



STRATEGIC IMPACT ASSESSMENT STUDY

CONCERNING

**LAND AT TOURLE STREET AND
INDUSTRIAL DRIVE, MAYFIELD - THE
"STEEL RIVER" PROJECT**

FEBRUARY 1998

**COMPILED FOR NEWCASTLE COUNCIL
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APPENDIX

- Draft Consultant's Scope of Work (original Steering Committee's brief for project)
- Draft Scope and Indicative Contents (Strategic Impact Assessment Study)
- Statement of Residents Groups' Perspectives and Views, including Concept Understanding by Northern Parks and Playgrounds Movement
- Minutes of the Steering Committee's Meetings
- SIAS Consultant Team

REPORT APPENDIX

VOLUME 1

- i) "BHP West of Tourle Street, Urban Design and Landscape Studies" Hassell Pty Ltd, December 1996.
- ii) "Preliminary Geotechnical Investigation, BHP Site West of Tourle Street Mayfield", Robert Carr and Associates Pty Ltd, June 1997.
- iii) "An Archaeological Survey for Aboriginal Sites at Tourle Street Newcastle, NSW" by Theresa Bonhomme, dated August 1996.
- iv) "An Assessment of the Historical and Archaeological Values of BHP Land at Tourle Street Newcastle" by Bonhomme Craib and Associates and Sue Rosen Pty Ltd February 1997.
- v) "Steel River Eco-industrial Park, Master Plan Report" Hassell, September 1997.
- vi) "Steel River Site, Socio-Economic Impact Assessment", by BBC Consulting Planners, April 1997.

VOLUME 2

- vii) "Industry Characteristics Study, BHP Land West of Tourle Street, Newcastle", by the Urban and Regional Research Unit, Tunra Limited, the University of Newcastle January 1997.
- viii) "Report on Transport Aspects of Proposed 'Steel River' Industrial Development, Mayfield West" by Colston Budd Hunt and Twiney, June 1997.
- ix) "Steel River Project Environmental Review and Operational Guidelines", by Woodward Clyde, July 1997.
- x) "Flora and Fauna Assessment for the Steel River Project, Tourle Street, Mayfield" by Hunter Wetlands Research and Management, June 1997.
- xi) "Steel River Project - Remedial Action Plan, Environmental Impact Statement", by Woodward Clyde, May 1997.
- xii) "BHP, Supplementary Statement of Environmental Effects concerning Site Infrastructure Details: Remediation and Infrastructure Development Application for the Steel River Project, Newcastle" by APT Peddle Thorp, June 1997.

EXECUTIVE SUMMARY

PART A: ASSESSMENT CONTEXT

1.0 INTRODUCTION

1.1 The Subject Land and the Assessment Objectives

The land which is the subject of this Strategic Impact Assessment Study (SIAS) is presently owned by BHP and has an area of approximately 104.0 hectares. It is bordered on the east, north, south and west by, respectively, Tourle Street, the South Arm of the Hunter River, an industrial railway easement, and the Pacific Highway/Industrial Drive arterial roads.

Industrial zoned areas lie generally to the east, north and west, while the residential areas of Mayfield lie generally to the south.

The assessment objectives which this SIAS seeks to achieve, and the purpose for which this SIAS has been prepared can be listed as follows:

- i) To support the preparation of a new environmental planning instrument applying to the subject land (LEP) providing for a mechanism which will allow a rapid (28 days) development approval period for industries which comply with the requirements of an environmental envelope.
- ii) To define an environmental envelope consisting of environmental standards, requirements and objectives, to which the new LEP will refer, and with which future development including designated development on the subject land must comply, or be subject to a further, development-specific environmental assessment.
- iii) To define a mechanism by which the environmental performance of future development on the subject land can be monitored and by which the environmental standards initially established can be subsequently reviewed on a regular basis.

The preparation of the new LEP for the land was the subject of a resolution by Newcastle Council at its meeting on 22nd April 1997. The SIAS has been prepared subject to the provisions of the Environmental Planning & Assessment Act 1979, as a local environmental study, according to specifications issued by the Director-General of the Department of Urban Affairs and Planning.

The general objectives for the development of the Steel River site can be listed as follows. These objectives are the result of combining the original aims of BHP with those which have evolved out of the work of the committee set up to steer the project, namely, the Newcastle Beyond 2000 Technical Steering Committee.

The socio-economic objective of providing a development which has the potential to provide 2000 jobs. This also includes the ability to achieve a rapid (28 day) approval process for incoming industries which comply with a pre-determined set of environmental criteria.

The eco-industrial objective of applying the principles of industrial ecology to the site itself and to the region as a whole, reflecting and building upon the socio-cultural, environmental and economic identity and strengths of the Hunter Region.

The socio-cultural objective in which the development of the site expresses its heritage, along with visual, landscape, artistic, and public accessibility goals.

The environmental management objective in which the management of the site is on-going and includes monitoring environmental performance as well as the continuing application and management of eco-industrial principles.

The community consultation objective aimed at permitting periodic consultation between the estate management and the community in respect of the environmental envelope and its application.

1.2 Socio-Economic Issues

Extensive socio-economic research studies were carried out in the light of the impact on Newcastle resulting from the announcement by BHP that the steel making facility was to close in 1999, involving the loss of some 2500 jobs.

The research confirmed that the creation of jobs on Steel River will help greatly to mitigate the job loss impact of the steel plant closure.

Having regard also to the "multiplier effect" of job creation on the Steel River site, and the advantages offered by the region as a whole, it could be concluded that the development of the site for industrial purposes in the manner discussed in the SIAS is justified on socio-economic grounds.

In addition to these socio-economic grounds for site development justification, there were also environmental reasons. Specifically these involved the optimisation of land and resource utilisation, and the opportunity for actual environmental enhancement.

1.3 Background Research and Reports

A body of research was carried out in order to provide essential background data, and a comprehensive information base for the SIAS. This research covered the areas of flora and fauna; socio-economic issues; future characteristics of industries locating on the site; traffic and transport; geotechnical characteristics; environmental studies; and archaeological and heritage issues. Basic landscape and urban planning matters were also addressed as well as civil engineering and public utility issues.

The separate reports dealing with each of the above areas of study appear in the Report Appendix to the SIAS.

Independent of the above studies, an investigation was carried out concerning site contamination. It was found that part of the site contained tar substances and required remediation.

Accordingly, a Remedial Action Plan (RAP) was prepared, accompanied by an Environmental Impact Statement (EIS) addressing the environmental issues involved in implementing the Remedial Action Plan. This RAP and EIS have been combined into one document and has also been included as an information report with this SIAS.

In addition, a document titled Supplementary Statement of Environmental Effects is included in the Report Appendix. That statement has been prepared specifically as part of the documents lodged with a development application for the remediation works and works associated with the development of the site infrastructure.

The development of the site infrastructure arises from the need to provide a structural framework into which future industries will fit as, one by one, they decide to locate in the Steel River site.

1.4 Consultation

The consultation process associated with the preparation of the SIAS involved those authorities and groups with which it would be necessary to consult in the course of preparing research and assessment documentation.

The individual reports which were mentioned above as being included in the Report Appendix to the SIAS each contain a list of all authorities and groups consulted and should be referred to where specific details are required.

As part of this consultation with the authorities, contact, including direct discussion, with a number of State and Local Government agencies, was facilitated by the Department of State and Regional Development.

In addition, the Newcastle Beyond 2000 Technical Sub-Committee included representatives from the following bodies.

State Government: Minister for Racing and Gaming and Minister Assisting the Premier on Hunter Development; Hunter Economic Development Corporation; Environment Protection Authority; State and Regional Development.

Federal Government: Hunter Regional Development Organisation.

Newcastle City Council: Councillor; Planning and Development Division; Community Development Division.

Community: Mayfield Residents Group; Community; Northern Parks and Playgrounds Movement.

Newcastle University: Geography Department.

Trade Union Movement: Australian Workers Union.

BHP: Manager Property; Public Affairs

2.0 SITE DETAILS

2.1 Locality Characteristics

The characteristics of the land in the immediate vicinity of Steel River were examined in respect of the potential impact that industrial development on Steel River might have.

To the south of the site, the existing residential area generally centred around Angophora Drive is shielded from the future development on the subject land by existing industrial land uses including a Telstra depot. From the commencement of Industrial Drive at its intersection with Maitland Road, to the south-west corner of the site at Tourle Street, there are existing residential areas on, or adjacent to, Industrial Drive, which will need to be considered in the context of the environmental impact of future development in the subject site. However, there is also an extensive area of open space along this section of Industrial Drive, which can act as a natural buffer to residential development further to the south.

To the east of Tourle Street lies the main BHP industrial complex, and to the north, across the river, lies the yet undeveloped area owned by BHP, on Kooragang Island. To the west of the site, beyond the industrial rail line, lies an extensive area of open space, beyond which are located large areas of industrial zoned land.

The site itself is described as being Lot 12 DP842850.

2.2 Site Development Influences

In terms of existing and future land use on Steel River, the SIAS notes that the Australian Manganese EMD Plant adjacent to the north-east corner of the site will remain and possibly expand its area by some 50%. Similarly, the existing electricity transmission lines in the existing easement will also remain. The other existing uses, the Boral slag crushing plant, the Boral concrete batching plant, and the BHP hot metal pits will eventually cease to be accommodated on site.

The topography of the site will be determined by the future filling operations proposed as part of the site remediation strategy. Essentially, the remediation proposed for the site is a "cap and contain" strategy, the capping being a large amount of coal washery reject fill material imported on to the site and graded to form a re-contouring of the land. The geotechnical investigations carried out for the site, together with the flora and fauna studies are dealt with in a later section of the SIAS.

Documents influencing development on Steel River, include State Environmental Planning Policies (SEPP's) namely SEPP 11, SEPP 33, SEPP 34. They also include the Hunter Regional Environmental Plan, the Newcastle Local Environmental Plan 1987, and Newcastle Development Control Plans, Numbers 20 and 33.

Possible additional environmental legislation such as future Integrated Development Assessment and Protection of Environment Policies (PEP's) together with existing state pollution legislation. Specific environmental acts, are also relevant.

PART B: SITE DEVELOPMENT

3.0 IMMEDIATE DEVELOPMENT

3.1 Remediation

The SIAS points out that there is certain work which must be carried out immediately so that the future development of individual industrial premises can actually occur on the subject site, under the provisions of what will be the new LEP. This work is aimed at firstly, remediating the site to a standard appropriate with industrial development, and secondly, at developing a basic infrastructure of roads, open spaces and utility services within which incoming future industries can commence to operate.

The description of the site remediation is contained in the report titled "Steel River Project - Remedial Action Plan, Environmental Impact Statement". This EIS notes that the essential strategy for remediation of the site is to "cap and contain" the tar-contaminated ground with coal washery reject fill material. There will be, however, on-going remedial activity still necessary.

In this regard, it is expected that localised areas of contaminated ground may also occur randomly throughout the site. These may be encountered as site development progresses, both in the construction of the site infrastructure, and in the construction of future industrial premises.

The proposed method of dealing with the issue of these "arisings" during the course of construction of the site infrastructure and future industrial premises is covered in the EIS.

3.2 Site Infrastructure

The infrastructure master plan has been developed through extensive consultation with the Newcastle Beyond 2000 Technical Sub-Committee, analysis of site constraints and research of industry requirements.

The main site entrance is located on Industrial Drive. Secondary entrance roads are provided off the Pacific Highway at the western end of the site and off Tourle Street on the site's eastern side.

The three site entries are connected by a river frontage road. This road will provide pedestrian and vehicular access to a riverfront park. A secondary road adjacent to the site's southern boundary will also connect the main entrance from Industrial Drive to the Pacific Highway entry road. This road will create a loop within the site maximising circulation opportunities and providing flexibility in the layout of future industrial allotments. An eco-industrial services trench will be located within the footpath reserves of the river frontage road and southern loop road.

A rail line easement will be provided to connect the Kooragang Island Goods Rail line to the main BHP plant, east of Tourle Street. The existing transmission line easement located on the southern side of the site will be retained, will be planted with native vegetation, and will incorporate cycle and pedestrian pathways.

Three principal parkland areas will be provided throughout the development to create a high quality visual environment and provide recreation outlets for both employees and local residents. These will be located at the site's main entrance on Industrial Drive, in the centre of the site at the end of the Industrial Drive entry boulevard, and on the site's northern boundary adjacent to the southern arm of the Hunter River. These parks will incorporate water quality ponds which will function as part of a water management strategy for the site, demonstrating the environmental objectives of the development as well as providing quality recreation settings and visual amenity.

As a result of a community workshop arranged by Council in May 1997, a design/development strategy was eventually identified for the South-East Hill area of the site.

This strategy will be integrated with, and will be implemented by, the progressive development of the site infrastructure in appropriate stages.

4.0 FUTURE DEVELOPMENT

4.1 Industry Investigations

Background investigations were carried out by both BHP and by the Hunter Economic Development Corporation (HEDC), aimed at identifying the range of industrial activities most appropriate for the site and its location, and therefore most likely to be able to generate the target employment figure of 2000 jobs.

BHP's investigations focussed on the kind of industries which would benefit most (and therefore be most likely to seek to locate in) a special kind of development area. This would be an area in which certain tariff advantages were available including a deferred Duty arrangement, which, among other names is called a "Foreign Trade Zone" (FTZ). BHP's investigations concentrated on identifying how these FTZ's operated and what kind of industrial activities were attracted to them. This research resulted in BHP's nominating some fifteen different categories of industry which could be appropriate for the Steel River site with an FTZ facility.

The HEDC analysis of the industrial nature of the region sought to identify those industries which seemed to have been successfully attracted to the region and accordingly may also be attracted to the Steel River site.

A number of industries and categories of industry were thus identified, and were combined with the main industrial classifications identified by BHP's research. The list so formed has been used in a part-basis for the SIAS assessment and consequent environmental envelope.

More detailed background investigations have also carried out which examined regional relationship and opportunities as well as some of the characteristics of certain industry groups or "clusters". The SIAS points out that clusters are being increasingly recognised as an essential component of the regional economy.

Among their advantages is the ability to "network", thus enabling the site, when fully developed, to have linkages in communication and networking in different forms, with the local area and the region as a whole.

4.2 *Eco-Industrial Potential*

The opportunities for the application of eco-industrial principles were examined and one study constructed three different models which had relevance to the principles of industrial ecology. These models were, Option 1, a single user application; Option 2, a multi-user, but single sector application; Option 3, a multi-user, multi-sector application.

It was concluded that whereas Option 1 provided more opportunity for the application of eco-industrial principles of operation, it did not produce employment densities such that the target of 2000 jobs could be met. In terms of employment, it was concluded that Option 3 provided the best potential. Option 3 pointed to a regional focus and scope for industrial ecology.

4.3 *Site Master Planning*

In respect of the future development of Steel River with individual industries, the SIAS notes that, following the development of the site infrastructure, incoming industries will be allocated areas for lease. Each industry will prepare documentation for its requirements in respect of buildings and land. To give general guidance as to the overall development objectives of Steel River, the master plan report notes that certain basic development objectives for the site, were followed.

One of these, the original concept of seeking to pursue the principles of industrial ecology, has been retained in the master plan proposals. To facilitate the achievement of this concept, the master plan layout has been designed to provide maximum flexibility to accommodate a variety of industry types and their needs. An internal loop road is proposed to assist in the transfer of materials and bi-products between industries by both conventional transport means and via a below-ground services trench.

It is also proposed to maximise the number of entry points to the site so as to reduce the transportation distances and energy cost in accessing the local road and rail network and port facilities.

4.4 *Site Management*

In addition to these physical development proposals the Steel River Project envisages the establishment/retention of an Estate Management Company (EMC) to market, oversee and manage the estate. All land will be leasehold. The Estate Management Company will be under contract to the Steel River Project Entity, the land owners.

The paramount objective of the Estate Management Company is to manage the Steel River Project so that the social, environmental and economic objectives for establishing the estate are met, and that the estate remains an attractive location for industries to establish in Newcastle.

The SIAS identifies areas of responsibility of the EMC. It notes that each industry within the Estate will be subject to all normal Government and LGA regulations such as health regulations and EPA licences, and the powers and responsibilities of these authorities are in no way diminished.

PART C: ENVIRONMENTAL ASSESSMENT

5.0 SUBJECT SITE AND LOCALITY: PHYSICAL

5.1 Geotechnical/Geotechnical Issues

A geotechnical assessment of the site was carried out to determine the suitability of the land for industrial development. Sub-surface conditions were tested and laboratory testing was carried out in respect of selected bulk and SPT samples. Chemical testing was also carried out to determine chemical parameters, including pH, sulphate, chloride, electrical conductivity and sodicity.

The stability of the bank adjacent to the south arm of the Hunter River was assessed. It was recommended that the stability of the bank should be reassessed if structures or development is proposed adjacent to the top of the bank, or if modifications to the bank are proposed.

A preliminary pavement design is given based on the results of BCR tests and the sub-surface conditions encountered in the test pits which were excavated along the alignment of the proposed road as part of the infrastructure master plan.

In respect of foundations the geotechnical assessment recommends that larger column loads be supported on piled foundations, with piles being founded in the dense sands or bedrock strata.

Filling and grading of the site together with the general issue of site regarding, particularly in respect of the excavability of the existing site, are examined and recommendations given. The issue of the nature and quantity of imported fill (coal washery reject) and its application to the site has been addressed fully in the Remediation EIS.

5.2 Flora and Fauna

The flora and fauna characteristics of the existing site were the subject of investigations carried out as part of the environmental assessment of the site remediation works. These investigations are described in the remediation and EIS report.

In addition to these investigations a further flora and fauna assessment was made, having regard to the future industrial use of the site. These additional investigations were specifically directed to the environmental envelope context of the site and to the impact of future industrial development on site, following remediation and the development of the site infrastructure.

Addressing the impact of future industrial development of the site, including its infrastructure, the assessment acknowledges the hazard to birds posed by the existing electricity transmission lines and recommends no additional lines or aerials.

For the future development's impact on flora and fauna generally, the assessment refers to the environmental standards to be set by the Environment Protection Authority, and makes recommendations about the desirability of maintaining and enhancing habitats as part of the site's landscape development.

To maximise the habitat enhancement opportunities of landscaping on the site, the assessment recommends that only native plant species be used in the landscaping, with an emphasis on local flora. Open space areas, such as around the proposed water quality ponds, should incorporate dense plantings of shrubs as well as trees to provide cover for smaller birds.

5.3 Traffic and Transport

The traffic and transport assessment was carried out on the basis that, although there is no specific development proposed for the site to actually test, the Steel River project will develop progressively as industries decide to locate their premises and activities on the site. When the site is fully developed it has been assumed that in accordance with the basic objective of site development there will be 2000 employees located at Steel River. The traffic implications of this figure are the subject of the assessment.

In addition, the implications of the other basic objective of the site's development, namely the application of the principles of industrial ecology, have also been addressed in the assessment.

The assessment found that traffic flows in the vicinity of the site are relatively heavy at peak periods and include a significant proportion of large trucks. The network generally has adequate physical capacity to cater for existing flows, with one exception. It was apparent also, that there were some amenity issues involved in Werribi Street/Maud Street between Industrial Drive and the Pacific Highway.

It was noted that the site was poorly serviced by public transport.

