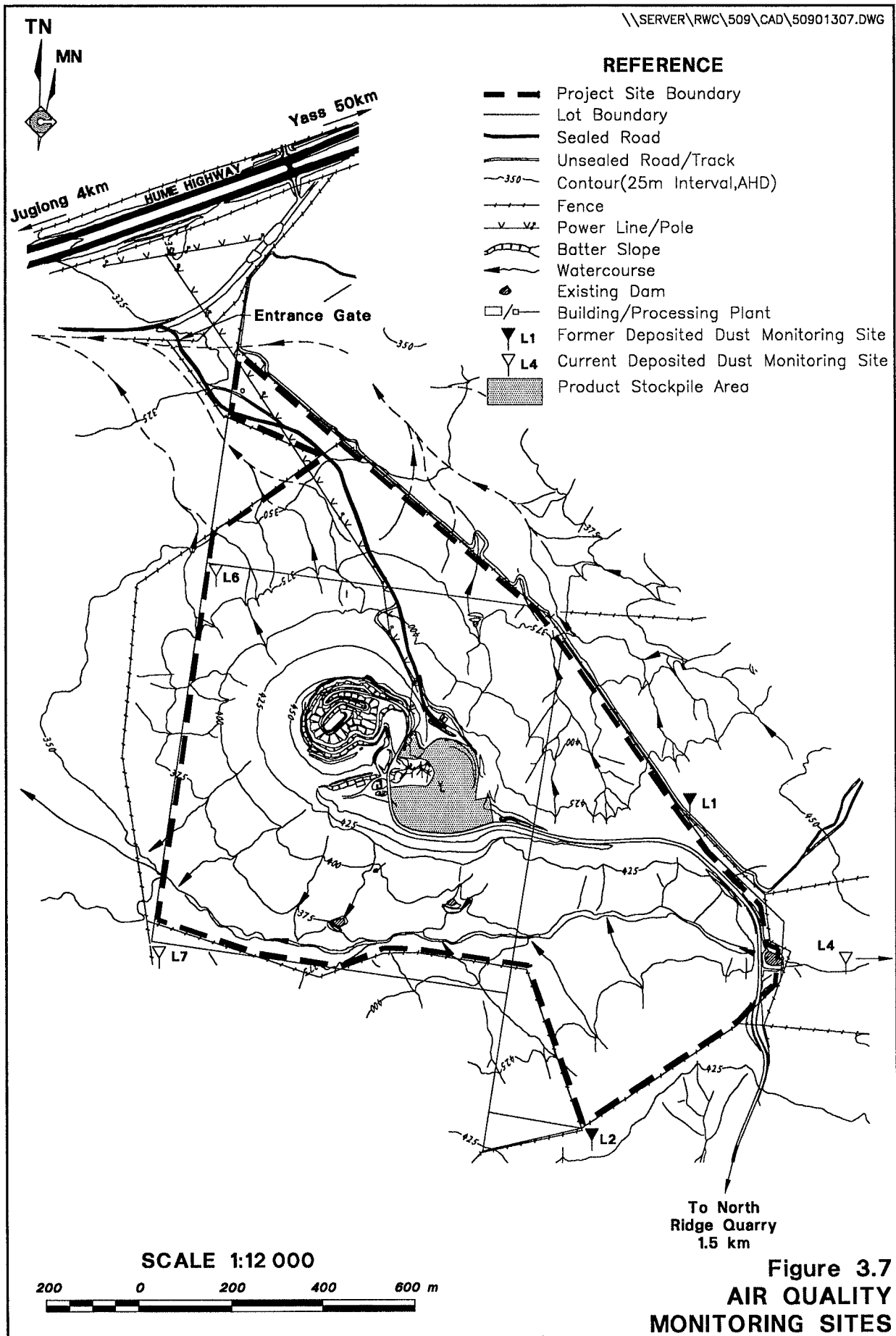
Although there are no quantitative background data on airborne dust levels in the proximity of the Project Site, airborne dust levels are likely to be in the range of 25 to 50 µg/m³.

3.6.3 Potential Air Contaminants

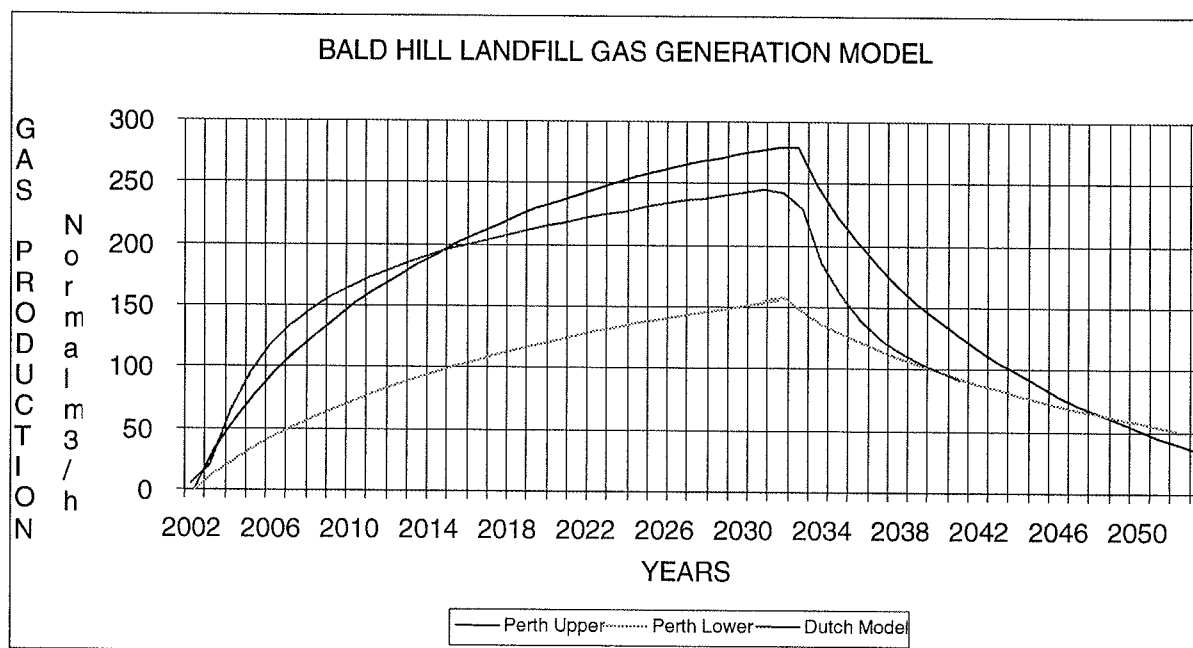
Potential air contaminants arising from the project are additional dust, landfill gas and odour.

Additional dust could arise from the movement of the dedicated landfill transfer truck over unsealed roads and the covering of the rubbish with inert quarry wastes.





Landfill gas can arise from the decomposition of the wastes over time. Landfill gas can cause a flammable hazard and/or odour. Landfill gas production has been modelled by Holmes Air Sciences using a combination of an Australian developed empirical model based on field trials in Perth and a Dutch theoretical model. The model depicts the gas generation shown in **Table 3.4** and the following graph.



The model assumes a constant rate of input of 17 800 tonnes per year of commercial and domestic wastes. The electricity export generation potential assumes 80% recovery efficiency, 31% thermal efficiency in electrical generation and 15% parasitic losses (Nolan ITU Pty Ltd 2001).

TABLE 3.4
Landfill Gas Generation and Electricity Potential

Time Period	Perth LFG Generation M ³ /hr	Dutch LFG Generation M ³ /hr	Exported Electricity Potential KW
5 years	65-130	160	145
10 years	100-205	210	140
15 years	130-255	235	210
20 years	155-240	250	225
25 years	175-320	265	240

Odour can potentially arise from the wastes deposited in the landfill as well as the leachate evaporation ponds.

3.6.4 Air Quality Guidelines

3.6.4.1 Odour

The EPA has recently published a Draft Odour Policy which includes recommendations for odour criteria (NSW EPA 2001). These recommendations have been used for this odour assessment.



The NSW EPA, through the Draft Odour Policy, has attempted to refine odour goals and the way in which they should be applied with dispersion models to assess the likelihood of nuisance impact arising from the emission of odour. However, as discussed above these procedures are still being developed and odour goals are likely to be revised in the future.

There are two factors that need to be considered:

1. what "level of exposure" to odour is considered acceptable to meet current community standards in NSW; and
2. how can dispersion models be used to determine if a source of odour meets the goals which are based on this acceptable level of exposure.

The term "level of exposure" has been used to reflect the fact that odour impacts are determined by several factors the most important of which are:

- the Frequency of the exposure
- the Intensity of the odour
- the Duration of the odour episodes, and
- the Offensiveness of the odour (the so-called FIDO factor)

In determining the offensiveness of an odour, it needs to be recognised that for most odours the context in which an odour is perceived is also relevant. Some odours, for example the smell of sewage, hydrogen sulphide, butyric acid, landfill gas etc., are likely to be judged offensive regardless of the context in which they occur. Other odours such as the smell of jet fuel may be acceptable at an airport, but not in a house, and diesel exhaust may be acceptable near a busy road, but not in a restaurant.

In summary, whether or not an individual considers an odour to be a nuisance would depend on the FIDO factors outlined above and although it is possible to derive formulae for assessing odour annoyance in a community, the response of any individual to an odour is still unpredictable. Odour goals need to take account of these factors.

The EPA Draft Odour Policy includes some recommendations for odour criteria. They have been refined by the EPA to take account of population density in the area. **Table 3.5** lists the odour certainty thresholds, to be exceeded not more than 1% of the time, for different population densities.

The difference between odour goals is based on considerations of risk of odour impact rather than differences in odour acceptability between urban and rural areas. For a given odour level there would be a wide range of responses in the population exposed to the odour. In a densely populated area there would therefore be a greater risk that some individuals within the community would find the odour unacceptable than in a sparsely populated area.



TABLE 3.5
Odour Performance Criteria for the Assessment of Odour (EPA, 2001)

Population of affected community	Odour performance criteria (nose response odour certainty units at the 99th percentile)
Single residence (<2)	7
10 – 30	6
30 – 125	5
125 – 500	4
500 – 2000	3
Urban	2

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It is common practice to use dispersion models to determine compliance with odour goals. This introduces a complication because Gaussian dispersion models are only able to directly predict concentrations over an averaging period of 3-minutes or greater. The human nose, however, responds to odours over periods of the order of a second or so. During a 3-minute period, odour levels can fluctuate significantly above and below the mean depending on the nature of the source.

To determine more rigorously the ratio between the one-second peak concentrations and three-minute and longer period average concentrations (referred to as the peak to mean ratio) that might be predicted by a Gaussian dispersion model, the NSW EPA commissioned a study by Katestone Scientific Pty Ltd (1995, 1998). The odour study completed for the Bald Hill Quarry Regional Landfill recommended peak to mean ratios for a range of source types. The ratio is also dependent on atmospheric stability and the distance from the source. A summary table of these ratios is presented in Holmes Air Sciences (2001).

The NSW EPA Draft Odour Policy (NSW EPA, 2001) take account of this peaking factor and the goals shown in **Table 3.5** are based on nose-response time.

Holmes Air Sciences (2001) conducted an odour assessment on the site using a worst-case meteorology and worst-case emission rate scenario. Emission rates used for the assessment are presented in **Table 3.6**. Detail on how these emission rates were determined is presented in Holmes Air Sciences (2001).



TABLE 3.6

Estimated Odour Emission Rates at the Proposed Bald Hill Quarry Landfill Site

Section	Specific emission rate (ou.m ³ /s/m ²)			Area (m ²)	Total Emission Rate (ou.m ³ /s)	
	"Actual"	Peak to mean factor			Neutral	Stable
		Neutral	Stable			
Active tipping face	0.354	2.5	2.3	400	354	326
Interim cap	0.046	2.5	2.3	14 000	1 610	148
Fully capped*	0.112	2.5	2.3	14 000	3 920	3 604
Leachate pond	0.2	2.5	2.3	2 200	1 100	1 012
* Reduced by 60% to account for gas collection						

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3.6.4.2 Dust

Depositing dust (dust fall), though not affecting public health can, if present at sufficiently high levels, reduce the amenity of an area which is used for living, farming and other activities to such an extent that they cease to be either enjoyable or viable. The principal effects contributing to this degradation of amenity include the presence of visible dust either in the air or on surfaces, and soiling of those surfaces and materials.

The EPA has adopted the criteria set out in **Table 3.7** to assess the impact upon amenity by deposited dust.

TABLE 3.7

EPA Guidelines for Deposited Dust

Existing Deposited Dust Level (g/m ² /month)	Maximum Acceptable Increase Over Existing Deposited Dust Level (g/m ² /month)	
	Residential/Suburban	Rural, Semi-Rural, Urban, Commercial and Industrial
2	2	2
3	1	2
4	0	1

Note:

If the existing deposited dust level is greater than 4 g/m²/month in a residential/suburban area or is greater than 5 g/m²/month in a rural or semi-rural area, then no increase in dust fallout is acceptable as a result of any proposed dust emitting works.

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The maximum acceptable increase in the mean annual dust deposition rate is assessed to be 2 g/m²/month in those areas in which the existing rate of dust deposition does not exceed 2 g/m²/month such as areas around the Project Site. The guidelines seek to limit the total dust deposition rate (the sum of the existing level and the increment due to a new development) to 4 g/m²/month in suburban / residential areas and to 5 g/m²/month in rural, semi-rural, commercial and industrial areas. The Applicant recognises that mean annual dust deposition rates due to the proposal should not increase to above 3.0 g/m²/month. **Table 3.8** indicates the potential dust creation differences between the quarry operations and the landfill operations.

TABLE 3.8
Dust Emission Inventory

Operation	Emission Factor	Source	Extent of Operation		Annual Emission	
			Quarry	Landfill	Quarry	Landfill
Loading	0.029 kg/t	USEPA (1985)	M = 300 000 t A = 150 000 t	7 000 t (cover material)	M = 8.7 t A = 4.35 t	0.14 t
Primary Crushing	0.125 kg/t (with water sprays)	USEPA (1985)	M = 300 000 t A = 150 000 t	-	M = 1 200 t A = 600 t	-
Haulage	2.0 kg/km	SPCC (1986)	M = 8 570 km A = 4 285 km	850 km	M = 37.7 t A = 18.85 t	1.70 t
Overburden Dumping	0.02 kg/t	SPCC (1986)	-	7 000 t (cover material)	-	0.14 t
Wind Erosion	0.40 kg/ha	SPCC (1986)	7 ha		0.00238 t	-
Less 20% of in pit emissions (due to shielding for overburden dumping in landfill only)			TOTAL	Average Maximum	623.2 t 1 246.4 t	1.98 t
			TOTAL	Average Maximum	607.86 t 1 215.6 t	1.95 t
VKT = vehicle km travelled M = Maximum A = Average ♦ VKT: vehicle km travelled based on 2.2 km one way, 35 t trucks * VKT: Based on 116 truck loads of cover material per annum = 232 truck movements + 850 waste loads (17000 t/20 t truck trips of landfill = 1 700 truck movements. Transfer station to landfill ~ 500 m one way.						

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3.6.4.3 Total Suspended Particulates

Health effects of atmospheric dust are generally related to the concentration of suspended particulates in the air as distinct from dust fallout. Suspended particulate matter includes dust, smoke, fog and fumes as well as pollen, micro-organisms and secondary aerosols such as sulphates and nitrates and may be derived from a wide range of natural and man-made processes and activities. Suspended particulates are removed from the atmosphere primarily by rainfall and gravitational settling.

The effects of inhaled particulates are related to the type of particles inhaled, particle sizes, the ability of the respiratory tract to capture and eliminate the particles and the reactivity of the particles with lung tissue.



The current guideline value (based on advice from the National Health and Medical Research Council (NHMRC)) for the mean annual concentration of total suspended particulates (TSP) (0.1 to 50 μm in size) is 90 $\mu\text{g}/\text{m}^3$.

The EPA has also set guideline values for particulate matter less than 10 microns in size (PM 10) and suspended matter. PM 10 refers to only those particles which are smaller than 10 microns. For concentrations of PM 10, the EPA has listed United States EPA standards of 50 $\mu\text{g}/\text{m}^3$ as an annual mean and 150 $\mu\text{g}/\text{m}^3$ as a 24-hour maximum concentration in residential environments. The World Health Organisation (WHO) long term goal of 40 $\mu\text{g}/\text{m}^3$ has been listed for mean annual concentrations of suspended matter.

3.6.5 Safeguards

3.6.5.1 Dust Management

The access road from the weighbridge to the transfer station would be sealed thus minimising dust. Any dust arising from the covering of the wastes with quarry overburden should be captured within the void. Once waste placement nears the top of the void dust management strategies would be implemented. These would include placement of wind deflecting barriers, progressive seeding of cleared areas where appropriate to minimise wind erosion causing dust and road watering as a form of dust suppression.

3.6.5.2 Landfill Gas Management

During the filling of the landfill, gas management would be conducted by progressive collection and removal. This would consist of near horizontal gas collection pipes laid in prepared trenches in the waste of intervals, radiating from the central leachate sump riser. The first 10m of these collection pipes will not be perforated and a condensate trap would be situated near the riser. The individual gas collection pipes enter the sump riser and connect to a rising gas pipe. The rising gas pipes from all levels in the wastes are connected to a valve manifold which is external to the sump riser. This valve manifold allows easy adjustment of the vacuum and flow rate of gas (**Figure 2.6**). Progressive gas collection would minimise greenhouse impact and methane emissions.

Landfill gas would be used if economically viable. The recent Renewable Energy Act and other initiatives by the Sustainable Energy Development Agency provide incentives for utilisation of landfill gas. If energy recovery is not viable, the collected landfill gas would be flared off in a simple elevated candle flare fixed to the top of the leachate sump riser.

The Applicant would periodically re-assess its attitude to landfill gas management and commercial / other opportunities to utilise the gas.

On closure of the landfill, the gas collection system would left in-situ to continue to collect accumulating gas. The collected gas would continue to be directed to the leachate sump riser and be either used or flared.

3.6.5.3 Odour Management

Odour can be largely managed by the same strict hygiene procedures that would help minimise impact from weeds and pest species.



These odour control measures include the following:

- wastes being completely covered during transport to the transfer station;
- washing of waste bins / trucks on an as needs basis (i.e. when high odour or visibly required);
- regular washing of the transfer station tipping floor;
- daily covering of the wastes in the quarry void;
- intermediate capping of the cells as they are completed; and
- fencing the landfill and minimising pest species would reduce litter scatter, thus potential odour.

3.6.6 Assessment of Impacts

3.6.6.1 Dust

The Bald Hill Quarry processing activities would remain the main source of dust in the immediate vicinity of the landfill. The ongoing quarrying and haul road use to and from the North Ridge Quarry would generate less than 1 per cent of the dust created by the quarry related activities. **Table 3.8** shows that the additional dust generated by landfill-related activities would account for less than 1 per cent of the dust generated by quarry-related activities.

The combined dust levels would be sufficiently low such that, when dispersed, the concentrations of both deposited dust and airborne dust at surrounding residences would be well within EPA criteria. As the landfill reaches the upper levels of the void, dust management strategies as detailed above would be implemented, resulting in minimal impact to the surrounding area.

3.6.6.2 Landfill Gas Impact

The odour assessment conducted by Holmes Air Sciences (2001) concluded there would be no impact to surrounding residences from odour of leachate gas.

Implementation and control of the leachate gas as detailed in Section 3.6.5.2 would result in minimal, if any, impact from leachate gas on surrounding residences or the environment.

3.6.6.3 Odour Impact

Odour impact may arise from the emission of leachate gas or from putrescible material within the landfill. Holmes Air Sciences (2001) conducted an odour assessment on the site to determine potential impact as discussed in Section 3.6.4.1. As mentioned, this assessment was based on a worst case scenario, including 400 m² of active tipping face in the void.

Figure 3.8 presents the maximum predicted odour levels due to emissions from the landfill assuming that 50 per cent of the total area is fully capped, 50 per cent is interim capped and there are 400 m² of active tipping. It is also assumed that the leachate evaporation pond is



aerobic. There are no predicted exceedances of the most stringent NSW EPA goal of 2 odour units. Given that this goal is a frequency based goal where 99 per cent compliance is required the results indicate that there should be no offensive odour impacts from this proposal.

The dispersion modelling results for an extreme worst-case scenario where it has been assumed that the odour emissions from the whole area of the tip would be at the high rate associated with an active tipping face is also illustrated on **Figure 3.8**. Further it has been assumed that the leachate evaporation pond would be in an anaerobic condition. Even under these extreme and quite unrealistic worst-case circumstances, the operations would still comply with the most stringent odour goal at the nearest residences which as noted above is a 99 per cent compliance goal rather than a 100 per cent compliance goal.

These results indicate that even under extreme conditions, there is unlikely to be any odour impacts at any of the neighbouring residences.

3.6.6.4 Greenhouse Gas Impact

A greenhouse gas impact assessment was completed by Nolan ITU and is presented in **Appendix 10**. It includes the impact of landfill gas generation as well as carbon dioxide (CO₂) from transportation of the wastes to the landfill.

The annual greenhouse impact of wastes being hauled to Bald Hill Quarry Regional Landfill is 227 tonnes of CO₂ per annum. The landfill gas, calculated on the estimated wastes input, is modelled at 12270 tonnes of CO₂ equivalent.

This total of 12497 tonnes of CO₂ equivalent for the Bald Hill Quarry Regional Landfill is a saving of 65% over the estimated 35 206 tonnes of CO₂ equivalent calculated for transportation and landfill gas production from local landfills within the eight LGA's.

3.7 ECOLOGY

3.7.1 Introduction

Flora and fauna on the Project Site has been surveyed for both the nearby North Ridge Quarry operations and for the landfill proposal. The survey completed for the landfill proposal was expanded to include pests and weeds, their presence, potential impact and safeguards. Although weeds on the Project Site were recorded during the fauna survey, the weed assessment focussed primarily on the possibility of weed / contamination across Local Government Areas. The possibility of insect pest cross contamination was also examined.

3.7.2 Flora

3.7.2.1 Survey Methods

Given that the bulk of the Project Site has been significantly disturbed by quarrying (the processing plant and stockpile area) activities, it was deemed unnecessary to undertake a formal flora survey. A brief description of the flora occurring on the Project Site is provided in Countrywide Ecological Service (2001a), who undertook a fauna survey and assessment across the Project Site in November 1998, and March 2001.



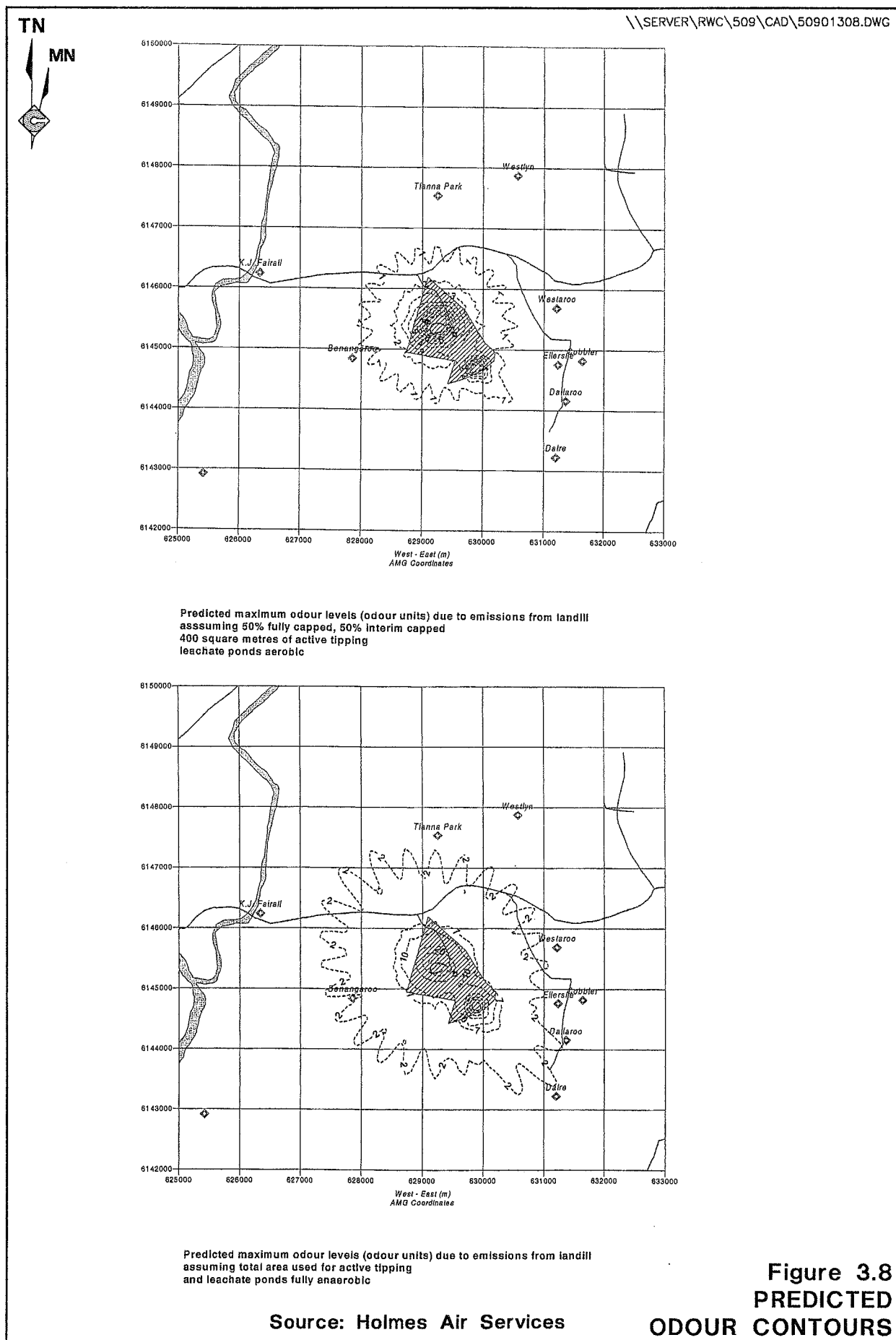


Plate 3.3 indicates the leachate evaporation ponds would be located in an area not directly affected by quarrying activities but have been used for a dwelling site (now removed) and grazing.

Shire weed lists were obtained and analysed for similarities between the Shires. The full weed lists are provided in Countrywide Ecological Service (2001b).



Plate 3.3 Location for leachate evaporation ponds (Ref: 509A/14A)

3.7.2.2 Results

The site inspection and fauna survey revealed that the Project Site is surrounded by farmland which has a partly cleared and predominantly White Box (*Eucalyptus albens*) woodland overstorey and an improved pasture understorey. The areas surrounding the site access road and internal road to the North Ridge Quarry are scattered with White Box (*Eucalyptus albens*), Yellow Box (*E. melliodora*), Apple Box (*E. bridgesiana*) and Grey Box (*E. microcarpa*). A few Kurrajong (*Brachychiton populneus*) are also present, however, no shrub layer is present due to its ongoing grazing use.

Ground cover in the area comprises a mixture of general pasture species including many introduced grasses, herbs and forbs. The Wild Oat (*Avena fatua*) is predominant in most areas, Barley Grass (*Hordem leporinum*), Rye Grass (*Lolium sp.*), *Stipa sp.*, Paterson's Curse (*Echium plantagineum*), sub-clover and medic species are also present.

The site of the proposed leachate evaporation ponds would be located on an old homestead site and comprises groundcover species with three fruit trees.



The National Parks and Wildlife Service Atlas of NSW Wildlife showed that no threatened plants have been recorded in the Cootamundra region (Map Sheet 8528 1:100 000 – 22/9/98 and Yass Map Sheet 8628-20/2/01).

There are 51 noxious weed species across the eight Local Government Areas. Of these, 31 are Category 2 (the weed must be fully and continuously suppressed and destroyed) and 12 are Category W1 (the presence of the weed on land must be notified to the local Council authority and the weed must be fully and continuously suppressed and destroyed). These 12 species are common across all eight Local Government Areas. The listed weeds cover a range of annual and perennial species including grasses, herbs, shrubs, trees and aquatic species. During the fauna survey, only a very low level of mistletoe infestation was observed on individual trees.