The traffic assessment deals with the issues of private vehicle usage and occupancy for the work journey and suggests measures for improvement in this regard. It also makes recommendations concerning the way in which the amenity issue in Werribi Street may be improved and at the same time cause improvements in the operating characteristics of the Maud Street - Pacific Highway intersection.

In addressing the matter of industrial ecology the assessment makes recommendations concerning the upgrade and use of cycle/pedestrian paths, private shuttle busses; the use of Warabrook Station; arrangements for car pooling, and upgrading public transport services in consultation with the operators.

5.4 Drainage and Water Quality Management

The assessment of the drainage and water quality management system noted that the existing drainage system of the residential area south of Industrial Drive, near Stevenson Park drains to the site via pipes under Industrial Drive and into soakage pits. Within the site, most stormwater is not controlled and is allowed to soak through the ground into the groundwater or to flow over the northern boundary and into the Hunter River.

The site remediation works, noted that a significant improvement to the water quality of the local area can be achieved by limiting future stormwater discharges to the groundwater. Consequently the site will be re-contoured to provide minimum crossfalls of 0.5% to allow surface flows towards the north.

The re-contoured site will also allow drainage water to be directed within lots to a new piped system, generally following the road routes, which will then drain to water quality ponds at the northern edge of the site and the river or to the Tourle Street boundary. Five sub-catchments are planned, some draining to water quality ponds. Water from the ponds can be reused for landscape watering but the catchment is not large enough to provide a sustainable reuse system for industry.

The provision of new and more natural aquatic habitats and the overall improvements in drainage and water quality for the site is consistent with the ANZECC environment protection documents.

In respect of industrial process water each development will need to comply with the relevant EPA and Hunter Water Corporation (HWC) requirements with respect to any water discharges from their individual site.

Discharges to the stormwater system will need to comply with the total site's water management criteria for both quantity and quality since the estate's discharges will be controlled by a licence granted by the EPA. Trade waste discharges to the HWC sewerage system will similarly require an HWC permit for each enterprise, this time from the HWC.

5.5 Water and Sewerage

Water supply for the site will be connected to the 500mm diameter pipeline in Tourle Street, the major supply line from the Tomago sandbeds which is one of Newcastle's sources of water.

Sewage from the estate will be collected in a new sewer network which will drain to a pumping station within the site, complete with an emergency storage component. The discharges to the sewer may be pretreated as required by the HWC trade waste policy. A rising main from this site will transport sewage to the existing HWC

system at a location determined by HWC. This sewage will eventually reach the Shortland sewage treatment plant, from where the HWC is soon to construct a pipeline to the western boundary of the site which will transport treated sewage effluent (or reclaimed water). This will be available to enterprises within the estate.

5.6 Energy

An underground electricity supply will be installed as part of the estate's infrastructure, at a capacity to suit the estate's requirements. The existing overhead supply to the steelworks will remain in a power easement.

High pressure gas mains located in Tourle Street and the Pacific Highway can supply gas to enterprises within the estate.

As part of recycling waste products within the estate some wastes which can generate energy (recycled energy) will either be used within the enterprise, sold to others in the estate or sold into the power network.

5.7 Air Quality

In respect of air quality, the SIAS refers to the report by AGC Woodward-Clyde titled "Steel River project - Environmental Review and Operational Guidelines".

The report examined meteorological information and focussed on a number of criteria including:

- total suspended particulates (TSP);
- fine particulates (PM10);
- dust deposition rates;
- lead;
- manganese;
- sulphur dioxide; and
- nitrogen dioxide.

The analysis of ambient air quality has identified particulates as a problem over the period that monitoring has been conducted. At Mayfield, TSP exceeded the annual goal in 1994, and exceeded daily maximum criteria on at least three occasions. Dust deposition rates were also much higher at Mayfield, especially during the summer period which has a greater prevalence of northeast winds.

Sulphur dioxide and nitrogen dioxide levels were well below NHMRC goals and currently do not present a serious problem. However, caution should be exercised with the assessment of individual industrial to ensure that the cumulative impacts of the Steel River Project do not significantly increase pollutant gas levels. This may be best achieved through the establishment of a model of air quality which would allow individual industry emissions to be added to provide an immediate indication of cumulative or net effect. Controls should be placed on operations within the Park to ensure impacts are minimal. With national air quality standards likely to become more stringent in the future, the concept of Best Available Control Technology Economically Achievable (BACTEA) will be a requirement for all new industries on the site.

5.8 Noise

In respect of noise the SIAS also refers to the report by AGC Woodward-Clyde titled "Steel River Project - Environmental Review and Operational Guidelines".

Information was derived from a number of sources and provided a 'ring' of data on lands around the southern side of the subject site.

NSW EPA guidelines use the concept of background noise level as a basis for assessing environmental noise. Background levels have been assessed as varying between 41 and 49 dBA (daytime) and, 36 and 44 dBA (night-time) based on measurements undertaken over a period of time. These background levels are, with two exceptions, within the range of background noise levels considered by NSW EPA to be appropriate for the respective land uses and locations.

Using these background noise levels, recommended daytime and night-time background noise levels have been estimated based on NSW EPA's Environmental Noise Control Manual.

The key issues for the Steel River Project are the control of noise emissions and the impact of noise levels at the most affected residential receiver, and the minimisation of the likelihood of background creep.

On the basis of net emissions, the total noise contribution of the Park can be set so as not to exceed a level which would result in the NSW EPA's recommended acceptable limits being maintained with respect to adjoining residential receivers. This may best be achieved through the establishment of a noise model for the Park which would allow individual industries and on site activities to be added to the information and provide an immediate indication of the cumulative effect of noise emissions from the Park. This will allow suitable siting for individual industries and will also enable each operator to identify the most appropriate form and type of noise control technology.

5.9 Waste Management

In respect of waste management the SIAS notes that it is no longer economically efficient or optimal in environmental terms for each Council to plan its own waste management strategies and provide its own waste management facilities. Regional waste planning is a progressive 'best practice' approach being adapted in many industrialised countries to overcome the inefficiency of small scale waste management.

To facilitate the application of eco-industrial principles, industries setting up in the Eco-Industrial Park would be expected to conduct a preliminary assessment of their operation and submit the results to the Estate Management Company (EMC).

The EMC would be the intermediary between industries on-site and the Waste Board and EPA. The EMC would formulate a waste management plan for the Eco-Industrial Park based on the information returned from the industries.

6.0 SUBJECT SITE AND LOCALITY: HAZARDS AND RISKS

6.1 Hazard and Risk Analysis

The requirement for hazard and risk assessment of any incoming industries would be determined by the consent authority based on the nature of the industry, potential for hazard determined on the proposed process, chemical storage, sensitive receptors and potential for cumulative impacts that may result from surrounding land use.

It is important that the quantification of risk be seen as only one output of the hazard analysis. Quantification of all dimensions of risk is not always possible or necessary to enable judgements to be made on sound hazard management. The results of the various elements of the analytical process - hazard identification, consequence analysis, probability/frequency analysis and risk estimation and analysis - should be used for 'avoiding avoidable risk', emergency planning, plant modification, and so on.

Decisions concerning the location of any hazardous facility and surrounding land uses are planning decisions. When implemented, the management of the issues will become an essential and integral component of land use planning. In this process, land use safety conflicts will be prevented by identifying, quantifying and managing hazards and risks in the context of broader consideration.

6.2 Analysis and Assessment Methodology

The basic methodology to be applied to hazard analysis and quantified risk assessment should consist of hazard identification, consequence analysis; probability/frequency analysis; and quantified risk.

For development of a potentially hazardous industry early consultation with the Council, (and possibly the Department of Urban Affairs and Planning and other relevant authorities) will take place.

Preliminary hazard analysis (PHA) is also required. This involves a comprehensive hazard identification including the identification of hazardous incident scenarios and reference to the proposed operational and organisational safeguards.

The results of the consequence and probability analysis should be combined and the risk results presented in the form of contours, societal risk curves or other appropriate format. The results should address, where appropriate, impacts on people, property and the environment.

Other matters which should be addressed within the general area of hazards and risks are hazard and operability studies; fire safety studies; preparation of an emergency plan and procedures; an updated hazard analysis; and construction safety studies.

7.0 SUBJECT SITE AND LOCALITY: SOCIAL AND CULTURAL

7.1 Socio-Economic Assessment

The socio-economic assessment has accepted that there is proposed on Steel River, a development which will occur in stages, as each incoming industry chooses to locate on the site. The total effect of this progressive development of the site will result in a total of 2000 jobs being provided on Steel River. The socio-economic assessment also acknowledged that, with the development of the subject site, will come opportunities for certain desirable social objectives to be achieved or accommodated.

In addressing the social and economic opportunities presented by the development, the assessment notes that from a review of other industrial estates, a number of benefits arise as a result of a high technology/industrial development, particularly relating to an improved environmental quality and spin-off development. It seems possible that the Steel River Project will attract retail, service and commercial activities on or near the site including such activities as convenience shops, banks and food outlets.

Planning for the Steel River Site could further enhance these benefits by considering the inclusion of some additional facilities although the assessment did not explore the cost implications of this approach.

The assessment examines the physical relationship of the site to the existing community; the implications of the site's development on community and recreation facilities; the potential benefits of the development on the quality of life and cultural issues.

In addressing the subject of the possible strategies and guidelines seen as appropriate to consider in the development of the site, the assessment deals with the provision of community and recreation facilities and services, listing recommended items. In addition, the assessment deals with the issues of visual amenity; access; cultural identity; on-going community consultation; and education and training; concluding with a discussion of the guidelines for social sustainability. In this regard the assessment discusses neighbourhood and residential amenity; community and recreation facilities and services; access; employment; and urban design implications.

7.2 Archaeology and Heritage

In respect of Aboriginal archaeology, the assessment involved background research on the past land use in the area, with particular emphasis on Aboriginal use of the area, an inspection of the NPWS register records and reports, field survey and consultation with the local Aboriginal Land Council representative. Field inspection was also undertaken.

No Aboriginal archaeological sites were found.

In respect of European occupation, the assessment does result in producing historic elements, confined to the area of the site known as the south-east hill. This site is the subject of one of the first grants to a free settler at Newcastle.

The grant was officially made on 30 June 1823 to John Laurio Platt, who took up residence in early 1822 and established a farm and milling operation there. By 1829 coal mining was also underway and in 1831 the rich shell middens - a remnant from the Aboriginal occupation of the area - were being mined. The Australian Agricultural Company purchased Platt's grant in 1838. Platt's mill was in operation until at least 1842, it being run firstly by Platt, then his son and finally by the site's purchaser, the AA Company. In 1875 a house was built for the general superintendent of the AA Company on the site. This house burnt down in 1901, but another was built shortly after, being completed by October 1902.

In 1933 the AA Company's superintendent's house was purchased by the Catholic Bishop of Maitland who established the Murray-Dwyer Orphanage there which was run by the Daughters of Charity of Saint Vincent de Paul. British child immigrants were subsequently accommodated there. During WWII the orphanage was occupied by military personnel. From 1940 BHP began to purchase parts of Platt's original grant.

The south-east hill area of the Steel River site is regionally culturally significant because of its historic associations with one of the first free settlers at Newcastle and in the Hunter Valley; because of its historic associations with the Australian Agricultural Company; and because of the early industrial activities (milling and coal mining) undertaken there. It may have research significance because of its potential as an archaeological site and its capacity to reveal information concerning the activities of one of Newcastle's first free settlers.

The site has social value because of its historic links with major historic phases of Newcastle's history from free settlement through the AA Company's occupation; as a picnic and recreation area valued for its aesthetic amenity; as a site linked with the Great Depression and WWII and latterly its links with BHP. The site's historic significance has been recognised by Newcastle historians from at least the 1930's. Further investigations work for remains of structures is currently being carried out, and will influence development guidelines for the South-East Hill area.

PART D: FINDINGS

8.0 THE ENVIRONMENTAL ENVELOPE

8.1 The Nature of the Envelope

The environmental performance required of the Steel River Estate is defined by an integrated set of environmental standards or criteria, which is termed the environmental envelope for the estate. These criteria include numerical standards, management standards and objectives and design standards and objectives and collectively they are intended to define the cumulative impact which the estate will have on both physical and socio-economic aspects of the local environment (adjacent land uses). Any individual industry proposing to locate within the estate must demonstrate prior to gaining approval that its pollutant load and other impacts will not cause any of the environmental criteria to be exceeded.

The consent authority for the Steel River development is Newcastle City Council. For the majority of industries which have been identified as possible occupiers of the Steel River estate, Newcastle Council will also be the regulatory authority, using its powers under the Local Government and Environmental Planning and Assessment Acts and the pollution control acts. Any industry regulated by the EPA must meet all conditions of its pollution control licence in addition to any requirements of the proposed LEP.

Some industries (identified in Schedule of Clean Air Act Regulations and Noise Control Act) locating on the Estate will be required to obtain Pollution Control Approvals and Pollution Control Licences from the EPA before they commence operation. It is intended that the emission limits applied in these approvals and licences will be consistent with the Clean Air Regulations applicable at the time of approval and with the ambient air quality and noise standards identified in this document or its successors.

8.2 Environmental Management

A co-ordinated environmental management policy which involves commitment from all industries located within the Steel River estate is an essential requirement for achieving the environmental performance objectives specified in the environmental envelope for the site.

The environmental policy will be administered by a single estate management authority, which should have responsibility, amongst other things, for:

- the development of an environmental management system (EMS),
- maintenance of modelling,
- pre-approval negotiations with potential industrial developers,
- monitoring of the environmental performance of the estate,
- initial investigation of non-compliance,
- reporting on performance to government and the community,
- co-ordination of eco-industrial resource sharing.

In the SIAS the estate management authority is referred to as the Steel River Estate Management Company (EMC). The EMC is required to prepare and implement an environmental management system (EMS) for the estate. The system should address all activities on the estate likely to impact on the environment and should include each individual industry locating in the estate.

8.3 Air Quality

The ambient air quality at the estate boundary and at the most affected receiving location outside the estate boundary, ie the ambient air quality which results from emissions from all premises within the estate, must not exceed certain specified ambient air quality standards. These standards have been identified as the parameters most likely to protect the environment and community health in urban areas. No ambient air quality standards are available for the very broad range of organic compounds which may be emitted by some industries and which may impact on urban air quality. These will be controlled at the design stage for each point source.

During the development and construction of the estate a certain dust deposition standard will apply. Both the dust deposition standard and the requirement for ongoing monitoring should be reviewed at the end of three years, or at the first LEP review after that time.

The odour and organic compound impacts within the estate which result from emissions from individual premises within the estate, must not exceed the design ground level concentration certain criteria as adopted by the Victorian EPA. Compliance with these criteria will initially be assessed at the design stage of a development using air dispersion modelling. At the commissioning stage, industries which emit these pollutants will be required to monitor stack emissions for relevant compounds to demonstrate compliance with the design ground level concentrations.

Ongoing monitoring of organic and odorous compounds within the estate will not be required unless certain conditions apply. The EMC should establish and maintain an air dispersion model of the entire estate and surrounding land. The EMC should also ensure that sufficient ambient air quality monitoring stations are established in and/or around the estate in order to determine compliance with the ambient air quality standards. The ambient monitoring stations should be sited and operated in accordance with the relevant Australian standards. The EMC will also be responsible for reporting to Newcastle Council and the EPA on its monitoring activities and results. Moreover, air quality criteria in the new LEP for Steel River must be reviewed at appropriate times.

8.4 Noise Controls

The noise criteria for the Steel River estate are based on planning noise level set for each of the different receive zones surrounding the estate. These receiver zones follow the land zonings of 2(a), 4(b), 5(a), (b), (c) and (e), 6(a) and 3(d) with the exception of an additional zone, 2(a)1. This zone is the first row of residences in zones 2(a) which are adjacent to Industrial Drive and opposite the estate. This additional zone of 2(a)1 allows for noise criteria which corresponds to the Environment Protection Authority's Environmental Noise Control Manual planning category of residential area on a busy road or near and industrial area.

Certain maximum day time and night time L_{A10} noise level for each zone are set. These must not be exceeded by noise from the estate when measured at or calculate for, any point within the zone. Similarly noise from the estate must not exceed the sleep disturbance criteria L_{A1} for night time for zones 2(a), 2(a) 1, 6(a) and 3(d). As noise emissions from the Steel River estate are likely to be relatively low in comparison with existing ambient noise levels, compliance will need to be demonstrated through a combination of modelling and, in time, field monitoring.

This will be the responsibility of the EMC who should establish, within three months of the gazettal of the new LEP for the site, a computer noise model for the estate. The model should allow for the prediction of cumulative noise emissions from the estate in relation to the surrounding zoning limits. The model will be updated by the EMC with noise emission information as each new development enters the estate.

The reporting requirements listed for air quality are to be followed for the reporting of noise monitoring results.

8.5 Water Quality Control

In respect of water quality it is a requirement that any stormwater discharged from the estate to the Hunter River (or any tributary drain) must be of a quality which is consistent with the ANZECC guidelines for protection of aquatic ecosystems. Stormwater must be managed to minimise the potential for recharge of shallow groundwater on the Steel River Estate.

No contaminated industrial process water is to be discharged from any industry on the estate to surface waters on the estate or to the Hunter River. No process water is to be discharged to groundwater. All industrial process water which cannot be re-used on the site must be disposed of to the reticulated sewage system. No contaminated groundwater is to be discharged from the estate to the Hunter River.

The sewage reticulation system on the estate must be designed and managed to minimise the risk of overflows from pumping stations, and to prevent any discharge of the raw sewage to stormwater or to the Hunter river in the event of an overflow.

The reporting requirements listed for air quality are also to be followed in relation to water quality.

8.6 Waste Management Requirements

In respect of waste management all existing and possible future requirements in the management of waste in New South Wales will need to be addressed. These relate to the transport, production, reprocessing, and disposal of waste; the need to obtain an EPA licence for hazardous waste generation and handling; the need to prepare a waste management plan; the need to link with regional waste or re-cycling activities; and the need for annual reporting.

8.7 Energy Management

In respect of energy the expectations for the Steel River site are that:

- Individual proponents should demonstrate that relevant national guidelines for energy efficient industrial design are applied in the layout and design of buildings located on that premises.
- The EMC should contribute to research into regional sourcing of renewable energy supplies.
- The EMC should develop and implement an energy efficiency plan for the estate, as part of the EMS for the estate.
- In respect of reporting, the annual report of the performance of the estate should include information on initiatives to improve the efficiency of energy use within the estate.

8.8 Socio-Economic and Cultural Objectives

The socio-economic and cultural objectives of the development include expectations for Steel River that:

- a number of community and recreation facilities and services are provided;
- access to these facilities and services is optimised;
- the facilities and services are a true reflection of needs and are physically integrated with the community;
- the optimum use is made of public transport;
- the amenity and identity of the local neighbourhood is enhanced through facilitating interaction by careful physical design;
- the community becomes involved in preparing a cultural plan which expresses the community's identity and the historical associations of the Steel River site.

In respect of employment, it is an over-riding objective that development on Steel River is directed towards providing some 2000 jobs by the year 2000. This is to be achieved by various methods. It is also an objective to provide opportunities for education and training associated with the primary aim of employment.

In respect of heritage and conservation, a great deal of research has already been carried out. Further physical investigations are currently under way, the outcomes of which will determine subsequent actions for conservation.

8.9 Development Guidelines and Objectives

The development guidelines and objectives that future development of Steel River is required to observe, include design guidelines, allotment and building design, parking and unloading areas, geotechnical requirements, and traffic and transport.

The aim of the design guidelines is to ensure an attractive, unified appearance when development on the Steel River site is completed. In respect of allotment and building design, the guidelines cover matters such as allotment size and configuration, site layout, site coverage, setbacks, building form and height, storage and work areas, building materials and colour schemes, energy efficient building design, landscape development, flora and fauna protection, fencing and screening, lighting and pedestrian and cycle access.

Parking and loading guidelines cover on-site parking loading, unloading and servicing areas.

In terms of geotechnical requirements, the guidelines require certain geotechnical investigations to be carried out prior to any development, as well as specifying certain foundation types.

Traffic and transport guidelines require development on Steel River to be consistent with objectives relating to traffic generation limits, parking provisions, public transport, pedestrians and cycle access, and the provision of information regarding car pooling.

8.10 Hazards and Risk Management

In respect of hazards and risk management, the requirements for hazard and risk assessment will be determined by Council in consultation with the Department of Urban Affairs and Planning based upon certain characteristics of a proposed development. The analysis should provide a formal identification of hazards, an assessment of their cumulative impacts, an analysis of the size and occurrence likelihood of hazardous incidents, and the adequacy of proposed safeguards.

Where potentially hazardous industries may wish to develop on Steel River, a number of issues are involved. These include, the need to ensure that no individual nor the community is exposed to unduly high levels of risk; that early consultation with relevant authorities is carried out; that a Preliminary Hazard Analysis or Environmental Impact Statement is prepared depending on the development type; and that an evaluation of risks is carried out where the transportation of hazardous material is involved.

8.11 Environmental Management

It is necessary that all of the various standards, objectives, requirements and guidelines which together make up the "environmental envelope" for Steel River, are managed and maintained as an on-going activity. The responsibility for this rests with the Estate Management Company (EMC) and it will be achieved by the preparation of an Environmental Management System.

Among the responsibilities of the EMC that have been identified, is the task of environmental performance monitoring which includes air quality, noise control, water quality, energy management, flora and fauna protection and hazards and risk management. In addition, implementation of socio-economic and cultural guidelines, together with development guidelines and objectives, facilitation of the principles of industrial ecology, and community consultation and development proposal assessment, will also be the responsibility of the EMC and Council.

9.0 ENVELOPE INDEX

The purpose of the envelope index is explained as being to provide a summarised list of the environmental requirements which individual industries, as well as the Estate Management Company have to address.

The two types of compliance requirements are identified as being firstly, numerical standards concerning air and water quality, and noise, each being related to a cumulative impact. The second type of compliance criteria concern objectives and requirements which an incoming industry and the EMC must observe in development proposals.

The envelope index is intended to be a readily usable reference list, indicating the location of the specific section or part of the SIAS where full details can be obtained as to the standards, requirements, objectives or guidelines which are relevant to a particular industry development.

10.0 DEVELOPMENT ASSESSMENT

10.1 Local Environmental Plan Requirements

The environmental envelope identified in Part D of the Strategic Impact Assessment Study (SIAS) creates the quantitative and qualitative standards against which development on the Steel River site is measured. Where a particular development complies in all relevant respects with the envelope, the development is termed “conforming development”, and as such, is entitled to certain status advantages in respect of approval timing and consent conditions.

Where a development proposed in the Steel River site, involves environmental effects not addressed in the environmental envelope, or does not readily meet the envelope requirements, undergoes assessment the same as other applications, but is not entitled to a rapid (28 day) approval.

The parties who will be involved most in the development assessment process for development on the Steel River site are respectively, the Newcastle City Council, the Environment Protection Authority (EPA), and the Steel River Estate Management Company (EMC).

The roles of each of these entities are identified. Essentially, these are that the Newcastle City Council is the consent authority and the EPA is the authority who will issue Pollution Control licences where required. The EMC will be responsible for ensuring the proper environmental impact studies are carried out and form part of every development application for the Steel River site. The EMC is also responsible for monitoring and reporting on the environmental background upon which the standards in the environmental envelope are based.

10.2 Development Applications: Preparation and Assessment

Development on Steel River will involve designated development, as defined as being that which is included in Schedule 3 to Clause 49(1) of the Environmental Planning and Assessment Regulation 1994 (EP&A Regulation), and non-designated development.

In the case of non-designated development, a procedure for the preparation and assessment of development applications is identified as a series of four steps. These steps begin with an individual industry seeking to lease land and develop in Steel River. The steps then proceed through stages of the EMC assisting in the preparation of the development application; consultations where necessary with relevant authorities; a study being prepared by a qualified person that demonstrates the application is “conforming development”, assessment and determination by Council, which should occur within 28 days of lodgement.

Where the development is assessed as being “not conforming”, the procedures for determination of development applications under Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act) apply in the normal way.

Should the State Government choose to “de-designate” certain classes of development within the site where a proposal is designated development (as defined above) the same steps apply as for non-designated development, except it is also proposed that:

- the environmental assessment of its impact which will form part of the development application documentation must be prepared on the basis of requirements as specified by the Director-General of the Department of Urban Affairs and Planning (D-G DUAP);
- prior to the development application being forwarded to Council, a certificate, additional to the study prepared by the qualified person, must be issued by the D-G DUAP verifying that the development complies in all respects with the environmental envelope as specified in the SIAS.

Where a proposed development (which would be "designated development" in accordance with Schedule 3 of Clause 49(1) of the EP&A Regulations) cannot demonstrate that it complies with the environmental envelope, that development remains designated development and must be subject to all of the advertising, exhibition, and third party appeal rights set out in the EP&A Act.

A "Development Assessment Chart" is included, which lists each and every requirement embodied in the environmental envelope described in Chapter 8. The requirements are the absolute numerical standards; the procedures required for various forms of hazard and risk control; the development objectives noted in the envelope (including socio-economic); and the monitoring and recording procedures required of the EMC.

The chart is so arranged that it presents a simple check-list for each new industry seeking to develop on Steel River, as well as ensuring that reviews of environmental data (upon which the environmental standards are based) are kept up to date.

PART A: ASSESSMENT CONTEXT

1.0 INTRODUCTION

1.1 SUBJECT LAND

The land which is the subject of this Strategic Impact Assessment Study (SIAS) is presently owned by BHP and has an area of approximately 104 hectares (available for development).

A more detailed locational description is given later in Section 2.1 of this SIAS, however the site can be described, essentially, as being bordered by Tourle Street in the east, the south arm of the Hunter River in the north, a railway easement in the west and Maitland Road and Industrial Drive in the south.

Industrial zoned areas lie generally to the east, north and west, while the residential areas of Mayfield lie generally to the south.

1.2 ASSESSMENT OBJECTIVES

The assessment objectives which this SIAS seeks to achieve, and the purpose for which this SIAS has been prepared can be listed as follows:

- i) To support the preparation of a new environmental planning instrument applying to the subject land (LEP) providing for a mechanism which will allow a rapid (28 days) development approval period for industries which comply with the requirements of an environmental envelope.
- ii) To define an environmental envelope consisting of environmental standards, requirements and objectives, to which the new LEP will refer, and with which future development on the subject land must comply, or be subject to a further, development-specific environmental study.
- iii) To define a mechanism by which the environmental performance of future development on the subject land can be monitored and by which the environmental standards initially established can be subsequently reviewed on a regular basis.
- iv) To provide for on-going community access to and participation in monitoring reporting and review processes for the site's development.

1.3 DIRECTOR-GENERAL'S REQUIREMENTS

The Director-General's requirements for the preparation of this Strategic Impact Assessment Study have been based upon the principal objectives for the SIAS as listed in the previous section. These objectives themselves have been the result of an evolving process of investigation of the site, its locality and region, its future development potential, and the characteristics of the industries judged to be the most likely to locate on the site. These factors have been combined with the outcome of a process of continuing consultation with community and Government representatives via the Technical Steering Sub-Committee noted in the next section.

Initially a Draft Consultant's Brief and Scope of Work was prepared. That original Scope of Work appears in the Appendix to this SIAS. Investigations proceeded based on that scope of works, however, over time, the strategy for achieving a mechanism which allowed a rapid approval process for incoming industries was evolving in consultation with the various state and local Government authorities concerned. It became appropriate to prepare what was termed a "Strategic Impact Assessment Study" (SIAS) in order to identify all of those environmental standards with which incoming industries were to comply in order to qualify for a rapid development approval period.

The matter was considered at a Council meeting on 22nd April 1997 where it was resolved that:

1. *Council resolve to prepare a Strategic Impact Assessment Study (SIAS) (which would include coverage of the matters usually dealt with by a Local Environmental Study), and a draft Local Environmental Plan (LEP) for the land bounded by the South Arm of the Hunter River, Industrial Drive, Tourle Street and the Kooragang Railway Line (as indicated in Appendix A).*
2. *The SIAS consider the creation of a special zone for the site, including environmental performance criteria and design guidelines to facilitate development of an eco-industrial park on the land and an approvals system for development identified as being suitable by the SIAS.*
3. *The outcomes of the SIAS be referred to Council prior to exhibition of the draft LEP.*
4. *Matters associated with the preparation of the SIAS be included in the urban design workshop for the site indicated in Appendix A.*

The form of the SIAS needed therefore to resemble the form of a Local Environmental Study (LES) with a clear specification from the Department of Urban Affairs and Planning (DUAP) as to what was to be included in the study.

A Draft Scope and Indicative Contents of such a study was finalised on the basis of consultation with the Government authorities concerned. A copy of that Draft Scope and Indicative Contents appears in the Appendix to this Assessment.

Council proposed this Draft Scope as being the specification of the SIAS subject to the agreement of the Director-General of DUAP. Accordingly, following examination of the Draft Scope by the Department, a letter of confirmation was issued to Council.

1.4 SITE DEVELOPMENT: GENERAL OBJECTIVES

The development of the subject land has the fundamental purpose of providing an industrial estate which is aimed at providing employment opportunities for some 2000 people. This purpose derives from the need to mitigate the effects of the closure of the steel-manufacturing activities in the main BHP plant immediately to the east of the site.

In addition to this primary purpose, the site has always been seen to offer an opportunity to apply and implement the principles of socially, environmentally, and economically sustainable development. In this regard expectations have included seeing the subject land as being an area in which the principles of industrial ecology might be applied as well as the priority of providing an opportunity for replacement employment. This expectation arose out of a meeting on 17th June 1996 of all "stakeholders" in the subject site, held in Newcastle.

At that meeting the essential goal of the development of the subject land was agreed by the stakeholders to be encompassed in the wording of the development objectives. This is to create ***"a world-leading eco-industrial park generating employment for over 2000 people which is aesthetically pleasing, functionally efficient and environmentally and economically sustainable for residents, workers and business operators. Initial and on-going access to this place of work by industry will be on the basis of a clear concise set of parameters which are implemented in a consistent, predictable manner."***

A committee was formed which took the title of the "Newcastle Beyond 2000 Technical Sub-Committee" and was charged with providing on-going stakeholder input into the development of the subject land. This committee was formed in August 1996 and has held regular fortnightly meetings since. Minutes of those meetings appear in the Appendix to this SIAS.

As a result of these meetings, other general objectives for the development of the site were identified. The details of these objectives are discussed later in this SIAS under the various disciplines relevant to the particular objective. In summary however these objectives can be listed as follows:

- i) **The socio-economic objective** of providing a development which has the potential to provide 2000 jobs. This also includes the ability to achieve a rapid (28 day) approval process for incoming industries which comply with a pre-determined set of environmental criteria.
- ii) **The eco-industrial objective** of applying the principles of industrial ecology to the site itself and to its links with the region as a whole, reflecting and building upon the socio-cultural, environmental and economic identify and strengths of the Hunter Region.
- iii) **The socio-cultural objective** in which the development of the site sympathetically expresses its heritage, along with visual, landscape, artistic, and public accessibility goals.
- iv) **The environmental management objective** in which the management of the site is on-going and includes monitoring environmental performance as well as the continuing application and management of eco-industrial principles.
- v) **The community consultation objective** aimed at permitting periodic consultation between the estate management and the community in respect of the environmental envelope and its application.

1.5 SITE DEVELOPMENT JUSTIFICATION

1.5.1 Local Socio-Economic Issues

The socio-economic issues related to the proposed development are discussed in the report titled "Steel River Site, Socio-Economic Impact Assessment" by BBC Consulting Planners. As indicated later, in Section 1.6 of this SIAS, that report appears in the Report Appendix.

All of the social research information is contained in the report, together with a discussion on the effect of the proposed development on the social and economic fabric of Newcastle and the Hunter. The assessment was carried out in the light of the June 1995 announcement by BHP that its steel making plant would close in 2002 to be replaced by an Electric Arc Furnace (EAF), resulting in the loss of some 2000 jobs. This was subsequently amended in April 1997 to closure in 1999, no EAF, and some 2500 jobs being lost, thus increasing the urgency of this project. The Executive Summary of the social assessment report states:

"BHP has set a target to generate in the order of 2,000 jobs by the year 2000 through the development of the Steel River Site. Further indirect employment growth may be created by the project through development activity on the site. If industries which use local inputs or attract related industries to locate in the area located at Steel River, there is likely to be further positive spin-off effects for the local economy and local employment growth."

The report comments on the extent to which employment growth on the Steel River site is able to reduce the impact of the projected loss of 2000 jobs, and in this regard notes that it is not possible to be certain as to the extent of the impact reduction, given the uncertainty regarding exactly what jobs will occur on Steel River as industries progressively locate there.

The report notes, however, that what is predictable is the fact that the creation of jobs on Steel River will help greatly to mitigate the job loss impact of the steel plant closure.

Having regard also to the "multiplier effect" of job creation on the Steel River site, it can be concluded that the development of the site for industrial purposes in the manner discussed in this SIAS is justified on socio-economic grounds.

1.5.2 Regional Economic Issues

In addition to these socio-economic considerations for development on the site itself, Steel River offers great potential to be a strong focus for regional industrial activity.

As part of the early research involved in the preparation of this SIAS, the characteristics of industries potentially appropriate to locate in the Steel River site were studied. A report was prepared titled "Industry Characteristics Study, BHP Land West of Tourle Street Newcastle" by the Urban and Regional Research Unit, Tunra Limited, the University of Newcastle. As indicated later, in Section 1.6 of this Assessment, that report is included in the Report Appendix.

In respect of the site's regional significance, the Executive Summary of that report states:

"The BHP land west of Tourle Street is a highly significant addition to the industrial land portfolio of the lower Hunter Valley.

Potential investors in new projects on BHP land west of Tourle Street can be made aware of the existing infrastructural and agglomeration advantages which are contained within the lower Hunter Valley's industrial ensemble. Recent studies reveal that substantial advantages continue to accrue from the region's industrial base. These include:

- *the availability of quality labour;*
- *publicly provided infrastructure;*
- *ease of access to major markets;*
- *availability of natural resources;*
- *availability of local producer services.*

These advantages should provide substantial attractions for new investors. However, in the face of a global economic environment where extant competitive advantages are destroyed at an accelerating rate, the establishment of new economic activity must coincide with the creation of new advantage. Inevitably, this will arise from a deepening and widening of the region's networking relationships. There are substantial opportunities for new investors to increase external economies as a result of the strengthening of existing intra-regional networks. There are also opportunities for forging new linkages, including materials flows and waste management both within and beyond the lower Hunter."

To the above attractions of the region, could be added the specific advantages generated by the established major components of Newcastle itself, namely, its rail facilities, its extensive port facilities, the University of Newcastle and the Newcastle TAFE.

Thus, not only can the site development be justified on the grounds of the socio-economic advantages experienced locally, justification can also be made on regional economic grounds, in that the site can contribute to the region's existing advantages for industrial activity.

1.5.3 Environmental Issues

In addition to the socio-economic justification for the development of the site for industrial uses, certain environmental opportunities also exist. These are:

i) Land and Resource Utilisation

The Steel River site represents a valuable resource of industrial land in the Hunter Region. It is fully serviced and has direct access from three arterial roads. Geotechnically, it is suitable for industrial development with appropriate, standard, engineering practice and the land is flood-free.

The purpose of this SIAS is, as stated earlier, to support the preparation of a new environmental planning instrument (LEP) which will rezone the site from its present 4(b) Industrial use to a new eco-industrial zone aimed at facilitating more efficiently, the development of the site for industry. This is entirely within both the spirit and the letter of State Environmental Planning Policy No 34 - Major Employment Generating Industrial Development (SEPP34), which lists among its objectives, the following:

- *to promote and co-ordinate the orderly and economic use and development of land and the economic welfare of the State; and*
- *to facilitate certain types of major employment-generating industrial development of State significance; and*
- *to provide for public participation and involvement in the assessment of applications for consent to carry out such development.*

Thus, the development of the site which will be facilitated by the creation of the new environmental planning instrument for the site is justified on the grounds of these SEPP 34 objectives.

ii) **Environmental Enhancement Opportunities**

As stated earlier, one of the general objectives for the new LEP for the site is to be able to achieve a rapid (28 days) approval period for incoming industries which comply in all respects to certain pre-determined environmental criteria.

In setting these criteria, the aim, as far as it is practical to do so, has been to improve on past environmental standards such that the environment, at least in respect of the Steel River site, can be improved and enhanced over time.

Moreover, the development of the site as permitted by the proposed new environmental planning instrument will enable a form of site management to be carried out whereby the application and management of eco-industrial opportunities can be continuously supervised.

In this regard the type of site management envisaged for the site (as discussed later in this assessment) includes not only the on-going monitoring of both individual industries and their environmental performance, but also the wider issue of environmental background monitoring within the locality as a whole.

The development is therefore justified on the grounds of environmental enhancement opportunities.

1.5.4 Alternative Strategies

Most of the Steel River site is currently zoned 4(b) Industrial under the Newcastle Local Environmental Plan 1987 (Newcastle LEP). Part of the site, in what is known as the south-east hill area, is zoned 5(a) Special Uses.

An alternative strategy for the future development of the site as described in Part C of this Assessment therefore could consist of developing the site under its present zoning and not to contemplate creating a new eco-industrial zone by way a new environmental planning instrument.

The consequences of proceeding with this course of action would be as follows:

- i) Approvals for development for incoming industries would be dealt with in accordance with the provisions of the Newcastle LEP. This means that in some cases a rapid development approval time may not be achievable, with the result that the site could not be marketed with this key development advantage. This, in turn, could be expected to result in some industries developing elsewhere, including off-shore locations.
- ii) The south-east hill area could not be developed for industrial uses, since its zoning would not permit such development. This area has high visibility and accessibility and has therefore high commercial appeal for activities benefiting for such exposure. These activities are envisaged as including research and development enterprises and other advanced technology activities.

The south-east hill area would need to be re-zoned in order to allow development. Coupled with the other issue of a lengthier approvals time, it is clear that the most efficient way of dealing with the site zoning is to create a new environmental planning instrument for the whole of the site, including the south-east hill area.

1.6 RESEARCH AND CONSULTATIONS

1.6.1 Background and Assessment Reports

In accordance with the Director-General's requirements, a body of research was carried out in order to provide essential background data, and a comprehensive information base for this SIAS. This research covered the areas of flora and fauna; socio-economic issues; future characteristics of industries locating on the site; traffic and transport; geotechnical characteristics, and archaeological and heritage issues. Basic landscape and urban planning matters were also addressed as well as civil engineering and public utility issues.