3.7.2.3 Conservation Significance

There are no flora species within the Project Site that are of conservation value. Strict control of potential weeds would be required to ensure the conservation value of species in surrounding areas are not compromised.

3.7.2.4 Constraints Assessment

As all sites to be disturbed as part of this proposal have been previously disturbed, flora issues pose no constraints on this proposal.

3.7.2.5 Safeguards

The only vegetation to be disturbed as a result of this proposal would be limited exotic trees on the leachate evaporation pond site.

Surface water and leachate management strategies, detailed in Section 3.5, would ensure there would be minimal, if any, impact on surrounding pastoral land caused by runoff from the Project Site.

Weeds could be spread through the following landfill activities:

- (i) from seeds being transported into the area as part of the load of waste material with rodents and birds accessing these seeds from the landfill and distributing them into the local environs;
- (ii) by vegetative propagation from propagules, or cuttings being dispersed collaterally by nuisance and pest species if they have access to the landfill;
- (iii) from wind-blown dispersal of seeds and propagules into the immediate surroundings;
- (iv) from scatter of seeds and propagules en route if the load is not covered; and
- (v) from transfer of seeds and propagules in the dirt stuck to the transporting vehicles to new sites en route and to the local environs at the subject site.



To ensure the above circumstances are avoided, the following safeguards would be implemented to minimise the chance for opportunistic escape of vegetative material either at the landfill or along the transport route.

- (i) All material transported to the Project Site would be covered from point of origin until it is unloaded inside the transfer station building.
- (ii) After sorting, all material placed in the quarry void would be covered with inert quarry wastes each evening to ensure seeds or propagules are not able to be access by birds or blown out of the landfill.
- (iii) Once the wastes reach a level 10 m below the rim of the quarry void, the quarry void would be fenced with a 2.0 m high litter fence with small diameter mesh to ensure that any vegetative material is contained within the former quarry void.
- (iv) The litter fence would be checked at regular intervals, initially weekly, and any wind-blown vegetative material removed.
- (v) The Project Site itself would be checked at regular intervals, initially monthly, to ensure that no weeds, from either listed or other species, have become established.
- (vi) Any weeds found to have become established, especially within 100 m of the quarry void, transfer station building and leachate evaporation pond would be destroyed using an appropriate herbicide.
- (vii) The leachate evaporation pond would be inspected regularly, initially weekly, and treated with a herbicide when necessary to ensure that any weed infestation that may occur is controlled.

3.7.2.6 Impact Assessment

Approximately 0.6 ha of pasture and three fruit trees would be cleared for the construction of the leachate evaporation ponds. This is assessed to have no adverse impact upon the region's native flora.

There would be little likelihood of any of the weed species entering the waste stream from any of the eight Shires. Since the wastes would be delivered from Shires which have the same species listed as W1 weed species and these weed species are notifiable and must be fully and continuously suppressed and destroyed.

Strict landfill operation controls as mentioned in Section 3.7.2.5 would ensure any potential impact on flora from weed infestation would be minimised, if not eliminated.

3.7.3 Fauna

3.7.3.1 Introduction

As indicated above, a fauna assessment of the Project Site and surrounding area was undertaken in November 1998 and March 2001, by Dr Leong Lim of Countrywide Ecological Service (CES).



The fauna survey was undertaken to detect and identify the fauna species inhabiting or using the Project Site and to assess the likely impact of the proposal on those fauna species, especially threatened species as listed on Schedule 1 (Endangered) and Schedule 2 (Vulnerable) of the *Threatened Species Conservation Act 1995*. Particular attention was focussed on the occurrence of the Turquoise Parrot (*Neophema pulchella*), Superb Parrot (*Polytelis swainsonii*), Swift Parrot (*Lathamus discolor*) and bat species Great Pipistrelle (*Falsistrellis asmaniensis*) and their habitat.

Assessments in accordance with Section 5A of the *Environmental Planning and Assessment Act 1979* were specifically carried out on the Turquoise Parrot, Superb Parrot and Swift Parrots as well as the Great Pipistrelle as suggested by the National Parks and Wildlife Service. CES have also considered the effects of clearing associated with the proposal in accordance with the *Native Vegetation Conservation Act 1997*.

The following sub-sections provide a summary of the survey findings. A full copy of the fauna survey report is presented in CES (2001a).

The potential for pest occurrence was also assessed, including both insect and vertebrate pests. A full copy of this assessment can be found in CES (2001b).

3.7.3.2 Survey Methodology

A variety of methods were used to identify the fauna present across the Project Site. Initially, CES prepared a checklist of fauna known to occur in the region using the NPWS Atlas of NSW Wildlife.

The surveys were conducted between 27 – 29 November 1998 and 9 – 10 March 2001 (**Figure 3.9**). Methods undertaken include opportunistic or chance sightings of mammals during daylight hours and spotlighting during the evenings. Birds were identified in the field from calls and direct observation each morning and opportunistically throughout the day. Reptiles and amphibians were sought in suitable habitats such as under rocks and logs. Four pitfall traps and numerous Elliott live mammal traps were also used to sample fauna. The ANABAT V sonar detection system was used to detect bats around the Project Site.

Additional bat recordings were made in March 2001 from two different levels in the exhausted Bald Hill quarry void.

3.7.3.3 Results

Amphibians

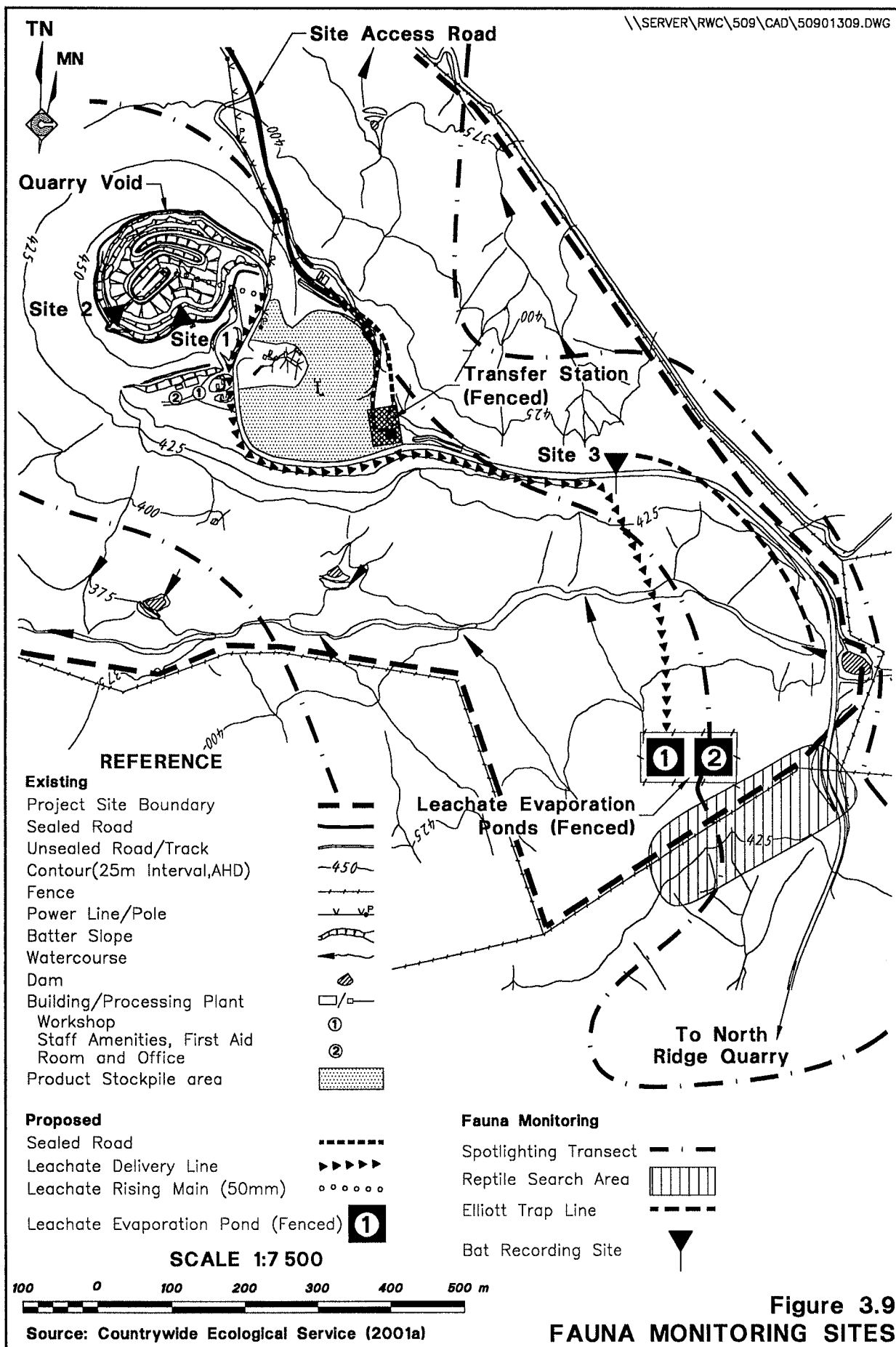
No amphibians were found on the Project Site.

The Spotted Grass Frog (*Limnodynastes tasmaniensis*) and the Common Eastern Froglet (*Cirinia signifera*) were identified from calls in the vicinity of where the haul road crosses Sawpit Creek south of the Project Site. No other species were identified or found.

Birds

Thirty-six bird species were observed during the survey in the vicinity of the Project Site including the threatened species Superb Parrot (*Polytelis swainsonii*). A full list of the species recorded is provided in CES (2001a).





Although the Square-tailed Kite, Powerful Owl and Regent Honeyeater are listed as occurring in the region, they were not observed in either survey.

Mammals

No mammals were caught in the traps deployed. Numerous Common Ringtail Possum (*Pseudocheirus peregrinus*) and two Common Brushtail Possums (*Trichosurus vulpecula*) were identified during spotlighting on the hill around the North Ridge Quarry in 1998.

Nine bat species were detected in the area from analysis of taped calls, November 1998. A full list of species is provided in CES (2001a).

The bat recording within the quarry void detected a large number of Little Mastiff bats which were using the pit for shelter during a period of persistent strong wind.

There was also evidence of bats roosting in tree hollows near the proposed leachate collection ponds.

Eastern Grey Kangaroos were abundant throughout the area with in excess of 20 animals seen together on occasions. Two Red Deer hinds, *Cervus elaphus*, were found feeding near the haul road between the Bald Hill Quarry – Stage 1 and North Ridge Quarry sites. Domestic sheep and cattle also graze over the surrounding pastoral land.

Reptiles

No reptiles were caught in the traps and searches under rocks and logs and around logs and rock piles also failed to locate any reptiles on the Project Site.

Insect Pests

Insect pests which may occur within eight Local Government Areas that could be transported to the landfill include Western Flower Thrips (*Frankiniella occidentalis*), Bush Flies and numerous plant bugs and mites (*full list is available in CES 2001b*). These species can cause diseases in stock and crops and impact on native flora and fauna.

Fruit fly does not occur at the Project Site or in any of the surrounding eight Local Government Areas.

Vertebrate Pests

A number of vertebrate pests are likely to be attracted to the site if hygiene standards in the landfill are poor.

These species include feral cats (*Felis catus*), European Red Fox (*Vulpes vulpes*), native and introduced rodents as well as a number of nuisance species such as the Australian Raven and Black Kite.



3.7.3.4 Conservation Significance

The Superb Parrot and Great Pipistrelle were the only two species of conservation significance that were recorded on site in 1998. The additional 2001 bat monitoring within the exhausted quarry void did not record the presence of any Great Pipistrelles.

The Superb Parrot is only rarely seen in this region on a seasonal basis when it frequents its breeding habitat. The closest breeding habitat found was approximately 40 km north-west of the Project Site.

3.7.3.5 Constraints Assessment

When determining the constraints fauna may pose on the project, the following were considered.

- The proposal would not impact upon the conservation status of any endangered or vulnerable species.
- Landfill operations are not a key threatening process under the *Threatened Species Conservation Act 1995*.
- None of the eight Local Government Areas are within the fruit fly quarantine area.
- The proposed landfill would fill the exhausted quarry void gradually over a number of years, this is unlikely to impact upon the bat's sheltering opportunistically within the void.

With consideration of the above, it is considered that native fauna poses no constraints to the project.

As a number of the vertebrate pest species such as feral cats and the European Red Fox are listed as Key Threatening Processes in the *Threatened Species Conservation Act 1995* (NSW), strict controls and management would be required to ensure that introduction and proliferation of vertebrate (and insect) pests is minimised.

3.7.3.6 Safeguards

A potential impact on native fauna would be the removal of nests / roosts in hollow trees. Only three individual exotic fruit trees would be removed for the leachate evaporation pond area. It is rare for fruit trees to contain hollows, but should this be the case, the hollows would be checked and any fauna nesting / roosting within the hollows removed prior to clearing.

Other safeguards to be implemented are related to the minimisation of insect and vertebrate pests.

The safeguards against pest species are inherent in maintaining a high level of hygiene within the transfer station and compound and landfill void.

Those measures already listed in Section 3.7.2.5 pertaining to weed control would also help eliminate pest issues. In addition to this, the following safeguards would be implemented should they be required.



- (i) The area around the transfer building, leachate evaporation ponds and the quarry void would be baited regularly with a suitable rodenticide as necessary.
- (ii) Baiting with 1080 laced meat baits would be carried out annually around the periphery of the landfill in conjunction with the surrounding landholders in conjunction with the Rural Lands Protection Board wild dog baiting programs, or as otherwise required.
- (iii) A regular effective trapping and shooting (as well as specific targeted feral cat baiting when becomes practicable) program would be implemented to control feral cats as necessary.

3.7.3.7 Impacts

Section 5A assessments were conducted on the Swift, Turquoise and Superb Parrots as well as one bat species, the Great Pipistrelle. The Section 5A assessments on the four species concluded the proposal would not impact upon the conservation status of these species (CES 2001a). A summary of this assessment is presented in Table 3.9 with the full assessment presented in Countrywide Ecological Service (2001a).

Countrywide Ecological Service (2001a) also concluded that no Species Impact Statement was warranted for the proposal due to the small size of the landfill operation and the land use history of the area.

No native vegetation / habitat would be destroyed as part of this proposal and with strict hygiene controls implemented across the site, impact on fauna should be minimal.

3.8 BUSHFIRE MANAGEMENT

The Applicant recognises the importance of having a bushfire management strategy to ensure its activities are neither the cause of a fire or may be affected by a fire entering the Project Site from adjoining lands. The Applicant currently adopts a bushfire management plan compiled in conjunction with the Harden Shire Council's fire control officer. Features of this plan include the following.

- Maintenance of fire extinguishers on all earthmoving equipment and structures.
- Maintenance of various items of fire fighting equipment such as knapsacks.
- Ensuring site access / escape through maintenance of on-site roads.
- Ensure access to local dams for water and provision of standpipe recharge facility.
- The use of on-site earthmoving equipment for controlling fire outbreaks.
- All site personnel including contractors receive training in the use of fire fighting equipment.
- Permanent onsite water tanker (pump equipped).





TABLE 3.9: SECTION 5A - Assessment of Significance

Section 5A Assessment Requirement	Turquoise Parrot (<i>Neophema pulchella</i>)	Superb Parrot (<i>Polytelis swainsonii</i>)	Swift Parrot (<i>Lathamus discolor</i>)	Great Pipistrelle <i>Falistictralis tasmaniensis</i>
Whether the life cycle of a threatened species is likely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction.	The local population of this species is unlikely to be disrupted by this proposed activity.	No resident local population would be expected and the proposed activities would not place the population at risk of extinction.	There is no resident local population of this species and the life cycle is most unlikely to be disrupted by this proposed activity.	The proposed operations will not disrupt the life cycle of this species and any local population will not be placed at risk of extinction given the scale and nature of the proposed activity.
Whether the life cycle of an endangered population is likely to be disrupted such that the viability of the population is likely to be significantly compromised.	No endangered population has been listed in this region.	No endangered population has been listed in the region.	No endangered population has been listed under the TSCA in the region.	The viability of the population will not be compromised by the proposed development.
Whether a significant area of known habitat of a threatened species, population or ecological community in the region is to be modified or removed.	No threatened population or community has been listed in this region. No significant area of the known habitat of the Turquoise Parrot will be modified or removed.	No threatened population or community has been listed in this region. No significant area of the known habitat of the Superb Parrot will be modified or removed. There is no threatened population or ecological community listed in the region.	No significant area of the known habitat of the Swift Parrot will be modified or removed.	The proposed development will not modify or remove a significant area of known habitat of the species.
Whether an area of known habitat is likely to become isolated from currently interconnecting or proximate areas of habitat for a threatened species, population or ecological community.	No known habitat of the Turquoise Parrot is likely to become isolated as a result of this proposed activity.	No known habitat of the Superb parrot is likely to become isolated as a result of this proposed activity.	No known habitat of the Swift Parrot is likely to become isolated as a result of this proposed activity. Nor will the activity disrupt any interconnections between habitat areas.	The proposed development will not isolate any known habitat or destroy any interconnections between habitats.
Whether critical habitat will be affected.	No critical habitat has been listed in NSW.	No critical habitat has been listed in the TSCA.	No critical habitat has been listed in the TSCA.	No critical habitat has been listed under the TSCA.
Whether a threatened species, population or ecological community, or their habitats, are adequately represented in conservation reserves (or other similar protected areas) in the region.	Representation of the species or its habitats in protected areas is not a consideration in this instance.	The consideration of whether this species or its habitat is adequately represented in reserve here is not relevant as this threatened species will not be significantly affected by the proposed activity.	No threatened population of community has been listed in the region. The Swift Parrot is a vulnerable species that feeds on a range of foods mainly nectar and pollen from eucalyptus and banksias, but lerps insects, larvae, grass seeds, fruits and berries are all included in the diet. The region is adequately endowed with the diversity of drier sclerophyll forests and woodland habitats supplying this food resource. There is however, some cause for concern that there is little to no tree recruitment in the region due to extensive grazing.	No threatened population or ecological community has been listed in the region.
Whether the development or activity proposed is of a class of development or activity that is recognised as a threatening process.	The Turquoise Parrot will not be affected by the proposal. Landfill operations are not listed threatening processes.	Landfill operations are not listed threatening processes.	Landfill operations are not listed threatening processes.	Landfill operations are not listed threatening processes.
Whether any threatened species, population or ecological community is at the limit of its known distribution.	The proposed Bald Hill Quarry Landfill is not at the limit of the Turquoise Parrot distribution.	The survey area is not at the limit of this species distribution although it is in a region that the species uses on a seasonal basis.	This threatened species only uses the region around the survey area on a seasonal basis during the non-breeding winter months. The survey area is not at the limit of its distribution.	The survey area is probably close to the western limit of this bat's distribution in this region of NSW but not the limits in its distribution latitudinally.

3.9 ABORIGINAL CULTURAL HERITAGE

As described in Section 3.7, the entire Project Site has been significantly disturbed by quarrying activities and therefore a detailed archaeological survey across the Project Site was not warranted.

The Applicant consulted with the Tumut/Brungle Local Aboriginal Land Council, which resulted in a visit to the exhausted quarry void in March 1999 by Mr R Russell and Mr R Dunn of the Land Council. Roland Williams of the Wiradjuri Branch of the NSW Aboriginal Land Council (SWALC) conducted an extension to this survey, 15th February 2001. This survey was to specifically examine the proposed landfill void. Mr Williams concluded that nothing of Aboriginal origin or significance was found and it would be highly unlikely that future operations in and around the landfill would encounter anything of Aboriginal origin (Williams 2001). Hence, Aboriginal heritage issues do not place any constraints upon the proposal.

3.10 EUROPEAN HERITAGE

No items with European heritage value (i.e. greater than 50 years old) are known to occur within the Project Site. The three fruit trees and concrete foundations near the proposal leachate evaporation ponds have no heritage value as the house was first occupied in the late 1950's and relocated elsewhere on the property in the early 1980's.

3.11 SURROUNDING LAND OWNERSHIP AND LAND USES

3.11.1 Introduction

The Project Site shares boundaries with two rural properties. To the west, the site is bounded by "Benangaroo" and to the east it is bounded by "Ellerslie" (**Figure 3.10**). All surrounding property residences have been involved in a process of community consultation as detailed in Section 1.5.2.

3.11.2 Existing Surrounding Land Ownership and Residence

The Project Site is located on three adjoining lots which are shown on **Figure 3.10** together with the surrounding properties. The land ownership details are presented in **Table 3.10**. **Table 3.10** also indicates the distance of each residence to both the proposed transfer station and the quarry void. The closest residence to the quarry void would be "Benangaroo Cottage" at 1.5 km while "Ellerslie" would be closest to the transfer station (1.7 km). There are no residences within 1.5 km of the proposed landfill.

Due to surrounding topography, "Westaroo" and "Tianna Park" are the only two residences with direct line of sight to areas of the Project Site where landfill-related activities are planned.

3.11.3 Existing Surrounding Land Use

Apart from the activities associated with the existing North Ridge Quarry and processing plant area at Bald Hill, the main land use within the Project Site would be sheep and cattle grazing on natural and improved pastures.



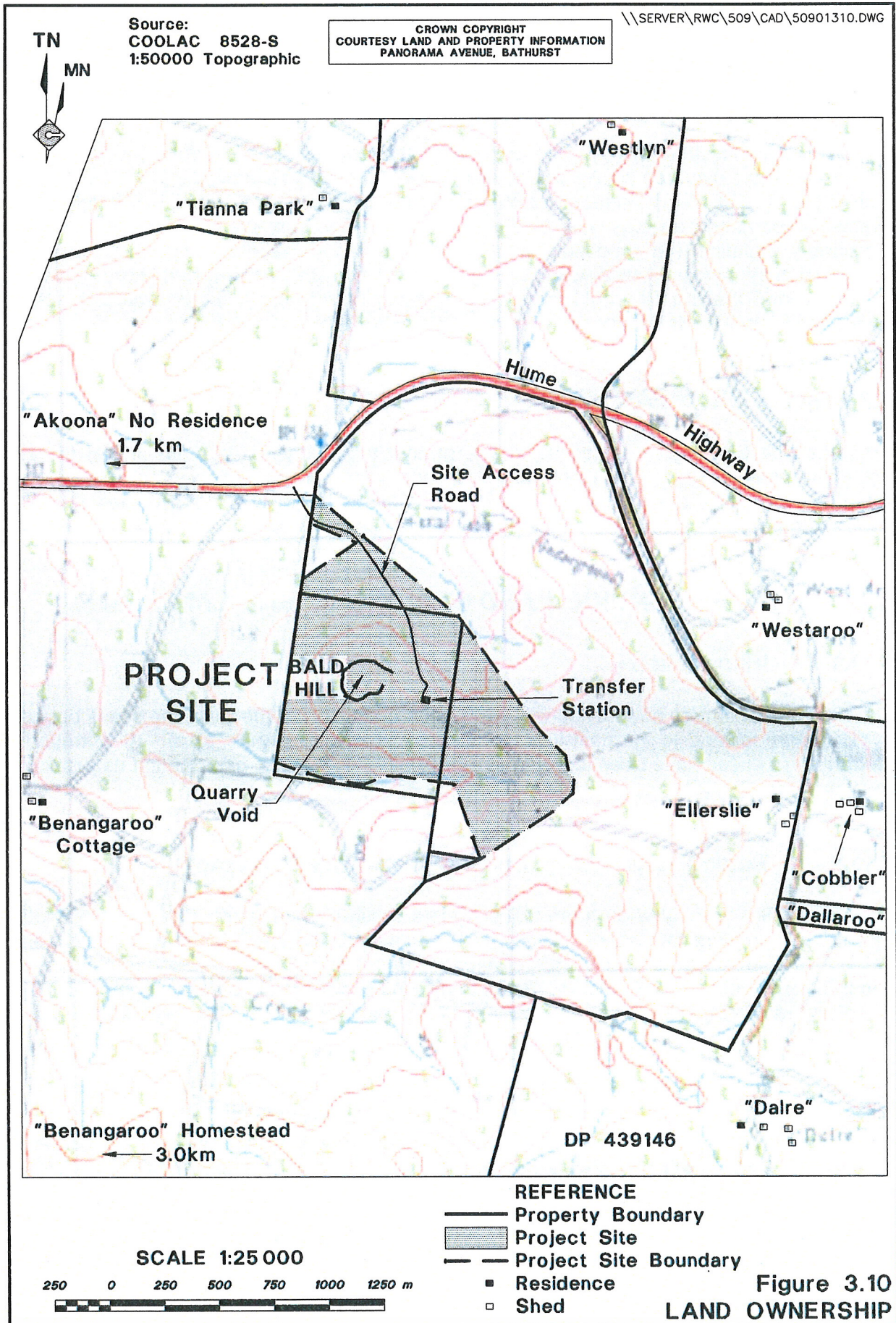


TABLE 3.10
Residences Surrounding the Project Site

Property Name	Landowner	Residence	Approximate Distance (km) of Residences to:		
			Transfer Station	Quarry Void	Processing Area
"Ellerslie"	A.J. Sharp	Yes	1.7	1.9	1.8
"The Cobbler"	C.N. Cooper & T.M. Sheahan	Yes	2.0	2.2	2.1
"Dalre"	R.T. Walker	Yes *	2.4	2.6	2.5
"Westlyn"	M.W. Suthern	Yes	2.8	2.7	2.75
"Akoona"	J. Sheahan	No	-	-	-
"Benangaroo Cottage"	T.A. Field Estates Pty. Ltd	Yes	1.8	1.5	1.65
"Westaroo"	M.B. Suthern	Yes	1.6	1.7	1.65
"Tianna Park"	D. Strong	Yes	2.3	2.1	2.2
Bald Hill Quarry	Bald Hill Quarry Unit Trust	No	-	-	-

* Not Occupied

50901T3.9

The land surrounding the Project Site would also be used mainly for sheep and cattle grazing, with the only area currently under cultivation being portions of a nearby property "Benangaroo", to the west of the Project Site.

3.11.4 Potential Impacts on Surrounding Land Uses

As "Westaroo" and "Tianna Park" have direct line of sight with the Project Site with no intervening topography, there would be potential for visibility and noise impacts at these residences. The extent and amelioration of these potential impacts would be discussed under the relevant sections.

There may be a degree of public perception that the presence of a regional landfill in close proximity may reduce property values. Considering the site is already an active quarry operation, the development of the landfill is not believed to have any noticeable effect on property values, particularly given:

- (i) the quarry void is located approximately 400 m from rural land managed by the Applicant's neighbours;
- (ii) the infrastructure and quarry void are well established; and
- (iii) the Applicant's performance record is well known to surrounding neighbours.



If the landfill site is poorly managed, there would be potential for odour, wind blown litter and pests to impact upon surrounding residences. However, with all safeguards implemented as discussed in the relevant sections, these impacts should not be realised.

3.12 OPERATIONAL NOISE

3.12.1 Introduction

An understanding of the potential noise impacts attributable to the additional activities within the Project Site has been undertaken through examining the existing noise climate and the influence of existing noise sources on the Project Site. The effectiveness of the range of design and operational safeguards necessary to achieve noise compliance was also reviewed.

The coverage of matters relating to noise is drawn from a report by Eric Taylor Acoustics Pty Ltd, acoustical consultants of Canberra. Reliance was placed in that report upon the noise compliance monitoring undertaken in August 2000 by Mark Eisner & Associates of the existing quarrying, processing and product despatch activities on site.

Environmental noise levels vary with time, and consequently it is necessary to describe the noise in terms of statistical descriptors. The statistical noise exceedance levels L_{AN} in dB(A) are the levels exceeded for N per cent of the measurement period. For example, L_{A90} is the noise level which is exceeded for 90 per cent of the measurement period and approximates the average minimum noise level. This is often referred to as the "background" noise level. Similarly, the L_{A10} is the noise level exceeded for 10 per cent of the measurement period, and approximates the average maximum noise level used to assess annoyance. L_{A1} is indicative of the maximum noise level that is exceeded 1 per cent of the time due to individual noise events such as vehicles passing. L_{Aeq} provides a measure of the total noise energy during the measurement period. All noise levels are assessed over a 15 minute period.