In summary, the separate areas of research described above are found in independent, stand-alone reports provided with this SIAS in the Report Appendix. Extracts from the various reports in that Appendix are included in the body of this SIAS. These reports are as follows:

- i) "BHP West of Tourle Street, Urban Design and Landscape Studies" Hassell Pty Ltd, December 1996.
- ii) "Preliminary Geotechnical Investigation, BHP Site West of Tourle Street Mayfield", Robert Carr and Associates Pty Ltd, June 1997.
- iii) "An Archaeological Survey for Aboriginal Sites at Tourle Street Newcastle, NSW" by Theresa Bonhomme, dated August 1996.
- iv) "An Assessment of the Historical and Archaeological Values of BHP Land at Tourle Street Newcastle" by Bonhomme Craib and Associates and Sue Rosen Pty Ltd February 1997.

- v) "Steel River Eco-industrial Park, Master Plan Report" Hassell, September 1997.
- vi) "Steel River Site, Socio-Economic Impact Assessment", by BBC Consulting Planners, April 1997.
- vii) "Industry Characteristics Study, BHP Land West of Tourle Street, Newcastle", by the Urban and Regional Research Unit, Tunra Limited, the University of Newcastle January 1997.
- viii) "Report on Transport Aspects of Proposed 'Steel River' Industrial Development, Mayfield West" by Colston Budd Hunt and Twiney, June 1997.
- ix) "Steel River Project Environmental Review and Operational Guidelines", by Woodward Clyde, July 1997.
- x) "Flora and Fauna Assessment for the Steel River Project, Tourle Street, Mayfield" by Hunter Wetlands Research and Management, June 1997.

1.6.2 Site Remediation

Independent of the above studies, an investigation was carried out concerning site contamination. It was found that part of the site contained tar substances and required remediation.

Accordingly, a Remedial Action Plan (RAP) was prepared, accompanied by an Environmental Impact Statement (EIS) addressing the environmental issues involved in implementing the Remedial Action Plan. This RAP and EIS have been combined into one document and, although the subject of a separate development application, has also been included as an information report with this Assessment. The RAP/EIS for the Steel River site is therefore listed among the separate reports provided in the Report Appendix of this SIAS as follows:

- xi) "Steel River Project - Remedial Action Plan, Environmental Impact Statement", by Woodward Clyde, May 1997.

1.6.3 Infrastructure Development

As stated earlier, in Section 1.4 of this SIAS the purpose of developing the site is to create an industrial estate which BHP hopes will contain industries whose collective workforce will total some 2000. In pursuing this objective BHP will seek to attract various types of industrial activities whose specific requirements will not be known until particular industries actually decide to locate on the site.

Consequently, it is not possible to indicate a detailed subdivision of land on the subject site. Such a pattern will emerge and evolve as successive industries are attracted to the site one by one. At that stage each incoming future industry will lodge a separate development application in respect of its own needs such as its land and its building requirements.

However, in order to create a basic structure of land development into which these future industries will be located, it is necessary first to establish an overall framework of infrastructure.

Such a framework has been designed and is known as the site Infrastructure Master Plan. The development application for consent to carry out site remediation works also seeks consent to construct this infrastructure, comprising components such as roads, open space areas, public utilities, and landscaping.

Thus, in order to maximise the general understanding of the nature of the site and the context of the new environmental planning instrument which will control development, a copy of the development application's Supplementary Statement of Environmental Effects (SEE) dealing with the infrastructure has also been added to the Report Appendix of this SIAS. This Supplementary SEE is complete with its own appendix in which certain stand-alone reports are included. Many of these reports are mentioned in the list given above as being included in the Report Appendix to this SIAS. The Supplementary SEE for the site infrastructure development application is listed in the Report Appendix as follows:

- xii) "BHP, Supplementary Statement of Environmental Effects concerning Site Infrastructure Details: Remediation and Infrastructure Development Application for the Steel River Project, Newcastle" by APT Peddle Thorp, June 1997.

A reduced set of plans which formed part of the documentation of the development application is also included with the SEE.

1.6.4 Consultation

The consultation process associated with the preparation of this SIAS has involved those authorities and groups with which it would be necessary to consult in the course of preparing research documentation for this SIAS.

The individual reports which were mentioned above as being included in the Report Appendix to this SIAS each contain a list of all authorities and groups consulted and should be referred to where specific details are required.

As part of this consultation with the authorities, contact, including direct discussion, with a number of State Government agencies, was facilitated by the Department of State and Regional Development. These Departments included:

- Premier's Department;
- Department of Urban Affairs and Planning;
- Environment Protection Authority;
- Department of Land and Water Conservation;
- Workcover New South Wales;
- New South Wales Fire Brigade;
- National Parks and Wildlife Service;
- New South Wales Roads and Traffic Authority;
- Minister for Racing and Gaming and Minister Assisting the Premier on Hunter Development;
- New South Wales State Emergency Services;
- Waterways Authority.

As mentioned earlier, in Section 1.4 of this SIAS a Community/Stakeholders forum was established known as the Newcastle Beyond 2000 Technical Sub-Committee. This Sub-Committee included representatives from the following bodies.

State Government: Minister for Racing and Gaming and Minister Assisting the Premier on Hunter Development; Department of Urban Affairs and Planning; Hunter Economic Development Corporation; Environment Protection Authority; State and Regional Development.

Federal Government: Hunter Regional Development Organisation.

Newcastle City Council: Councillor; Planning and Development Division; Community Development Division.

Community: Mayfield Residents Group; Community; Northern Parks and Playgrounds Movement.

Newcastle University: Geography Department.

Trade Union Movement: Australian Workers Union.

BHP: Manager Property; Public Affairs.

The above sub-committee was serviced by the consultants engaged by BHP to undertake the Steel River Project, and who have participated in the research on which this SIAS is based.

The members of the Technical Sub-committee, at their fortnightly meetings, provided comments and opinions throughout the work associated with the Steel River Project. These comments have also included inputs into some of the various research reports listed previously, and into the basic infrastructure master plan for which a development application has been made.

Specifically, the Northern Parks and Playgrounds movement provided a letter and a chart illustrating that Organisation's perceptions of essential issues to be addressed in the Steel River Project, following the inaugural meeting of stakeholders in June 1996 referred to earlier. That chart has been included in the Appendix to this Assessment.

In addition to this chart, a statements were also provided, indicating the Mayfield Residents Group's views, as well as a perspective of the project in review. That perspective took the form of a visual presentation at a Steering Committee meeting and graphics used in that visual presentation, together with the written statement are also included in the Appendix to this SIAS.

2.0 SITE DETAILS

2.1 LOCATION, TITLE AND OCCUPANCY

2.1.1 Locality

Figure 1 shows the site within the general urban context of Newcastle. Areas of open space are shown highlighted in order to illustrate the ratio of built-up area to open spaces, and thereby give scale to the size and location of the site relative to Newcastle as a whole. The principal institutional uses of the University, the John Hunter Hospital, and the TAFE College are shown, since the proximity of the subject land to these places is seen as relevant in terms of possible future relationships between industry on the Steel River site, and training and other activities carried out in these institutions.

The Newcastle CBD and Newcastle Port Area is shown, again, with a view to illustrating the strategic proximity of the subject land, to these areas, whose functions will undoubtedly have a relationship with the functions of industries on the Steel River site.

The main connecting and arterial roads of urban Newcastle are shown, together with the position of the rail lines, (both main and industrial).

The figure also shows the site in the context of industrial and employment distribution generally in Newcastle.

Figure 2 shows the site relative to the immediate area in which it is located. Bordering the site are the arterial roads of Industrial Drive/Maitland Road on the south and Tourle Street on the east. The northern boundary of the site is formed by the south arm of the Hunter River, and the western boundary is formed by land occupied by an industrial rail line extending across the river and serving Kooragang Island. A visual analysis of the setting of the site is given in the Hassell Report titled "BHP West of Tourle Street, Urban and Landscape Studies" appearing in the Report Appendix to this SIAS.

To the south of the site, the existing residential area generally centred around Angophora Drive is shielded from the future development on the subject land by existing industrial land uses including a Telstra depot.

From the commencement of Industrial Drive at its intersection with Maitland Road, to the south-west corner of the site at Tourle Street, there are existing residential areas on, or adjacent to, Industrial Drive, which will need to be considered in the context of the environmental impact of future development in the subject site. However, there is also an extensive area of open space along this section of Industrial Drive, which can act as a natural buffer to residential development further to the south.

To the east of Tourle Street lies the main BHP industrial complex, and to the north, across the river, lies the yet undeveloped area owned by BHP, on Kooragang Island.

To the west of the site, beyond the industrial rail line, lies an extensive area of open space, beyond which are located large areas of industrial zoned land.

2.1.2 Title and Area

The site itself is shown on Figure 3 and is described as being Lot 12 DP842850.

The plan shown in this figure takes account of a small area of land (1729m²) on Industrial Drive excised from the total land area for the purposes of providing a Fire Station. The figure also shows the lease boundary of the Australian Manganese leased area in the north-east corner of the site.

Having regard to this lease area, (but not to its possible extension), the area of the site which will be available for development and therefore, eventually, the subject of the new LEP, is understood to be 104.256ha.

2.1.3 Existing Land Uses: The Present

Within the site, Figure 4 shows the land uses which presently exist. These are as follows:

- i) **The Australian Manganese EMD Plant** at the north-west corner of the site. This has an area of some 9.0 hectares.
- ii) **Hot Metal Pits**, immediately to the west of the EMD Plant, adjacent to the bank of the river. These pits are connected to the main BHP industrial complex east of Tourle Street by an industrial rail line and are used in emergency situations. Because of the safety aspects associated with their periodic use, a fenced-off exclusion zone operates around the pits.
- iii) **Areas of Land leased to Boral** on which slag crushing operations are carried out with waste material from the BHP complex east of Tourle Street. Although the leases will eventually expire, the layout of the new roads and infrastructure which is the subject of a separate development application mentioned previously, has taken account of the location and extent of the leases in the short term.
- iv) **Easements for Electricity Transmission Lines**, extending from the south-west corner of the site, along the inside of its southern boundary approximately parallel to Industrial Drive, and thence into the BHP complex east of Tourle Street, crossing Tourle Street at about its mid point between the river and Industrial Drive. These easements carry two separated, electricity transmission lines each of 132kv, each from different supply sources, to provide power to the BHP industrial complex, east of Tourle Street.

2.1.4 Existing Land Uses: The Future

- i) **The EMD Plant** is subject to a possible westwards extension, increasing its present area by some 50%. The visual appearance of the plant is likely to be incompatible with the visual appearance of the future new industrial park

on the Steel River land. Similarly, the access to this plant, presently located across the subject site northwards from Industrial Drive carries traffic, the nature of which is likely to be incompatible with traffic in the future industrial park.

- ii) **The Electricity Transmission Lines** will remain in their present position and occupy the easement in which they are presently located, although proposals for landscaping these easements are described in the Hassell "Steel River Eco-Industrial Park Master Plan Report" and in the Supplementary Statement of Environmental Effects, both located in the Report Appendix to this SIAS.
- iii) **The Hot Metal Pits** together with their feeder rail connection with the BHP industrial complex east of Tourle Street will be phased out in accordance with the long-term plans for the main steel plant. However the development proposals described in the development application for the site infrastructure referred to earlier envisage the ability to retain some form of rail connectivity between the land on the east and west sides of Tourle Street.
- iv) **The Areas of Land Leased to Boral** will eventually revert back to a vacant state when leases expire, and will form part of the future industrial estate.

2.2 PHYSICAL CHARACTERISTICS

2.2.1 Topography

The topography of the site is shown on Figure 5. The form and extent of this topography is the result of the site remediation operations for which a Remedial Action Plan/Environmental Impact Assessment has been prepared. This RAP/EIS document, as stated earlier, appears in the Report Appendix to this SIAS.

Essentially, the remediation proposed for the site is a "cap and contain" strategy, the capping being a large amount of coal washery reject fill material imported on to the site and graded to form a re-contouring of the land. In addition it is expected that localised areas of contaminated ground may occur randomly throughout the site as development progresses.

2.2.2 Geology

The geology of the site has been the subject of geotechnical investigations and the full report of those investigations titled "Preliminary Geotechnical Investigation BHP Site West of Tourle Street, Mayfield" by Robert Carr and Associates Pty Ltd is contained in the Report Appendix to this SIAS. A discussion of geology and geotechnical issues is found in Section 5.1 of this SIAS, in which extracts from the Report's summary and conclusion are repeated for convenience.

2.2.3 Flora and Fauna

The flora and fauna characteristics of the site were the subject of investigations carried out as part of the environmental assessment of the proposed site remediation works. As a result of those works, the nature of the site will be

changed such that much of the existing vegetation (and therefore potential fauna habitat) will be removed and replaced with imported coal washery reject fill material as mentioned previously in respect of Topography in Section 2.2.1. Subsequently, as future development occurs within the site new vegetation will be provided in the form of extensive landscaping. The existing flora and fauna studies, and the environmental issues which address the consequences of the site remediation works, are therefore to be found in Chapter 11 of the Remediation EIS for the remediation included in the Report Appendix to this SIAS.

In addition, a subsequent flora and fauna study was carried out to assess the impact of future development of Steel River by incoming industries, following the completion of remediation. That study is titled "Flora and Fauna Assessment for the Steel River Project, Tourle Street Mayfield" and is addressed in Section 5.2 of this Assessment. It is also included in the Report Appendix to this SIAS.

Figure 6 shows the vegetation which will be remaining after the site remediation works are completed but before new landscaping is carried out as part of the infrastructure development proposals and as part of future development generally, on the subject site.

2.3 DOCUMENTS CONTROLLING DEVELOPMENT

One of the outcomes of this SIAS is the preparation of a new environmental planning instrument (LEP) for the subject site. This new LEP will include environmental standards and mechanisms for rapid development approvals. As such, the new LEP will be somewhat different to the Local Environmental Planning Instrument currently controlling development on the site.

It is nevertheless instructive to include in this SIAS, brief comments about this existing environmental planning instrument, together with other statutory and non-statutory controls, so that the new LEP can be seen in the context of these other documents. In statutory order, the following are the control documents relating to the site.

2.3.1 Statutory Instruments

i) State Environmental Planning Policy No 11 - Traffic Generating Development (SEPP 11)

This policy applies to the whole State and notes that its objectives and strategies are to ensure that the Traffic Authority:

- a) is made aware of and
- b) is given an opportunity to make representations in respect of development referred to in Schedule 1 or 2.

Schedule 1 and 2 both contain descriptions of development which is likely to occur on the subject site.

ii) State Environmental Planning Policy No 33 - Hazardous and Offensive Development (SEPP 33)

This policy applies to the whole state and lists as its aims and objectives the following:

- a) *to amend the definitions and offensive industries where used in environmental planning instruments; and*
- b) *to render ineffective a provision of any environmental planning instrument that prohibits development for the purpose of a storage facility on the ground that the facility is hazardous or offensive if it is not a hazardous or offensive storage establishment as defined in this Policy; and*
- c) *to require development consent for hazardous or offensive development proposed to be carried out in the Western Division; and*
- d) *to ensure that in determining whether a development is a hazardous or offensive industry, any measures proposed to be employed to reduce the impact of the development are taken into account; and*
- e) *to ensure that in considering any application to carry out potentially hazardous or offensive development, the consent authority has sufficient information to assess whether the development is hazardous or offensive and to impose conditions to reduce or minimise any adverse impact; and*
- f) *to require the advertising of applications to carry out any such development.*

It is conceivable that the kind of future industries envisaged for the subject site could include those which fall within the strict definition of hazardous or offensive. For example SEPP 33 defines "potentially offensive industry" as being:

"potentially offensive industry" means a development for the purposes of an industry which, if the development were to operate without employing any measures (including, for example, isolation from existing or likely future development on other land) to reduce or minimise its impact in the locality or on the existing or likely future development on other land, would emit a polluting discharge (including, for example, noise) in a manner which would have significant adverse impact in the locality or on the existing or likely future development on other land, and includes an offensive industry and an offensive storage establishment.

Thus, the new LEP for the site will need to take account of the provisions of SEPP 33 in framing the environmental standards with which incoming industries will be required to comply in order to qualify for the rapid (28 days) development approval period specified in the new LEP.

iii) State Environmental Planning Policy No 34 - Major Employment - Generating Development (SEPP 34)

This policy applies to the whole State, and lists as its aims, the following:

- *to promote and co-ordinate the orderly and economic use and development of land and the economic welfare of the State; and*
- *to facilitate certain types of major employment-generating industrial development of State significance; and*

- *to facilitate the carrying out of labour intensive rural industrial development of State significance; and*
- *to achieve appropriate planning controls in respect of such development; and*
- *to provide for public participation and involvement in the assessment of applications for consent to carry out such development.*

As most of the site is presently zoned Industrial 4(b), the provisions of this policy would apply to future development on it. That future development will consist of individual industries locating on the site, progressively. Even though the current zoning will change as a result of the making of a new LEP for the site, future industry will still fall within the categories of development noted in Schedule 1 of SEPP 34 and to which the provisions of the Policy will apply.

iv) The Hunter Regional Environmental Plan 1989 (Hunter REP)

This Regional Plan applies to the site. It was gazetted in December 1988 and has been the subject of two subsequent amendments. These amendments were, respectively, Amendment No 1 gazetted in September 1995, and Amendment No 2 gazetted in October 1995.

The aims and objectives of the REP are listed as being:

- a) to promote the balanced development of the region, the improvement of its urban and rural environments and the orderly and economic development and optimum use of its land and other resources consistent with conservation of natural and man made features and so as to meet the needs and aspirations of the community;*
- b) to co-ordinate activities related to development in the region so there is optimum social and economic benefit to the community; and*
- c) to continue a regional planning process that will serve as a framework for identifying priorities for further investigations to be carried out by the Department and other agencies.*

The method of implementing the aims in the REP is stated as being achieved by specifying:

- a) objectives for the future planning and development of the region;*
- b) regional policies to guide the preparation of local environmental plans and development control plans, to control development and to control activities in the region; and*
- c) principles relating to future needs of the region, future development opportunities and requirements and the manner in which the effects of growth and change are to be managed.*

In respect of Industrial land, the Hunter REP seeks to ensure that an adequate supply of land for industry is maintained, and accordingly contains provisions relating to the making of Local Environmental Plans in which industrial land is included.

The REP also contains provisions concerning development control and the local environmental plan - making process in respect of social development, economic development, land use and settlement, transport, natural resources, environment protection, conservation and recreation.

The future development envisaged for the site consists of creating new premises for industrial purposes. This development therefore, accords with the objectives of the Hunter REP.

v) Newcastle Local Environmental Plan 1987 (Newcastle LEP)

Most of the land which is the subject of this application is zoned Industrial 4(b) under the Newcastle Local Environmental Plan 1987. This LEP was gazetted in June 1987, and its aims are given as being:

- a) *to promote the management, development, conservation and economic use of the resources of the City of Newcastle and to protect the amenity of its environment; and*
- b) *to provide a comprehensive planning instrument for the City that is clear and explicit but which provides flexibility in its application.*

The LEP identifies a number of specific objectives sought by the Plan, and these are listed under the relevant headings to which they refer, as follows:

- a) *Population and Housing:*
 - i) *to facilitate both the maintenance of the residential population and an increase in the number of dwellings of the City of Newcastle;*
 - ii) *to provide opportunity for the development of a wide range of housing stock commensurate with the changing characteristics of Newcastle's population;*
 - iii) *to encourage residential development that will achieve efficient use of existing physical and social infrastructure;*
 - iv) *to provide for the location of new urban development in areas that can be economically serviced;*
- b) *Employment and Economic Development:*
 - i) *to facilitate employment generating development which will contribute to the economic and social growth of the City of Newcastle;*
 - ii) *to provide for appropriate home-based employment opportunities;*
- (c) *Retailing and Commerce:*
 - (i) *to maintain and reinforce the role of the Central Business District as the Hunter Region's major commercial, administrative, cultural and entertainment centre;*
 - (ii) *to maintain and reinforce the viability of existing commercial centres in a manner appropriate to their functional role;*
- (d) *Leisure:*
 - to provide for appropriate open space opportunities and to allow for the development of a variety of recreation and leisure activities commensurate with the size and preferences of the population and Newcastle's role as regional capital;*

- (e) *Community Services:*
to allow for the provision of a variety of community facilities appropriate to the needs of the people of Newcastle;
- (f) *Transport:*
 - (i) to facilitate the provision of a safe and efficient transport network for the movement of goods and people;
 - (ii) to delineate the arterial road network and to facilitate the free flow of traffic thereon;
 - (iii) to provide for additions and realignments of the road network;
- (g) *Rural and Environmental Areas:*
 - (i) to protect environmentally sensitive areas from development, and minimise adverse impacts of urban development on the natural environment;
 - (ii) to restrict development within flood prone areas in order to minimise flood damage and obstruction to flood waters;
- (h) *Heritage Conservation:*
 - (i) to conserve the environmental heritage of the City of Newcastle;
 - (ii) to integrate heritage conservation with planning and development control processes;
 - (iii) to provide for public involvement in the assessment of development proposals relating to a heritage item;
 - (iv) to ensure that new development is undertaken in a manner that is sympathetic to and does not detract from the heritage significance of heritage items and their settings, important streetscapes and landscapes and the distinctive character which they impart to the City; and
 - (v) to provide incentives for the restoration and conservation of heritage items; and
- (i) *Administration:*
to provide guidance in the facilitation and management of development in Newcastle through enunciation of the Council's environmental planning objectives.

A small portion of the site, in the south-east corner, is zoned Special Uses (Ecclesiastical) 5(a). The objectives and permissible uses for the Industrial zone 4(b) are given as being:

1. *Objectives of zone*

The objectives are:

- a) to facilitate the development of large scale industrial, service and storage activities which by nature of their operations should be isolated from residential areas; and
- b) to allow commercial, retail or other development only where it is:
 - i) ancillary to the use of land within this zone for industrial, service and storage purposes;
 - ii) primarily intended to provide personal services to persons occupied or employed in activities otherwise permitted in this zone;
 - iii) associated with an industrial environment;
 - iv) unlikely to prejudice the viability of existing commercial centres; and

v) will not prejudice the intent of objective (a).

2. Without development consent

Nil.

3. Only with development consent

Any purpose (which in the opinion of the Council, is consistent with the objectives of this zone) other than a purpose included in Item 4 of the matter relating to this zone.

4. Prohibited

Advertising structures; caravan parks; dwellings (other than those used in conjunction with industry and situated on the same land as the industry); educational establishments; hospitals; institutions; mines; motels; residential flat buildings; roadside stalls; tourist facilities.

The development of industries envisaged for the Steel River site complies with the objectives of the industrial zone in all respects. The development would also comply with those uses which are permissible with consent.

2.3.2 Non-Statutory Instruments

i) Newcastle Development Control Plan No 20: Guidelines for Industrial Development (Adopted September 1989)

The aims and objectives of this DCP are given as being:

The aims and objectives of this Plan are:

- *To outline Council's requirements for Industrial Development within the City of Newcastle.*
- *To provide advice to developers and/or industrialists on the interpretation and application of Newcastle LEP 1987 as it relates to industrial development within the City.*
- *To promote the efficient and economic use of the City's industrial resources by ensuring that development proposed is appropriate to Industrial Areas.*
- *To minimise the impact of industrial development, visual or otherwise through careful site planning and ensure that adequate environmental safeguards are implemented.*
- *To ensure that industrial development proposed in close proximity to residential areas does not have a materially detrimental effect on such areas.*

The nature of the future development envisaged for the site is such that the guidelines given in the DCP for industrial buildings could be applicable and have been taken into account in framing the proposed new guidelines for the site.

The DCP guidelines relating to engineering matters and to landscaping have been taken into account in the proposals for the infrastructure are the subject of a separate development application, discussed later in this SIAS.

ii) Newcastle Development Control Plan No 33 Landscape Design Principles and Guidelines (Adopted November 1994)

The aims of this DCP are given as being:

The aims of this Development Control Plan are:

- *To provide a reference for Council's objectives, requirements and procedures for the landscape planning and design of development sites.*
- *To encourage developers to appreciate landscape design as a fundamental and critical element in the preparation of a development proposal and to include landscape design considerations at an early stage in the planning process.*
- *To provide comprehensive landscape design guidelines and advice on the landscape design process.*
- *To provide a convenient checklist for evaluating the adequacy of landscape design details required to be submitted to Council at both the Development Application and Building Application stages of a development project.*

The DCP identifies design issues and provides guidelines for various kinds of development including industrial, residential, commercial, multiple use drainage systems, special development, car parks, road reserves and utility easements, and heritage conservation.

The proposals envisaged for future development would need to comply with this DCP. Accordingly the provisions of that DCP have been considered in framing the new control guidelines for the site. The infrastructure proposals, the subject of the separate development application mentioned above have had due regard to, and are intended to comply in all relevant respects with, the landscape aims and guidelines set out in this DCP.

2.3.3 Existing Pollution Control and Environmental Legislation

In NSW the statutes that are mainly relevant to the control of Pollution on site include:

- Noxious Trades Act 1902
- Public Health Act 1902
- Clean Air Act 1961
- Clean Water Act 1970
- Pollution Control Act 1970
- Dangerous Goods Act 1970
- Dangerous Goods Act 1975
- The Noise Control Act 1975
- Occupational Health and Safety Act 1983
- The Environmental Offences and Penalties Act 1989

- The Public Health Act 1991
- The Local Government Act 1993
- The Waste Minimisation and Management Act 1995.

These Acts are relevant in varying degrees when considering the effects of industry on the environment. The Environmental Planning and Assessment Act (1979) and the Environmental Planning and Assessment Regulation (1994) contain provisions that relate directly to industrial development. With respect to the Steel River site these Acts are administered through the Newcastle City Council (NCC) and NCC is responsible for bringing issues that require the attention of determining authorities.

In addition to the above list of pollution control sets, the following can be included:

- The National Parks and Wildlife Act
- The Fisheries Management Act
- The Rivers and Foreshore Act
- The Heritage Act

The following diagram is taken from a public discussion paper for the Protection of the Environment Operations Bill 1996, and tables the range of environmental legislation, according to the group or category to which each piece of legislation belongs.

NSW Environment Legislation



2.3.4 Possible additional environmental legislation: Protection of the Environment Operations Draft Bill

In 1997, the Government released for public comment the exposure draft of the Protection of the Environment Operations Bill. This draft Bill proposes to repeal and replace five existing pollution control Acts:

- Clean Water Act 1970
- Clean Air Act 1961
- Pollution Control Act 1970
- Noise Control Act 1975
- Environmental Offences and Penalties Act 1989

The draft Bill also incorporates major regulatory provisions of the Waste Minimisation and Management Act 1995.

The proposals in the Bill consolidate, streamline and improve the regulatory regimes which deal with these aspects of the environment. Other important aspects of the draft Bill include:

- Protection of the Environment Policies (PEPs)
- An overhaul of the environmental protection licensing system
- Clearer definition of the regulatory roles of State and Local Government
- Stronger investigative and enforcement powers
- Voluntary audit scheme and mandatory audit powers
- Scope for using economic instruments to achieve effective environment protection.

PEPs may apply to the whole of NSW or to specified areas. They may deal with an aspect of the environment or with any activity that may impact detrimentally on the environment. PEPs will provide environmental benchmarks and policies to help develop environmentally sustainable local and regional plans. Examples of possible PEPs include:

- Water quality objectives for a specified river catchment
- Ambient air quality objectives and air quality management plans to meet those objectives

Another important aspect of the proposed pollution control legislation is the integration of environment protection licensing with planning approvals (see also Section 2.3.5). The draft Bill proposes combining the separate pollution control approvals and licences into one instrument which can be staged. Where the EP&A Act requires the preparation of an EIS for a proposed activity, the EPA will need to be consulted by the Department of Urban Affairs and Planning before notifying the applicant of the requirements of the Director General for preparation of EIS. The EPA will be required to provide a range of advice to consent authorities early in the assessment process for developments in which it has a statutory interest.

The proposed new approach has the benefits of involving the EPA in considering environment protection issues at a very early stage of any development. This will allow for more informed decision making by local authorities and the general public and will provide greater certainty for developers at the development consent stage.

2.3.5 Integrated Development Assessment

In February 1997 the Department of Urban Affairs and Planning published a White Paper and Exposure Draft Bill, titled "Integrated Development Assessment". This Environmental Planning and Assessment Amendment Bill, 1997, seeks, essentially, to provide a streamlined development assessment and approvals system, aimed at encouraging business activity and employment opportunities in New South Wales.

As such, the Amendment Bill is directly relevant to the Steel River site, since the purpose of creating an "environmental envelope" to facilitate a pre-approval assessment mechanism, through this Strategic Impact Assessment Study and Draft Local Environmental Plan, is to produce the kind of outcome sought by the Amendment Bill.

As described in the February 1997 White Paper, the Environmental Planning and Assessment Amendment Bill proposes extensive changes to the present Environmental Planning and Assessment Act 1979 (EP&A Act). Specifically, the Bill proposes a remodelled system for development assessment under Part 4 of the EP&A Act including the absorption of building and subdivision controls into the development control framework.

The principle reform proposals are intended to:

- integrate development consents;
- provide for appropriate assessment;
- increase the role of the private sector in the assessment process.

In respect of integrated development consents, the Bill proposes to integrate consents under the EP&A Act with other approvals processes, by:

- introducing a new single assessment system for development, building and subdivision control;
- rationalising other local government approvals, such as the operation of a public car park, with a development consent granted under the EP&A Act;
- linking approval requirements under other Acts, such as pollution control licences, with a development consent granted under the EP&A Act.

In respect of providing for appropriate assessment, the Bill aims to establish a more streamlined decision-making system *"to ensure that the level of assessment reflects the significance and likely environmental impact of a development. This will involve clarifying the role of the State Government and local government in the development assessment system."*

This more streamlined decision making system will be achieved by:

- Simplifying and rationalising assessment criteria. In this regard the Bill states:
"The range of matters to be considered by a consent authority in determining whether or not a proposed development should proceed will be simplified. The current section 90 of the EP&A Act will be replaced by a more concise list of generic matters to be taken into account when assessing development proposals."

- Clarifying and improving the assessment process for 'Local Development'. In this regard the Bill states:
"Local Development' will be defined as development which requires consent and is not 'State Significant Development'. In most circumstances, local councils will be the decision makers. In addition to the new categories of 'exempt development' and 'complying development', pre-application notification and certification of aspects of local development in the pre- and post-consent phase are proposed to reduce delays and provide choice for applicants."
- Rationalising the decision-making process for State or regionally significant development. In this regard the Bill states:
"State Significant Development' will be development identified by an environmental planning instrument (EPI) or by the Minister for Urban Affairs and Planning as being of State or regional significance. The Minister will be the consent authority for such development. A more consistent and integrated decision-making process will apply to these major developments."
- Exempting minor proposals from the need for approval. In this regard the Bill states:
"A new classification of 'exempt development' will remove the need to seek any approval for certain minor development, provided that predetermined standards are satisfied. For example, a proponent will need to ensure that the exempt development complies with relevant standards such as the Building Code of Australia (BCA)."
- Introducing a specific assessment process for routine 'complying development'. In this regard the Bill states:
"Complying development' is routine development which can be certified entirely as complying with predetermined criteria. Separate complying assessment procedures will provide a faster system for assessing complying developments. This will free up local government resources to focus attention on more complex development proposals or other functions such as strategic policy making."

In respect of increasing the role of the private sector in the assessment system, the Bill proposes to establish certification scheme as part of the mechanism by which the private sector can be used in the assessment process. Specifically the Bill proposes to increase the role of the private sector by:

- Enabling professional associations to act in partnership with government in the implementation of an accreditation scheme.
- Enabling accredited certifiers to perform compliance functions currently conducted by consent authorities. In this regard the Bill states:
"Accredited certifiers' will be private-sector professionals endorsed by an accrediting association. Both applicants and consent authorities will be able to engage accredited certifiers to confirm or check compliance with procedural or technical aspects. Accredited certifiers will also be able to certify whether applications for 'complying development' conform with the pre-set requirements."

- Enabling 'accredited certifiers' to issue four new types of certificates. In this regard the Bill states:
"Applicants or consent authorities will be able to engage accredited certifiers to consider issuing complying development certificates, complying component certificates, completion of building work certificates and subdivision certificates."

As noted above, the remodelled assessment system will involve substantial changes to Part 4 of the EP&A Act, including the introduction of new, main categories of development, namely:

- exempt development;
- complying development;
- development of local and State significance.

In relating these new categories of development to other parts of the EP&A Act the Bill explains the mechanisms as follows:

The role of environmental planning instruments (EPIs).

Development controls in EPIs will continue to specify whether or not a proposal requires development consent, or whether it is prohibited.

Development without consent. *'Exempt development' is a new category within this classification. If the development meets all relevant standards specified in an EPI, no assessment under either Part 4 or 5 of the EP&A Act will be required. Environmental assessment under Part 5 will still apply for proposals where consent is not required and the development is not 'exempt development', such as government infrastructure projects.*

Development with consent. *Building work which previously required a building application (BA) will require development consent, unless declared as 'exempt development'. Where consent is required, development will be categorised as either a 'State Significant Development' or a 'Local Development'. Local developments of a routine nature will fall within the separate sub-category of 'complying development'. Compliance with predetermined standards and policies may be certified by accredited certifiers.*

Prohibited development. *Consent cannot be sought for the development which is expressly prohibited by an EPI. The only exception is where the Minister wishes to consider a prohibited proposal, as currently provided under section 100A of the EP&A Act.*

In the preparation of both the SIAS and the Draft Local Environmental Plan for the Steel River site the objectives and proposed mechanisms in the Amendment Bill have been taken into account and reflected in these documents to the extent it is possible to do so.

PART B: SITE DEVELOPMENT

3.0 IMMEDIATE DEVELOPMENT

It was stated earlier that this SIAS has been prepared as a support to the introduction of a new environmental planning instrument (new LEP) for the site. It was also stated that it would be the aim of the new LEP to enable an environmental envelope to be established within the provisions of the new LEP and to introduce a mechanism which would provide a rapid (28 days) approvals period for development which would comply with the environmental envelope standards.

There is certain work, however, which must be carried out immediately so that the future development of individual industrial premises can actually occur on the subject site, under the provisions of what will be the new LEP. This work is aimed at firstly, remediating the site to a standard appropriate with industrial development, and secondly, to developing a basic infrastructure of roads, open spaces and utility services within which incoming future industries can commence to operate.

3.1 SITE REMEDIATION

The description of the site remediation is contained in a separate report titled "Steel River Project - Remedial Action Plan, Environmental Impact Statement". As noted earlier, that combined RAP-EIS document is provided as reference material in the Report Appendix to this SIAS.

While the essential strategy for remediation of the site is, as also stated earlier, to "cap and contain" the tar-contaminated ground with coal washery reject fill material, there will still be on-going remedial activity necessary.

This on-going remediation is relevant to future development on the site and therefore to the preparation of the new LEP for Steel River.

The importation and spreading of fill material over those areas of contamination will render to the ground in a remediated condition suitable for industrial use.

However, as mentioned earlier, it is expected that localised areas of contaminated ground may also occur randomly throughout the site. These may be encountered as site development progresses, both in the construction of the site infrastructure, and in the construction of future industrial premises.

The proposed method of dealing with this issue of "arisings" during the course of construction of the site infrastructure and future industrial premises is covered in the EIS under the heading of a "Post Remediation for Management Plan" and for convenience, the relevant extract is repeated, as follows:

"A Post Remediation Management Plan would be prepared to ensure that future activities on the Project site do not create unacceptable risk to human health or the environment.

Any intrusive works conducted on-site would be required to be in compliance with a Health and Safety Plan designed specifically for post remediation activities and with BHP requirements for contractors.

Any contracting personnel involved in the intrusive works (eg drillers, plumbers etc) would be required to attend an induction briefing presented by a BHP representative and obtain a permit prior to the commencement of any works on-site. Issues which would be included in the briefing are:

- health and safety requirements for intrusive work;*
- the identification of hazards;*
- the appropriate action on identifying a hazard, including health and safety procedures, the BHP contact person and measures to protect the immediate environment;*
- contamination assessment and delineation procedures;*
- appropriate remedial actions based on the contamination assessment;*
- the documentation of actions and location of contaminated materials (arisings);*
- the notification of relevant statutory authorities.*

As a principle, where possible, contaminated material (arisings) would be handled within the relocation areas. The location of materials exceeding remediation criteria would be documented by survey and copies of the documentation provided to the EPA and Council.

The landscape mediums imported onto the site for use in public open spaces where existing fill materials have the potential to exceed the remediation criteria, would be assessed against the Health Based Soil Investigation Guidelines (NEHF 1996a and 1996b) for parks, recreational open space and playing field.

A number of environmental safeguards/mitigation measures to reduce any potential environmental impacts which may be generated by the proposed works have been detailed in the various subject chapters.

These measures would be implemented throughout the duration of the project. Table 21.1 summarises these safeguard measures, sets up priorities for implementation, and lists the authorities responsible for ensuring that these safeguard procedures are carried out. This is the first step in the preparation of an EMP which forms the link between environmental assessment and construction operations. The EMP would include a general environmental management component, designation of environmental responsibilities and general environmental procedures with respect to reporting, complaint investigation, operator training, engineering response procedure and so on."

It is envisaged that the EMP referred to above will be the responsibility of an entity to be known as the Estate Management Company (EMC) described later in Section 4.4 of this SIAS. One of the tasks of the EMC will be to prepare and implement an Environmental Management System (EMS) of which the EMP will form a part.

3.2 SITE INFRASTRUCTURE

The masterplan for the development of the site infrastructure, shown in Figure 7, has been prepared. As stated earlier in Section 1.6.3, a development application for the remediation works has also included the infrastructure proposals. A Supplementary Statement of Environmental Effects (SEE) for that infrastructure, including a report specifically dealing with the master planning of the site is found in the Report Appendix to this SIAS. That master plan report as stated earlier, is titled "Steel River Eco-Industrial Park, Master Plan Report", Hassell, September 1997. For convenience an extract from the SEE describing the master plan proposals for the site infrastructure is repeated here:

The master plan has been developed through extensive consultation with the Newcastle Beyond 2000 Technical Sub-Committee, analysis of site constraints and research of industry requirements. Various master plan schemes were prepared, each being modified in turn to take account of the concerns and aspirations of the community and technical inputs from the project team and client to ensure project viability.