The Environment Protection Authority's Industrial Noise Policy has introduced the concept of a rating background level which provides the opportunity to establish a single-figure background noise level for the nominated period of operations. This single figure represents the median level of the background noise levels during the day-time, evening or night-time.

The A-weighting is a standard electronic weighting applied to the measurement of sound to approximate the frequency response characteristics of the normal human ear when judging the loudness of a sound. For comparative purposes, a level of 40 dB(A) is typical of a quiet refrigerator and a level of 60 dB(A) is typical of noise levels in a department store.

3.12.2 Existing Noise Climate

3.12.2.1 Introduction

An understanding of the existing noise climate is required to establish the criteria used by the Environment Protection Authority (EPA) for the assessment of noise impacts. The existing noise climate around the Project Site is influenced largely by:

- the existing processing activities, periodic extraction activities at the North Ridge Quarry and the on-site truck movements;



- traffic on the Hume Highway and to a lesser extent on rural roads;
- rural farm equipment and activities as well as stock, pets and birds; and
- occasional aircraft.

Noise levels around individual residences are also influenced by wind in the trees surrounding the residences, particularly when wind speeds exceed 1.5 m/s.

3.12.2.2 Existing Noise Levels

A comprehensive set of noise data was collected by Mark Eisner & Associates between 1 and 3 August 2000 as part of the noise compliance monitoring specified for the ongoing operations of the North Ridge Quarry and Bald Hill Quarry processing and product despatch operations. Noise measurements were recorded at “Dalre” and “Ellerslie” (see **Figure 3.10**) using a continuous noise data logger and hand held noise meters at various times of the day and night. Climatic conditions were also measured concurrently throughout the noise measurement period which demonstrated that all measurements were valid. Noise measurements at these two residences were nominated for that study as they are the two closest residences to the North Ridge Quarry and the processing operations.

“Dalre” The L_{A90} noise level was frequently below 30 dB(A) even with the quarry plant and equipment being fully operational and with trucks travelling along the haul road to the North Ridge Quarry. The only time quarry noise was audible was when large rocks were first being loaded into trucks at the stockpile area of the North Ridge Quarry.

“Ellerslie” Noise measurements at “Ellerslie” identified that the principal noise source appeared to be the relatively continuous heavy vehicle traffic on the Hume Highway. Quarry operations were not audible above ambient noise levels except for the loading of trucks early on 3 August 2000.

Given the proximity of other residences surrounding the Project Site (see **Table 3.9**) to the Hume Highway, it could equally be assumed that traffic noise would also dominate the existing noise environment at those residences, subject to the prevailing wind direction.

For the purpose of impact assessment, the rating background noise level is assumed to be 30 dB(A), that is the level recognised by the EPA to be the threshold level for noise level assessment in rural areas.

3.12.2.3 Constraints Assessment

The local noise climate is not a significant constraint upon the proposed landfill project. The considerable distance of the surrounding residences to the Project Site, intervening topography and the presence of the almost-continual traffic on the Hume Highway results in a noise climate unlikely to be influenced by the proposed additional activities within the Project Site.



3.12.3 Noise Impact Assessment Procedures

3.12.3.1 Environmental Noise Control - General Objectives

Introduction

Responsibility for the control of noise emissions in New South Wales would be vested in Local Government and the EPA. The EPA released its Industrial Noise Policy in January 2000 that provided a framework and process for deriving noise criteria for Development Consents and Environment Protection Licences to enable the EPA to regulate premises that are scheduled under the *Protection of the Environment Operations Act 1997*. The proposed Bald Hill Quarry Regional Landfill would be a scheduled premise under the Act.

The specific policy objectives of the Industrial Noise Policy are to:

- establish noise criteria that would protect the community from excessive intrusive noise and preserve the amenity for specific land uses;
- use the criteria as the basis for deriving project specific noise levels;
- promote uniform methods to estimate and measure noise impacts, including a procedure for evaluating meteorological effects;
- outline a range of mitigation measures that could be used to minimise noise impacts;
- provide a formal process to guide the determination of feasible and reasonable noise limits for consents or licences that reconcile noise impacts with the economic, social and environmental considerations of industrial development; and
- carry out functions relating to the prevention, minimisation and control of noise from premises scheduled under the Act.

The approach to assessing whether the noise criteria adopted are based upon either intrusive noise or amenity-related issues is set out below.

Assessing Intrusiveness

For assessing intrusiveness, the background noise needs to be measured or the default L_{A90} level of 30 dB(A) assumed. The intrusiveness criterion essentially means that the equivalent continuous noise level (L_{Aeq}) of the source should not be more than 5 dB(A) above the measured (or default) background level (L_{A90}).

Assessing Amenity

The amenity assessment would be based on noise criteria specific to land use and associated activities. The criteria relate only to industrial-type noise and do not include road, rail or community noise. If the existing noise level from industry approaches the criterion value, then noise levels from new industries need to be designed so that the cumulative effect does not produce noise levels that would significantly exceed the criterion. For high-traffic areas there would be a separate amenity criterion. The cumulative effect of noise from industrial sources needs to be considered in assessing the impact.

An extract from the EPA's Industrial Noise Policy that relates to the amenity criteria is given in **Table 3.11**.



EPA Assessment of Prevailing Weather Conditions

Wind

Wind has the potential to increase noise at a receiver when it is light and stable and blows from the direction of the source of the noise. As the strength of the wind increases, the noise produced by the wind would obscure noise from most industrial and transport sources.

TABLE 3.11
Amenity Criteria – Recommended L_{Aeq} Noise levels from Industrial Noise Sources

Type of Receiver	Indicative Noise Amenity Area	Time of Day	Recommended L_{Aeq} Noise Level	
			Acceptable dB(A)	Recommended Maximum dB(A)
Residence	Rural	Day	50	55
		Evening	45	50
		Night	40	45
	Suburban	Day	55	60
		Evening	45	50
		Night	40	45
	Urban	Day	60	65
		Evening	50	55
		Night	45	50
	Urban/Industrial Interface - for existing situations only	Day	65	70
		Evening	55	60
		Night	50	55
School classrooms - internal	All	Noisiest 1-hour period when in use	35	40
Hospital ward - internal	All	Noisiest 1-hour period	35	40
	All	Noisiest 1-hour period	50	55
Place of worship - internal	All	When in use	40	45
Area specifically reserved for passive recreation (eg National Park)	All	When in use	50	55
Active recreation area (eg. school playground, golf course)	All	When in use	55	60
Commercial premises	All	When in use	65	70
Industrial premises	All	When in use	70	75

Notes For Monday to Saturday, Daytime 7.00 am - 6.00 pm; Evening 6.00 pm - 10.00 pm; Night-time 10.00 pm - 7.00 am.
On Sundays and Public Holidays, Daytime 8.00 am - 6.00 pm; Evening 6.00 pm - 10.00 pm; Night-time 10.00 pm - 8.00 am.

The L_{Aeq} index corresponds to the level of noise equivalent to the energy average of noise levels occurring over a measurement period.



Wind effects need to be assessed where wind is a feature of the area as is the case near the Project Site. Wind is considered to be a feature where source-to-receiver wind speeds (at 10 m height) of 3 m/s or below occur for 30 per cent of the time or more in any assessment period (day, evening, night) in any season. This differs from the procedure used with temperature inversions, in that the 30 per cent occurrence applies to all seasons and each assessment period - and not just the winter season and night assessment period. There are two ways to assess wind effects:

- Use wind roses to determine whether wind is a feature based on the frequency of occurrence and wind speed. In doing this, care needs to be taken to assess the source-to-receiver components of wind that are relevant.
- Simply assume that wind is a feature of the area (foregoing the need to use wind roses) and apply a “maximum impact” scenario.

The default wind speed proposed by the EPA in the Industrial Noise Policy is 3 m/s.

Temperature Inversion

Inversion

Temperature inversions, when they occur, have the ability to increase noise levels by focusing sound waves. Temperature inversions occur predominantly at night during the winter months. For a temperature inversion to be a significant characteristic of the area it needs to occur for approximately 30 per cent of the total night-time during winter or about 2 nights per week.

In the absence of any site specific data, default values for temperature inversions and associated drainage-flow wind speeds are provided by the EPA for use in assessing impacts where inversions are present for at least 30 per cent of the total night-time during winter. These default values have been chosen based on the analysis of available field data. The following default parameters are specified for non-arid areas:

Moderate (F-class stability category) inversions

A 3°C/100 m temperature inversion strength for all receivers, plus a 2 m/s source-to-receiver component drainage-flow wind speed for those receivers where applicable.

Additional EPA Noise Assessment Information

The EPA's recommended noise assessment criteria aim to limit potential intrusive noise emissions and preserve noise amenity. In cases where the limiting noise assessment criterion (in this case $L_{Aeq(15\text{minutes})}$ intrusiveness criterion) cannot be achieved, then practicable and economically feasible noise control measures should be applied. This usually requires demonstrations that Best Achievable Technology and Best Environmental Management Practices have been implemented to mitigate adverse acoustical impacts.

In the event that the lowest achievable noise emission levels remain above the noise assessment criteria, then the potential noise impact needs to be balanced and assessed against any economic and social benefits the project may bring to the community. It then follows that where the consenting authority may consider that the development does offer community benefits, then these may be grounds for permitting achievable noise emission levels as statutory compliance levels.



3.12.3.2 Noise Emission Criteria

It would be considered appropriate that the noise assessment for the proposed landfill operation would be considered in conjunction with the ongoing processing and product despatch activities associated with the quarrying operations. Hence, the use of a single noise criteria for the combined activities based upon the consideration of both the amenity criterion and intrusive noise criterion, would be believed to be suitable.

The existing ambient L_{Aeq} in the area surrounding the Project Site would be controlled by existing quarrying and related operations, traffic noise and rural noise sources. The acceptable amenity criteria during the proposed periods of operation would be 50 dB(A), based upon **Table 3.11**. The residences in the general area surrounding the Project Site are best described by the "rural" receiver type, albeit they are constantly exposed to traffic noise from the Hume Highway.

For the purpose of noise impact assessment for the proposed Bald Hill Quarry Regional Landfill, the $L_{Aeq(15min)}$ intrusive noise criterion would be 35 dB(A). Compliance with this criterion would also result in compliance with the L_{Aeq} amenity criteria. Therefore, the controlling noise criterion would be the intrusive noise criterion.

3.12.4 Noise Control Measures

There are three main aspects that would influence noise levels heard at surrounding residences arising from activities associated with the ongoing quarry-related activities and the landfill:

- (i) the distance between the noise source(s) and each residence;
- (ii) the intervening topography between the noise source and each residence; and
- (iii) the loudness of the noise at the source.

Set out below are notes on each of these three aspects that relate to the proposal. Ultimately, it would only be the localised topography around the Project Site and the loudness of the source noises that can be controlled to achieve acceptable noise levels at surrounding residences.

Distance to Residences

The Project Site is well positioned in that there are no residences within 1.5 km of the activity areas within the Project Site. For the purpose of noise impact assessment, the closest point to the proposed activities would be considered given the operations in this area would potentially be the loudest. The distances between these activities and the residences are listed on **Table 3.10**.

Intervening Topography

The topography between the activity areas within the Project Site and the surrounding residences is comparatively hilly such that there is only direct line of sight from "Westaroo" and "Tianna Park" to sections of the Project Site. Furthermore, for much of the Project life, the walls of the quarry void would provide substantial protection to noise generated within the void. It would only be later in the life of the landfill that equipment would be operating near and at the surface of Bald Hill when no or little topographic shielding would be possible.



Loudness of Operating Equipment

The ongoing quarry-related operations and landfill-related activities would involve the use of a range of equipment, each with different noise levels and sound characteristics. **Table 3.12** sets out the sound power levels of each of the items of plant and equipment to be used on site. The higher the sound power level, the noisier the equipment is. Ultimately, it would only be those equipment with sound power levels of greater than approximately 115 dB(A) that would noticeably influence noise levels beyond the Project Site.

Each of the earthmoving equipment listed in **Table 3.12** would be fitted with standard mufflers in order to achieve the nominated sound power level. No other additional safeguards are required to control noise from earthmoving equipment.

TABLE 3.12
Equipment Sound Power Levels - Landfill Operations

Equipment	Location	Sound Power Level (dB(A))
Bulldozer	Site construction activities	124
Front-end Loader	Loading wastes into transfer truck and general duties in the compound	119
Landfill Transfer Truck	Transferring wastes from the transfer station and cover materials to quarry void	114
Traxcavator	Compaction of wastes and distribution of cover material	120

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3.12.5 Impact Assessment

3.12.5.1 Approach to Assessment

The assessment of noise from the landfill activities has been undertaken with a combination of site-specific measurements and with the assistance of specialised computer programs where all of the variables discussed above (distance, topography, source noise levels) are assessed together with other factors such as air and ground absorption and meteorological factors such as wind and temperature gradients.

Impact was assessed in relation to residences at “Westaroo” and “Tianna Park”. These two residences are directly visible from the Project Site with no intervening topography to ameliorate noise impacts.

3.12.5.2 Construction Activities

Construction activities at the landfill site would comprise:

- construction of the initial leachate evaporation pond;
- minor roadworks around the transfer station compound; and
- the erection of the transfer station building.

Of these activities, the potentially largest noise impact would involve the construction of the initial leachate evaporation pond and impact noises associated with the construction of the



transfer station building. For the purposes of impact assessment, the construction of the initial leachate evaporation pond using a single D9 bulldozer would generate 48 dB(A) of noise at "Westaroo" and 35 dB(A) at "Ellerslie", the two closest residences to the leachate evaporation ponds.

It is noted that "Ellerslie" is screened by the terrain which accounts for the lower noise level. These levels would only occur for a few days in any event. The delivery and shaping of the material for the side walls of the ponds would generally create comparable noise levels to the earthworks involving the bulldozer. Furthermore, trucks transporting the materials for the side walls would be backloading from a delivery of rock from the North Ridge Quarry to the processing plant. Therefore, little change could be expected in the local acoustic environment.

The impact of fabrication noise due to the erection of the transfer building upon surrounding residences should be negligible, particularly if impact noise occurs only during the period of 7.00 am to 5.00 pm, Monday to Saturday.

3.12.5.3 Landfill Operations

The operational noise generated by landfill-related activities relate to:

- the delivery of the wastes by registered trucks;
- activities within the waste transfer building and compound;
- the transfer of the wastes and cover material to the quarry void; and
- the compaction and covering of the wastes within the quarry void.

The assessment of each of these noise sources follows.

Delivery of Wastes

Once fully operational, there would be an average of six waste deliveries per day which equates to 12 truck movements. For the purpose of impact assessment, a maximum of 10 loads generating 20 truck movements could occur on a few days per year. In reality, it would be possible that there may be up to four vehicle movements in any 15 minute period, i.e. the period for impact assessment.

Based on the measurements recorded by Mark Eisner & Associates in August 2000, the L_{A10} noise level of a loaded truck travelling up the steep incline to the transfer station building would be approximately 55 dB(A) at 50 m. Based on this measurement and the maximum frequency of 4 trucks per 15 minute period, the calculated $L_{Aeq\ 15\ minute}$ noise levels would be:

- "Westaroo" - 29 dB(A); and
- "Tianna Park" - 27 dB(A).

It is noted that these levels are approximately 15 dB(A) lower than the noise levels experienced at these residences from traffic noise on the Hume Highway, namely "Westaroo" (45 dB(A)) and "Tianna Park" (40 dB(A)).



Transfer Station

The vehicles and machinery involved with the transfer station would be a front-end loader and one truck being unloaded with another being loaded to transfer the wastes to the quarry void for burial. The wastes transfer operation would occur within an enclosed building which would attenuate emitted noise except in a northerly direction which would be the side of the building opened for waste truck access.

It is calculated that the noise level within the building could be in the order of 80 dB(A) which would be reduced by the structure itself to at least 60 dB(A) at 10 m from the building. The sound attenuation from the transfer station to the nearest line-of-sight residence ("Westaroo") is 45 dB(A) which means that the noise component from the transfer station at "Westaroo" would be approximately 15 dB(A). Based upon this assessment, the noise emitted from the transfer station would be inaudible at all residences.

Transfer of Wastes and Cover Material to the Quarry Void

The Company would transfer the wastes from the transfer station building to the quarry void using a conventional off-road haul truck specially adapted to carry wastes. Similarly, haul trucks normally used for transporting rock from the North Ridge Quarry to the processing plant would be used to transport cover material to the active disposal area within the quarry void.

The number of movements of these trucks per day would amount to up to 6 movements which would be less than 30 per cent of the movements of these vehicles around the processing plant. For the purpose of impact assessment, it is calculated that the noise attributable to one movement of the haul truck in a 15 minute period would be:

- "Westaroo" - 27 dB(A); and
- "Tianna Park" - 25 dB(A).

Compaction and Covering of Wastes

The use of the traxcavator to compact and cover wastes within the quarry void would be inaudible at all residences whilst these activities occurred almost to the rim of the quarry void. As the placement and compaction of wastes becomes visible, it would be possible that the equipment and the delivering landfill transfer truck would be audible. It is calculated that the following noise levels would be attributable to the landfill transfer truck and compactor operating on the closest side of the quarry rim to each residence.

- "Westaroo" - 27 dB(A); and
- "Tianna Park" - 25 dB(A).

Cumulative Noise of Landfill Operations

The cumulative noise of the various noise sources outlined in this section would amount to the following.

	Below Rim of Quarry Void	Above Rim of Quarry Void
"Westaroo"	31 dB(A)	32 dB(A)
"Tianna Park"	29 dB(A)	30 dB(A)



Based on this assessment, the noise generated by the landfill-related activities would be not greater than the noise levels experienced at the two most affected residences, "Westaroo" and "Tianna Park", due to traffic noise on the Hume Highway.

It is also noted that the landfill operations would not operate outside the hours of 7:00 am and 10:00 pm Monday to Friday and 7:00 am and 5:00 pm on Saturdays, Sundays and Public Holidays.

3.12.5.4 Cumulative Noise Levels

The landfill-related activities on the Project Site supplement a number of other activities involved with the ongoing quarry-related operations. Hence, it is important for the overall impact assessment to consider the cumulative noise levels of both the quarrying and landfill-related activities. This assessment would be possible based upon the combination of noise measurements recorded by Mark Eisner & Associates in August 2000 and the calculated levels set out in Sections 3.12.5.2 and 3.12.5.3. It is noted that the cumulative impacts of the noise generated at the North Ridge Quarry and the processing activities is negligible given the 2 km separation of the two sites.

Assessment Under Calm Conditions

Under calm conditions when there are no temperature inversions or wind, the following cumulative noise levels would apply at the two residences under consideration.

	Activity Below Rim of Quarry Void	Activity Above Rim of Quarry Void
"Westaroo"	33 dB(A)	34 dB(A)
"Tianna Park"	32 dB(A)	33 dB(A)

Assessment Under Adverse Weather Conditions

The average annual rainfall in the vicinity of Bald Hill is approximately 596 mm. This would indicate, from Appendix C of the EPA Industrial Noise Policy that any temperature inversions would be Class F (3°C/100m). There would not be any source to receiver drainage wind because of the elevation of each residence with respect to the quarry void. The maximum increase in noise level, therefore, is assumed to be 1.5 dB(A), based on Table D1 of the Industrial Noise Policy.

Under adverse weather conditions, therefore, the following cumulative noise levels would apply at the two residences under consideration.

	Activity Below Rim of Quarry Void	Activity Above Rim of Quarry Void
"Westaroo"	34.5 dB(A)	35.5 dB(A)
"Tianna Park"	33.5 dB(A)	34.5 dB(A)

3.12.5.5 Conclusion

Due to the continuous traffic noise associated with the high traffic volume from the Hume Highway, landfill construction activities would barely be audible, if at all. Hence, these activities would have minimal impact on the local acoustic environment.



Operational noise would also be minimal in comparison to that generated by Hume Highway traffic and continued quarrying and processing operations.

It is apparent that, until the quarry void is filled to the rim by solid wastes, the intrusive noise levels at the two residences under consideration, due to the combined operations of quarrying and landfill would not exceed the rating background noise level by more than 5 dB(A) as required by the Industrial Noise Policy. Even when the quarry void is filled above the rim with landfill, the intrusive noise level at "Westaroo" only marginally exceeds the criterion and would still be less than the masking noise level due vehicular traffic in Hume Highway.

3.12.6 Monitoring

The Applicant proposes to continue to monitor its operations to ensure that the specified EPA criteria are satisfied at surrounding residences. Monitoring of the additional noise from landfill-related activities would be incorporated into the ongoing monitoring of the quarry-related activities.

In addition to the monitoring, the Applicant would maintain regular contact with surrounding residents to ensure that neither the character or level of noise is causing any difficulties.

3.13 TRANSPORTATION

3.13.1 Introduction

Access to the Project Site would be via the site access road that serves the Bald Hill Quarry Processing Plant and the existing North Ridge Quarry (see **Figure 2.2**). The site access road intersects with a section of the Old Hume Highway approximately 1 km to the north of the Bald Hill Quarry Site which in turn intersects with the Hume Highway approximately 0.5 km to the north-west. The Hume Highway is the main road connection between Sydney and Melbourne. The existing regional road network is shown on **Figure 3.11**.

The existing site access road is sealed from the weighbridge office at the Bald Hill Quarry site to the intersection with the Old Hume Highway and has a seal width of approximately 8 m. From the site access road intersection to the Hume Highway, the Old Hume Highway is a dual-lane sealed road in moderate condition. Harden Shire has committed to future upgrade works on this section.

The intersection of the old Hume Highway and the Hume Highway is approximately 12 m wide (at the widest part – **Plate 3.4**). Visibility along the Hume Highway from the intersection is very good, being more than 1 km to the west and 2 km to the east. The Hume Highway comprises a dual carriageway with a medium strip that divides south (west) and northbound (east) traffic and allows for traffic turning either direction to do so safely. The speed limit on the Hume Highway in the vicinity of the Project Site is 110 km/h.



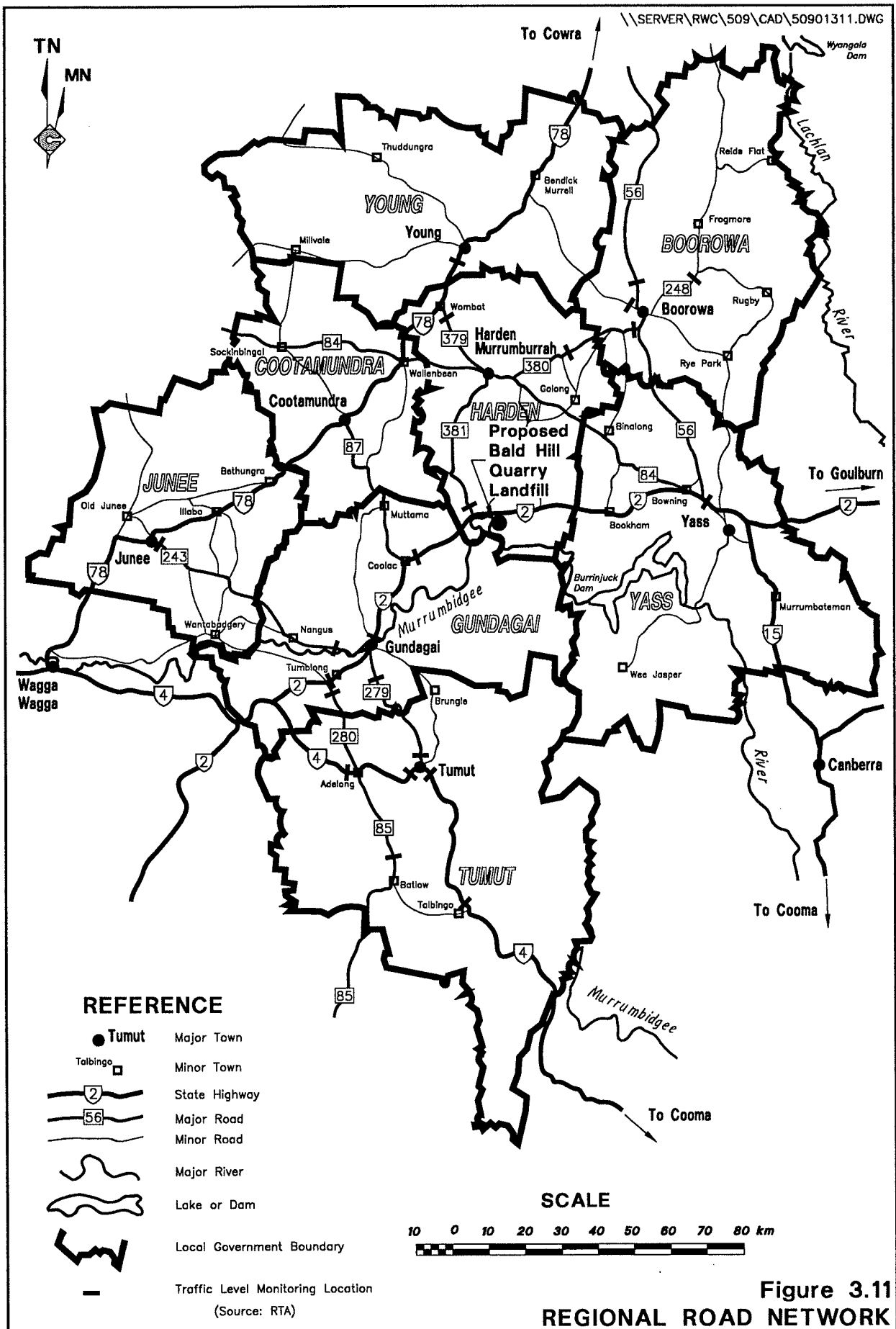




Plate 3.4 Site access from the Hume Highway (Ref: 509B/7)

The Applicant has commenced a program culminating in the upgrade of the intersection of the Hume Highway and the old Hume Highway in fulfilment of a conditional requirement for the North Ridge Quarry Development Consent.

3.13.2 Existing Traffic Levels

Table 3.13 lists current traffic levels using the regional road network that would be used by trucks delivering wastes to the Bald Hill Quarry Regional Landfill if it is approved.

Traffic levels on these roads are high, especially along the Hume Highway where more than one third of total vehicles are trucks.

3.13.3 Safeguards and Management Procedures

The contractor awarded the contract to transport wastes from the regional areas to the Bald Hill Quarry Regional Landfill would be required to operate late model, well maintained trucks. These trucks would be based at either the Project Site or an approved location within the participating Local Government Areas, to avoid indiscriminate parking of waste trucks.

An upgrade to the intersection of the site access road and the Hume Highway is required under Conditions 12 and 13 of the North Ridge Quarry Development Consent (DA T.98.027). The proposed upgrade would be sufficient to accommodate the additional traffic associated with the landfill. Should any deterioration of the entrance be noticed in the future, the relevant sections would be upgraded. Under this consent, Section 94 contributions are already payable to the Council (Conditions 14 to 19).

An emergency response plan would be developed for the landfill to ensure fast and effective clean up of spilt wastes should an incident occur involving one of the trucks carrying wastes enroute to the landfill. The implementation of the response plan would be the responsibility of the transport contractor.