The master plan layout contained in this report has been developed in detail to illustrate the infrastructure component of the project while maintaining the flexibility to accommodate a variety of future industries which may locate within the site. In accommodating the requirements of industry and the aspirations of the community, the following components will be included in the development.

- *industrial development sites;*
- *heavily landscaped streets;*
- *entry treatments;*
- *parklands;*
- *rail and transmission lines easements;*
- *a pedestrian and cycle circulation network; and*
- *a water management system.*

The master plan for the site is exclusive of the existing EMD plant and land nominated for its future expansion. It also excludes the area known as the south east hill which is the subject of separate, further, studies and consultation with the community.

At the time that the Masterplan for Steel River was prepared, the most critical portion of the site, namely, the South-East Hill area, was still an unresolved matter. This is because a community workshop arranged by Council, was intended to provide guidance to future development in that area, as well as an opportunity for the community at large to make an input into the design process.

The workshop was held in May 1997 and, as a result, a design/development strategy was eventually identified for the South-East Hill. This strategy, which is illustrated in Figure 8, will be incorporated into the development of the site infrastructure as it proceeds in appropriate stages.

In describing a general overview of the site layout, the SEE summarises the essential features of the master plan, as follows.

The master plan, Figure 1: Landscape Master Plan, illustrates the layout of the above components. Three access points are provided to the site to maximise links to the adjacent suburbs and to limit the concentration of traffic on any one perimeter road. The main site entrance is located on Industrial Drive. Secondary entrance roads are provided off the Pacific Highway at the western end of the site and off Tourle Street on the site's eastern side. These entrances will enable traffic to be diverted from Industrial Drive and the Pacific Highway and pass conveniently through the site increasing the commercial exposure of future industries located within the site.

The three site entries are connected by a river frontage road. This road will provide pedestrian and vehicular access to a riverfront park. A secondary road adjacent to the site's southern boundary will also connect the main entrance from Industrial Drive to the Pacific Highway entry road. This road will create a loop within the site maximising circulation opportunities and provide flexibility in the layout of future industrial allotments.

An eco-industrial services trench will be located within the footpath reserves of the river frontage road and southern loop road. This trench will enable bi-products to be transported between industries within the estate for incorporation into their manufacturing operations.

A rail line easement will be provided to connect the Kooragang Island Goods Rail line to the main BHP plant, east of Tourle Street. The rail easement has been located on the northern edge of the site adjacent to the river and immediately south of the EMD plant. The use of this easement will be subject to the rationalisation of BHP's steel mill operations and the potential requirement of industries which may locate within the Steel River site.

The existing transmission line easement located on the southern side of the site will be retained. This easement comprises two 132 kV transmission lines. The easement will be planted with native vegetation and will incorporate cycle and pedestrian pathways.

Three principal parkland areas will be provided throughout the development to create a high quality visual environment and provide recreation outlets for both employees and local residents. These will be located at the site's main entrance on Industrial Drive, in the centre of the site at the end of the Industrial Drive entry boulevard, and on the site's northern boundary adjacent to the southern arm of the Hunter River. These parks will incorporate water quality ponds which will function as part of a water management strategy for the site demonstrating the environmental objectives of the development as well as providing quality recreation settings and visual amenity.

A complete description of the master plan for the development of the site infrastructure is found in the Hassell report appearing in the Report Appendix to this SIAS. That report also includes guidelines for the more detailed control of future incoming industries and the way in which their premises will be developed. These guidelines cover the issues of Allotment and Building Envelopes; Access, Parking and Loading/Unloading Areas. They also include a range of guidelines concerning the architectural appearance of future buildings, their aesthetic qualities generally, and their respect for the environment in which they are located.

The future development of the site will therefore occur within an already-established structure of utility services and landscape, and in addition will have clear guidelines for the development of individual industrial properties.

The staging of this development can not be predicted at this time but will be in accordance with market take-up.

4.0 FUTURE DEVELOPMENT

4.1 BACKGROUND INVESTIGATIONS: GENERAL

The purpose of developing the site by its present owner, BHP, has been stated on several occasions earlier in this SIAS. This purpose is that by developing the land for industrial uses replacement jobs may be established to compensate for those lost as a result of the closure of the steel-making facility on the principal BHP site in Newcastle.

Initial investigations were carried out by both BHP and by the Hunter Economic Development Corporation (HEDC), aimed at identifying the range of industrial activities most appropriate for the site and its location, and therefore most likely to be able to generate the target employment figure of 2000 jobs.

BHP's investigations focussed on the kind of industries which would benefit most (and therefore be most likely to seek to locate in) a special kind of development area. This would be an area in which certain tariff advantages were available including a deferred Duty arrangement.

Such areas are common in international commerce, being present in at least 32 countries, and are variously known by such names as "Foreign Trade Zones, Free Trade Zones, Customs Free Zones, Special Enterprise Zones and Free Ports".

It is a consistent factor that within these zones, foreign and domestic merchandise is generally considered to be in international commerce and thus exempt from the customs duties and other tax imposts of the host country whilst they remain in the zone. It is the US Foreign Trade Zone (FTZ) Act that is advocated as the model for Australia.

As part of the research into FTZs, BHP also identified all the industry types operating in US General Purpose FTZs and FTZ sub zones. Some fifteen of these categories could be appropriate for the Steel River Project as they are compatible with Hunter regional strengths.

Concurrently with this investigation, the HEDC analysed the industrial nature of the Hunter Region in an attempt to identify those industries which might also be attracted to the Steel River site as a result of the region's competitive advantages.

A number of industries and categories of industry were thus identified. These were combined with the main industrial classifications identified by BHP's research. Some industries were seen as being subdivisions of the industry types identified by BHP while others were seen as being either categories of industries in their own right or a subdivision of those categories.

The completed list of industries seen as being appropriate to locate within the Steel River site is given in the following tabulated list.

Draft Range of Possible Industry Types Locating on the Steel River Site

- 1) Auto Parts and Aircraft Parts
 - Aerospace services
- 2) Radio Cassette Decks and Parts
- 3) Pharmaceuticals
 - Chemicals and Pharmaceuticals (and Associated Products) Cluster
- 4) Computers and Office Equipment Parts and Computers
- 5) Ship Parts and Shipboard Equipment
 - Marina (pleasure boats)
 - Marine Services (pleasure boats)
 - Marine Engineering
 - Marine Products
- 6) Electronic Products and Parts
- 7) Wearing Apparel, Textile Products
 - Cotton, wool and hemp
 - Non-food Resources Processing Cluster
- 8) Audio Video Equipment
- 9) Machinery Equipment
 - Heavy Engineering
 - Processing Mill
 - Metal Products, Machinery and Equipment Cluster
- 10) Photo Optical Equipment
- 11) Home Appliances
- 12) Steel (wire products)
 - Metal Products, Machinery and Equipment Cluster
- 13) Other Metal and Mineral Products
 - Ceramics
 - Heavy Engineering
 - Processing Mill
 - Non-food Resources Processing Cluster, excluding metallic products
- 14) Liquor (wine)
- 15) Wood Products
 - Timber Production (furniture only)
 - Paper/Pulp Mill (small operations only)
 - Timber Re-cycling
 - Non-food Resources Processing Cluster
- 16) Food and Beverage Processing Cluster
- 17) Transport and Storage Cluster
- 18) Property and Business Services Cluster
- 19) Extrusions
- 20) Transport Distribution (supporting activities only, because of low employment density).
- 21) Warehousing (supporting activities only, because of low employment density).
- 22) Assembly Imports
- 23) Building construction
- 24) Glass manufacturing
- 25) Light manufacturing
- 26) Chemical Related Industries
- 27) Industrial Tourism
- 28) Leisure products

- 29) Food Processing
- 30) Eco-Technologies
 - Solar hot water
 - Low Energy Lighting
 - Pollution Control Technology
 - Solar Panels
 - Recycling Industries
- 31) Aluminium Die Casting (operations up to 5.0 hectares maximum).

4.2 BACKGROUND INVESTIGATIONS: DETAILED

The above list of industries provided a base for more detailed investigations into this matter by Tunra Limited at the University of Newcastle. These investigations were recorded in the form of a report titled "Industry Characteristics Study, BHP Land West of Tourle Street, Newcastle" and, as stated earlier, is included in the Report Appendix of this SIAS.

The report produced by Tunra was comprehensive and should be seen as a resource document in its entirety. For convenience however, extracts from the report's Executive Summary are repeated here.

In discussing the regional context in which the Steel River site will be developed the report identified certain advantages, that would continue to accrue from the region's industrial base, namely:

- the availability of quality labour
- publicly provided infrastructure
- ease of access to major markets
- availability of natural resources
- availability of local producer services

In respect of industrial "clusters" the report points out that these are being increasingly recognised as an essential component of regional economic development. Among their advantages is the ability to "network", thus enabling the site, when fully developed, to have linkages in communication and networking in different forms, with the local area and the region as a whole. The report states:

"Development in the Hunter region has already been strengthened by the establishment of networking initiatives. Regional examples include Hunternet, a network of regional manufacturers and the proposed Hunter Regional Resource Recovery Network, a waste recovery network. Likewise, global linkages to export markets can be facilitated through intra and inter-corporate transfers, industry development associations and government trade and development organisations. The development of network linkages in the Hunter provides both a strategic and competitive advantage for the local industrial ensemble."

In addressing Eco-Industrialism the report notes that this has become a leading conceptual framework for encouraging business towards a sustainable future. The report continues:

The term industrial ecology describes the symbiotic interrelationships that can occur in industrial complexes. In theory, industrial ecology models the flows of resources, materials and energy in industry as if they were natural systems. Waste can be eliminated as a by-product of industry through one industry's waste becoming another's raw material. A desired outcome of industrial ecology is the complete elimination of waste as an end product or pollutant. The principles of industrial ecology can be applied in specific localities to produce eco-industrial parks. Here, an individual area is designed intentionally to enhance the use and reuse of materials and energy using advanced information technologies and environmentally friendly industrial processes.

The application of eco-industrial principles has the potential to generate positive economic benefits by stemming the loss of materials and energy from a value-adding chain, lowering the costs of production, reducing the demand for scarce raw materials and subsequently ameliorating the rising costs of resources extraction. Finally, efficiency gains and the co-generation of energy can result in lower production and energy costs."

The regulatory framework within which the Steel River site will be developed was examined, as were the actual physical requirements of industry types identified by Tunra as being those which possibly would locate in the subject site. The methodology for these studies is described in the report and the results are provided on spreadsheets located in the report's appendix.

The Tunra Study constructed three different models which had relevance to the principles of industrial ecology. These models were, Option 1, a single user application; Option 2, a multi-user, but single sector application; Option 3, a multi-user, multi-sector application.

It was concluded that whereas Option 1 provided more opportunity for the application of eco-industrial principles of operation, it did not produce employment densities such that the target of 2000 jobs could be met.

In terms of employment, Option 3 provided the best potential. The report states:

"The multi-user (multi-sector) application for the WOTS site (Option 3) could be expected to produce an average employment intensity of 30 employees (EFT) per hectare based on net 70ha land use, making this application the most likely to meet the goal of 2,000 jobs for the WOTS development.

Option 3 would require materials inputs across a range of general industrial and service sectors. Users would rely on existing external infrastructure, and attend to their own smaller-scale, user-specific transport requirements. These would be invariably road-based. The outputs generated may include consumer products, business products and business services. These would have low export intensity.

A key economic problem with this application is its lack of inherent 'stickiness'. That is, SMEs are relatively more mobile businesses. Potential users will have relatively lower sunk costs and potentially higher mobility. Firms may come, but they also have the opportunity to leave if locational incentives arise in other regions. Hence,

Option 3 could result in a fragmentation of land use on the WOTS site thereby disrupting opportunities for applying eco-industrial principles to materials cycles such as described for the multi-user (single sector) application.

On the other hand, should substantial competitiveness and 'stickiness' measures be incorporated into a multi-user (multi-sector) application for WOTS then there would be considerable potential for raising export performances. Multiplier effects have the potential to be moderate to high locally if firms are embedded in strong local and regional networks. This application provides a unique opportunity for the lower Hunter Valley industrial ensemble. In this way, opportunities could exist for:

- the development of efficient energy budgets internal and external to WOTS through use of renewable energy, re-use of produced or captured energy and co-generation*
- internal and external management of a waste stream through participation in the maintenance of a regional waste network*
- on-site strategies to enhance worker well-being with potential for the external transfer of effective practices.*

This approach to the use of eco-industrial principles through a multi-user (multi-sector) application for WOTS involves the maximisation of positive externalities from WOTS. It is a view of WOTS based on regional enhancement rather than that of a fortress."

(It should be noted that reference to "WOTS" site means the Steel River site).

The report pointed out that an important element of Option 3 would be the establishment of a Strategic Information Centre which could incorporate four functions which are seen as being increasingly fundamental to the region's economic dynamism these are:

- the administration of the region's economic, waste and materials networks (including a dynamic materials management system)*
- research and information gathering to guide individual and regional strategic decision making*
- the propagation of inter-firm relationships and the promotion of new-firm formation in order to deepen and embed the regional environmental and economic linkages*
- the provision of training and accreditation schemes promoting best practice in economic and environmental behaviours.*

Because of these, the Steel River site was seen as offering an opportunity to generate and enhance value-adding and waste minimisation, not only in the site itself or even its region, but over entire areas of NSW.

4.3 PROGRESSIVE DEVELOPMENT

Section 3.2 of this SIAS discussed broadly, the components which together form what is called the "infrastructure master plan" for Steel River. A complete description is given in the Hassell report titled "Steel River Eco-Industrial Park Master Plan Report", found in the Report Appendix to this SIAS. For convenience, an extract from that report is repeated here, in order to explain briefly, the purpose and nature of future industrial development on the site.

2.1 Development Approach/Philosophy

The approach to developing the master plan for the Steel River site is to create an industrial estate which BHP hopes will contain industries whose collective workforce will total some 2,000 employees. In pursuing this objective, BHP will seek to attract various types of industrial businesses, whose specific requirements will not be known until particular industries actually decide to locate on the site. To this end, the master plan has been prepared to provide maximum flexibility to accommodate a variety of industry types and their requirements. It will set out the overall infrastructure framework required to create the basic structure of land development into which future industries will be located.

Consequently, it is not possible to indicate a detailed subdivision of land. Such a pattern will emerge and evolve as successive industries are attracted to the site one by one. At that stage each incoming future industry will lodge a separate development application in respect of its own needs - its land and its building requirements.

The concepts for the eventual development of the Steel River project will incorporate features which are the result of community involvement. At an early stage in this process, a "stakeholders" meeting resolved, among other things, to incorporate the principles of industrial ecology into the design and development of the estate.

Following the development of the site infrastructure, incoming industries will be allocated areas for lease. Each industry will prepare documentation for its requirements in respect of buildings and land. To give general guidance as to the overall development objectives of Steel River, the master plan report notes basic development objectives for the site, as follows:

2.2 Development Objectives

To guide the development of the master plan and assist in the preparation of the landscape strategy, a number of development objectives have been formulated. These are to:

- create a viable and functionally efficient eco-industrial park capable of generating and sustaining the employment of 2,000 jobs;*
- demonstrate the application of environmentally sensitive design responding to site constraints, remediation requirements and the management of water resources;*
- create an enjoyable and aesthetically pleasing work and recreation environment for both employees and the local community;*
- provide safe and effective access to the riverfront and proposed parklands within the site to maximise recreation opportunities for employees and the community; and*
- create a strong and identifiable corporate image for the site which promotes a sense of quality, innovation, technology and environmental awareness.*

The original concept of seeking to pursue the principles of industrial ecology has been retained in the master plan proposals. In this regard, the master plan report states:

2.3 Eco-Industrial Park Concept

The Steel River Project is proposed to be Australia's first eco-industrial park. This concept is based on ecologically sustainable development principles in seeking to improve the economic performance of participating companies while minimising their environmental impact.

In practice, the concept will involve inter-company partnering of environmentally conscious business, encouragement of recycling and waste minimisation, bi-product exchange and resource demand reduction.

To facilitate the achievement of this concept, the master plan layout has been designed to provide maximum flexibility to accommodate a variety of industry types and their needs. An internal loop road is proposed to assist in the transfer of materials and bi-products between industries by both conventional transport means and via a below-ground services trench.

It is also proposed to maximise the number of entry points to the site so as to reduce the transportation distances and energy cost in accessing the local road and rail network and port facilities.

A future estate management structure will be established to assist in implementing further eco-industrial initiatives and co-ordinate the clustering of environmentally-conscious industries.

As stated earlier, visual objectives and landscape guidelines have been identified for the use of incoming industries when preparing proposals for their buildings and land. For industrial properties generally, the master plan report discusses development sites in relation to the roads they may abut. In this regard the report states:

3.3 Industrial Development Sites

The area of land available for future industrial development is illustrated on the master plan, refer Figure 1. It is envisaged that this area will be subdivided in the future with additional roads provided in the form of cul de sacs and loops to give access to individual properties.

Guidelines relating to the size of allotments, their configuration, setbacks and site layout within the industrial development area are set out in Part Two of this report.

Also included are guidelines concerning the architectural appearance of buildings on the Estate, including their aesthetic qualities generally, and their respect for the environment in which they are located. In terms of access, the report states:

No direct access from industrial allotments will be provided to Industrial Drive, Tourle Street or the Pacific Highway. A minimum development setback including external work, storage and car parking areas of 10 metres shall apply to all external site boundaries of the Steel River site. This setback is to be heavily landscaped to provide a visual buffer to the development.

4.4 ESTATE MANAGEMENT

4.4.1 Management Entity and Responsibilities

The development proposals for the Steel River site are described generally, above. These involve firstly, of a basic site infrastructure of roads, open spaces, and utility services, and secondly, of incoming industries which will develop buildings and land progressively for their particular needs.

In addition to these physical development proposals the Steel River Project envisages the establishment/retention of an Estate Management Company (EMC) to market, oversee and manage the estate. All land will be leasehold. The Estate Management Company will be under contract to the Steel River Project Entity, the land owners.

The paramount objective of the Estate Management Company is to manage the Steel River Project so that the social, environmental and economic objectives for establishing the estate are met, and that the estate remains an attractive location for industries to establish in Newcastle.

The specific areas of responsibility of the Estate Management Company include:

- Estate Marketing
- Negotiating and letting of leases
- Facilitating the granting of approvals for new industries
- Facilitating the introduction to the Steel River Project's Design Construct and Fund (DCF) facility
- Ensuring and maintaining the integrity of the approved remediation strategy for the site
- Monitoring the compliance of the Estate within the approved Environmental Envelope
- Development, maintenance and on-going development of the Estate's Environmental System (EMS)
- Co-ordination of eco-industrial resource sharing to achieve industrial ecology objectives
- Development and maintenance of the environmental model to the satisfaction of Council and the EPA
- Reporting the environmental performance of the Estate to Council and the community
- Maintenance of the public areas of the estate, landscape, roads etc
- Estate security
 - Conference centre
 - Car parks
 - Child Care
 - Shuttle bus (if proven to be economic)
 - Car pool organisation for estate employees
- Estate services
 - Rubbish removal
 - Power supply
 - Communications
- Rental collections
- Legal and Insurance requirements
- Operation of the Foreign Trade Zone when approved.