TABLE 3.13

Traffic Levels on Regional Roads

Local Government Area		Station Location (see Figure 3.11)	Existing Levels #		Future Levels	
			AADT	% Heavy Vehicle	LRT *	% Increase *
Gundagai						
SH2	Hume Hwy	3km N MR87 Coolac	10781	38%	16	<1%
SH2	Hume Hwy	Gundagai Sheahan Bridge	10396	41%	7	<1%
SH2	Hume Hwy	Tumblong E of Adelong Rd	9503	38%	0	Nil
MR279	Gundagai	Tumut Road 8km S of SH2	1092	13%	7	<1%
MR280	Tumblong	Adelong Rd S of SH2	489	11%	0	Nil
MR243	Gundagai	June Rd 9.5km W of SH2	467	9%	2	<1%
Tumut						
SH4	Snowy Mtns Hwy	N of Talbingo Rd	532	8%	0	Nil
SH4	Snowy Mtns Hwy	S of Stony Cr Bridge	1198	10%	7	<1%
SH4	Snowy Mtns Hwy	W of MR 279	6397	10%	0	Nil
SH4	Snowy Mtns Hwy	W of MR280 Campbel St	3097	15%	0	Nil
MR279	Tumut – Gundagai Rd	At Gilmore Cr Bridge	1846	11%	7	<1%
MR85	Batlow Rd	6km N of P.O			0	Nil
Young						
MR78	Olympic Way	S of Hennessy St	2847	13%	8	<1%
Harden						
MR381	Jugiong – Harden Road	N of SH2 Hume Hwy	796	11%	19	2.4%
MR379	Murrumburrah–Wombat Rd	Railway Bridge	1071	13%	8	<1%
MR380	Harden – Boorowa Rd	Cunningar Rlwy Crossing	305	12%	1	<1%
Boorowa						
MR380	Boorowa – Harden Rd	1.5km W of MR56	772	6%	1	<1%
MR248	Boorowa – Frogmore Rd	0.4km N of Boorowa River Br.	360	6%	0	Nil
MR56	Boorowa – Young Rd	W of Kenyu Rd	1632	13%	0	Nil
MR56	Boorowa – Cowra Rd	N of MR241	1253	15%		
June						
MR243	Gundagai – June Rd	E of Lorne St	1444	9%	2	<1%
MR243	June - Gundagai	Gundagai Shire Boundary	203	13%	2	<1%
Yass						
SH2	Hume Hwy	1.5km E of MR56	15053	28%	4	<1%
Cootamundra						
MR87	Cootamundra - Coolac Rd	N of SH2, Hume Highway	661	9%	1	<1%
MR87	Cootamundra - Coolac Rd	9.5 km S of MR 78	583	10%	1	<1%
AADT = Average Annual Daily Traffic %HV = % Heavy Vehicles % Increase = (LRT/AADT) x 100						
* Calculation detailed in Note A - Appendix 7 LRT = Landfill Related Traffic (AADT Equivalent)						
# Source: Traffic Volume Data, South Western Region, RTA 2001						



3.13.4 Assessment of Impact

The increase in traffic as a result of the landfill proposal would be minimal. The landfill operation would result in a maximum addition of 20 truck movements per day over the entire transport network. The resultant impact is indicated in **Table 3.13**.

The most noticeable increase in traffic levels would be on the Jugiong – Harden Road where an increase of only 2.4 per cent AADT is predicted. All other routes would experience traffic level increases of less than 1 per cent. Given these levels of traffic increases, negligible impacts on traffic levels on regional roads are predicted. It is also noted that interactions between trucks travelling to and from the Bald Hill Quarry Regional Landfill would be similar to existing levels, e.g. for school buses and light vehicles.

The transport of wastes on public roads would be undertaken by a Council nominated contractor. It would be a requirement of those contractors to implement an emergency response plan.

Section 3.12 indicates negligible noise impacts on surrounding residences resulting from increased traffic levels at the Bald Hill Quarry Regional Landfill site.

3.14 SERVICES

3.14.1 Existing Services

Existing services to the Project Site are illustrated in **Figure 2.10**. The site is currently serviced by overhead powerlines, telephone lines and groundwater bore as detailed in Sections 2.7 and 3.5.

3.14.2 Safeguards

The overhead powerline would be extended from the transfer station for powering lights and the pump to remove the washdown water. This powerline would be extended underground to minimise the danger associated with overhead powerlines and machinery.

Water would be sourced from the groundwater bore on site. Water would be used as efficiently as possible. Containers would be washed on an as needs basis and, where possible, would be washed at the same time as the tipping floor.

3.14.3 Assessment of Impacts

The proposed landfill-related activities would not have any adverse impacts on existing services within the Project Site or that would impact upon surrounding landowners.

3.15 VISIBILITY

3.15.1 Existing Visibility

The predominant skyline feature in the vicinity of the Project Site is Mt Bundarbo, with the overall visual environment being dominated by partly cleared woodland interspersed with improved pastures.



The Bald Hill quarry void and associated activities are currently visible along a corridor of land on the northern side of the Hume Highway as well as being visible from higher ground to the south and west. **Plate 3.5** shows current visibility from the Hume Highway. The interior of the quarry void and the crushing and screening area are not visible from the highway.



Plate 3.5 A view eastward from the Hume Highway towards Bald Hill. (Ref: 509B/1)

Sections of the Project Site are visible from the residences on “Westaroo” and “Tianna Park”.

3.15.2 Constraints Assessment

Only two residences have line of sight with the quarry void. As the visible area is already disturbed with quarry operations and the quarry void walls would mask operations for many years, visibility poses no constraint to the proposal.

3.15.3 Safeguards

The main safeguard to visibility would be the landfill operation being largely contained within the void, thus the walls provide a natural visibility barrier. For most of the project life, the walls of the quarry void would provide a visual barrier to the actual landfilling operations. Only later in the project would the burial / covering operations be visible from the Hume Highway and potentially from the two residences.

Strict hygiene controls including sufficient cover material and daily application of cover would ensure minimal visual intrusion from wind-blown litter on the surrounding area. These controls would be supplemented by once the level of wastes rose to within 10 m of the quarry void rim. Should any litter escape at any time, manual collection would be undertaken.



Appropriate waste covering would also minimise attraction and thus visibility of pest species such as Australian Ravens.

The leachate evaporation ponds would be visible from the nearby paddocks of “Ellerslie”. The walls of the pond would be seeded with pasture mix to minimise visual intrusion.

3.15.4 Assessment of Impacts

The leachate evaporation ponds would be visible from the nearby paddocks of “Ellerslie”. Seeding the pond walls would minimise impact but the ponds would still be visible as they are situated on an elevated ridge of 435 m, AHD.

The transfer station activities would be visible from “Westaroo” and “Tianna Park” but as they are intermingled with the current quarry processing plant, visual intrusion would be negligible.

Waste management activities within the landfill would be hidden from sight until towards the end of landfill life. At this time, these activities would be visible from both “Westaroo”, “Tianna Park” and a section of the Hume Highway (**Plate 3.5**).

3.16 SOCIO-ECONOMIC SETTING

3.16.1 Existing Community Profile

The socio-economic profile of the eight involved Local Government Areas is presented in **Table 3.14**. Tumut and Young are the most populated Local Government Areas in the region. All eight Local Government Areas have relatively low populations of non-English speaking inhabitants (<3.7 per cent). Only three of the Local Government Areas (Boorowa, Cootamundra and Harden) have unemployment rates higher than the NSW average of 8.8 per cent.



TABLE 3.14
Socio-Economic Profile

	Boorowa	Cootamundra	Gundagai	Harden	Junee	Tumut	Yass	Young
Estimated Resident Population (a)	2484	7782	3798	3902	5970	11398	9370	11384
% People of Working Age 15-64	62.9%	60.6%	60.4%	61.2%	65.9%	62.6%	64.3%	61.3%
People Born in Non-Main English-Speaking Countries(b)	1.4%	1.7%	1.1%	2.1%	2.4%	3.6%	3.7%	2.3%
People of Indigenous Origin(b)	1.5%	2.5%	1.4%	2.2%	2.4%	2.6%	1.6%	1.4%
16 Year Olds Still at School(a)	96.3%	75.5%	85.4%	84.8%	86.1%	70.5%	87.2%	78.5%
People with Degree or Higher Qualifications(b)	5.4%	4.8%	4.5%	5.0%	3.8%	5.1%	11.0%	5.0%
Labour Force Participation Rate	57.1%	54.7%	59.0%	55.2%	56.8%	59.7%	66.8%	56.2%
Unemployment Rate	9.7%	9.4%	8.8%	10.2%	8.9%	7.8%	6.9%	8.4%
Household Income per capita \$	225	240	220	229	234	256	308	238
Households in owner-occupied Dwellings(c)	74.4%	72.3%	71.0%	73.0%	74.1%	68.3%	74.1%	70.8%
(a) As at 30 June 1996		(b) As a proportion of all people				(c) As a proportion of all		
(d) As a proportion of all households, excluding non-classifiable and visitor only households								
Source: Australian Bureau of Statistics 1996 Census								

50901T3.13

1996 Household income per capita ranged from \$220 in Gundagai to \$308 in Yass. All regions have more than 68 per cent of households being owned by the occupier.

3.16.2 Evaluation of Social Impact

The approval of the Bald Hill Quarry Regional Landfill would result in eventual closure of many small regional landfills. As the majority of these landfills are nearing their capacity, their closure is eminent regardless of the approval of this proposal. Apart from regular kerb-side collection services, residents of the surrounding Local Government Areas would be required to use transfer stations for delivery of wastes. Such a change in procedures would be seen as an improvement in services and overall health and safety standards.

The centralisation of the wastes transportation system and the closure of the local landfills may result in minor job losses from the individual Councils although existing personnel are likely to be re-deployed managing the wastes transfer facilities in the regional centres and local towns.



The construction of the transfer buildings, access road, leachate evaporation ponds and collection system would involve employment of short term contractors, with local firms being used where economically feasible.

Operation of the landfill would also ensure the full-time employment of two additional people on the site.

3.16.3 Evaluation of Economic Impact

If the proposal is approved, the potential direct and/or indirect economic impacts for the Applicant, local community and State / Federal Government are as follows.

Local Community

- (i) Additional employment of two full-time and one part-time personnel. Creation of jobs is recognised by the Applicant as important to the economy of the Jugiong area and Harden Shire.
- (ii) Financial contributions by the Applicant and employees to the local economy, particularly for housing, food and clothing, entertainment and services.
- (iii) Easing of economic constraints on local eight Local Government Areas for the ongoing management of small landfills.
- (iv) Should the proposal be approved, local residents would also benefit through the Applicant's ongoing financial support of local community organisations.

New South Wales

- (i) The New South Wales Government would benefit directly from the long-term employment of the Applicant's workforce and the associated payroll tax and other charges and flow-ons.
- (ii) May save in funding to Local Government Areas for landfill management and remediation.

Australia

- (i) Australia would also benefit from the proposal in the form of corporate income tax and personal income tax.



SECTION 4

JUSTIFICATION / EVALUATION OF THE PROPOSAL

P R E A M B L E

This section concludes the document with an evaluation of the Bald Hill Quarry Regional Landfill, especially in its regional context. The evaluation considers social, economic and biophysical aspects of the proposal.

The proposal is then assessed in relation to the principles of Ecologically Sustainable Development.

This section ends with a discussion on the consequences of this proposal not proceeding.



4.1 JUSTIFICATION OF THE PROPOSAL

4.1.1 Introduction

Schedule 2 (6) (1) of the *Environmental Planning and Assessment Regulation, 2000* requires this document to justify the Bald Hill Quarry Regional Landfill proposal in the manner proposed having regard to biophysical, economic and social considerations and the principles of Ecologically Sustainable Development. This sub-section of the document therefore addresses each of these considerations, drawing principally on the assessments of impacts set out in Section 3 of the document.

4.1.2 Biophysical Considerations

The Bald Hill Quarry Regional Landfill has been designed in such a manner that the exhausted quarry void can be used for wastes disposal without adversely affecting the environment around Jugiong and the surrounding district.

Regionally, this proposal would enable the improvement of the environment as many small, ill-financed and badly constructed landfills would close and be rehabilitated. Many of these landfills would have been developed prior to substantial environmental legislation governing landfill development and operations, thus they do not have the strict environmental controls now considered appropriate.

The assessed physical impacts on the local and regional environment from the landfill development and the justification of those impacts is set out below.

- (i) The proposal would result in further modification of the Bald Hill Quarry site. The main modifications would be the construction of the transfer station and up to two leachate evaporation ponds. No areas will be cleared for this development.
- (ii) Additional use of the Bald Hill Quarry site access road which gives good access to the Hume Highway.
- (iii) Soil erosion and sediment controls would ensure the soil resources and local water quality are properly managed.
- (iv) Additional wastes truck traffic may increase local noise levels slightly but noise levels would still satisfy the noise guideline levels at existing residences.
- (v) The development is backfilling an exhausted quarry void, thus creating a more natural final landscape and maximising the use of already disturbed areas.
- (vi) No rare or threatened plant / animal species will be impacted by the proposal. Rather, the proposal would remove the need for additional local landfill developments in the surrounding shires, representing less clearing and a positive impact.
- (vii) All wastes is directed to one site. This will minimise potential contamination to other sites.



- (viii) This site provides a naturally impermeable geological barrier, without the need for a liner for the most part, thus minimising potential impact through groundwater contamination from the outset.
- (ix) The current low level of deposited dust is likely to remain and therefore would readily comply with EPA guidelines and not adversely affect residential amenity.
- (x) Existing services to, on or in the vicinity of the Project Site would be unaffected by the Applicant's proposal.
- (xi) Any detrimental environmental impacts from smaller local landfills may be decreased / ceased once the smaller landfills are closed down.
- (xii) A reduction in greenhouse gas emissions of 65%.

4.1.3 Economic Considerations

The economic considerations of the proposal are assessed in the context of the benefits to the economy if the Development Application for the Bald Hill Quarry Regional Landfill proposal is approved and the impacts upon the local economy if the Development Application is not approved. Should the Applicant's Development Application be approved, there would be a number of direct and/or indirect economic benefits for the Applicant, its employees and contractors, as well as for the local community, and State and Federal Authorities and Governments. These benefits are detailed in Section 3.16.3.

The impacts upon the Local, State and Federal economies if the Applicant's Development Application is not approved are assessed as follows.

- The economic benefits to the Local, State and Federal economies would not eventuate to the same extent.
- Any perceived reduction in property values due to the extended presence of a landfill in the local area would not eventuate. This is likely to be negligible, however, due to the large land holding of the Applicant and the rural setting of the proposal.

4.1.4 Social Considerations

The principal social considerations that would arise from the approval of the Applicant's Development Application would be as follows.

- (i) Long term direct employment of the proposed two permanent and one part-time Jugiong and district based employees would be realised.
- (ii) Continued support of local services through expenditure by the Applicant, its contractors and employees.
- (iii) The Applicant's contributions to the local community groups or infrastructure projects.



- (iv) Social benefits from the community realisation that the proposed landfill is a responsible wastes management action taken by all Shires involved.
- (v) Potential social benefits from small landfills being closed and rehabilitated. This may increase community pride in areas that were previously lacking.
- (vi) Centralisation of the wastes transport system and the closure of local landfill may result in minor job losses, although existing personnel may be re-deployed to staff and / or assist in the upgrade of regional / local wastes transfer facilities.

The proposal has been designed to ensure all potential adverse impacts are controlled which, in turn, would result in social impacts being limited.

In the event that the Development Application is not approved, the social consequences would be the reverse of the benefits listed above, namely:

- (i) employment opportunities for two full-time people and one part-time person would be foregone;
- (ii) the support for local services and community groups by the Applicant and its employees would be reduced;
- (iii) increased social costs associated with the need to manage current landfills and establish expensive new landfills as their capacity runs out; and
- (iv) a loss of revenue to Harden Shire Council and the NSW and Federal Governments.

4.2 ECOLOGICAL SUSTAINABILITY

4.2.1 Introduction

Ecologically Sustainable Development (ESD) is a concept which can be defined as development which uses, conserves, and enhances the community's resources in such a way that ecological processes on which life depends are maintained and the total quality of life, now and in the future can be increased. An alternative definition is "a development which aims to meet the needs of Australians today, while conserving and enhancing our ecosystems for the benefit of future generations". This section of the EIS has been prepared with reference to a range of documents including the draft Practice Guidelines for ESD in Environmental Impact Assessment prepared by the Department of Urban Affairs and Planning.

Landfills are an essential part of the modern consumer world. While the ESD concept promotes reducing, re-using and recycling of wastes, there are ultimately residual that must be disposed of. Often, the only feasible disposal method is to landfill. Landfill construction often involves some degree of environmental damage and poorly managed / constructed landfills can have detrimental impacts on the surrounding environment. In the context of ESD, the issue of whether environmental impacts are irreversible or affect long-term ecological sustainability is important. For this reason, siting of the landfill is a critical planning issue and proper construction and ongoing management vital.

It is intended in this section to address how the Bald Hill Quarry Regional Landfill proposal has been planned and would operate in a manner that is consistent with the principles of ESD. It is



also necessary for the proposal to be prepared **and** evaluated with an approach that is consistent with the two main features of the National Strategy for Ecologically Sustainable Development (NSED) namely:

- (i) the need to consider in an integrated way the wider economic, social and environmental implications of our decisions and actions for Australia, the international community and the biosphere; and
- (ii) the need to take a **long-term** rather than a short-term view when taking those decisions and actions.

4.2.2 Principles of ESD

As defined under Schedule 2(6)(1) of the Environmental Planning and Assessment Regulation, 2000, ESD involves the following four interrelated principles:

- the precautionary principle;
- the principle of inter-generational equity;
- the principle of the conservation of biodiversity and ecological integrity; and
- the principle for the improved valuation and pricing of environmental resources.

The Precautionary Principle

This principle states that “where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation”. In the application of the precautionary principle, public and private development decisions should be guided by:

- (i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment; and
- (ii) an assessment of the risk-weighted consequences of various options (IGAE, 1992).

To satisfy this principle of ESD, emphasis must be placed on anticipation and prevention of environmental damage, rather than reacting to it. For this purpose, the Applicant has engaged specialist consultants during the design of the proposal to examine the existing environment, predict possible impacts and recommend safeguards in order to ensure that the level of impact satisfies statutory requirements or reasonable community expectations. Considerable emphasis has been placed upon planning for the prevention or minimisation of environmental harm.

Environmental safeguards, as discussed in Section 3 of the EIS, are measures that have been planned with a comprehensive knowledge of the existing environment and an appreciation of the potential impacts, in order to prevent or limit environmental degradation. Throughout the development of the proposal, the Applicant and their consultants have adopted an anticipatory approach to risk, particularly the risk of irreversible ecological damage by undertaking an appropriate level of investigation and environmental evaluation.



After a full evaluation of the potential environmental impacts of the proposal, there are no activities or features for which there is a level of uncertainty in achieving an acceptable level of environmental performance. The procedures necessary to achieve good and responsible landfill practices are well known and benchmarked by the EPA and, together with a proactive response to on-site environmental management and a co-operative and open approach to all issues with the appropriate Government Authorities, should lead to protection of the surrounding environment. Features of the local environment such as water quality, soil resources, air quality and flora and fauna would be managed throughout the life of the project such that they would be comparable before and after the proposed landfill operations.

It would remain a guiding principle for the Applicant when operating within the proposed Bald Hill Quarry Regional Landfill to continue to be pro-active and anticipate problems rather than allow problems to develop.

Inter-Generational Equity

The objective of this ESD principle is that “the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations” (IGAE, 1992).

This principle is based on social equity for the current generation (intra-generational) and future generations (inter-generational).

Intra-generational equity requires that the economic and social benefits of the proposed development be distributed appropriately among all members of the community. The Bald Hill Quarry Regional Landfill, and particularly the safeguards proposed with respect to flora, fauna, water, air, noise, visibility, transportation and soil management, have been designed to ensure that no part of the community would be unacceptably disadvantaged. Rather, areas of the community currently exposed to many small local landfills will have their local amenity improved with the closure and rehabilitation of these landfills.

Due to the large capacity of the proposed landfill, it provides a wastes solution for eight different Local Government Areas for many years.

The non-material well-being or “quality of life” of existing and future residents of the Jugiong area would continue to be maintained throughout and beyond the life of the project through implementation of safeguard measures to mitigate any environmental impacts, and a progressive rehabilitation program.

Conservation of Biological Diversity and Ecological Integrity

Biological diversity or biodiversity describes life forms and is usually considered at three levels: genetic diversity, species diversity and ecosystem diversity. Ecological integrity describes the condition of an ecosystem that is relatively unaltered from its natural state. For the purposes of this assessment, biodiversity is considered both on the Project Site, and where appropriate, beyond the Project Site.

The Applicant's specialist consultants consider that in both the short and long-term, the biodiversity of the Project Site and surrounding area would be conserved, maintained and, more than likely improved as a greater diversity of vegetation is returned to the Project Site



after rehabilitation. Given the Applicant's proposed adoption of benchmark techniques to minimise impact, the fact that no additional area of native vegetation is to be disturbed, the implementation of final form rehabilitation and the use of flora species native to the area, the biodiversity and ecological integrity of the area long-term would be maintained.

Improved Valuation, Pricing and Incentive Mechanisms.

This principle involves consideration of the materials being disposed of and the surrounding environmental resources (e.g. air, water, land and living things) which may be affected.

The valuation and pricing of the wastes being disposed comprises the cost of supplying bins, transport, sorting and rehabilitation.

The Councils, by continuing or enhancing their recycling operations, ensure that wastes going to the landfill is of minimum value.

Whilst it is difficult to assign a dollar value to environmental resources, the subjective value placed by the Applicant on the environmental resources, evident in the extent of research, planning and design of environmental safeguards and measures to prevent irreversible damage of these resources.

4.2.3 Overview

The development and operation of the Bald Hill Quarry Regional Landfill proposal as presented within this document, has been designed to assist in the disposal of regional wastes in an efficient and environmentally responsible manner. The approach taken in planning the proposal has been multi-disciplinary, with community involvement and consultation with professionals and various Government Authorities, and with emphasis on the application of safeguards shown to be effective in various existing landfills using the EPA benchmark techniques.

It has been assessed that the proposal would enable the operation of a Class 1 solid landfill within the limits of accepted criteria benchmark techniques and with minimal adverse impact on the surrounding physical environment. The proposal is consistent with the features which distinguish an ecologically sustainable approach to development in that the development and operation of the Bald Hill Quarry Regional Landfill would provide a high quality facility for the disposal of wastes in the local region for a period of approximately 40 years.

The economic and social benefits of such a development are also considered to outweigh the possible short-term economic, social or environmental "costs" to the local community. Especially in the regional sense, the development of the large central landfill making use of pre-disturbed land is a much more sustainable option than the continued operation and/or additional operation of small localised landfills.



4.3 CONSEQUENCES OF NOT PROCEEDING WITH THE DEVELOPMENT

Schedule 2(3) of the Environmental Planning and Assessment Regulation, 2000, requires this document to address the consequences of not proceeding with the Bald Hill Quarry Regional Landfill proposal. The consequences of not proceeding are manifold and include:

- (i) a number of direct jobs would be foregone;
- (ii) the economic and social benefits identified in Sections 4.1.3 and 4.1.4 would not eventuate;
- (iii) significant additional costs would be borne by residents, eight affected Local Government Areas, the Councils and State Government Authorities due to increased costs attributable to the increased distance wastes materials would need to be transported to alternate disposal sites of appropriate wastes management;
- (iv) the minor potential impacts on the local environment would not eventuate;
- (v) the continuation of safety issues associated with an open quarry void;
- (vi) the continuation of the visibility of an exhausted quarry void for nearby residences;
- (vii) continued potential environmental impacts from the operation of numerous small landfills, many of which may not have appropriate environmental controls; and
- (viii) the need in the near future for additional local landfills as current operations fill to capacity.

4.4 CONCLUSION

The Applicant's proposal for the development and operation of the Bald Hill Quarry Regional Landfill in the manner identified in this document would enable a substantial high quality landfill operation to be developed. All environmental constraints imposed upon the proposal would be overcome through the implementation of a range of safeguards to ensure the surrounding physical and socio-economic environment and surrounding residents are not adversely affected by the proposal. These safeguards would be better or comparable to the EPA landfill operation benchmark techniques, representing current best practice.

Although some impacts may occur, it is assessed that the level of impact in all areas would meet specified criteria or reasonable community expectations, with any adverse impacts far outweighed by the positive impacts.



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REFERENCES

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APPENDIX 1

(No. of pages excluding this page = 9)

Development Application



COPY

Development application

Department of Urban Affairs and Planning



Date received: ____/____/____ DA no: _____

The consent of the Minister for Urban Affairs and Planning is needed if you want to carry out certain types of development, such as development the Minister has declared to be of state significance. If the Minister's approval is needed, you can use this form to apply for development consent. The DA Supplement that accompanies this form will help you complete the application.

To complete this form, please place a cross in the boxes ☐ and fill out the white sections as appropriate. To minimise delay in receiving a decision about your application, please ensure you submit all relevant information. When your application has been assessed, you will receive a notice of determination.

1. Details of the applicant

Mr ☐ Ms ☐ Mrs ☐ Dr ☐ Other ☐		
First name	Family Name	Company/Organisation
		Bald Hill Quarry P/L
Unit/street no.	Street name	
	Hume Highway	
Suburb or town	State	Postcode
Jugiong	NSW	2726
Daytime telephone	Fax	Mobile
02 62277817	02 62277863	0418 670 291
Email		
jpw@interact.net.au		

2. Identify the land you propose to develop

Unit/street no.	Street name
Bald Hill	Hume Highway
Suburb or town	Postcode
Jugiong NSW	2726
Lot no.	Section
	see attached project site map
DP/MPS no.	Volume/folio

You can find the lot no., section, DP/MPS no. and volume/folio details on a map of the land or on the title documents for the land. If you need additional room, please attach a schedule and/or a map with these details.

3. Describe what you propose to do

Construct + operate a Class 1 Putrescible Regional Land Fill at the Stage 1 Bald Hill Quarry, Jugiong NSW.



3. continued

Will this involve:

- ☒ erecting, altering or adding to a building or structure
 - Is it a temporary building or structure? Yes ☐ No ☐
- ☐ subdividing land
- ☐ subdividing a building into strata units
- ☐ demolition
- ☐ changing the use of land or a building or the classification of a building under the Building Code of Australia (without building, subdividing or demolishing)
- ☒ other work (without building, subdividing or demolishing)?

4. Staged development

You can apply for development consent for only part of your proposal now, and for the remaining part(s) at a later stage.

Are you applying for development consent in stages?

No ☒

Yes ☐ ➤ Please attach:

- Information which describes the stages of your development
- a copy of any consents you already have for part of your development.

5. Plans of the land and development

You need to provide a number of plans that show what you intend to do. Section 2 of the DA Supplement sets out which plans to provide and the details to include.

Please attach:

- a site plan of the land, drawn to scale (3 copies)
- plans or drawings of the proposal, drawn to scale (3 copies)

and, where relevant:

- an A4 size plan of the proposed building and other structures on the site
- a plan of the existing building, drawn to scale.

6. Environmental effects of your development

To assess your proposal, we need to understand the impacts it will have. Depending upon the nature and scale of your proposal, you need to provide one or more of the statements listed below to explain the environmental effects of your proposal. See section 3 of the DA Supplement.

Is your proposal **designated development**?

Yes ☒ ➤ Please attach an environmental impact statement.

No ☐ ➤ Please attach a statement of environmental effects.

Is your proposal likely to significantly impact on **threatened species**, populations, ecological communities or their habitats?

Yes ☐ ➤ Please attach a species impact statement.

No ☐

7. Concurrences from state agencies

Do you need the concurrence of a state agency to carry out the development? See section 4 of the DA Supplement.

No ☐

Yes ☒ ➤ Please list any agencies whose concurrence you need.

Environmental Protection Authority.

Please attach sufficient information for the agency(s) to assess your application.



8. Approvals from state agencies

If you need a development consent and one or more of the approvals listed in **Attachment A** of the **DA Supplement**, your development is known as integrated development. The relevant state agency will be involved in the assessment of your proposal. See **section 5** of the **DA Supplement**.

Is your application for integrated development?

No ☐

Yes ☒ Please submit **Attachment A** of the **DA Supplement** with your application and attach:

- sufficient information for the approval body(s) to assess your application
- additional copies of your application for each agency. *We can tell you the number that will be needed.*

9. Supporting Information

You can support your application with additional material, such as photographs, including aerial photographs, slides and models to illustrate your proposal. Please list what you have attached:

See attached EIS, LEMP & supporting technical information.

10. Application fee

For development that involves a building or other work, the fee for your application is based upon the estimated cost of the development. If your application is for integrated development, you need to include \$250 for each agency that will look at your proposal. If your development needs to be advertised to the public you may also need to include an advertising fee. We will help you calculate the fee for your application. (Advertising fees attract GST, all other fees do not).

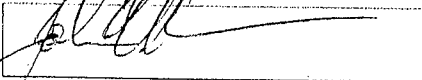
11. Signatures

The owner(s) of the land to be developed must sign the application.

If you are not the owner of the land, you must have all the owners sign the application. If the land is Crown land, an authorised officer of the Department of Land and Water Conservation must sign the application.

As the owner(s) of the above property, I/we consent to this application:

Signature



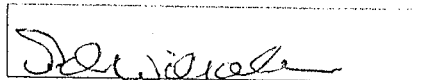
Name

JOHN WILKINSON

Date

7-09-01

Signature



Name

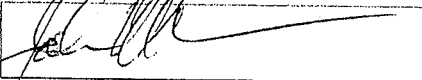
TONY WILLIAMS

Date

7-09-01

The applicant, or the applicant's agent, must sign the application.

Signature



Name, if you are not the applicant

In what capacity are you signing if you are not the applicant

Date

7-09-01



12. Privacy policy

The information you provide in this application will enable us and any relevant state agency to assess your application. If the information is not provided, your application may not be accepted. Your application will be advertised to the public for comment if the development is designated development or advertised development. Please let us know if the information you have provided in your application is incorrect or changes.

13. Lodgement

Before submitting your application, please ensure you have attached all the information the consent authority needs to assess your proposal. You can use the following checklist. Please place a cross in the box ☐ next to any items you have attached:

Land details

- ☒ A map that sets out the lot, DP/MPS and volume/folio numbers
- ☐ A schedule that sets out the lot, DP/MPS and volume/folio numbers

Staged development

- ☐ Information which describes the stages of the development
- ☐ A copy of any consents already granted for part of the development

Plans

- ☒ A site plan of the land (3 copies) — **required for all applications**
- ☒ Plans or drawings of the proposal (3 copies) — **required for all applications**
- ☐ An A4 size plan of the proposed building and other structures on the site
- ☐ A plan, drawn to scale, of the existing building

Environmental effects

- ☒ An environmental impact statement for a designated development proposal
- ☐ A statement of environmental effects — **required for all applications** that are not designated development
- ☐ A species impact statement

State agency concurrences and approvals

- ☒ Additional information required by the agencies from which you need concurrence
- ☒ Attachment A of the DA Supplement
- ☒ Additional information required by the agencies you have identified in Attachment A of the DA Supplement
- ☒ Additional copies of your application for each of those agencies

Supporting information

- ☒ Other material to support your application, such as photos, slides and models.

Application fee

- ☒ Your application fee — **required for all applications.**



COPY

Attachment A Integrated development - approvals from state agencies

Some proposals need other kinds of approvals (eg licences, permits). Your proposal is known as integrated development if you need development consent and one or more of the approvals that have been set out in this attachment. Follow through each group of questions to decide whether you need any of these approvals. If you have identified you need one or more approvals, please include this attachment with your application. (Section 5)

Aquaculture

Do you want to carry out aquaculture?

No ☒

Yes ☐ > You need a permit under section 144 of the *Fisheries Management Act 1994* from NSW Fisheries.

Dredging or reclamation

Do you want to carry out dredging or reclamation work in a waterway (a stream, river, lake, lagoon, estuary or marine waters)?

No ☒

Yes ☐ > You need a permit under section 201 of the *Fisheries Management Act 1994* from NSW Fisheries.

Marine vegetation

Will your development harm any mangroves or seagrasses in a public waterway or on the shore of a public waterway?

No ☒

Yes ☐ > You need a permit under section 205 of the *Fisheries Management Act 1994* from NSW Fisheries.

Do you want to take sea lettuce or blackfish weed to use as bait from a public waterway or the shore of a public waterway?

No ☒

Yes ☐ > You need a permit under section 205 of the *Fisheries Management Act 1994* from NSW Fisheries.

Heritage

Does your development involve a building, a place or land that has a permanent conservation order, an interim conservation order or an interim heritage order protecting it, or which is listed on the State Heritage Register?

No ☒

Yes ☐ > You need an approval under section 57 of the *Heritage Act 1977* from the NSW Heritage Office.

Mine subsidence

Do you want to build, subdivide, make roads, paths or driveways, or put in any pipelines, water, sewage, telephones, gas or other service mains in a mine subsidence district, or alter any of these types of development in a mine subsidence district?

No ☒

Yes ☐ > You need an approval under section 15 of the *Mine Subsidence Compensation Act 1961* from the Mine Subsidence Board.



Attachment A continued

Aboriginal relics and places

Will your development destroy, damage or otherwise harm an Aboriginal relic that is known to exist on the land you want to develop?

No ☒

Yes ☐

Are you going to do so in accordance with Aboriginal tradition?

Yes ☐

No ☐ You need an approval under section 90 of the *National Parks and Wildlife Act 1974* from the National Parks and Wildlife Service.

Will your development destroy, damage or otherwise harm land that has been declared to be an Aboriginal place?

No ☒

Yes ☐

You need an approval under section 90 of the *National Parks and Wildlife Act 1974* from the National Parks and Wildlife Service.

Pollution

Is your development designated development?

No ☐

Will the development cause the pollution of water?

No ☐

Yes ☐ You can apply for a licence under section 43(d) of the *Protection of the Environment Operations Act 1997* from the Environment Protection Authority so that you cannot be convicted of an offence of polluting water.

Yes ☒

You are likely to need a licence from the Environment Protection Authority. Is your land already designed to carry out the activity?

No ☒ You need a licence under section 47 of the *Protection of the Environment Operations Act 1997* from the Environment Protection Authority.

Yes ☐ You need a licence under section 48 of the *Protection of the Environment Operations Act 1997* from the Environment Protection Authority.

Rivers and lakes

Is your development within 40 metres of a stream, river, lake or lagoon?

No ☒

Yes ☐

Are you going to excavate the land, remove material from the land or do anything which will obstruct or detrimentally affect the water flowing in a stream, river, lake or lagoon?

No ☐

Yes ☐ You need a permit under Part 3A of the *Rivers and Foreshores Improvement Act 1948* from the Waterways Authority if the development will affect Sydney Harbour or its tributaries, Botany Bay (east of Captain Cook Bridge) or the Ports of Newcastle, Kembla, Eden or Yamba, and from the Department of Land and Water Conservation in any other case.

Roads

Will your development affect a public road, a Crown road, a highway, a main road, a freeway or a tollway?

No ☒

Yes ☒

You need a consent under section 138 of the *Roads Act 1993* from the Roads and Traffic Authority, the Department of Land and Water Conservation or the council.



Attachment A continued

► *Joint water supply scheme*

1. Is your development going to be used for conserving water, irrigation, water supply, drainage, changing the course of a river or preventing the course of a river from changing?

No ☒

Yes ☐ ► Will your development affect the quantity or use of water in a river, lake or swamp, or water flowing into or from a river, lake or swamp?

No ☐

Yes ☐ ► Go on to question 2

2. Is the development going to be used by two or more occupiers of land to supply water to their lands?

No ☒

Yes ☐ ► Go on to question 3

Is the development going to supply water to irrigate land(s) other than the land on which the development is built?

No ☒

Yes ☐ ► Go on to question 3

Will the development involve pipes (or the like) to carry water to irrigate your land and the land of other occupiers?

No ☒

Yes ☐ ► Go on to question 3

3. Will the development be built on land that is occupied by those who will use the water?

Yes ☐ ► Go on to question 4

No ☐ ► You need an authority under section 20B of the *Water Act 1912* from the Department of Land and Water Conservation to build and use the development and take and use the water.

4. Do the occupiers of land who will use the water wish to build and use the development to supply water for household use, stock water use or irrigation?

No ☐

Yes ☐ ► Do they occupy all of the land on which the development will be built, and the land on which the pipes (or the like) will be built?

Yes ☐

No ☐ ► Can they obtain occupation of the land?

Yes ☐

No ☐ ► You need an authority under section 20CA of the *Water Act 1912* from the Department of Land and Water Conservation to build the development and take and use the water.

► *Group licences*

Are you a Board of Management elected under the *Private Irrigation Districts Act 1973*?

No ☐

Yes ☐ ► Do you want to build and use the development to take water from a river or lake for occupiers of land in a private district to use?

No ☐

Yes ☐ ► You need a group licence under section 20L of the *Water Act 1912* from the Department of Land and Water Conservation.

► *Bores*

Do you want to sink a bore or enlarge, deepen or alter a bore?

No ☐

Yes ☐ ► Is the work to be carried out by the Crown?

Yes ☐

No ☐ ► You need a licence under section 116 of the *Water Act 1912* from the Department of Land and Water Conservation.



Attachment A continued

Using water

NB: The following approvals are taken from the 1912 Water Act. It is proposed that the review of the Water Act, which is currently taking place, will consolidate and reduce the number of these approvals.

> Licences and permits for occupiers of land

Is your development going to be used for conserving water, irrigation, water supply, drainage or changing the course of a river?

No ☒

Yes ☐ >

Will your development affect the quantity or use of water in a river, lake or swamp, or water flowing into or from a river, lake or swamp?

No ☐

Yes ☐ >

If you occupy the land on which you propose to build the development, you need a licence under section 10 of the *Water Act 1912* from the Department of Land and Water Conservation to build and use your development, and take, use and dispose of the water for any purpose.

> If you own or occupy the land on which you propose to build the development, and you will be irrigating less than 4 hectares of land, you can apply for a permit under section 18F of the *Water Act 1912* from the Department of Land and Water Conservation to build and use your development and take, use and dispose of the water for anything other than irrigation.

> Licence for non-occupiers of land

1. Do you propose to build pumps (or the like) to obtain water, or build pipes (or the like) to carry water?

No ☒

Yes ☐ >

Is your development going to be used for conserving water, irrigation, water supply, drainage, changing the course of a river, or preventing the course of a river from changing?

No ☐

Yes ☐ > Go on to question 2

2. Will your development affect the quantity or use of water in a river, lake or swamp, or water flowing into or from a river, lake or swamp?

No ☒

Yes ☐ >

Do you propose to use the water for household use, stock use or irrigation?

No ☐

Yes ☐ > Go on to question 3

3. Do you occupy the land on which you propose to build the pumps (or the like)?

Yes ☐ > Go on to question 4

No ☐ > Can you obtain occupation of the land?

No ☐ > You need a licence under section 13A of the *Water Act 1912* from the Department of Land and Water Conservation to build the pumps and take and use the water.

Yes ☐ > Go on to question 4

4. Do you occupy all the land on which you propose to build pipes (or the like) to carry the water from the pumps to the land where you will use the water?

Yes ☐

No ☐ > Can you obtain occupation of the land?

Yes ☐

No ☐ > You need a licence under section 13A of the *Water Act 1912* from the Department of Land and Water Conservation to build the pumps and take and use the water.



Attachment A continued

> River banks and floodplains

1. Do you want to build an earthwork, embankment or levee, or a road, railway or bridge?

No ☒

Yes ☐ > Go on to question 2

2. Will the development be on land that is the bank of a river or lake, forms part of a bank of a river or lake or is within a floodplain?

No ☒ > Go on to question 3

Yes ☐ > Do you have a licence, authority, permit or consent under the *Water Act 1912*?

Yes ☐

No ☐ > You need an authority under Part 8 of the *Water Act 1912* from the Department of Land and Water Conservation.

3. Will the development affect the flow of water to or from a river or lake and prevent land being flooded by water?

No ☒

Yes ☐ > Do you have a licence, authority, permit or consent under the *Water Act 1912*?

Yes ☐

No ☐ > You need an authority under Part 8 of the *Water Act 1912* from the Department of Land and Water Conservation.

Contact details for state agencies

NSW Fisheries

Internet: www.fisheries.nsw.gov.au

Phone: (02) 9527 8411

Email: information-advisory@fisheries.nsw.gov.au

Environment Protection Authority

Internet: www.epa.nsw.gov.au

Phone: (02) 9995 5000

Email: info@epa.nsw.gov.au

NSW Heritage Office

Internet: www.heritage.nsw.gov.au

Phone: (02) 9635 6155

Email: heritageoffice@heritage.nsw.gov.au

Department of Land and Water Conservation

Internet: www.dlwc.nsw.gov.au

Phone: (02) 9228 6111

Email: infocentre@dlwc.nsw.gov.au

Mine Subsidence Board

Internet: www.minesub.nsw.gov.au

Phone: (02) 4926 9750

Email: mail@minesub.nsw.gov.au

Waterways Authority

Internet: www.waterways.nsw.gov.au

Phone: (02) 9563 8511

Email: enquiries@waterways.nsw.gov.au

National Parks and Wildlife Service

Internet: www.npws.nsw.gov.au

Phone: (02) 9585 6444

Email: info@npws.nsw.gov.au

Roads and Traffic Authority

Internet: www.rta.nsw.gov.au

Phone: (02) 9218 6888

Email: rta@rta.nsw.gov.au

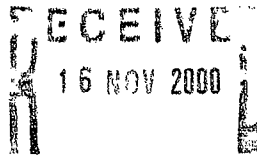


APPENDIX 2

(No. of pages excluding this page = 13)

**Director-General's Requirements for the
Environmental Impact Statement
(Incorporating EPA Requirements)**





Department of
Urban Affairs and Planning

Mr Robert W Corkery
R.W. Corkery & Co.Pty Ltd
P O Box 80,
Orange NSW 2800

Development and Infrastructure Assessment
Level 22, 1 Farrer Place
Sydney NSW 2000
GPO Box 3927
Sydney NSW 2001

Telephone: 02 9391 2043
Facsimile: 02 9391 2151
Email: sohan.fernando@duap.nsw.gov.au
File: Q97/00092

Dear Mr Corkery

SUBJECT: Proposed Landfill – Jugiong (Bald Hill Quarry Pty Ltd)

We refer to your letters dated 29 September and 17 October 2000, reconsulting with the Director-General on the above proposal.

The Department requested the EPA to provide any additional requirements if applicable. A copy of the reply from the EPA, dated 27 October 2000 is attached to this letter.

The Department has no further requirements in addition to the requirements issued in our letter dated 30 November 1998. The requirements issued on 30 November 1998, modified by the letter dated 27 October 2000 from the EPA, constitute amended Director-General's requirements to be taken into consideration in preparing the EIS for the proposed landfill development application.

Should you have any further queries, please contact Sohan Fernando on telephone (02) 9391 2043

Yours sincerely

Derek Mullins
Assistant Director
Development and Infrastructure Assessment

13/11/00

Copy to
B.H.Q. 16/11/00

CHECKED



Your Reference : Q97/00092
Our Reference : 290002A6 (QUF 2341)

Received Quarf 2/11/2000



Mr Sohan Fernando
Development and Infrastructure Assessment
Department of Urban Affairs and Planning
GPO Box 3927
SYDNEY NSW 2001

Southern Tablelands Region

Dear Mr Fernando

Proposed Landfill – Bald Hill Quarry Pty Ltd, Jugiong

Reference is made to your letter dated 4 October 2000 regarding the Director-General's requirements for the Environment Impact Statement (EIS) for the above proposed landfill.

The Environment Protection Authority (EPA) has reviewed the requirements provided in November 1998 in the context of identifying varied or additional information required for the EIS to be prepared. Since the provision of the EPA's requirements, the principle legislation relating to environmental protection has changed to the Protection of the Environment Operations (POEO) Act 1997, and as such, some references to legislation should be changed to reflect this. In particular:

- Point 7 should now read "How the requirements of section 87 of the Protection of the Environment Operations Act 1997 will be met"; and
- The reference in Appendix A to the "Environmental Guidelines: Assessment, Classification and Management of Non-Liquid Wastes (1997)" and "Environmental Guidelines: Assessment, Classification and Management of Liquid Wastes (1998)" should be replaced with the updated publication "Environment Guidelines: Assessment, Classification and Management of Liquid and Non-Liquid Wastes (1999)".

The EPA has no additional matters to be included.

Should you have any further enquiries regarding this matter please contact Cathy Trindall of this office on (02) 6122 3100.

Yours sincerely

A handwritten signature in black ink, appearing to be 'Nigel Sargent'.

Nigel Sargent
Head Regional Operations Unit
Southern Tablelands
for Director General
27/10/00

Environment Protection Authority

PO Box 622 Queanbeyan NSW 2620 Australia

Telephone 61 2 6122 3100

Facsimile 61 2 6299 3525

ABN 43 692 285 758

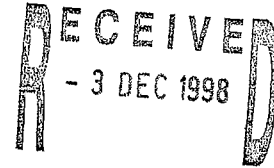
www.epa.nsw.gov.au

Unit 4 Robert Lowe Building 30 Lowe Street Queanbeyan NSW 2620



New South Wales Government
Department of Urban Affairs and Planning

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Mr R W Corkery
R W Corkery & Co Pty Ltd
P O Box 80
ORANGE NSW 2001

Contact: S Fernando
Our Reference: Q97/00092
Your Reference:

Proposed Landfill - Jugiong (Bald Hill Quarry Pty Ltd) Harden Shire LGA

Dear Mr Corkery

Thank you for your letter of 9 November 1998, seeking consultation with the Director-General for the preparation of an environmental impact statement (EIS) for the above development.

Under the provisions of State Environmental Planning Policy No.48 - Major Putrescible Landfill Sites, the Minister for Urban Affairs and Planning would be the consent authority for the proposal.

Under clause 55 of the *Environmental Planning and Assessment Regulation 1994* (the Regulation), the EIS should specifically address the key issues outlined below.

Key Issues

1. Route options, construction timing of upgradings, and any interim measures proposed in connection with any road upgrading and/or traffic management measures. Particular consideration should be given to item d(iv) under traffic issues at section 6.E.1 in the Department's '*Landfilling*' guidelines.
2. Consideration of the provisions of relevant environmental planning instruments and studies including:
 - State Environmental Planning Policy No. 48 - Major Putrescible Landfill Sites. Particular consideration should be given to the matters listed under clause 12 of the policy;
 - State Environmental Planning Policy No. 11 - Traffic Generating Developments. Reference should be made to the RTA publication, *Guide to Traffic Generating Development*.

Governor Macquarie Tower
1 Farrer Place, Sydney 2000
Box 3927 GPO, Sydney 2001

Telephone: (02) 9391 2000
Facsimile: (02) 9391 2111

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R.W. CORKERY & CO. PTY. LIMITED

3. The impact in respect of air, water and noise when considered cumulatively with the impacts from the proposed stage 2 development of the site.
4. The cumulative impact on the Murrumbidgee River, including from other quarrying operations in the region.

Attachment No. 1 outlines the statutory matters that must be included in any EIS as required by clauses 54 and 54A of the Regulation.

Attachment 2 is a record of the Planning Focus Meeting (PFM) for the subject proposal. In preparing the EIS, you should also consider the matters raised in this attachment.

The Department's EIS Guideline '*Landfilling*' (September 1996) contains the type of information most likely to be relevant to your proposed development. Not all the matters it contains may be appropriate for consideration in your EIS; equally, it is not exhaustive. The Guideline is available for purchase from the Department's Information Centre, 1 Farrer Place, Sydney or by calling (02) 9391 2222.

As a result of recent amendments to the *Environmental Planning and Assessment Act 1979*, development applications lodged on or after 1 July 1998 are "integrated development" where certain licences or other approvals are required. The Department has consulted with the Environment Protection Authority and its general terms for approval have been included as attachment 3.

You should consult with Harden Shire Council and take into account any comments Council may have in the preparation of the EIS. The EIS should also address other issues that emerge from consultations with relevant local, State and Commonwealth government authorities, service providers and community groups. The following agencies should be specifically consulted:

- The Department of Land and Water Conservation;
- NSW Fisheries;
- Department of Mineral Resources;
- Roads and Traffic Authority;
- Local Catchment Management Committee/Trust;
- NSW Agriculture; and
- National Parks and Wildlife Service.

Please note that, as this proposal is State significant development, the development application should be lodged with the Department rather than the Council. When

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submitting your development application (DA), please include at least 4 copies of the EIS and any other supporting documentation. You are also required to lodge the DA and supporting documentation including the EIS, with the approval body (EPA) at the same time that you lodge them with this Department

Please contact Sohan Fernando on (02) 9391 2043 if you require any further information regarding the Director-General's requirements for the EIS.

Yours sincerely,



for Geoff Noonan 30/11/98
Director

Development and Infrastructure Assessment
As Delegate for the Director-General

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DEPARTMENT OF URBAN AFFAIRS AND PLANNING

Attachment No. 1

STATUTORY REQUIREMENTS FOR THE PREPARATION
OF AN ENVIRONMENTAL IMPACT STATEMENT UNDER PART 4 OF
THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

In accordance with the *Environmental Planning and Assessment Act 1979* (the Act), an environmental impact statement (EIS) must meet the following requirements.

Content of EIS

Pursuant to Schedule 2 and clause 54A of the *Environmental Planning and Assessment Regulation 1994* (the Regulation), an EIS must include:

1. A summary of the environmental impact statement.
2. A statement of the objectives of the development or activity.
3. An analysis of any feasible alternatives to the carrying out of the development or activity, having regard to its objectives, including:
 - (a) the consequences of not carrying out the development or activity; and
 - (b) the reasons justifying the carrying out of the development or activity.
4. An analysis of the development or activity, including:
 - (a) a full description of the development or activity; and
 - (b) a general description of the environment likely to be affected by the development or activity, together with a detailed description of those aspects of the environment that are likely to be significantly affected; and
 - (c) the likely impact on the environment of the development or activity, having regard to:
 - (i) the nature and extent of the development or activity; and
 - (ii) the nature and extent of any building or work associated with the development or activity; and
 - (iii) the way in which any such building or work is to be designed, constructed and operated; and
 - (iv) any rehabilitation measures to be undertaken in connection with the development or activity; and
 - (d) a full description of the measures proposed to mitigate any adverse effects of the development or activity on the environment.
5. The reasons justifying the carrying out of the development or activity in the manner proposed, having regard to biophysical, economic and social considerations and the principles of ecologically sustainable development.
6. A compilation, (in a single section of the environmental impact statement) of the measures referred to in item 4(d).
7. A list of any approvals that must be obtained under any other Act or law before the development or activity may lawfully be carried out.
8. For the purposes of Schedule 2, the principles of ecologically sustainable development are as follows:
 - (a) The precautionary principle - namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.
 - (b) Inter-generational equity - namely, that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.
 - (c) Conservation of biological diversity and ecological integrity.
 - (d) Improved valuation and pricing of environmental resources.

Note

The matters to be included in item (4)(c) might include such of the following as are relevant to the development or activity:

- (a) the likelihood of soil contamination arising from the development or activity;
- (b) the impact of the development or activity on flora and fauna;



- (c) the likelihood of air, noise or water pollution arising from the development or activity;
- (d) the impact of the development or activity on the health of people in the neighbourhood of the development or activity;
- (e) any hazards arising from the development or activity;
- (f) the impact of the development or activity on traffic in the neighbourhood of the development or activity;
- (g) the effect of the development or activity on local climate;
- (h) the social and economic impact of the development or activity;
- (i) the visual impact of the development or activity on the scenic quality of land in the neighbourhood of the development or activity;
- (j) the effect of the development or activity on soil erosion and the silting up of rivers or lakes;
- (k) the effect of the development or activity on the cultural and heritage significance of the land.

An environmental impact statement referred to in Section 78A(8) of the Act shall be prepared in written form and shall be accompanied by a copy of Form 2 of the Regulation signed by the person who has prepared it.

Procedures for public exhibition of the EIS are set down in clauses 57 to 61 of the Regulation.

Attention is also drawn to clause 115 of the Regulation regarding false or misleading statements in EISs.

Note

If the development application to which the EIS relates is not exhibited within 2 years from the date of issue of the Director-General's requirements, under clause 55(7) of the Regulation the proponent is required to reconsult with the Director-General.

— ♦ —



ATTACHMENT 2

MINUTES OF PLANNING FOCUS MEETING
PROPOSED LANDFILL SITE - JUGIONG N.S.W.

Held Friday 30 October 1998 at
Harden Shire Council Chambers, Harden N.S.W.

Attendance - see attached sheet.

Meeting commenced at 10.15am.

Chris Manchester welcomed attendee's outlining local government interest in this proposal.

Derek Mullins (DUAP) outlined Government interest for proposed development.

- 60% reduction target still supported by Government.
- Justification of demand (assuming 60% reduction)
- Waste management integration (ie region waste plans)
- Views of other authorities
- Location requirements met.

State significant and Integrated development - SEPP 48. Requiring Minister's consent.

Craig Filmer (Manager Environmental Services Harden Shire Council)

- Outlined local government areas interested in proposal.
- Has blessing of 'H' division waste board.
- Information from South Western Slopes sub group will be available.
- Expressed confidence that SWSSG would satisfy needs criteria as required by clause 12. SEPP 48
- REROC data will be available on alternative/existing sites.
- Expressed support for a central well managed facility rather than 40 or 50 small facility.

John Wilkinson (Managing Director Bald Hill Quarry Pty Ltd)

- Gave brief history and overview of company site at Jugiong.
- Indicated location and broad environmental aspects of proposed site.
- Proposal to accept inert, putrescable, solid, sludge & organic waste in conjunction with on going quarry operations.
-
- Three stages of implementation:-
-
- (i) Landfill site to received waste from local government areas.



- (ii) Introduction of commercial collection services. (based at landfill).
- (iii) Materials Recovery Facility.
- Site availability 3 - 6 months.

R. Corkery (R.W.Corkery Pty.Ltd)

- Soon to write to each Authority to seek written requirements for EIS (please be specific).
- Indicated need to streamline and efficiently deal with responses from departments.
- Draft EIS not required.
- Accepted LEMP to form part of EIS – mainly to meet EPA requirements. (Effectively on draft to be finalised after approval).

Derek Mullins (DUAP)

Stated today's meeting will be treated by DUAP as formal request for all three stages. Detail to be made available to all agencies.

- On writing the approval agencies, info to be provided within 21 days.
- Everytime more information required clock stops.
- Determination 60 days after submitted to Minister.
-

Matters conveyed as being significant for consideration in EIS.

John Scown (LAWC)

- Only an approval authority if a bore is required, or a dam to store clean water is required.
- Leachate, ground water, pollution of surrounding waters.
- Monitoring throughout life of project of water quality.
- Site rehabilitation – Progressive and Final.
- Sediment control
- Access road upgrade(?)

David Bell - (EPA)

- Supervisory License need to be held by Public Authority.
- Sub Sect. 3 & 5 to be addressed.
- EPA will require L.E.M.P. as part of EIS.
- License will be standard and will be subject to Benchmark Guidelines.
- Tightness of rock - high degree of certainty regarding leachate. This will be the make or break issue.
- Requested sufficient info is made available in EIS.



Rhod Stevens - (RTA)

- Safety on road net work.
- Traffic Impact Statement
- Types of vehicles, traffic routes, turning movements, peak hourly volumes
- Hours of operation.
- No concern over existing location of intersection.

Francis Knight - (NPWS)

- Introduction of pests that could affect wildlife.
- Supports composting.
- Erosion and sedimentation
- Aboriginal sites. (Accepted LALC being involved).
- 8 part test for flora/fauna species contamination of water.
- Bush fire control.
- Vermin control.

John Dymock - (NSW Agriculture)

- Pests (insect, algae, fungal)
- Airborne litter
- Sedimentation and erosion.
- Consistency with Council's strategic planning for land use.

Mike Cassidy - NSW HEALTH

- Protection of down stream water supplies
- Vector Controls (Insects and rodents)
- Provision of on site potable water (for workers).
- On site Water Treatment and disposal facilities may need to be upgraded.

Draft minutes to be faxed to all attendees for confirmation/correction.

An invitation was extended to tour the site of the proposal.

Meeting closed 11.45am.



ATTACHMENT 3



Mr D Mutton - Acting Director
Development and Infrastructure Assessment
Department of Urban Affairs and Planning
GPO Box 3927
SYDNEY NSW 2001

Our Reference: 290002A1

Your Reference: Q97/00092

Environment
Protection
Authority
New South Wales

Suite 4
Robert Lowe Building
30 Lowe Street
PO Box 622
Queanbeyan
NSW 2620

Telephone .06. 299 3330
Facsimile .06. 299 3525

Dear Mr Mutton

Proposed Landfill – Bald Hill Quarry Pty Ltd, Hume Highway, Jugiong

I refer to your request for the Environment Protection Authority's (EPA) requirements for the Environmental Impact Statement (EIS) in regard to the above proposal received on 10 November 1998.