Each industry within the Estate will be subject to all normal Government and Local Government controls such as health regulations and EPA licences, and the powers and responsibilities of these authorities are in no way diminished. However, the existence of the Estate Management Company and its power as administrator for the landlord will provide comfort to the Landlord, Council and the Community that the Estate will be administered in the best possible manner.

In addition to these tasks, the EMC is also intended to be responsible for:

- The facilitation of industrial ecological principles on site generally, and within the region in its interaction with the site.
- Continuing community liaison including the maintenance of feed-back mechanisms.
- Continuing monitoring of all industries within the site to ensure that the relevant environmental standards are being maintained and complied with, both for individual industries and cumulatively, for the estate as a whole.
- Directly monitoring flora and fauna for potential adverse effects of development on the site, in addition to the monitoring of air and water quality.
- Facilitation of communications networks, including transportation, (as part of the application of industrial ecology principles) both within the site and within the region.

In respect of the facilitation eco-industrial principles generally, it may be noted that the environmental envelope proposed for the site and implemented by its new Local Environmental Plan does not of itself, provide the conditions to facilitate eco-industrial development on the Steel River estate.

The environmental envelope prescribes the maximum cumulative impact of the estate on the surrounding environment. Eco-industrial principles and practices may be applied to meet the requirements of the envelope. Full exploration and implementation of eco-industrial principles in relation to the development of the estate would be the responsibility of the EMC. In developing eco-industrial concepts within the estate and with other regional landuses, the EMC could consider the following:

- i) industry clusters based on flows of wastes and resources. Linkages with non-industrial sectors should be considered;
- ii) provision of resources to encourage small businesses to establish, or close liaison with other regional business development agencies;
- iii) accessible information about all inputs and outputs of industries located within the estate to facilitate new initiatives in products and services;
- iv) access to new national and international information about sustainable business practices (eg) Zero Emissions Research Institute, UN University Tokyo, Japan;
- v) development and maintenance of networks to other regional industry and environmental management groups;
- vi) management of transport for raw materials, products and people to minimise road traffic but maximise accessibility and community linkages.

These matters should be addressed in an Environmental Management System (EMS) for the estate and in communication strategies developed for the estate.

4.4.2 Marketing/Development Strategy

The conventional industrial park development strategy is to recruit companies on the basis of access to supplies and markets, workforce capabilities and costs, transportation access, economic incentives, and quality of life. More general features of the site plan such as an industry focus, outer competitive advantage to potential tenants.

The Steel River Project Eco-Industrial park has these strengths to begin with but will add a new level of benefits to participating companies in improved economic and environmental performance through eco-efficiency and synergistic relations among the park's companies. The marketing strategy will feature these advantages as additional incentives that will contribute directly or indirectly to the tenants bottom lines and their public images.

4.4.3 Potential Benefits to Companies

- Park environment management infrastructure and services enable tenants to outsource major responsibilities in these areas.
 - Site-wide environmental envelope for rapid approvals
 - Shared solid and liquid waste management
 - Shared training in new regulations and technologies
 - Shared emergency management services
- Sales of material and energy by-products increase revenues and reduce disposal costs.
- Membership of the Steel River Project Eco-Industrial Park gives companies an authentic green image in the marketplace.
- Potential collaboration among some companies in marketing, training, or R&D may offer a new source of competitive advantage.
- Other possible shared services in the Steel River Project Eco-Industrial Park reduce costs to companies
 - Cafeterias, day care
 - Purchasing of non-product related supplies
 - Education/training facility
 - Transportation services

4.4.4 Development Strategies: Two Possibilities

- i) The Anchor Tenant Option
A typical development practice is to seek a major anchor tenant to serve as attractor by its prestige and potential for other firms to be suppliers or customers. In the Steel River Project Eco-Industrial Park, the major inputs and outputs of this anchor will help define the search for the next round of companies, ones capable of using its by-products or supplying it with theirs. Once this first major company has signed a contract to locate in the Steel River Project Eco-Industrial Park, its staff will probably be able to help BHP to identify recruitment candidates who fit well with it. After several other companies have committed, there will be a richer mix of potential exchanges, which will define the next wave of recruitment.

- ii) **A Waste Transfer Station as EIP Hub**
Cities developing solid waste transfer stations such as Newcastle has at Summer Hill, suggest a potentially useful variation of the anchor tenant strategy. Local rubbish deposited and sorted at Summer Hill can become raw material for recycling companies and, even though it is some distance away, such a facility could provide the anchor facility for the Steel River Project Eco-Industrial Park, and additional industries located adjacent to the Summer Hill facility. Summer Hill could (as envisaged for Newcastle City Council's Recycling Network) provide the raw materials for companies turning wastes into industrial feestocks construction materials, and various end-user products. The inputs and outputs of this round of companies would then open niches for further recruitment.

4.4.5 The Fit with the Foreign Trade Zone Proposal

A Foreign Trade Zone is a restricted access site in which goods in international commerce may be manufactured, processed, mixed with domestic goods, assembled, exhibited, stored or repackaged, without being subject generally to import duties, sales taxes, and excise taxes. Such goods become subject to these duties and taxes when they are removed from the zone for sale or use in the domestic market but are not subject to them if exported directly from the zone.

Australia, by world standards, has a relatively small domestic market. As such, to achieve international competitiveness, companies need to access the economics of scale presented by the world markets by being able to import and export freely. Foreign Trade Zones facilitate this.

For the Steel River Project Eco-Industrial Park, access to world markets are important factors in the "Basics" described in Section 4.5.1 above. Whether the Steel River Project is an Eco-Industrial Park or not, the size of the market that can be accessed is critical to the economic success of the tenants. Therefore for companies using waste as a raw material, a world market for their products is likely to be very important for their commercial success. Similarly it is likely that they will need to source some component used in their manufacturing process from off shore, to be commingled and re-exported.

This is where the Foreign Trade Zone fits with an Eco-Industrial Park and adds an additional dimension to the profitability of companies tenanted in the estate.

PART C: ENVIRONMENTAL ASSESSMENT

5.0 SUBJECT SITE AND LOCALITY: PHYSICAL

5.1 GEOLOGY/GEO TECHNICAL ISSUES

A geotechnical assessment of the Steel River site was carried out in order to determine the suitability of the land for the purposes for which it is intended to be developed. These purposes include the basic site infrastructure and land uses of open space, roads, and utility services, along with the future industrial development of buildings and land. Both the existing site characteristics, and the future site characteristics after remediation works by re-contouring the site with imported fill material, were examined. Specifically, the scope of work for the geotechnical investigation was as follows:

- A review of geological, geotechnical and hydrogeological background information.
- An assessment of the existing subgrade along the proposed road alignment.
- An assessment of the quality of imported coal washery reject to be used as filling on the site.
- An assessment of acid sulphate conditions and the corrosiveness of the soil.
- An assessment of river bank stability.
- A preliminary pavement design for the proposed road alignment.
- An assessment of foundation types suitable for industrial structures.
- Recommended site preparation/filling procedure for the placement of filling for the grading of the site and estimated settlements that the placement of this additional filling is likely to induce.

All of the above tasks were aimed at demonstrating that the land is suitable for, and capable of supporting, general industrial development in accordance with the master plan established by the basic site infrastructure. In addition, issues of permeability and chemical composition of the existing and future material of the site were examined in order to determine the potential for industries which may fall into the “designated development” category because of their location on the site relative to its ground characteristics.

The full report detailing the geotechnical work carried out is contained in the report by Robert Carr and Associates titled “Preliminary Geotechnical Investigation, BHP Site West of Tourle Street, Mayfield”. As noted previously, that report appears in the Report Appendix to this SIAS. This report should be read in its entirety in order to obtain a complete understanding of the geotechnical characteristics of the site. For convenience however, the “Summary and Conclusions” section of the report is repeated here as a brief overview for information.

Subsurface Condition

The fieldwork was undertaken between the 6th and 19th of March and consisted of 64 test pits and 5 boreholes. The subsurface conditions encountered generally comprised filling (coal washery rejects, slag, flyash and rubble) to a depth of approximately 10m, overlying estuarine sediments which typically consisted of layers of soft to firm clays, silty clays/clayey silt, sandy clay/clayey sand, silty sand and sand. The estuarine sediments were underlain by very stiff to hard silty clay at depths of 15-16m, although in some locations the estuarine sediments extended to a depth in excess of 20m. Background information showed that bedrock was encountered at depths typically ranging from 25-28m in areas adjacent to the Hunter River and in the area of the old river channel. The depth to rock was generally less at the higher areas of the site adjacent to Industrial Drive and the Pacific Highway.

Laboratory Testing

Laboratory testing was carried out on selected bulk and SPT samples in order to provide engineering design parameters for the strata encountered, in particular the coal washery rejects and the estuarine sediments. Testing included CBR testing, particle size distribution, moisture contents and plasticity index. Chemical testing was also carried out with soil samples from four locations being tested to determine chemical parameters, which included pH, sulphate, chloride, electrical conductivity and sodicity. Full details of all laboratory testing are presented within the report.

Bank Stability

The stability of the bank of the South Arm of the Hunter River, which forms the northern boundary to the site, has been assessed in its present condition. The results show that the factor of safety for a localised failure of the bank is marginally greater than 1.0. This is as expected since the slag filling has been dumped and allowed to form an embankment slope equivalent to its angle of repose. For a deep seated mode of failure, the analysis indicates acceptable factors of safety for the bank in its present conditioning, with factors of safety of approximately 1.8. For this mode of failure, the failure surface intersects the ground surface approximately 20m from the edge of the embankment. The combination of a localised and a deep seated failure would not be considered to result in acceptable factors of safety, which are of the order of 1.2.

It is recommended that the stability of the bank should be reassessed if structures or development is proposed adjacent to the top of the bank, or if modifications to the bank are proposed.

Pavement Design

A preliminary pavement design was based on the results of the CBR tests and the subsurface conditions encountered in the test pits which were excavated along the alignment of the proposed road. A typical pavement profile which would be suitable for the road within the proposed industrial estate would comprise a 150mm basecourse of high quality crushed rock or base quality gravel overlying sub-base quality gravel. The required thickness of the sub-base is dependent on the design traffic loading and varies in thickness from a minimum of 150mm to 250mm for allowable traffic loadings of 1×10^5 to 1×10^7 ESA's respectively. A contingency for subgrade replacement should be allowed for considering the variable nature of the subsurface profile.

Foundations

Since the site is so large (approximately 110ha in area) and the subsurface ground profile is of a variable nature across the site, generalised comments and recommendations were provided regarding typical foundations for the envisaged industrial structures. Proposed developments will require specific geotechnical investigation for detailed foundation design.

High level pad and strip footings are considered to be suitable for light structural loads with a maximum allowable bearing pressure of 150kPa being recommended for design purposes. The settlements of lightly loaded high level footings are likely to be within acceptable limits. However, considering the variable nature of the subsurface profile and the risk of unacceptable differential settlements, it is recommended that specific investigation be carried out to confirm the presence of uniform site conditions prior to high level footing design. If heavily loaded or settlement sensitive structures are proposed for the respective industrial structures, it is recommended that piled foundations be considered.

Consideration has also been given to slabs on ground under uniformly distributed loads. The settlement of lightly loaded slabs (up to 5 kPa) on ground are likely to be acceptable, however specific investigation would be required to quantify expected settlements. To some extent, the slag filling may bridge the estuarine sediments at depth. However, the performance of high level foundations, particularly with respect to differential settlements of pad footings, may be enhanced by dynamic compaction of the filling, thereby creating a layer of more uniform strength within the upper layers of filling.

It is recommended that larger column loads be supported on piled foundations, with piles being founded in the dense sands or bedrock strata. Driven concrete or steel section piles are considered to be the most suitable for this site. Typical allowable load capacities are given for a selection of pile types. It is suggested that the actual pile capacities should be verified from the driving records of the piles in conjunction with a recognised dynamic pile driving formula.

Filling and Grading of Site

Recommendations were also provided regarding site preparation/filling procedures for the additional filling (which may be up to 5-6m in depth in the southern areas of the site) which will be required for the grading of the site.

Estimates of the mean settlements that this additional filling would be likely to induce were also made. The initial and total final mean settlements were estimated to be of the order of 50-100mm and 250-300mm respectively. Long-term consolidation settlements of approximately 150-200mm are expected over a period of years. Significant variation in expected settlements can be expected due to variations in ground conditions and imposed loads.

Site Regrading/Excavation

Excavations in most areas of the site will encounter a hard layer of cemented slag of approximately 0.5m thickness within the upper 2m of the filling. These layers of cemented slag are likely to require ripping with a bulldozer before regrading of the surface of the existing filling could be undertaken.

The issue of the nature and quantity of imported fill (coal washery reject) and its application to the site has been addressed fully in the Woodward Clyde Remediation EIS, Chapter 4, which as also noted earlier, is titled "Steel River Project - Remedial Action Plan, Environmental Impact Statement" and appears in the Report Appendix to this SIAS.

5.2 FLORA AND FAUNA

The flora and fauna characteristics of the existing site were the subject of investigations carried out as part of the environmental assessment of the site remediation works. These investigations are described in Chapter 11 of the remediation and EIS report by Woodward Clyde mentioned above in Section 5.1 and appearing in the Report Appendix of this SIAS.

In addition to the investigations carried out as part of the environmental assessment of the site remediation works, a further flora and fauna assessment was made, having regard to the future industrial use of the site. These investigations are contained in a report titled "Flora and Fauna Assessment for the Steel River Project, Tourle Street Mayfield" by Hunter Wetlands Research and Management, dated June 1997.

This report contains some material used also in the flora and fauna assessment in the remediation EIS mentioned above, however the assessment now appearing in the report was specifically directed to the environmental envelope context of the site and to the impact of future industrial development on site, following remediation and the development of the site infrastructure.

The issues covered were as follows:

- a description of the present flora and fauna of the study area;
- a description of the ecological setting of the study area;
- an assessment of ecological impacts of development of the study area for the 'Steel River' project;
- recommendations for amelioration of possible ecological impacts.

The report should be read in its entirety, however, for convenience extracts from the Executive Summary of the report are repeated here.

In respect of the site as it exists at present (before re-contouring as part of the remediation works) the report notes:

The extensive past modifications of the study area have effectively removed most native animal habitat, with bird and reptile species being the main users of the site. None of the plant and animal species recorded within the study area or that are considered likely to occur within the study area are considered to be locally important, and no such species are likely to occur within the study area. No threatened plant species were recorded on the subject site during sampling, and none are considered likely to occur within the study area. The highly modified nature of the study area makes it highly unlikely that any threatened fauna species would reside within the study area, nor regularly visit the area. Two possible exceptions were identified in the analysis of habitats and potential fauna usage,

Common Bent-wing Bat and Large-footed Myotis. Common Bent-wing Bat could forage in the remnant woodland habitats on the site, while Large-footed Myotis is likely to forage over the adjacent Hunter River. Derelict buildings on the subject site provide potential roost habitat for both species, albeit low quality.

The report also notes much of the Study area originally consisted of Spit Island (a delta island in the Hunter on which occurred river mangroves and salt marsh). Reclamation of land in the 1950's and subsequent clearing has resulted in the elimination of this vegetation except for small relic patches.

Extensive wetlands do, however, remain on Kooragang Island to the north and as part of the Hexham Swamp complex to the south west, (including the Shortland Wetlands). The Kooragang Nature Reserve wetlands are recognised as having international significance inferred from their listing in the Convention of Wetlands of International Importance (Ramsar Convention).

In respect of the site following the re-contouring as part of the remediation works, the report states:

Development of the study area would require reshaping of much of the land surface (excluding the hill in the southeastern corner), and therefore would involve the removal of all of the existing vegetation and the fauna habitats this vegetation supports. However this vegetation has minor habitat value, and landscape plantings as part of the development have the potential to provide comparative replacement habitat. The two threatened species considered to have some potential to utilise habitats on the site, Common Bent-wing Bat and Large-footed Myotis, would not be significantly affected by development of the site.

The patches of vegetation within the study area represent one of the few areas where some native habitats are present on the southern bank of the Hunter River, providing an interrupted link to native remnants in suburban Mayfield - Warabrook - Shortland for some fauna species. While clearing of the existing vegetation on the site would interfere with this link, it would be re-established by the landscape plantings.

Addressing the impact of future industrial development of the site, including its infrastructure, the report acknowledges the hazard to birds posed by the existing electricity transmission lines and recommends no additional lines or aerials. The report states:

Past studies have shown that power lines in the area present a collision hazard for birds, especially where the lines cross a regularly used flight path. Existing transmission lines crossing the site would be retained on the developed site but no additional transmission or aerial distribution lines would be installed. The power lines on the developed site, therefore, would not present any additional risk of collision.

For the future development's impact on flora and fauna generally, the report refers to the environmental standards to be set by the Environment Protection Authority, and makes recommendations about the desirability of maintaining and enhancing habitats as part of the site's landscape development. The report states:

It is difficult to prescribe standards for pollutants based on the existing knowledge of the biology and ecology of most native flora and fauna species. Water and air quality standards to be set by the NSW Environment Protection Authority are considered to be generally appropriate for the protection of flora, fauna and ecosystems surrounding the development. There is considered to be a need to directly monitor flora and fauna for potential adverse effects, in addition to the proposed water and air quality monitoring.

To maximise the habitat enhancement opportunities of landscaping on the site, it is recommended that only native plant species be used in the landscaping, with an emphasis on local flora. Open space areas, such as around the proposed water quality ponds, should incorporate dense plantings of shrubs as well as trees to provide cover for smaller birds.

Responsibility for implementing the recommendations for flora and fauna protection (and enhancement where possible) will be with the Estate Management Company proposed to be established as described earlier in Section 4.4 of this SIAS.

5.3 TRAFFIC AND TRANSPORT

The traffic and transport issues associated with the development of the Steel River site were the subject of a study and report. That report, by Colston, Budd, Hunt and Twiney is titled "Report on Transport Aspects of Proposed "Steel River" Industrial Development, Mayfield West" and, as noted previously, is included in the Report Appendix to this SIAS.

The traffic and transport study was carried out on the basis that, although there is no specific development proposed for the site to actually test, the Steel River project will develop progressively as industries decide to locate their premises and activities on the site. When the site is fully developed it has been assumed that in accordance with the basic objective of site development there will be 2000 employees located at Steel River. The traffic implications of this figure are the subject of the study.

In addition, the implications of the other basic objective of the site's development, namely the application of the principles of industrial ecology, has also been addressed in the study.

For convenience, extracts from the report's executive summary is repeated in this section.

In respect of the existing traffic situation in the locality, the report states:

The "Steel River" site is located on the south bank of the Hunter River on the western side of Tourle Street. The site occupies most of the block bounded by Tourle Street, Industrial Drive, Pacific Highway, the Kooragang Goods Railway and the Hunter River.

The site is fortunate in having direct frontage to three major arterial roads, Tourle Street, Industrial Drive and Pacific Highway. This offers opportunities to access the site with a minimum of intrusion into sensitive residential areas. The site already

has access to Tourle Street and Industrial Drive and there are opportunities to access Pacific Highway adjacent to the railway overpass.

Traffic flows in the vicinity of the site are relatively heavy at peak periods and include a significant proportion of large trucks. The network generally has adequate physical capacity to cater for existing flows. The exception to this is the intersection of Maitland Road and Maud Street which operates at a poor level of service, particularly during the afternoon peak.