Under Integrated Development Assessment (IDA) it is essential that the EPA is provided with all necessary information essential to its determination of the proposal and preparation of general terms of approval.

The EPA has considered the details of the proposal as provided by the Department of Urban Affairs and Planning (DUAP) and the information on Form A provided by the proponent.

The EPA requires information in regard to the following aspects of the proposal:

1. Compliance with all relevant standard operating conditions and benchmark techniques described in the EPA Guidelines listed in Attachment A.
2. Details of the construction and operation of the proposed materials recovery facility. The EIS must identify potential impacts and any actions that are required to protect the environment from negative impacts.
3. The EIS must fully describe the geology and hydrogeology of the proposed site and surrounds. It should describe the risks to ground and surface water associated with the proposed development and the actions required to minimise these.



4. The design, construction and maintenance of critical environmental controls at the facility, including but not limited to, the leachate barrier, collection and treatment system for the landfill cells.
5. An assessment of any potential noise impacts that may be associated with the facility.
6. An assessment of any potential air impacts, including but not limited to, odour that may be associated with the facility.
7. How the requirements of section 48 of the Waste Minimisation and Management Act 1995 will be met.
8. The EIS should address the matters raised in State Environmental Planning Policy No. 48 (SEPP 48) and, in particular, section 12 (including the justifiable demand for the proposal and what effect the proposal will have on waste minimisation and its significance in the region).
9. The proposed source(s) of the waste (including quantity and type).
10. The status of discussions or participation in any process to become a service provider in respect of waste identified in (9).
11. Identification of the need for additional landfill capacity within any of the local government areas from which waste is proposed to be sourced.

In the absence of a regional waste plan(s) for the region, the EIS should include discussions with the local governments from which waste will be sourced to consolidate their landfill operations, based on the proposed new landfill. This could include proposals to close existing landfills. A proposed landfill closure timetable obtained through written correspondence between Bald Hill Quarry Pty Ltd and the local governments from which waste is proposed to be sourced would be of assistance to the EPA in determining the demand for the proposed landfill.

12. The minimum operating capacity (tpa) and expected total capacity of the proposed landfill;
13. A draft Landfill Environmental Management Plan (LEMP).

As this proposal will be assessed under IDA, the EPA is required to notify to the consent authority general terms of approval. Consequently, a draft, comprehensive LEMP that addresses all of the environmental goals in the EPA's *Environmental Guidelines: Solid Waste Landfills* (Landfill Guidelines) is required.

The LEMP should address how the design, construction, operation, monitoring and rehabilitation of the proposed facility will meet all of the environmental goals specified in the Landfill Guidelines. This should include special considerations that might be necessitated by specific conditions existing at the site.

The LEMP should provide clear documentation as to whether each of the environmental goals will be achieved and how these goals will be achieved. The LEMP should clearly identify where the benchmark techniques detailed in the EPA's



Landfill Guidelines or alternative techniques will be used. Where alternative techniques are proposed, these must be justified.

The sections of the LEMP dealing with ongoing operations should be of such a form and standard that it will also serve as a guide for the management of the facility. It may also form the basis for training manuals and Standard Operating Procedures for all administrative and operational staff at the facility.

14. The EIS should also be prepared in accordance with the Department of Urban Affairs and Planning's (DUAP) *EIS Practice Guideline: Landfilling* which details the general environmental issues that should be addressed.

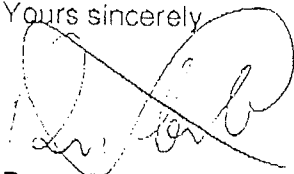
Based upon the information provided to the EPA to date, the applicant will require an Environment Protection Licence to construct and operate the waste facility if the Protection of the Environment Operations (POEO) Act 1997 has commenced at the time of determination. However, prior to implementation of the POEO Act a pollution control approval to construct pollution control works under the Pollution Control Act 1970 and a licence to operate under the Waste Minimisation Act 1995 will be required.

If it is intended that Bald Hill Quarry Pty Ltd should operate the facility, then a supervisory licence must be held by a public authority. The EIS should clearly define the operational and contractual relationship between the supervisory licence holder and the operator to enable the EPA to administer Section 48 of the WMMA (or Section 87 of Operations Act when it has commenced). This information is also required by the EPA to be able to determine its "general terms of approval".

To assist the EPA in assessing the EIS once it has been lodged with the consent authority, it is suggested that the format of the EIS follow the format of the EIS requirements as outlined in Attachment A. The EPA would like to receive two (2) copies of the final EIS for assessment purposes.

Should you have any further enquiries regarding this matter please contact David Bell of this office on (02) 6299 3330.

Yours sincerely

 24/1/98

Ross Carter
Regional Manager, Southern Tablelands
for Director General

cc
Mr John Wilkinson
Bald Hill Quarry Pty Ltd
Hume Highway
JUGIONG NSW 2726

Mr Robert Corkery
R W Corkery & Co
PO Box 80
ORANGE NSW 2800



ATTACHMENT A
ENVIRONMENT PROTECTION AUTHORITY REQUIREMENTS FOR
ENVIRONMENTAL IMPACT STATEMENT

The following EPA Guidelines are all relevant to the range of proposed facilities for this development. The Environmental Impact Statement (EIS) should include an assessment of the relevant parts of each of the guidelines as they relate to each of the components of the regional waste facility (landfill, composting, drying beds, greenwaste area, MRF, etc.).

The listed guidelines are available, currently free of charge, from the EPA Information Line on 131 555.

- Environmental Guidelines: Solid Waste Landfills (1996)
- Environmental Guidelines: Assessment, Classification and Management of Non-Liquid Wastes (1997)
- Draft Environmental Guidelines: Assessment and Management of Liquid Wastes (1998)
- Environmental Guidelines: Use and Disposal of Biosolid Products (1997)
- Environmental Noise Control Manual (Not free of charge - cost of \$80)



APPENDIX 3

(No. of pages excluding this page = 4)

Government Authority Requirements and Coverage within the Environmental Impact Statement



APPENDIX 3

Coverage of EIS of Requirements from Government Authorities

Page 1 of 4

Authority	Relevant Specific Issue to be Covered	Covered in Section(s)
Department of Urban Affairs and Planning (See Appendix 2)	* Traffic routes / management. * Provisions of relevant environmental planning instruments (SEPP 48 and SEPP 11). * Air, water and noise impacts cumulatively considered with North Rigde Quarry. * Regional cumulative impact on Murrumbidgee River.	2.6; 3.13 1.5 3.5.6; 3.6.6; 3.12.5 3.5.6
Environment Protection Authority (See Appendix 2)	* Compliance with operating conditions and benchmark techniques. * Details of construction and operating of transfer station. * Geology and hydrogeology of site. * Critical environmental controls, especially leachate collection. * Noise impacts. * Air impacts including odour. * Section 48 of Waste Minimisation and Management Act 1995 requirements, SEPP 11 and SEPP 48. * Source, quantity and type of waste. * Status of any waste service provider discussions. * Justification of project, discussions and timetables of waste services in LGA. * Operating plus total capacity. * DUAP's EIS Practice Guidelines Landfills. * Draft LEMP. * Supervisory licence held by public authority. * Geology with respect to leachate.	Draft LEMP 2.4 3.2; 3.5 3.5.5.4; Draft LEMP 3.12.5 3.6.6 1.5 2.1.3 Appendix 4 1.4.4; 4.1; Appendix 4 2.4 EIS Draft LEMP 2.2 3.2



APPENDIX 3
Correspondence from Government Authorities

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Authority	Relevant Specific Issue to be Covered	Covered in Section(s)
NSW National Parks and Wildlife Service	* Litter (general and wind blown into River). * Vermin. * Weeds. * Contaminated water. * Erosion and sedimentation * Flora / fauna survey with reference to Superb Parrot, * Composting of putrescible waste to minimise pest species. * Revegetation Plan to show conservation management of remaining vegetation. * Archaeology studies in conjunction with local Aboriginal community or Local Aboriginal Lad Council. Copies of report to Zone Archaeologist for comment. * Contingency plan for emergency spills / seeps / leaks. * Bushfire prevention plan.	2.4.3; Draft LEMP 3.7 3.7; Draft LEMP 3.5 3.4.; 3.5 3.7 Not Applicable 2.5; Draft LEMP 3.9 Draft LEMP 3.8
NSW Agriculture	* Agricultural pest assessment including insects and other pathogen. * Control of airborne litter. * Sediment and erosion control. * Dust control. * Consistency with Council's strategic planning for land use.	3.7 2.4 3.4; 3.5 3.6.5.1 1.5
Department of Land and Water Conservation	* Water requirements (include water budget) and existing / future water licence arrangements. * Leachate management and monitoring with respect to groundwater contamination. * Leachate management and monitoring with respect to surface water contamination. * Soil and Water Management Plan is required for approval by DLWC and Council prior to any works including all temporary and permanent works and timetable.	2.7; 3.5 3.5.5.4; Draft LEMP 3.5.5.4 Draft LEMP



APPENDIX 3
Correspondence from Government Authorities

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Authority	Relevant Specific Issue to be Covered	Covered in Section(s)
Department of Land and Water Conservation (cont'd)	* Rehabilitation Plan - passive and final.	2.5; Draft LEMP
	* Wind blown litter causing local stream pollution	2.4
	* Road management including erosion control.	2.6
	* General locality issues including land ownership.	3.11
	* General planning issues and surrounding land use compatibility.	1.5; 3.11
	* General proposal description and layout.	Section 2
	* Site history.	1.4
	* Infrastructure requirements.	2.3
	* Flooding and water quality issues including monitoring throughout life of project.	3.5
	* Erosion control.	3.5; 3.4
	* Stability of site.	3.2
	* Any impacts during development of the proposal.	Section 3
	* Production of LEMP.	Draft LEMP
NSW Health (from Planning Focus Meeting)	* Protection of downstream water supply.	3.5
	* Pest control.	3.7
	* Provision of on site potable water.	2.7
	* An upgrade of existing on site waste treatment and disposal facilities may be required.	2.7
	* Distances to existing dwellings.	3.11
	* Details of current / proposed zones and land use on adjoining properties.	1.5; 3.11
	* Prevailing winds and climatic conditions.	3.3
	* Geological and hydrological assessments of the site with regard to potential impact on any sources of drinking water.	3.2; 3.5
	* Provision of staff ablution facilities, water supply and provision of on site waste water management.	2.7
	* Site management plans. Projected life of project and end land use.	2.4.6; 2.5; Draft LEMP



APPENDIX 3
Correspondence from Government Authorities

Page 4 of 4

Authority	Relevant Specific Issue to be Covered	Covered in Section(s)
Roads and Traffic Authority <i>(from Planning Focus Meeting)</i>	* Safety on road network.	2.6; 3.13
	* Traffic Impact Statement must be incorporated.	Appendix 7
	* Traffic information to be included.	2.6; 3.13
	* Hours of operation.	2.4.5



APPENDIX 4

(No. of pages excluding this page = 17)

Current Waste Generation and Management in the Local Government Areas of the South West Waste Group



PREFACE

Eight local Councils have formed a group to collectively address the management of wastes in their Local Government Areas, namely the "South West Waste Group". This appendix draws together a range of data compiled from surveys and interviews of each of the participating Councils together with a summary of each Council's position with respect to a regional landfill facility. The information presented comprises:

- an overview report on the importance of the proposed landfill – prepared by Waste Want Recycling Pty Ltd;
- a compilation of survey data on existing waste sources and management facilities;
- a tabulated survey of each Council's position regarding the Regional landfill near Jugiong.



***Overview Report
on the
Regional Importance
of the
Proposed Landfill***

November 1999

Prepared by:

Waste Want Recycling Pty Ltd
ACN 084 241 323
PO Box 1
Lyneham
ACT 2602



SOUTH WEST WASTE GROUP

During October 1999 Waste Want Recycling Pty Ltd interviewed representatives from each of the councils that make up the South West Waste Group, and undertook a survey of current council waste operations in each shire area.

The recorded data was then compiled to assess the current situation and to determine the benefits to the participating councils if they utilised one central landfill site at Jugiong.

The South West Waste Group (SWWG) is made up of seven councils:

- *Harden Shire Council,*
- *Gundagai Shire Council,*
- *Yass Shire Council,*
- *Young Shire Council,*
- *Boorowa Shire Council,*
- *Junee Shire Council, and*
- *Tumut Shire Council.*

SWWG covers an area of 18,821 square kilometres with a population of 48,575. Nine (9) major population centres with 29,520 people make up 60% of the population. A further 13% of the population are residents of the twenty seven (27) villages. The population is not expected to change over the coming years.

Development within the region is predominately rural with various light industries.



Current SWWG Waste Disposal Facilities

There are ten (10) landfills in SWWG accepting in excess of 1,000 cubic metres of waste per year and twenty three (23) smaller village landfills. Yass Shire Council operates five (5) transfer stations, one each in Yass, three (3) villages and at the Murrumbateman Landfill. Young Shire Council operates small transfer stations for domestic waste in two (2) villages. These forty (40) facilities accept 20,080 tonnes of waste per annum or 0.41 tonnes per annum per person.

Major landfills and the transfer stations within the area are locked outside of operating hours. The smaller village facilities are also locked with local residents gaining access through the use of a common key or similar system. All landfills provide residents with adequate access to disposal facilities.

The securing of landfills in this way has controlled the rate of waste disposal and increased their life. Many of the current landfills have limited available space and SWWG councils are actively confronting the problems caused by this shortage of landfill space.

If current waste disposal rates continue, 5 of the 10 major landfills in the area will be exhausted and closed within eight years. This will leave four shire councils and 50% of SWWG's total population without a major landfill.

The seriousness of this situation is highlighted by the fact that 14 of the 23 village landfills will be full within five years. This will require alternative waste disposal arrangements to be provided for these small village populations within a relative short time.

With the closure of these landfills, SWWG is investigating the establishment of transfer stations to:

- maintain service provision to local business and residents,
- allow for the efficient removal of waste to a licenced facility.

The remaining landfills in the area have a longer life expectancy, but face other issues that affect their usefulness as landfills. In addition to landfill shortages, councils are addressing other issues such as:

- landfill location,
- excessive operating costs,
- community pressure and
- EPA regulations.

Each of the councils interviewed expressed concern regarding the future of their current landfills and the availability of alternative disposal sites within their Shire area, and is actively exploring alternatives that provide cost effective solutions.



Current SWWG Waste Reduction

All waste disposal facilities in the SWWG divert portions of the waste stream. Typically materials such as glass and plastic containers, paper and cardboard, steel, organic matter and reusable items, are recovered. The quantity of material diverted from the waste stream in this way varies from council to council, with differing collection systems and methods of dealing with the diverted materials.

1. Organic Matter

Waste facilities within the SWWG divert organic matter from landfill. The quantity of organic matter diverted in this way is difficult to establish from data presented by councils, but from the facilities inspected during this assessment considerable amounts of landfill space is saved by this practice.

2. Recyclable Material

In addition to the organic matter diverted at landfill sites, councils achieve reasonable recovery rates of recyclable materials. The data received from SWWG councils indicates that some 4473 tonnes of material (Steel, Paper, Glass & Plastics) per annum is diverted from the waste stream under the current system. This figure represents 18% of the areas total waste stream.

The current breakdown of this recovered material is:

▪ Paper and Cardboard	45.0 %
▪ Steel	21.0 %
▪ Glass	14.5 %
▪ Metals	10.5 %
▪ Plastics	9.0 %

3. Other

SWWG councils, where possible, divert other material from the waste stream such as portions of Building and Demolition waste. This practice separates inert materials (such as concrete) from the domestic waste at landfills.

Yass Shire Council, has taken an active role in resource recovery and waste diversion through the operation of transfer stations. Infrastructure has been designed to facilitate this recovery, significantly reducing the quantity of material requiring transfer to landfill for final disposal. The approach taken by council has resulted in impressive diversion rates approaching 40% of the total waste stream.

For each of the small councils in SWWG, the economic viability of resource recovery is the major hurdle to increasing the current diversion levels. Councils were aware of community pressure to improve local recycling service provision. Recognition was also evident of the need to, where possible, reduce the volume and weight of material that would require transport to, and landfilling at, any Regional Landfill Site.



It is anticipated that the viability of resource recovery will improve significantly if incorporated into any new waste acceptance/transfer system and through the economies of scale presented through the formation of an innovative council grouping such as SWWG.

SWWG Preferred Option

Council's within SWWG support the Regional Landfill as a means of addressing their current situations. If such a site is as centrally located as the quarry at Jugiong, it is expected that transport costs will not be prohibitive.

To utilise the quarry at Jugiong, transfer stations will need to be established at current landfill sites. The relatively small quantity of waste requiring disposal at any of the landfills within SWWG, would easily be handled by standard waste skips. The close proximity of many of the sites, both to each other and Jugiong, will allow for the establishment of an efficient waste transport network across the seven Shire Councils.

The economies of scale presented by the formation of SWWG offer an opportunity to:

- viably improve waste disposal practices, and
- increase the quantity of recovered resources.

Opportunity also exists to

- standardise service provision and fees in SWWG,
- offer a consistent approach to waste/recycling information and education in SWWG,
- develop a model of responsible rural waste management.

Alternative Landfill Sites Available To SWWG

The availability of the quarry at Jugiong to establish a centrally located Regional Landfill provides a solution to the imminent closure of half of the SWWG's waste facilities. There is **no** other alternative landfill site in the area covered by SWWG.

The shortage of landfill space within each council, necessitates the establishment of a major landfill within a cost effective travelling distance.

Data presented by councils indicate that such a facility would need to be capable of accepting in excess of 15,000 tonnes per annum, to cater for the expected needs. It is estimated that 13,000 tonnes per annum of domestic waste would require disposal at such a facility.

The only facilities nominated as alternatives to the Jugiong site were Gregadoo Landfill at Wagga and possibly Woodlawn Mines at Tarago. Both these sites were considered to be too far away to provide an economically viable alternative.



Transport Considerations

Roads within SWWG are capable of handling the expected load-weights of waste skips and all landfill sites have suitable truck access.

The additional volume of traffic associated with the proposed waste disposal system, is expected to be negligible.

SWWG Regional Landfill Benefits and Impacts

The establishment of a Regional Landfill will benefit SWWG councils and residents in numerous ways.

The closure of existing landfills will reduce the environmental impact generally caused by waste disposal facilities. Council's interviewed expect improvements in the following areas:

- **Environment**
 - progressive closure of up to 33 landfills
 - the use of 1 central landfill negates the need to establish new landfills in each Shire when the existing landfills are exhausted
 - machinery usage reduced
(no need to construct or cover trenches)
 - erosion at landfill sites can be controlled
- **Pollution**
 - improvements in air and water pollution levels
 - reduction of windblown waste and cleanup costs
 - better control over pollution with transfer stations
 - ground water quality will be improved
- **Social**
 - improvements in waste management practices to benefit residents
 - avoidance of conflicts
(such as plastic bags and fires)
 - improved service provision
 - councils will gain from co-operating with other shires through sharing of knowledge and technology
- **Economic**
 - short and long term economic savings
 - apparent cost savings over existing operational system
 - reduced landfill costs for each council
 - savings to ratepayers
 - Removes need to seek and develop new landfill sites in the shires (avoiding new landfill establishment and operating costs)
 - opportunity for cost sharing



A Summary of Council's Views Towards a Regional Landfill Facility near Jugiong

Council's View	Comments
Boorowa Council Full support yet with retention of existing landfills for the remainder of their useful life.	Council has extended the landfill facilities at three sites yet two other small sites have a short useful life.
Gundagai Council Full support of regional landfill economically viable. Aim to gradually replace all village landfills with feeder stations.	Current landfill sites have very short life remaining. All other options reviewed are politically, socially or financially unacceptable.
Harden Shire Council Full support of the ultimate aim to convert all three landfills to transfer stations.	Council recently extended one landfill but would only sustain a small part of the Shire. The Shire has only implemented short term waste management measures to date.
Junee Council Full support if proved economically viable with aim to gradually replace village landfills with feeder stations.	Current landfill sites have very short life remaining. All other options reviewed are politically, socially or financially unacceptable.
Tumut Council Full support of the regional landfill proposal.	Reasonable capacity exists in current Council landfills, however, development, environmental and topographical issues affect the landfill operations.
Yass Council Full support of the regional waste landfill.	Currently operate one landfill with reasonable life span and several transfer stations. Increased costs are making the current land site less attractive.
Young Council Support of the Bald Hill regional landfill subject to economic viability.	Council has been reviewing waste management options for past ten to twelve years. New landfill site have not been forthcoming.

Bald Hill Quarry Landfill Proposal

1. LOCAL GOVERNMENT AREA DETAILS

1.1 -Name	Boorowa Shire Council	Yass Shire Council	Young Shire Council	Junee Shire Council	Harden Shire Council	Tumut Shire Council	Gundagai Shire Council	TOTALS
1.2 -Total Area				Total Shire				
(SQ Km)	2600	3415	2700	2045	1863	3750	2448	18821
-Waste Catchment Area								
(SQ Km)	Not known	1000	30	2045	1863	3750	1800	10488
1.3 -Population	2400	9400	11045	5800	3930	12,000	4000	48575
1.4 -Major Population Centres								
-Town (1)	Boorowa	Yass	Young	Junee	Harden Murrumburrah	Tumut	Gundagai	
-Population	1200	4700	7000	4000	2200	6000	2500	27600
-Town (2)						Batlow		
-Population						1000		1000
-Town (3)						Adelong		
-Population						920		920
								Total Major Pop. 29520
Town (4)								
-Minor Population Centres								
-Village (1)	Rugby	Murrumbateman	Koorawatha	Old Junee	Jugiong	Talbingo	Coolac	
-Population	50	1087	325	250	150	400	200	2462
-Village (2)	Frogmore	Binalong	a	Bethungra	Galong	Brungle	Muttama	
-Population	50	250	100	225	150	50	100	925
-Village (3)	Reids Flat	Bowning	b	Illabo	Wombat		Tumblong	
-Population	100	150	100	250	150		150	900
-Village (4)	Rye park	Bookham	c	Wantabadgery	Rural		Nangus	
-Population	100	50	75	100	1310		250	1885
-Village (5)		Wee Jasper	d				rural	
-Population		15	50				approximately 1000	65
								Total Minor Pop. 6237
1.5 -Development Profile e.g. Rural								
	Rural	Rural	Rural/residential	Rural	Rural	Rural	Rural/Tourism	
2. WASTE STREAM								
-Significant Sources of Waste & Type	Source	Source	Source	Source	Source	Source	Source	Source
e.g. -Abattoir 1	Residential	Abattoir	Household	Abattoir	Cannery	Residential	Residential	Abattoir
-Industrial Estate 2		Steel fabricator		Skin processing	Orchards and packing	McDonalds	McDonalds	Steel fabricator
3				Construction & Industrial	sheds	Highway Service Centres	Highway Service Centres	Household
4				Drum Muster			Abattoir	Residential
5							Skin processing	Drum Muster
6							Construction & Industrial	Cannery
								Orchards and packing sheds

Bald Hill Quarry Landfill Proposal

1.1 -Name	Boorowa Shire Council	Yass Shire Council	Young Shire Council	Junee Shire Council	Harden Shire Council	Tumut Shire Council	Gundagai Shire Council	TOTALS
2.1 -Potential growth for waste generation.	(Yes / No) negative	(Yes / No) No	(Yes / No) Yes	(Yes / No) No	(Yes / No) Yes	(Yes / No) Yes	(Yes / No) Yes	
-Expected population growth		0.75%	0.1%	Nil	0		2%	
-Type of growth		A). Urban	A). Domestic	A).	A). Industry	Due to establishment of Visy mill near Tumut - note that mill will not generate large amounts of waste when operational. During construction and start-up there will be some waste disposed to landfill	A). Putrescible	
-Waste (T/A)		13t/pa	Minimal			Domestic, general commercial, minimal industrial		
2.2 -Total quantity of all wastes dealt with (T/A)	600	1700	10,000	1140 3900 cm	t/a 1241 255 g 336 j 650 h	4814	585 50+25+ 30+30 +450	20080
2.3 -Total quantity of waste Classified per stream (T/A)								0
-Current		1700	10,000	1140	1241	4814	585	19480
-Paper/cardboard		500	981				9	1490
-Metals		26	7.6					33.6
-Plastics		33	32.2				7	72.2
-Building waste		150	0				5	155
-Glass		170	265					435
-Steel		250	440				5	695
-Organic		1000	0				15	1015
-Other (specify)			0					0
3. EXISTING WASTE MANAGEMENT FACILITIES								
3.1 -Major Landfill (>1000m3/A)								
3.1.1								
-Location (1)	Boorowa	Murrumbateman	Briggs St, Young	Gundagai Road, Junee	Harden	Boonderoo Road, Tumut	Gundagai	
-Remaining Capacity (m3)	60,000	25000	Not calculated	40,000	1000	Estimate vague and not really worth much		126000
-Estimated remaining useful life (years)	10	8	15	4	6.5	20	4	67.5
-Method of collection	Garbage truck & tip deposit	Kerbside	Contract	Council Collection & Public Drop off	240 x 1/ week	Domestic garbage brought in using single operator truck - all other materials brought in by private contractor or residents	Kerbside	
-Type		240 mgb	Domestic / commercial	Acco 1850G + Compactor			240 MGB	
-Frequency	Weekly	Weekly	Twice weekly			Domestic collection from all urban areas once a week	Weekly	

Bald Hill Quarry Landfill Proposal

1.1 -Name	Boorowa Shire Council	Yass Shire Council	Young Shire Council	Junee Shire Council	Harden Shire Council	Tumut Shire Council	Gundagai Shire Council	TOTALS
-Vehicle km per year	Not known	20000	Unknown			23000	25000	68000
-Licenced (Yes/No)	Not known	Yes	No	No	No	Yes	No	
-m3/year	6000	3125		10,000	155			
3.1.2								
-Location (2)		Yes	Red Hill Rd Young			Keenan's Road, Batlow	N/A	
-Remaining Capacity (m3)		5000	Not calculated			Vague		5000
-Estimated remaining useful life (years)		5	10			50 to 100 years		
	1	2	2	1	1	2	1	10
3.2 -Alternative Major Landfill (Yes/No)	No	No	No	No	No	No	None	None
3.2.1 Total Landfill Remaining Capacity Estimate								
131000								
3.3 -Minor Landfill/Tip (<1000m3/A)								
-Transfer stations	4	5	5	6	2	1	4	27
-Location	Rugby	Wee Jasper	Koorawatha	Wantabadgery	Jugiong	Grahamstown Road, Vague	Coolac	
-Remaining capacity (m3)	N/A	5000	Not calculated		11120			
-Remaining useful life (years)	5	2 yrs	15-20	2.5	20 yrs	up to 100 years	5	
-Location	Frogmore	Burrenjack	Bribbaree	Old Junee	Galang		Muttama	
-Remaining capacity (m3)	N/A		Not calculated		78000			
-Remaining useful life (years)	5		50	4	20 +		5	
-Location	Reids Flat	Bookham	Bendick Murrell	Junee Reefs			Tumblong	
-Remaining capacity (m3)			Not calculated					
-Remaining useful life (years)			20	1.5			4	
-Location	Rye Park	Bowning	Tubbal	Eurongilly			Nangus	
-Remaining capacity (m3)	28000		Not calculated					
-Remaining useful life (years)	15		20	1.5			3	
-Location		Binalong	Milvale	Illiba				
-Remaining capacity (m3)			Not calculated					
-Remaining useful life (years)			15	2				
-Location		Binalong		Bethungra				
-Remaining capacity (m3)								
-Remaining useful life (years)				2				

Bald Hill Quarry Landfill Proposal

1.1 -Name	Boorowa Shire Council	Yass Shire Council	Young Shire Council	Junee Shire Council	Harden Shire Council	Tumut Shire Council	Gundagai Shire Council	TOTALS
-Location								
-Remaining capacity (m3)								
-Remaining useful life (years)								minor landfills
-Remaining capacity (m3)	4	1	5	6	2	1	4	23
-Remaining useful life (years)								
3.4 -Alternative Minor Landfill/Tip Sites (Indicate location on map)								
-Location							None	
-Remaining capacity (m3)			0					
-Remaining useful life (years)								
4.0 Existing Recycling Facilities (Yes/No)								
4.1 -Location	Yes Boorowa	Yes Faulder Ave	Yes Briggs St Young	Yes Junee Landfill	Yes Harden Landfill	Yes Depots at landfills - materials transferred out of Shire for sorting and reprocessing	Yes Gundagai Landfill	
4.1.1								
-Maximum capacity (T/A)	N/A	1500 tonnes / annum						
4.1.2								
-Total quantity of materials streamed and diverted	N/A							
(T/A)	300	730	2000	500	Not provided	1562	175	5267
-Estimated breakdown of diverted waste stream								
Paper/Cardboard (T/A)	135	500	981	208		53	30	1907
Glass (T/A)	50	170	265	13		90	25	613
Steel (T/A)	100	250	440	40		0.16	60	890.16
Metals (T/A)	6	26	7.6			360	40	439.6
Plastics (T/A)	7	33	32.2			287	20	379.2
Hydrocarbons (T/A)		4				73		77
Building waste (T/A)		150				17		167
Composting (Yes/No) (T/A)		3300c/m				No	no	0

4228.96

4472.96

Bald Hill Quarry Landfill Proposal

1.1 -Name	Boorowa Shire Council	Yass Shire Council	Young Shire Council	Junee Shire Council	Harden Shire Council	Tumut Shire Council	Gundagai Shire Council	TOTALS
Mulching (m3)		1000				No	no	1000
4.2 -Are Recycling Facilities Planned (Yes/No)	No	No				657 5 22	None further but will be necessary if transfer station is realised	
4.2.1								
-Location							Gundagai	
4.2.2						No		
-Max capacity (T/A)								0
4.2.3								
-Estimated quantity of waste this facility will divert from landfill (T/A)							400	0 0
5. WASTE TO LANDFILL								
5.1 -What quantity of waste do you expect to go to the Jugiong landfill when your existing landfill is exhausted								
-Total (T/A)	No idea	1700	6000	1200	1300	4500	1200	15900
				4000 m ³ per annum				79% of current total waste produced
5.2 -Estimate the nature & quantity of existing waste that would go to the Jugiong Landfill?								
-Waste type		Household	Domestic / commercial / putrescible	Putrescible /household	Harden	Putrescibles	Domestic putrescible	
-Quantity (T/A)		1700	4000	1200	650	4494	1000	13044
-Waste type		Building waste			Jugiong	Builders waste - asbestos	Other	
-Quantity (T/A)		150			336	2	200	688
-Waste type					Galong			
-Quantity (T/A)					255			255
5.3 -What wastes would you like to be permitted to be received at the Jugiong landfill?								0
Non Liquid								
-Inert								
e.g.Concrete, tyres (Yes/No)	Yes	Yes	No	No	Yes	No	No	3y 4n
-Solid								
e.g.Household domestic waste (Yes/No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	0 7y
Cleans ups (Yes/No)	Yes	Yes	No	Yes	Yes	Yes	Yes	6y 1n
Food waste (Yes/No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	7y
Non chemical waste (Yes/No)	Yes	Yes	No	Yes	No	Yes	No	4y 3n

Bald Hill Quarry Landfill Proposal

1.1 -Name	Boorowa Shire Council	Yass Shire Council	Young Shire Council	Junee Shire Council	Harden Shire Council	Tumut Shire Council	Gundagai Shire Council	TOTALS
-Industrial	No	Yes	Yes	Yes	Yes	Yes	No	5y 2n
e.g.Asbestos (Yes/No)	No	Yes	No	No	No	No	No	1y 6n
-Hazardous	No	Yes	No	No	No	Yes, although not a priority as existing disposal arrangements for Tumut seem to be working well		2y 4n
e.g.Clinical waste (Yes/No)	No	No	No	No	No	No	No	7n
Sharps waste (Yes/No)	No	No	No	No	No	No	No	7n
Liquid								
-Hazardous								0
e.g.Flamable (Yes/No)	No	No	Yes	No	No	Yes, although not a priority - would be good if there were another avenue than CWDS (eg.)	No	5n
Corrosive (Yes/No)	No	No	Yes	No	No		No	5n
Group 'A'								
-Non Aqueous								0
e.g.Solvents/oils (Yes/No)	?	No	Yes	No	No	Yes, although not a priority - would be good if there were another avenue than CWDS (eg.)	No	
Paints (Yes/No)	Yes	No	Yes	No	No		No	0
-Aqueous								0
e.g.Ash slurry (Yes/No)		Yes	N/A	No	No	Yes, although not a priority - would be good if there were another avenue than CWDS (eg.)	No	0
Group 'B'								
e.g.Grease trap waste (Yes/No)	Yes	No	Yes	No	No	No	No	5n
Food waste (Yes/No)	Yes	No	Yes	No	No	No	No	5n
Group 'C'								
e.g.Human waste – Pump out (Yes/No)	No	No	Yes	No	No	No	No	6n
Group 'C'								
e.g.Human waste – Pump out (Yes/No)								

Bald Hill Quarry Landfill Proposal

1.1 -Name	Boorowa Shire Council	Yass Shire Council	Young Shire Council	Junee Shire Council	Harden Shire Council	Tumut Shire Council	Gundagai Shire Council	TOTALS
6. ALTERNATIVE TO LANDFILLING								
-Have you an economic alternative for any major waste class that currently diverts from landfill								
-Putrescible								
-Yes/No		No	Does not divert	No	No		No	
-If no WHY?							No economic alternative available	
-Green organics								
-Yes/No	No	Yes	Does not divert	No	No		Yes	
-If no WHY?	No market			Cost				
-Glass								
-Yes/No	Yes	Yes	Yes	Yes	No		Yes	
-If no WHY?								
-Metals								
-Yes/No	Yes	No	Yes	Yes	No		Yes	
-If no WHY?		\$ value						
-Paper/cardboard								
-Yes/No	Yes - but for how long?	y???	Yes	Yes	No		Yes	
-If no WHY?								
-Building waste								
-Yes/No	No	No	Does not divert	Yes	No		No	
-If no WHY?	No market	\$\$					Minor amounts that are easily handled	
-Hydrocarbons								
-Yes/No	No	Yes	Collected by private contractor	No	No			
-If no WHY?	?	Free pick up						
-Other (specify) Plastics Drummuster								
-Yes/No		\$\$						
-If no WHY?								
7. ALTERNATIVE TO JUGIONG LANDFILL								
-Have you an alternative regional landfill site to consider								
(Yes/No)	No	Yes	No	Yes	No		No	2y
-If 'YES' : Location		Woodlawn		Wagga				
Distance		110		50km				
Capacity				50 Years				

Bald Hill Quarry Landfill Proposal

1.1 -Name	Boorowa Shire Council	Yass Shire Council	Young Shire Council	Junee Shire Council	Harden Shire Council	Tumut Shire Council	Gundagai Shire Council	TOTALS
-At this point in time, why is the Jugiong landfill an option worth considering for your landfill needs?								
List reasons	Only alternative within an economic distance						The life of current landfills are extremely limited and this opportunity to regionalise is an advantage not to be missed.	
8. TRANSPORT IMPLICATIONS								
8.1 -Are roads capable of handling load-weights (Approx 30-40T)?								
(Yes/No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
8.2 -Do proposed transfer station sites have suitable truck access?								
(Yes/No)	Not even contemplated at this stage Can see no problems	Yes	Yes	Yes	Yes	Yes	Yes	
8.3.1 -Is it expected that the impact of the proposed transfer network will be acceptable to your council?								
(Yes/No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
8.3.2 -Do you envisage any major problem with associated traffic in population centres?								
(Yes/No)	No	No	No	No	No	No	No	
-If 'YES' , can these problems be overcome?								
(Yes/No)								
-If 'YES' , can these problems be overcome?								
(Yes/No)								
9. ENVIRONMENTAL IMPACTS								
-What benefits will your LGA get from this proposal?								
None - the present system works OK for the small communities but the requirements are such that they are going to be forced to close.								
9.1 Energy	List Benefits	List Benefits	List Benefits	List Benefits	List Benefits	List Benefits	List Benefits	
9.2 Water		less pollution			Improvement at 2 landfill re ground water			
9.3 Landuse			Yes		Avoidance of conflicts (plastic bags/fire etc)		Existing Landfills	

Bald Hill Quarry Landfill Proposal

1.1 -Name	Boorowa Shire Council	Yass Shire Council	Young Shire Council	Junee Shire Council	Harden Shire Council	Tumut Shire Council	Gundagai Shire Council	TOTALS
9.4 Economic		Cost sharing. Reduced landfill costs	Maybe long term		Saving to ratepayers Avoiding new landfill costs		T/Stations	
9.5 Social		Rate payers benefits					Community Perception	
9.6 Environmental		Less impact	Yes				All Landfills	
9.7 Other								
10. What impacts will your LGA suffer?								
	List Impacts	List Impacts	List Impacts	List Impacts	List Impacts		List Impacts	
10.1 Energy	The costs will rise.		None that I can think of					
10.2 Water							Nil	
10.3 Landuse							Nil	
10.4 Economic	Rising costs						Capital Outlay	
10.5 Social							Nil	
10.6 Environmental								
10.7 Other								

APPENDIX 5

(No. of pages excluding this page = 8)

Harden Shire Council Correspondence





HARDEN SHIRE COUNCIL

All Communications to be
Addressed to the General Manager
P.O. Box 110, Harden 2587

PHONE: (02) 6386 2300
FAX: (02) 6386 2083

Contact: P Campbell

G.1/8
9 April 2001

Mr T Willsallen
Bald Hill Quarry Pty Ltd
Hume Highway
JUGIONG NSW 2726

Dear Sir,

Please be advised that at its meeting on 5 April 2001 the South West Waste Management Group resolved to proceed in principle with the establishment of a garbage landfill operation at the Bald Hill quarry.

The Group covers the local government areas of Boorowa, Gundagai, Harden, Junee, Tumut, Yass and Young and is presently administered through Harden Shire Council. The source of the garbage will be from within these local government areas.

It is intended that the landfill operation will be contracted to an operator to carry out the process on behalf of the aforementioned Council's as will the transport network. The establishment of the landfill will enable the closure of numerous existing landfill garbage depots, which will be replaced by transfer stations from which the garbage will be hauled to the landfill site.

The landfill proposal has the support of the Group member Councils as well as strong support throughout the full region due to its significant benefits to the environment which will be sustained over several decades.

A copy of the draft legal agreement constituting the South West Waste Management Group is also enclosed for your information. It should be noted that this agreement is only in its draft stage and will be completed in due course in line with minor amendments required by the member Councils.

Yours faithfully

P Campbell
General Manager

MEMORANDUM OF AGREEMENT

AGREEMENT made the _____ day of _____,

pursuant to the Local Government Act 1993 ("the Act") between

THE COUNCIL OF THE SHIRE OF BOOROWA,
THE COUNCIL OF THE SHIRE OF GUNDAGAI,
THE COUNCIL OF THE SHIRE OF HARDEN,
THE COUNCIL OF THE SHIRE OF JUNEE,
THE COUNCIL OF THE SHIRE OF TUMUT,
THE COUNCIL OF THE SHIRE OF YASS AND
THE COUNCIL OF THE SHIRE OF YOUNG

(hereinafter referred to as "the Councils")

WHEREAS section 24 of the Act empowers a Council to provide goods, services and facilities, and carry out activities, approximate to the current and future needs within its local community and of the wider public, subject to the Act the regulations under the Act and any other law

AND WHEREAS section 355 of the Act provides that a function of a Council may be exercised by two or more, Councils jointly

AND WHEREAS the Councils are of the view that it is appropriate to the current and future needs of their local communities to provide a waste management service ("the service") and to enter into an agreement pursuant to section 355, of the Act to provide the service throughout all their areas

NOW THIS AGREEMENT WITNESSES that the Councils mutually covenant and agree as follows:

1. Objectives

- 1.1 Establish the SWRWMG ("the Group") to:
 - 1.1.1 provide a co-ordinated approach to waste management within the areas of the Councils, and
 - 1.1.1.1 confirm a commitment to reduce the volume of waste going to landfill disposal by 50% per capita for the period from 2000 to ?????? and
 - 1.1.1.2 detail the functioning of the Group and confirm the commitment of the Council to achieving these objectives through mutual co-operation.

2. Area of Operation

- 2.1 This agreement shall operate within the areas of the Councils ("the area of operations").

3. Establishment and Role of the Group

- 3.1. The Group is established on and from the date of this agreement
- 3.2. The role, of the Group shall be:

- 3.2.1 to control the provision of waste disposal services to the Councils at the Bald Hill Quarry Landfill Site, and also an integrated transport system thereto,
- 3.2.2 to co-ordinate and encourage waste reduction within the area of operations by waste minimisation, recycling, composting or any other process or processes which in the opinion of the Committee is appropriate to attain the objectives of this agreement;
- 3.2.3 to seek to rationalise waste disposal facilities within the area of operations, and
- 3.2.4 to develop environmentally sound operational standards for landfill waste disposal facilities within the area of operations; and
- 3.2.5 to promote activities and initiatives designed to achieve the objectives of this agreement and to monitor and survey the results of those activities and initiatives.

4. Delegations

- 4.1. Each of the Councils shall delegate, subject to the provisions of section 377 of the Act, such powers and functions to the Committee as are necessary to carry this agreement into effect.

5. Membership of the Committee

- 5.1 Each of the Councils shall nominate two members of the Committee, one of whom shall be a Councillor and the other a member of staff.
- 5.2 Each member shall hold office for a period of four years (concurrent with the cycle of Local Government elections) from the date of his or her appointment, and shall unless disqualified be eligible for re-appointment.
- 5.3 Each Councillor only shall be entitled to one vote.

6. Cessation of Membership

- 6.1 A member of the Committee shall cease to be a member if;
 - 6.1.1 being a Council-nominated member, his or her appointment is revoked by the Council which appointed him or her; or
 - 6.1.2 he or she resigns from the Committee in writing; or
 - 6.1.3 he or she is declared bankrupt or assigns his or her estate for the benefit of his or her creditors; or
 - 6.1.4 being a Councillor, he or she becomes disqualified from holding civic office within the meaning of section 275 of the Act; or
 - 6.1.5 he or she is absent without leave from three successive meeting of the Committee.
- 6.2 In the event of there being a vacancy in the membership of the Committee;
 - 6.2.1 where the vacancy is caused by the cessation of membership of a Council-nominated member, the Council from which the vacating member came shall nominate a replacement member;
within three months from the date on which the vacancy occurred.
- 6.3 A replacement member shall hold office for the balance of the term of office of the vacating member.

7. Quorum

- 7.1 A simple majority of the eligible voting members present at a meeting the Committee shall constitute a quorum.

8. Meetings of the Committee

- 8.1 Subject to clause 9 the provisions of the Act and the Local Government [Meetings] Regulation 1993 shall apply to the conduct of the meetings and general business of the Committee.
- 8.2 Meeting of the Committee shall be held at least once in every three-month period, or as may be called from time to time by the Chair, at a venue to be provided by each constituent Council in turn.

9. Chair

- 9.1 The Committee shall at the first meeting in each year elect one of its members who is a Councillor to be Chair and to hold office until a successor is elected at the first meeting of the succeeding year.
- 9.2 The Chair shall preside over all meetings of the Committee, but in the absence of the Chairman for any reason any other member of the Committee may be elected to act as Chair during that absence.
- 9.3 The Chair shall exercise the same powers and perform the same duties for the Committee as are exercised and performed by the Mayor for a Council.
- 9.4 The Chair without the authority of the Committee shall incur no expenditure in excess of five hundred dollars [\$500].

10 Alternate Delegate

- 10.1 In the event that any Council-appointed member of the Committee is unable to attend to that member's duties the Council represented by that member may by resolution appoint a deputy in place of that member.
- 10.2 An Alternate Delegate shall whilst acting in the place of a member have all the powers and authorities of the member.
- 10.3 No-one shall be entitled to inquire as to whether or not an occasion has arisen requiring or authorising a Alternate Delegate to act in the place of a member.
- 10.4 All things done, or omitted to be done, by a Alternate Delegate when acting in the place of a member shall have the same effect and consequences as if done or omitted by the member in whose place the Alternate Delegate is acting.

11 Secretary

- 11.1 The Committee shall appoint as Secretary an officer of the Council the Councillor representative of which is elected Chair of the Committee
- 11.2 The Secretary shall have the following duties and responsibilities:
 - 11.2.1 to keep the minutes of meetings of the Committee
 - 11.2.2 to have charge of the Minute Book and other records of the Committee
 - 11.2.3 to keep the accounts of the Committee and present them for audit from time to time in accordance with the requirements of the Act for the keeping and auditing of the accounts of a Council; and
 - 11.2.4 to send and receive correspondence on behalf of the Committee.

12. Minutes

- 12.1 The Committee shall cause minutes to be made and kept of all business transacted at each of its meetings.
- 12.2 The minutes of a meeting of the Committee shall be submitted for approval at the next successive meeting of the Committee and if approved each page of the minutes shall be signed by the Chair and countersigned by the Secretary.

- 12.3 A copy of the minutes of each meeting of the Committee shall be supplied to each of the members of the Committee and to each Council represented on the Committee.

13. Powers of the Committee

- 13.1 The Committee shall, subject to the provisions of the Local Government Act 1993, have the following powers;
- 13.1.1 to establish, conduct and manage the service within the areas of the Councils;
 - 13.1.2 to appoint, dismiss and reappoint such staff as in the opinion of the Committee are necessary for the proper and efficient conduct of the service;
 - 13.1.3 to acquire by way of purchase, lease or any other means land within or outside the areas of the Councils which in the opinion of the Committee is necessary for the conduct of the service
 - 13.1.4 to arrange for such advances as may from time to time in the opinion of the Committee be necessary for the purposes of this agreement;

Any sum received by the Committee under a contract of insurance referred to in this paragraph shall, after the deduction from it of any expenses incurred in recovering it, shall be paid by the Committee to, or to the personal representative of, the person in respect of whom the sum was received.

14. Reimbursement of Expenses

- 14.1 The Committee may reimburse its members for out of pocket expenses reasonably incurred for travelling expenses and subsistence in travelling to and from meetings of the Committee.
- 14.2 In compliance with resolutions of the Committee, the Committee may reimburse its members for out of pocket expenses reasonably incurred for travelling expenses and subsistence in attending upon inspections or other business of the Committee whether within or outside of the areas of the Councils.

15. Signing of Cheques

- 15.1 All cheques drawn by the Council managing the funds on behalf of the group shall be done so under the normal scrutiny and checking as required under the provisions of the Local Government (Financial Management) Regulation 1993

16. Auditor

- 16.1 The Committee shall annually appoint an auditor who shall be the auditor who shall be auditor to one of the Councils and who shall audit annually the accounts of the Committee.

17. Funds

- 17.1 The Committee shall establish and maintain:
- 17.1.1 a general fund into which all income shall be paid and from which all expenditure and outgoings shall be met; and
 - 17.1.1.1 a trust fund which shall be administered in accordance with section 411 of the Act

- 17.2 Each of the Councils shall contribute to the funds of the Committee according to the following formula:
17.2.1 (INSERT FORMULA FOR CONTRIB's)
18. **Estimates**
- 18.1 The Secretary shall once in each year prepare and submit to the Committee estimates of the income and expenditure of the Committee for the following year.
- 18.2 For the purpose of this clause, "year" shall mean financial year as defined in the Act.
19. **Financial Statements**
- 19.1 The Secretary shall prepare and submit to each meeting of the Committee a statement prepared in accordance with the Local Government (Financial Management) Regulation 1993 showing the position of each fund held on behalf of the Committee.
- 19.2 Within a period of six weeks from the end of each quarter, the Secretary shall prepare a financial statement with respect to each fund except the Trust fund showing the estimated total income and expenditure of the funds on present trends for the year under review and the estimated funds position at the close of that year. The statements shall be prepared on the income and expenditure system of accounting and in accordance with the Local Government (Financial Management) Regulation 1993, and shall be presented to the first Committee meeting after their preparation.
20. **Undertakings and Indemnities**
- 20.1 The Councils hereby agree to be mutually responsible for and to pay all wages, salaries, costs, charges, expenses, and liabilities whatsoever properly incurred by the Committee or the Chair or any other member of the Committee for the carrying out of the terms of this agreement.
- 20.2 The Councils hereby jointly and severally agree to save harmless and keep indemnified, in the proportions set out in clause 21, the Committee and the Chair and members of the Committee and each of them respectively from all claims or actions for wages, salaries, costs, charges, expenses and all other liabilities whatsoever and all other liabilities of any kind that may be brought against them or any of them in respect of or in conjunction with the carrying out the provisions of this agreement.
21. **Contributions to Deficiencies**
- 21.1 In the event that the annual financial statements disclose any deficiency in the operation of the scheme the Committee may apportion that deficiency in accordance with this clause.
- 21.2 The amount of any deficiency in the operation of the scheme shall be apportioned between the Councils in the same proportion as the Councils contributed to the funds of the Committee.
- 21.3 If during a year it appears that the Committee will incur a deficiency for that year the Committee may require the Councils to make an advance towards meeting that deficiency, the amount of such advance to be determined in accordance with paragraph 21.2 of this clause.

21.4 Contributions to deficiencies called for by the Committee in accordance with this clause shall be paid by the Councils within one calendar month from the date of receipt of the call.

21.5 In the event that a Council to which a call for a contribution has been made pursuant to this clause has not paid the amount of that call in accordance with paragraph 21.4 of this clause it shall be lawful but not obligatory for the other Councils which are members of the scheme, or any one of them, to pay the amount of that call to the Committee and recover the amount of its debt in a court of competent jurisdiction from the Council by which the payment was required to have been made under this agreement.

22. Annual Reports

22.1.1 The Committee shall submit an annual report, setting out the activities of the Committee for the preceding year, to each of the Councils.

23. Procedure on Termination

23.1 Upon termination of this agreement an adjustment shall be made of the interest of each Council in any funds and assets that may be held by the Committee and which are not required for the purposes of this agreement.

23.2 Such funds and assets shall be disbursed in the procedure in which they were contributed.

24. Period of Agreement

24.1 This agreement shall remain in force for a period of twenty years from the date of its commencement.

24.2 This agreement may at any time during its currency be extended for such further period, as the Councils consider appropriate.

25. Resolution of Disputes

25.1 In the event that any dispute arises between the Councils or between one or more of those Councils and the Committee as to the construction of this agreement or any matter arising under or in connection with it then such dispute shall be resolved pursuant to section 742 of the Act.

IN WITNESS WHEREOF the Common Seals of the Councils have been hereunto affixed.

THE COMMON SEAL of THE COUNCIL
OF THE SHIRE OF BOOROWA was hereunto
Affixed on the ____ day of 2001 in pursuance
to a resolution of the Council passed on the ____
day of _____ 2001 and in the presence of:

]

Mayor

]

General Manager

THE COMMON SEAL of THE COUNCIL
OF THE SHIRE OF GUNDAGAI was hereunto
Affixed on the ____ day of 2001 in pursuance
to a resolution of the Council passed on the ____
day of _____ 2001 and in the presence of:

]

Mayor

]

General Manager

THE COMMON SEAL of THE COUNCIL OF THE SHIRE OF HARDEN was hereunto Affixed on the ____ day of 2001 in pursuance to a resolution of the Council passed on the ____ day of _____ 2001 and in the presence of:	]]]]]	Mayor General Manager
THE COMMON SEAL of THE COUNCIL OF THE SHIRE OF JUNEED was hereunto Affixed on the ____ day of 2001 in pursuance to a resolution of the Council passed on the ____ day of _____ 2001 and in the presence of:	]]]]]	Mayor General Manager
THE COMMON SEAL of THE COUNCIL OF THE SHIRE OF TUMUT was hereunto Affixed on the ____ day of 2001 in pursuance to a resolution of the Council passed on the ____ day of _____ 2001 and in the presence of:	]]]]]	Mayor General Manager
THE COMMON SEAL of THE COUNCIL OF THE SHIRE OF YASS was hereunto Affixed on the ____ day of 2001 in pursuance to a resolution of the Council passed on the ____ day of _____ 2001 and in the presence of:	]]]]]	Mayor General Manager
THE COMMON SEAL of THE COUNCIL OF THE SHIRE OF YOUNG was hereunto Affixed on the ____ day of 2001 in pursuance to a resolution of the Council passed on the ____ day of _____ 2001 and in the presence of:	]]]]]	Mayor General Manager

APPENDIX 6

(No. of pages excluding this page = 2)

Landfill Information Brochure



NO POSTAGE STAMP
REQUIRED

For more information please send in the reply
paid portion of this brochure or write to:

John Wilkinson*
Bald Hill Quarry
Jugiong NSW 2726

Or call your local Council on:

Boorowa:	(02) 6385 3303
Gundagai:	(02) 6944 1266
Harden:	(02) 6386 2305
Junee:	(02) 6924 1277
Tumut:	(02) 6947 0555
Yass:	(02) 6226 1477
Young:	(02) 6382 1466

Bald Hill Quarry P/L
Reply Paid 67214
JUGIONG NSW 2726



Your rubbish



where will it go?

**Tumut Gundagai Junee Harden
Young Boorowa Yass**

Your local Council, along with six others, is investigating using a proposed regional landfill near Jugiong. This will allow local government to dispose of waste in a much more environmentally friendly way.

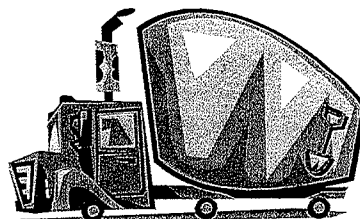
Your rubbish would be collected by the garbage truck and you could drop it off at your local landfill or existing transfer station just as you can today. Instead of waste (that can't be recycled) being buried at the local landfill, it would be transported to the regional facility for proper disposal.

At the moment an Environmental Impact Statement is being prepared for the proposed landfill. When ready, this will go on display at your local Council and you will have the opportunity to comment.

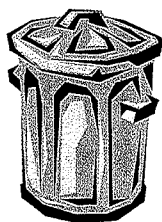


Benefits of a regional landfill

- ✂ Regional solution to local problems
- ✂ No reduction in Council services
- ✂ Lower long term landfill costs
- ✂ Better environmental management of waste
- ✂ One licenced landfill could replace 35 small tips over time
- ✂ Landfill access exclusive to participating Councils
- ✂ 40+ years life expectancy
- ✂ Cooperative approach ⇒ smarter solutions



What is happening?



Seven Councils have agreed to investigate combining their landfill requirements and using a proposed landfill to be operated by Bald Hill Quarries P/L of Jugiong. The seven Councils are Boorowa, Gundagai, Harden, Junee, Tumut, Yass and Young.

Bald Hill Quarries P/L owns a disused basalt quarry near their rock crushing operation at Jugiong. The quarry hole is 80 metres deep and has a volume of about 1 million cubic metres. The company is financing an Environmental Impact Statement (EIS) as part of a development application to have the site approved as a landfill which can accept all household and commercial waste.

The proposed landfill would be used by regional local Councils only - the landfill is not being developed to bury waste from Sydney or Canberra. The consent of the State Government will be required to operate any proposed regional landfill. This information leaflet is the first part of an extensive planned public consultation process.

If your Council decides to use the proposed landfill, your local tip would most likely be converted to a transfer station (if required), where you put your rubbish in large bins. The bins would then be taken to the Bald Hill landfill where the waste would be buried under strictly controlled conditions.

Your Council is interested in the proposal because it could have big financial and environmental benefits. If your waste does start going to Bald Hill landfill, your Council will still be committed to recycling and waste reduction programs. Many of the landfills in this region are running out of room for residents' waste. Many of the Councils face having to develop a new small landfill in the next five to ten years. New landfills are very expensive and politically sensitive.

Your comments can help make sure community concerns are addressed in the plans for the landfill and the environmental impact statement: please fill in this form.



Get more info - have your say!

If you'd like to have some input to the development of this proposal, write your comments or questions here, tear off the reply paid slip and drop it in the mail. Thanks!

Comments: _____

If you would like more information on the proposal, please fill in your contact details. You will be sent an information package and updates on what is happening with the proposal.

Name: _____

Address: _____

Fax: _____

email: _____

APPENDIX 7

(No. of pages excluding this page = 8)

Technical Calculations on:

- Leachate Generation;
- Rainfall & Evaporation Pond Design; and
- Capillary Cap Design

(Compiled by Nolan ITU Pty Ltd)

Leachate Generation and Evaporation Calculations

HELP Leachate Model

The HELP model was run using weather records from Gundagai and Wagga Wagga and assuming 10m of waste in the base of the quarry void and no run-off. The rainfall data was multiplied by the funnelling ratio.

Area of base = 900m^2 (60 x 15)

Area of top = $18\,000\text{m}^2$ (150 x 120)

Funnelling ratio of top area to base is 20:1.

The HELP modelled output for leachate generation is as follows.

Table 1: Raw HELP Leachate Generation

Year	Total Volume (m ³)
1990	13 800
1991	11 300
1992	17 400
1993	14 700
1994	7 800
1995	15 600
1996	12 750
1997	8 200
1998	10 100
1999	12 300
Average	12 400

However, the sides of the quarry hole do not act as a perfect funnel. There is considerable absorption of water in the rock mass and the access track base. With the whole open area contributions (current situation) using monthly weather records, a calculation was made of the effect run-off coefficient for the quarry walls.

Sept '99 – April 2000: Client indicated water in base was depth of 5m before pumping out, or **1900m³**. The monthly rainfall records for "Ellerslie", neighbour of the Bald Hill quarry were used for the relevant months.

Rainfall and Evaporation Pond Design Calculations

Table 2: Rainfall Sept 99- April 2000

Month	Precipitation (mm)
Sept '99	41
Oct'99	148
Nov'99	45
Dec'99	151
Jan'00	44
Feb'00	18
Mar'00	41
Apr'00	42
Totals	530

HELP modelling showed 86% of the rainfall collected at the bottom of the hole i.e.456 mm. Using 456mm x funnelling effect (20) = **9100mm**. The Volume in the quarry base using HELP modelling with 100% run-off would therefore be 9100mm x 900 (m²) = **8200m³** from Sept 99 to April 2000.

At an average evaporation rate of 5mm/day, the same period would have had 1100m³ evaporation.

The actual Run-off Coefficient to be applied to the Raw HELP leachate volume is determined by dividing the total volume (actually collected and evaporated) by the raw HELP modelling volume:

$$\frac{1100}{1900} + \frac{8200}{8200} = 37\%$$

In addition, as the upper benches are drained to increase run-off, the funnelling ratio is reduced.

Area of base = 900m² (60 x 15)

Adjusted area of 'top' = 12 000m² (100 x 120)

Funnelling ratio of top area to base is 13.3:1.

This reduces the original raw HELP leachate volume calculated by a function of 1.5. Therefore, in a wet year from Table 1 (raw HELP leachate = 16,000m³), the 'worst-case scenario' for the leachate that would require pumping from the empty quarry at the beginning of the landfill operation can be calculated:

$$\frac{16,000}{1.5} = 10,667 \text{ m}^3$$

Apply run-off coefficient: $10,667 \times 0.37 \cong 3,947 \text{ m}^3$

Conclusion

A leachate treatment/evaporation system may need to cope with 4,000m³ possible volume of leachate that could be generated in the first year of the landfill operation if there was a wet year. This is very unlikely and as the landfill fills the leachate volume will decrease significantly and leachate can be sprayed over the face. The initial evaporation ponds will be sized at 2,000 m³ with the contingency that the size can be increased.

Gundagai Meterological Data (Ridge Street - site 073128)**1976-1995****Ellerslie is a local property where rainfall records have been kept from 1976-2001**

	Gundagai average monthly rainfall	Decile 9 rainfall	Gundagai highest monthly rainfall	Wagga average monthly evaporation	Ellerslie average monthly rainfall	Ellerslie 1995 monthly rainfall
Jan	65.8	154.0	305.6	275.9	50.2	133.0
Feb	41.1	111.1	148.0	229.6	28.0	18.0
Mar	43.6	116.4	167.6	186.0	35.0	0.0
Apr	54.9	126.8	136.0	108.0	41.6	20.0
May	67.0	132.1	134.4	58.9	56.0	125.0
Jun	60.0	108.0	121.8	36.0	51.2	68.0
Jul	78.6	155.7	156.6	37.2	64.8	106.0
Aug	63.2	116.4	117.6	55.8	52.6	10.0
Sep	68.4	117.4	134.0	78.0	58.3	41.0
Oct	69.2	142.2	145.6	130.2	56.1	54.0
Nov	49.5	93.8	95.0	192.0	52.3	132.0
Dec	52.3	139.2	154.4	263.5	50.2	70.0
Annual	713.6	937.7	1816.6	1651.1	596.3	777.0

Average Year

ELLERSLIE

	Avg Monthly Rainfall (Ellerslie) (mm)	Pan Evap.(W agga) (mm)	PET Factor 0.8	Excess Evap (mm)	Simulated Leachate Input (m ³)	Net Evaporation over Rainfall (Leachate Evaporation) (m ³)
Depth						0.64
JAN	50.2	275.9	220.72	170.5	168.4	532.88
FEB	28.0	229.6	183.68	155.7	93.9	486.50
MAR	35.0	186.0	148.8	113.8	117.4	355.63
APR	41.6	108.0	86.4	44.8	139.5	140.00
MAY	56.0	58.9	47.12	-8.9	187.8	-27.75
JUN	51.2	36.0	28.8	-22.4	171.7	-70.00
JUL	64.8	37.2	29.76	-35.0	217.3	-109.50
AUG	52.6	55.8	44.64	-8.0	176.4	-24.88
SEP	58.3	78.0	62.4	4.1	195.5	12.81
OCT	56.1	130.2	104.16	48.1	188.2	150.19
NOV	52.3	192.0	153.6	101.3	175.4	316.56
DEC	50.2	263.5	210.8	160.6	168.4	501.88
Annual	596.3	1651.1	1320.88	724.6	2000.00	2264.31

Pond
Size m2
3125
55.9 m square

Actual Wet Year 1995

ELLERSLIE

	Wet Yr(Ellerslie) Rainfall (mm)	Pan Evap. (mm)	PET Factor 0.8	Excess Evap (mm)	Leachate Input (m ³)	Net Evaporation over Rainfall (Leachate Evaporation) (m ³)
Depth						0.64
JAN	133.0	275.9	220.72	87.7	342.3	274.13
FEB	18.0	229.6	183.68	165.7	46.3	517.75
MAR	0.0	186.0	148.8	148.8	0.0	465.00
APR	20.0	108.0	86.4	66.4	51.5	207.50
MAY	125.0	58.9	47.12	-77.9	321.8	-243.38
JUN	68.0	36.0	28.8	-39.2	175.0	-122.50
JUL	106.0	37.2	29.76	-76.2	272.8	-238.25
AUG	10.0	55.8	44.64	34.6	25.7	108.25
SEP	41.0	78.0	62.4	21.4	105.5	66.88
OCT	54.0	130.2	104.16	50.2	139.0	156.75
NOV	132.0	192.0	153.6	21.6	339.8	67.50
DEC	70.0	263.5	210.8	140.8	180.2	440.00
Annual	777.0	1651.1	1320.88	543.9	2000.00	1699.63

Pond
Size m2
3125

Evapotranspiration Table

Based on Ellerslie

	Ellerslie Avg Monthly Rainfall (mm)	WaggaE vap. (mm)	Crop Factor (pasture)	Potential ET (mm)
JAN	50.2	275.9	0.70	193.13
FEB	28.0	229.6	0.70	160.72
MAR	35.0	186.0	0.70	130.2
APR	41.6	108.0	0.60	64.8
MAY	56.0	58.9	0.50	29.45
JUN	51.2	36.0	0.45	16.2
JUL	64.8	37.2	0.40	14.88
AUG	52.6	55.8	0.45	25.11
SEP	58.3	78.0	0.55	42.9
OCT	56.1	130.2	0.65	84.63
NOV	52.3	192.0	0.70	134.4
DEC	50.2	263.5	0.70	184.45
Annual	596.3	1651.1		1080.87

Site ROC	Average Year	0.15		
	Wet Year	0.2		
Porosity (mm/m)		402	90% Total Porosity of SM/SC Soil from HELP	447 mm
Wilting Point (mm/m)		52.5	For SM/SC Soil from HELP	
Depth of cover (m)		1	wilt pt x depth	52.5
Max soil moisture		402.3		
Max. Moisture Loss		20%	In any one month	
Contributing Area Factor		1.2	infiltration is 1.2 x precipitation to account for pooling etc	

Potential evapotranspiration is calculated by the actual evaporation multiplied by a crop factor (see PET sheet).

Average Rainfall Ellerslie

month	precipitation (mm)	Rainfall Runoff (mm)	infiltration (mm)	soil moisture first day (mm)	soil moisture last day (mm)	percolation (mm)	actual ET (mm)	potential ET (mm)
JAN	50.2	7.5	52.7	196	156.8	0	91.9	193.1
FEB	28.0	4.2	29.4	156.8	125.4	0	60.8	160.7
MAR	35.0	5.3	36.8	125.4	100.4	0	61.8	130.2
APR	41.6	6.2	43.7	100.4	80.3	0	63.8	64.8
MAY	56.0	8.4	58.8	80.3	109.6	0	29.5	29.5
JUN	51.2	7.7	53.8	109.6	147.2	0	16.2	16.2
JUL	64.8	9.7	68.0	147.2	200.4	0	14.9	14.9
AUG	52.6	7.9	55.2	200.4	230.5	0	25.1	25.1
SEP	58.3	8.7	61.2	230.5	248.8	0	42.9	42.9
OCT	56.1	8.4	58.9	248.8	223.1	0	84.6	84.6
NOV	52.3	7.8	54.9	223.1	178.4	0	99.5	134.4
DEC	50.2	7.5	52.7	178.4	142.8	0	88.4	184.5
SUM	596.3					0.0		



90th Percentile Rainfall (Ellerslie 1995)

month	precipitation (mm)	Rainfall Runoff (mm)	infiltration (mm)	soil moisture first day (mm)	soil moisture last day (mm)	percolation (mm)	actual ET (mm)	potential ET (mm)
JAN	133.0	26.6	133.0	196.3	157.0	0	172.3	193.1
FEB	18.0	3.6	18.0	157.0	125.6	0	49.4	160.7
MAR	0.0	0.0	0.0	125.6	100.5	0	25.1	130.2
APR	20.0	4.0	20.0	100.5	80.4	0	40.1	64.8
MAY	125.0	25.0	125.0	80.4	176.0	0	29.5	29.5
JUN	68.0	13.6	68.0	176.0	227.8	0	16.2	16.2
JUL	106.0	80.0	47.2	227.8	260.1	0	14.9	14.9
AUG	10.0	2.0	10.0	260.1	245.0	0	25.1	25.1
SEP	41.0	8.2	41.0	245.0	243.1	0	42.9	42.9
OCT	54.0	10.8	54.0	243.1	212.4	0	84.6	84.6
NOV	132.0	26.4	132.0	212.4	210.0	0	134.4	134.4
DEC	70.0	14.0	70.0	210.0	168.0	0	112.0	184.5
Total	777.0					0		

Average Year with wettest September and October (Ellerslie)

month	precipitation (mm)	Rainfall Runoff (mm)	infiltration (mm)	soil moisture first day (mm)	soil moisture last day (mm)	percolation (mm)	actual ET (mm)	potential ET (mm)
JAN	50.2	10.0	50.2	196.3	157.0	0	89.5	193.1
FEB	28.0	5.6	28.0	157.0	125.6	0	59.4	160.7
MAR	35.0	7.0	35.0	125.6	100.5	0	60.1	130.2
APR	41.6	8.3	41.6	100.5	80.4	0	61.7	64.8
MAY	56.0	11.2	56.0	80.4	107.0	0	29.5	29.5
JUN	51.2	10.2	51.2	107.0	142.0	0	16.2	16.2
JUL	64.8	13.0	64.8	142.0	191.9	0	14.9	14.9
AUG	52.6	10.5	52.6	191.9	219.4	0	25.1	25.1
SEP	149.0	29.8	149.0	219.4	325.5	0	42.9	42.9
OCT	135.0	27.0	135.0	325.5	375.8	0	84.6	84.6
NOV	52.3	10.5	52.3	375.8	300.7	0	127.5	134.4
DEC	50.2	10.0	50.2	300.7	240.5	0	110.3	184.5
Total	765.9					0.0		



APPENDIX 8

(No. of pages excluding this page = 3)

Traffic Impact Assessment



APPENDIX 8

TRAFFIC IMPACT ASSESSMENT - BALD HILL QUARRY REGIONAL LANDFILL

Key Transportation and Traffic Issues Covered in the Environmental Impact Statement *

Page 1 of 2

Issue	Section in Document
BRIEF DESCRIPTION OF THE DEVELOPMENT BACKGROUND	1.4
DESCRIPTION OF THE SITE AND PROPOSED ACTIVITY	Section 2
SITE LOCATION	
* Current land use characteristics (zoning) of the proposed site and land use in the vicinity	3.11
* Site Access	2.6
THE EXISTING TRAFFIC CONDITIONS	
* Road hierarchy, including the identification of the classified road network (major and minor roads) which may be affected by the development proposals	3.13
* Inventory of road widths, road conditions, traffic management and parking control	3.13
* Current and proposed roadworks	3.13
TRAFFIC FLOWS	
* Identification of key roads, and appropriate assessment period; AADT on key roads	3.13
* Estimate of the speed of traffic on the road to which vehicular access is proposed	3.13
* Current traffic generation of site	3.13
* Daily and peak period heavy vehicle flows and percentages	2.6, 3.13
TRAFFIC SAFETY	3.13
PEDESTRIAN NETWORK	Not Applicable
PUBLIC TRANSPORT	
* Bus routes (especially school buses)	Not Applicable
DEVELOPMENTS IN THE VICINITY	Not Applicable
Source: Roads & Traffic Authority of NSW, 1993	
* Extract from "Guide to Traffic Generating Developments - December 1993"	



APPENDIX 8

TRAFFIC IMPACT ASSESSMENT - BALD HILL QUARRY REGIONAL LANDFILL

Key Transportation and Traffic Issues Covered in the Environmental Impact Statement*

Page 2 of 2

Issue	Section in Document
THE DEVELOPMENT	
* Nature of development	2.1
* Hours and days of operations	2.4.5
* Staging and timing of development	2.4.6
ACCESS	
* Alternative locations of access	None
* Site distance of driveways and comparisons with stopping and desirable minimum sight distances	3.13
TRAFFIC GENERATION DURING DESIGN PERIODS	
* Daily and seasonal factors	3.13
IMPACT OF TRAFFIC SAFETY	
* Assessment of Road Safety Impact	3.13
IMPACT OF GENERATED TRAFFIC	
* Daily traffic flows and composition on key streets and their expected effect on the environment	3.13 (see Note A attached)
* Impact of construction traffic during construction stages	Not Applicable
* Other proposed developments in the vicinity, their timing and likely impact, if known	Not Applicable
* Assessment of traffic noise	3.12
RECOMMENDED WORKS	
* Improvements to site access and circulation	2.6
* Improvements to roads, signals, roundabouts and other traffic management measures	None
* Noise attenuation measures	3.12
* Extract from "Guide to Traffic Generating Developments - December 1993"	

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NOTE A

Assumptions used to calculate LRT as an AADt. (AAD+).

1. All vehicle types assumed to be large 7 axle configuration for the purpose of this analysis. In reality approximately 30% of vehicles are expected to be 2 or 3 axle vehicles.
2. Total vehicle movements as per Table 2.1 in the EIS.
3. AADT based on 365 day year (Explanatory Notes: Traffic Volume Publication for South Western Region 1997). For this analysis LRT has been limited to a 260 day year (5 day week).
4. The traffic from the one on-site employee additional to those currently employed for the quarry operations is accounted for in assumption 1 above.
5. "AADT figure at a given point represents the average number of axle pairs passing in both directions, during a 24 hour period estimated over one year" – Traffic Volume Publication for South Western Region 1997.

$$\text{AADT (for specific road)} = \frac{\text{TOTAL VEHICLE MOVEMENTS per week} \times 7 \text{ (axle configuration)}}{5 \text{ DAYS PER WEEK} \times 2 \text{ axles (axle pair)}}$$

WORKED EXAMPLE: MR 381 Jugiong – Harden Rd N of SH2

LRT from the shires of Young, Harden and Boorowa would use this road prior to joining SH2

$$\begin{aligned} \text{AADT (MR 381)} &= \frac{\text{Young LRT} + \text{Harden LRT} + \text{Boorowa LRT} \times 7}{5 \times 2} \\ &= \frac{(12 + 13 + 2) \times 7}{10} \\ &= \frac{27 \times 7}{10} \\ &= \frac{189}{10} = 18.9 = 19 \text{ AADT} \end{aligned}$$



APPENDIX 9

(No. of pages excluding this page = 3)

Energy Statement



ENERGY STATEMENT

PREAMBLE

This Energy Statement has been prepared in accordance with the requirements of the Office of Energy and provides a concise assessment of the impact of the proposed Bald Hill Quarry Landfill operations on energy resources.

1.0 BACKGROUND INFORMATION

The Applicant, Bald Hill Quarry Pty Ltd, proposes to develop a regional Class 1 Solid Waste landfill within the exhausted Blad Hill Quarry void. The landfill would service the surrounding eight Local Government Areas.

A regional waste contractor would transport the wastes to the Bald Hill Quarry Landfill where the wastes would be tipped and sorted for recyclables in the transfer station. Wastes would then be loaded onto the landfill transfer truck and deposited in the void. Deposited wastes would be covered with fine basalt quarry fines daily.

The landfill transfer truck, quarry trucks transporting the quarry fines, front-end loader at the transfer station and the traxcavator compacting the wastes would all be powered by diesel fuel.

Electricity would be used to power lights at the transfer station as well as the pump. The pump will be used to deliver the leachate from the washdown of the tipping floor and waste bins to the leachate evaporation ponds.

2.0 OPERATIONAL ENERGY REQUIREMENTS

The site preparation, waste transport, delivery, transfer, deposition and covering would necessitate the consumption of diesel and electricity.

2.1 Site Preparation

Site preparation would involve the construction of the transfer station, leachate management system including the leachate evaporation ponds and upgrade of the internal void access road.

The Applicant estimates fuel use for these activities would be as follows:

Front-end Loader	2000 L
Grader	1000 L
Excavator	1000 L
TOTAL:	4000 L



2.2 Landfill Operations

The Applicant estimates that fuel use for the landfill operation will be as follows:

Wastes Transport	127200 L per year
Traxcavator	10400 L per year
Front-end Loader	9050 L per year
Quarry Trucks (transporting cover material)	2080 L per year
Landfill Transfer Truck	2000 L per year
TOTAL:	150730 L per year

Wastes transport fuel use is based on 2 loads per day, each travelling approximately 120km return and assumed to be using 1.5 L/km.

Electricity power useage for leachate pumping and lights is estimated to be approximately \$500 per month.

3.0 JUSTIFICATION OF FUEL AND ENERGY USAGE

The current fuel and energy usage for the many small local landfills is presented in the table below.

Boorowa Shire	7000 L per year
Cootamundra Shire	35000 L per year
Gundagai Shire	12000 L per year
Harden Shire	30920 L per year
Junee Shire	34840 L per year
Tumut Shire	55000 L per year
Yass Shire	40240 L per year
Young Shire	66000 L per year
TOTAL:	281000 L per year

Currently, 281000L of diesel fuel is used per annum for the local landfills in the eight surrounding Local Government Areas. This would be reduced to approximately 150,730L per annum with the centralisation of a regional landfill. This indicates a more efficient energy use.



APPENDIX 10

(No. of pages excluding this page = 5)

Greenhouse Gas Assessment
(Compiled by Nolan ITU Pty Ltd)



GREENHOUSE IMPACT OF THE PROPOSED BALD HILL QUARRY REGIONAL LANDFILL

Greenhouse Impact Model

This greenhouse impact model compares the combined greenhouse impact of the methane emissions from uncontrolled local landfills, to the overall greenhouse impact of the landfill gas controlled Bald Hill landfill. The CO₂ produced due to transporting waste from population centres to the central landfill is added to the overall greenhouse impact of the Bald Hill landfill.

Eight Local councils have given an estimate of the waste currently going to local landfills and the quantities they may send to the Bald Hill Quarry Regional Landfill. These estimates are significantly lower than predictions by Nolan-ITU based upon total population and the type of industry in the Shire. The population-based approach also allows the waste stream to be split into standardised Australian Waste Database categories and an assessment of the quantities that will probably be transferred to Bald Hill. Green waste is estimated as 20% of the total 'Other Domestic and Other Council'.

This greenhouse impact model presents the Council estimate as a lower bound, and the Nolan-ITU estimate as an upper bound of waste production. The greenhouse impact for both estimates is worked through in the following sections.

Waste Quantities

The annual quantity of waste going to the local landfills is shown in Table 1.

TABLE.1:

Annual Waste Tonnes Going to Local Landfills.

Council Estimate (t)		Nolan-ITU Estimate (t)					
Council	TOTAL	Domestic	Other Domestic and Other Council	C&I	B&D	Recycled Green	TOTAL
Boorowa	600	499	372	263	263	93	1489
Yass	1700	1955	1455	1716	1716	364	7205
Young	10000	2297	1710	2429	4031	427	10885
Junee	1340	1206	898	635	635	224	3599
Harden	1241	817	608	430	430	152	2439
Tumut	4812	2496	1858	2628	4380	464	11826
Gundagai	585	832	619	438	438	155	2482
Cootamundra	2000	1040	774	913	913	194	3833
TOTAL	22278	11144	8293	9452	12806	2073	43757

Only waste that will be transferred to the Bald Hill Quarry Regional Landfill need be entered into calculations of greenhouse impact. All solid inert waste will be disposed of locally. The proportion of Other Domestic and Other Council wastes that is considered solid inert depends on the level of kerbside and other services provided by in each Local Government Area. For large towns (Yass, Young and Tumut) this was assumed to be 50% retained and for small Shires 20% retained. 20% of the C&I waste and all B&D waste is assumed to solid inert. Separated green waste will be retained for local use in the Shire. These retained portions of the waste stream are subtracted from the total waste going to local landfill. Therefore, the total waste likely to be delivered to the Bald Hill Quarry Regional Landfill is less than the amount of waste currently going to local landfills for both the Council and the Nolan-ITU estimate in most cases. The waste quantities are shown below in Table 2.

TABLE 2:
Annual Waste Tonnes to Transfer to Bald Hill.

Council Estimate		Nolan-ITU Estimate					
Council	TOTAL	Domestic	Other Domestic and Other Council	C&I	B&D	Recycled Green	TOTAL
Boorowa	400 ⁽¹⁾	499	372	210	0	0	1081
Yass	1700	1955	909	1372	0	0	4237
Young	6000	2297	1069	1935	0	0	5301
June	1200	1206	898	508	0	0	2612
Harden	1300	817	608	344	0	0	1770
Tumut	4500	2496	1161	2102	0	0	5759
Gundagai	1200	832	619	350	0	0	1802
Cootamundra	1500 ⁽¹⁾	1040	774	730	0	0	2544
TOTAL	17800	11144	6410	7553	0	0	25106
(1) Unsure of waste tonnage to transfer. Nolan-ITU estimate							

GREENHOUSE IMPACT MODEL

METHANE EMISSION FROM LOCAL LANDFILLS

The total waste stream has been divided into standard categories (**Table 1**). The proportion of each waste type for every local landfill is entered into a computer model, which calculates the landfill gas flow rate from the landfill as an equivalent annual rate. Given that 60% of the landfill gas is methane, and that methane has a Global Warming Potential (CO₂ equivalence factor) of 21, the greenhouse impact of landfill gas is calculated for each of the local landfills and shown in **Table 3** below.

TABLE 3:

Annual Greenhouse Impact of Landfill Gas from Local Landfills.

Council	Tonnes CO ₂ equivalent Council Estimate	Tonnes CO ₂ equivalent Nolan-ITU Estimate.
Boorowa	500	1351
Yass	2487	6199
Young	8905	7868
Junee	1497	3258
Harden	1634	2225
Tumut	6768	8662
Gundagai	1535	2305
Cootamundra	1968	3338
<i>TOTAL</i>	<i>25294</i>	<i>35206</i>

Haulage to Bald Hill

The energy expenditure in waste transportation is calculated in Megajoules (MJ) per tonne kilometre. This is derived from the fuel consumption of a loaded and an unloaded truck (to include the return journey) to be approximately 2 km/L and 2.5 km/L respectively. A full load (27 t) is divided into the total energy released from diesel (35.97MJ/L) to give an energy value per tonne kilometre. The calculated energy consumed per tonne kilometre is 1.2 MJ / t km. Each MJ of fuel consumed causes an emission of 77.4 gm/CO₂.

For Local Government Areas with lower amounts of waste, the energy per tonne kilometre is increased by a loading factor of 2 to allow for trucks to travel to Bald Hill with less than a full load. Sites with high amounts of waste (Yass, Young and Tumut) are likely to have fully loaded trucks and so have been calculated using a loading factor of 1. The results are shown in **Table 4**

TABLE 4:

Annual Greenhouse Impact of Haulage to Bald Hill.

Council	Kilometers to Jugiong	Tonnes CO ₂ per Year Council Estimate	Tonnes CO ₂ per Year Nolan- ITU Estimate
Boorowa	69	5	14
Yass	65	10	26
Young	92	51	45
Junee	103	23	50
Harden	37	9	12
Tumut	88	37	47
Gundagai	40	9	13
Cootamundra	42	12	20
<i>TOTAL</i>		<i>156</i>	<i>227</i>

Methane Emission From Bald Hill Landfill

Calculation of the greenhouse impact of landfill gas from the proposed Bald Hill Quarry Regional Landfill is similar to that for each of the local landfills. Proportions of waste from **Table 2** are used in the model to give a total landfill gas flow. Although the Bald Hill Quarry Regional Landfill would have measures to control landfill gas, the effective control would not be 100%. This greenhouse impact model assumes 60% control of total landfill gas emissions if gas is collected progressively by the proposed horizontal gas collection system.

The total greenhouse impact of the Bald Hill landfill is the uncontrolled landfill gas, plus the additional impact of transport from the population centres (from **Table 4**). It is noted that the greenhouse impact due to transport of wastes from local landfills to Bald Hill is minor compared to the benefit of controlling a proportion of the landfill gas.

Table 5:

Total Annual Greenhouse Impact of Bald Hill Central Landfill.

	Tonnes CO ₂ equivalent – Land Fill Gas (60% controlled).	Tonnes CO ₂ equivalent – Transport.	TOTAL Greenhouse Impact (Tonnes CO ₂ equivalent)
Council Estimate	8 710	156	8 866
Nolan-ITU Estimate	12 270	227	12 497

Comparison Of Local Landfills To The Bald Hill Quarry Regional Landfill

Table 6: Comparison of Annual Greenhouse Impact

	Local Landfills (Tonnes CO ₂ equivalent)	Bald Hill (Tonnes CO ₂ equivalent)	Tonnes CO ₂ equivalent Saved by Bald Hill Landfill	% Saved
Council Estimate	25 294	8 866	16 428	65%
Nolan-ITU Estimate	35 206	12 497	22 709	65%

Table 6 lists the total quantities of greenhouse gas expressed as tonnes CO₂ equivalent. The total greenhouse impact of the Bald Hill landfill is about one third of the combined greenhouse impact of using many local landfills.

The greenhouse impact of hauling waste to the proposed Bald Hill Quarry Regional landfill is insignificant compared to the emission of methane from the landfills. Methane gas is the determining factor in this greenhouse impact model. The saving of CO₂

equivalent by utilising the Bald Hill Quarry Regional Landfill is the direct result of controlling a portion of the methane. In addition the solid inert waste remaining at the local landfills could continue to generate a methane emission, depending on the method of operation.