In relation to amenity issues it is apparent that Werribi Street, and to a significantly lesser extent Vine Street, are currently performing arterial road functions. This is apparent in Werribi Street in terms of the use of the street by heavy vehicles and by the high proportion of traffic that traverses Werribi Street/Maud Street between Industrial Drive and Pacific Highway. It is therefore apparent that there are amenity issues in Werribi Street/Maud Street between Industrial Drive and Pacific Highway.

Finally, it was noted that the site is currently poorly served by public transport.

In terms of the traffic implications of the proposed development of industries on Steel River, providing some 2000 jobs, the report states:

The development will be provided with a high standard of connection to the surrounding major road network. It is proposed that there will be some 2000 employees on the site. It is understood that at nearby BHP industrial sites, currently some 95 per cent of employees travel by car at an average of 1.2 persons per car.

It is proposed to seek an immediate reduction in this level of car dependence with an initial goal of reducing the percentage of employees travelling by car to 85 per cent and increasing car occupancy to 1.4 persons per vehicle. If achieved, this would reduce the number of car trips by nearly a quarter, compared to the existing levels at nearby sites.

It might be noted that this strategy is aimed at achieving an initial goal. Further reductions might be possible by applying, for example, network car pooling with other nearby sites, such as the main BHP plant east of Tourle Street.

In respect of other issues relating to the traffic implications of the eventual development on Steel River, the report continues:

It was found that the intersection of Pacific Highway and Maud Street continues to operate at a poor level of service and would benefit from upgrading, even with existing flows. The level of service at the intersection of Industrial Drive and Pacific Highway falls to level of service D in the morning peak hour. Whilst this is an acceptable level of service at a major intersection in peak hours, it does suggest that the intersection would benefit from upgrading in the future.

In relation to amenity issues, it has already been noted that the site benefits from its direct access to major roads which minimises the attractiveness of using inappropriate residential streets. However, as already discussed there are concerns with the impact of existing traffic on Werribi Street, and to a lesser extent Vine Street. Development of the subject site will lead to an increase in flows in Werribi Street.

This combines with the capacity problems at the intersection of Maud Street and Pacific Highway to suggest that some action in this area is worthy of consideration. The problem of controlling through traffic in any street is complex. Whilst it is beyond the scope of this study to undertake the regional analysis necessary to fully address this issue, the broad range of options can be identified and discussed. On the basis of a preliminary analysis, the closure of Werribi Street offers some significant attractions. These include removing through traffic from the Street and simplifying the intersection of Maud Street and Pacific Highway.

It is therefore considered that the ability of reducing, or eliminating the role of Werribi Street as a through street is worthy of further consideration by the various stakeholders. The viability of this option is reinforced by the options available to the RTA to either extend Industrial Drive south through Warabrook and/or complete State Highway 123 north to Pacific Highway. Construction of either of these links, although neither is yet programmed, would greatly reduce pressure on the Maud Street route, making it easier to close Werribi Street.

The above extracts from the Executive Summary of the traffic report focus on the traffic generation issues related to the development of Steel River for industrial purposes. The report, however, also addresses some of the ways in which Steel River could make a positive contribution to the general objectives of pollution reduction and the facilitation of eco-industrial principles as applied to the site.

In this regard, the report deals with other possible transport initiatives, and states:

It has been a strongly stated aim of stakeholders that positive and specific actions be incorporated in the development to reduce the dependency of the development on road based transport. The extent to which the use of road based transport of goods can be minimised depends on two factors. The first is the extent to which the source of raw materials and/or the destination for finished product can be other industries within the site. The second is the extent to which other modes, notably rail, could be used.

In relation to the first matter, the design of the internal road system has made provision for future trenches in the verges to carry pipelines for the movement of material between industries within the site. In relation to the use of other modes the potential to bring a rail siding into the site is being retained.

The movement of employees to and from the site offers greater opportunities to reduce car dependence. The number of cars seeking to travel to and from the site can be reduced by two main means, firstly by encouraging employees to use other modes of transport and, secondly, by encouraging increased numbers of people in each car.

The encouragement of employees to share a single vehicle to travel to work rather than each bringing their own car is car pooling. Car pooling is generally only successful if there is some central system for matching employees that travel to and from work at similar times and whose homes are located conveniently in relation to each other.

The establishment of such a system may be difficult on a site that may eventually house a large number of separate industries. However, the systems that will be set up to promote the internal transfer of raw materials and products should be able to also provide a central matching system to assist and encourage car pooling.

The use of alternative modes of transport relates primarily to walking, cycling or the use of public transport. It was noted above that access to the site by bus services is relatively poor. It was also noted that there is a new railway station at Warabrook, south of the site.

It is therefore recommended that the following actions be considered to improve public transport access to the site:-

- instigate a shuttle bus service between the site and the railway station;*
- provide high quality pedestrian connections to and across the major frontage roads and to the railway station and bus stops;*
- hold discussions with bus operators to provide regular services, preferably into the site, but, at least, along the frontages of the site;*
- provide information to employees to assist and encourage them to use public transport; and*
- ensure adequate infrastructure, bus shelters, seating, timetables and route information etc is in place in the site.*

In addition it is proposed to provide high quality access to the site for pedestrians and cyclists. The Newcastle-Lake Macquarie Council's Bicycle Plan shows existing and proposed on road cycle ways on Tourle Street, Industrial Drive and sections of Pacific Highway. These connect to on and off road cycle ways links south to the station and University.

It is proposed to connect to these routes at the three main access points to the site. Within the site, dedicated cycle ways will be provided within the wide verges that edge the major internal roads. In this way cyclists will be able to move around the site with a minimum of conflict with vehicles.

It is also suggested that consideration be given to a new cycleway and pedestrian path commencing on the southern side of Industrial Drive opposite the main site entrance and connecting across Stevenson Park and via Purdie Street to Pacific Highway. The signals at Warabrook Boulevard would be used to cross the highway and connect to the cycleway to the station and University.

In relation to pedestrians it is proposed to provide dedicated footpaths along both sides of all internal roads. These will be separate from the cycle ways in order to minimise conflicts. In addition a system of pathways is proposed within the open space areas to interconnect the various parts of the site.

Overall, it is concluded that with the above measures implemented to encourage increased car pooling, use of public transport and/or walking and cycling trips to work, the objective of reducing the number of people travelling to work by car from 95 to 85 per cent and increasing car occupancy from 1.2 to 1.4 persons per vehicle

should be achievable. This would result in a reduction of nearly one quarter in the peak hour generation of the site. In practice, the initiatives could result in greater reduction in car dependency.

5.4 DRAINAGE AND WATER QUALITY MANAGEMENT

5.4.1 Drainage

The existing drainage system of the residential area south of Industrial Drive, near Stevenson Park drains to the site via pipes under Industrial Road and into soakage pits close to the existing site entry from Industrial Drive. The existing industrial area fronting the Pacific Highway also drains into the site.

Within the site, most stormwater is not controlled and is allowed to soak through the ground into the groundwater or to flow over the northern boundary and into the Hunter River. A small portion of the hill area drains to the southeast, to an existing drainage easement at the intersection of Industrial Drive and Tourle Street.

As mentioned previously, a Remedial Action Plan - EIS has been prepared by Woodward Clyde for the remedial action plan. This EIS appears in the Report Appendix to this SIAS.

As part of the site remediation works, it was noted in Chapter 7 of the EIS by Woodward Clyde that a significant improvement to the water quality of the local area can be achieved by limiting future stormwater discharges to the groundwater. Consequently the site will be re-contoured to provide minimum crossfalls of 0.5% to allow surface flows towards the north. This re-contouring will be achieved by some cut and fill of the existing flat ground (currently mostly at approximately RL 9.0AHD) and importation of additional fill material.

The re-contoured site will allow drainage water to be directed within lots to a new piped system, generally following the road routes, which will then drain to water quality ponds at the northern edge of the site and the river or to the Tourle Street boundary.

Five sub-catchments are planned all as illustrated on the drawings submitted with the Development Application for the Remediation and Site Infrastructure. The three sub-catchments draining to the north have a combined catchment area of approximately 85ha (approximately 87% of the site) and each will have a water quality pond prior to discharge to the river. The two minor catchments drain to existing drainage systems in the Tourle Street area and therefore will not have water quality ponds.

The water quality ponds will improve water quality through the removal of nitrogen and phosphorous by the take up of these elements by the aquatic flora in the ponds. These will be planned as part of the total landscaping of the development which will provide visual amenity by placing the ponds in a parkland setting. It will also provide habitats for a range of fauna.

Water from the ponds can be reused for landscape watering but the catchment is not large enough to provide a sustainable reuse system for industry. The site can, however, take advantage of the reclaimed water supply to be constructed to the site's western boundary by Hunter Water, a significant advantage for industry.

The stormwater and drainage strategy identified for the estate adopts an integrated approach and a mix of strategies that complies with NSW's "Managing Urban Stormwater" guidance documents. The strategy is tailored to take advantage of the physical and ecological characteristics. The strategy is tailored to take advantage of the physical and ecological characteristics of the area and offers a mix of protective and restoration measures and minimisation of runoff at source. This will result in improvements to water quality and a decrease in sedimentation and pollutant loadings to aquatic environments.

The provision of new and more natural aquatic habitats and accompanying multi-functionality of these water bodies and the overall improvements in drainage and water quality for the site is consistent with the ANZECC environment protection documents, specifically the water quality guidelines for fresh and marine waters and the health guidelines. The drainage strategy will improve the condition and ecological integrity of the site and the surrounding area and its waterways.

5.4.2 Water Quality

Water quality in the area of the Steel River Project is summarised in AGC Woodward-Clyde's "Environmental Review and Operational Guidelines". As indicated previously, that report is included in the Report Appendix to this SIAS. Information was obtained from a number of sources, which provided data on surface waters and ground waters and river water.

The water quality information focussed on:

- sediments associated with surface waters;
- inorganic chemicals with specific reference to manganese;
- organic chemicals with specific reference to polycyclic aromatic hydrocarbons (PAHs) and BTEX; and
- influence of site fill materials on groundwater hydrochemistry.

Surface water quality data specific to the site is limited. The existing site does not favour the generation of surface water runoff as it is mostly flat and grassed. The report indicated that in the event of surface water runoff occurring, potential for suspended sediments to be transported to the river exists. Sediments would be expected to have similar chemical properties to those for coal washery reject material, which predominantly covers the site surface.

Groundwater monitoring data indicated manganese levels are not significantly different to background concentrations. Fill materials are associated with elevated PAH concentrations, and to a limited extent BTEX concentrations in groundwaters. It was estimated that PAH concentrations in the Hunter River would be less than analytical detection limits due to PAHs concentrations in groundwaters discharged from the site. A risk assessment indicated that the discharge of dissolved contaminants did not pose an unacceptable risk to the Hunter River environment.

The available data on the water quality of the Hunter River indicated no measurable effect on river water quality attributable to discharges from the Mayfield site under current conditions. PAHs were below detection limits, and there were no trends for manganese concentrations downstream from the Project site. The salinity of the river is roughly equivalent to seawater.

The report recommended that ground water, discharge surface waters and sediments from the Park be monitored to maintain protection of the Hunter River. This may be best achieved with the Estate Management Company co-ordinating the installation and monitoring works.

5.5 INDUSTRIAL PROCESS WATER

Each development will need to comply with the relevant EPA and Hunter Water Corporation (HWC) requirements with respect to any water discharges from their individual site.

Discharges to the stormwater system will need to comply with the total site's water management criteria for both quantity and quality since the estate's discharges will be controlled by a licence granted by the EPA.

Trade waste, which must discharge to the HWC sewerage system, will similarly require a permit for each enterprise, this time from the HWC. The latter requires pretreatment of waste process water within a development prior to discharge to the sewer system as set out in the HWC Trade Waste Policy (July 1996).

This on-site treatment can often produce a waste product or resource which is used by another enterprise and so reuse is achieved. To facilitate this reuse of resources an additional easement will be provided in the road reserve (an "eco-services" easement) so that the resource can be transferred by a pipeline from one enterprise to another within the site.

As mentioned previously, there will be a HWC reclaimed water system at the western boundary of the site, with a capacity of approximately 5,000kL per day. This is treated sewage effluent from HWC's Shortland sewage treatment works and will be available to enterprise within the estate. The services easement in the road reserve is designed to allow a reclaimed water system to be reticulated throughout the site.

5.6 SEWER AND WATER

The estate will be connected to the existing HWC sewerage system and water supply.

Water supply will be connected to the 500mm diameter pipeline in Tourle Street, the major supply line from the Tomago sandbeds which is one of Newcastle's sources of water.

Sewage from the estate will be collected in a new sewer network which will drain to a pumping station within the site. The discharges to the sewer may be pretreated as required by the HWC trade waste policy. There will be an emergency storage component built into the pumping station to accommodate overflows which might occur during periods of power outages. A rising main from this site will transport sewage to the existing HWC system at a location determined by HWC. This sewage will eventually reach the Shortland sewage treatment plant.

HWC is soon to construct a pipeline from this treatment plant to the western boundary of the site which will transport treated sewage effluent (or reclaimed water). This will be available to enterprises within the estate.

5.7 ENERGY

Energy in the form of electricity and gas will be available within the estate.

The 132kV electricity supply for the existing steelworks passes through the site on twin overhead pylons. A 330kV supply crosses over the south western corner of the site near the Pacific Highway and a 11kV/33kV supply is located in the roads around the site.

An underground electricity supply will be installed as part of the estate's infrastructure, at a capacity to suit the estate's requirements. The existing overhead supply to the steelworks will remain in a power easement.

High pressure gas mains located in Tourle Street and the Pacific Highway can supply gas to enterprises within the estate.

As part of recycling waste products within the estate mentioned in Section 5.6 above, some wastes can generate energy (recycled energy) which will either be used within the enterprise, sold to others in the estate or sold into the power network. It will also be possible to generate electricity from gas, should this be economically viable.

Site building guidelines should address the need for energy efficient buildings, through the use of appropriate materials taking into account life cycle costs and by designing the structures taking into account orientation to sunlight.

5.8 AIR QUALITY

Ambient air quality in the area of the Steel River Project is detailed in AGC Woodward-Clyde's "Steel River Project - Environmental Review and Operational Guidelines" report. As noted previously in this SIAS, that document is included in the Report Appendix. The report examined meteorological information and focused on a number of criteria including:

- total suspended particulates (TSP);
- fine particulates (PM10);
- dust deposition rates;
- lead;
- manganese;

- sulphur dioxide; and
- nitrogen dioxide.

TSP levels, while higher than the annual goal in 1994, have been below the NSW EPA goal since 1995 but remain relatively high. Daily TSP values indicate three occasions where daily guideline values have been exceeded.

Only limited PM10 data is presently available but 24 hour average rates since 1995 suggest a range of PM10 concentrations which are similar to those experienced for Newcastle as a whole but which, like the TSP levels, are relatively high.

Dust deposition rates at Mayfield have decreased over the past two years but remain high and in excess of NSW EPA objectives.

Mean lead levels are consistently below the NSW EPA 90-day air quality goal with highest quarterly results for Mayfield being approximately 10% of the guideline.

Levels of manganese present in TSPO indicate concentrations have increased since 1994. NSW EPA has no current criteria for manganese levels but the World Health Organisation (WHO) recommends an air quality guideline which is below the levels monitored at the EMD plant.

Sulphur dioxide levels are generally acceptable with monitoring results indicating annual average levels at Mayfield being 55% of the guideline. Ten minute and one hour maximum values were found to be below half the goal set by National Health and Medical Research Council (NHMRC).

Nitrogen dioxide annual averages at Mayfield were well below (43.5%) the NSW EPA goal while one hour maxima values were also well below current criteria at approximately 26.9%.

The analysis of ambient air quality has identified particulates as a problem over the period that monitoring has been conducted. At Mayfield, TSP exceeded the annual goal in 1994, and exceeded daily maximum criteria on at least three occasions. Dust deposition rates were also much higher at Mayfield, especially during the summer period which has a greater prevalence of northeast winds.

Sulphur dioxide and nitrogen dioxide levels were well below NHMRC goals and currently do not present a serious problem. However, caution should be exercised with the assessment of individual industrial to ensure that the cumulative impacts of the Steel River Project do not significantly increase pollutant gas levels. This may be best achieved through the establishment of a model of air quality which would allow individual industry emissions to be added to provide an immediate indication of cumulative or net effect. Controls should be placed on operations within the Park to ensure impacts are minimal. With national air quality standards likely to become more stringent in the future, the concept of Best Available Control Technology Economically Achievable (BACTEA) should be a requirement for all new industries on the site.

5.9 NOISE

The noise environment at Mayfield is detailed in AGC Woodward-Clyde's "Steel River Project - Environmental Review and Operational Guidelines" report. As already noted, that document appears in the Report Appendix of this SIAS. Information was derived from a number of sources and provided a 'ring' of data on lands around the southern side of the subject site.

NSW EPA guidelines use the concept of background noise level as a basis for assessing environmental noise. Background levels have been assessed as varying between 41 and 49 dBA (daytime) and, 36 and 44 dBA (night-time) based on measurements undertaken over a period of time. These background levels are, with the exception of location P1 which is situated at 27 Groongal Street and P2 which is located at 20 Norris Street, within the range of background noise levels considered by NSW EPA to be appropriate for the respective land uses and locations. The exceedences at locations P1 and P2 are believed to be attributed to the high volume of traffic on Industrial Drive.

Using these background noise levels, recommended daytime and night-time background noise levels have been estimated based on NSW EPA's Environmental Noise Control Manual as shown in the table below. It should be noted that the recommended acceptable levels vary between locations and the predominant land use.

The key issue for the Steel River Project is the control of noise emissions and the impact of noise levels at the most affected residential receiver. It is also important to achieve noise emission levels within the Park which minimise the likelihood of background creep.

The control of noise is normally considered on an industry by industry basis but in this case, it is possible to examine noise issues from the perspective of net emissions from the Park. On this basis the total noise contribution of the Park can be set so as not to exceed a level which would result in the NSW EPA's recommended acceptable limits being maintained with respect to adjoining residential receivers.

This may best be achieved through the establishment of a noise model for the Park which would allow individual industries and on-site activities to be added to the information and provide an immediate indication of the cumulative effect of noise emissions from the Park. This will allow individual industries to be sited within the Park in a manner which provides optimum results for each of the industrial premises and the adjoining residents. It will also enable each operator to identify the most appropriate form and type of noise control technology to be incorporated into their project in accordance with the concept of BACTEA.

Table - Assigned background levels and EPA Guideline background level limits.

Data Collection Location	Assigned Levels (dBA)	Background	Noise	
			Daytime	Night-time
	Daytime	Night-time	Daytime	Night-time
P1	49	44	50	40
P2	41	40	45	35
1	49 ¹	44 ¹	50	40
2	45	39	65	65
3	42	34	45	35
4	45	39	45	35
5	47	36	50	40

¹ Estimated from Location P1.

5.10 WASTE MANAGEMENT - STEEL RIVER ECO-PARK

5.10.1 Regional Context

It is no longer economically efficient or optimal in environmental terms for each Council to plan its own waste management strategies and provide its own waste management facilities. Regional waste planning is a progressive 'best practice' approach being adopted in many industrialised countries to overcome the inefficiency of small-scale waste management. It ensures that there is integrated waste planning and management across all waste streams, based on a thorough assessment of the volume and nature of waste generated, and a clear sense of responsibility for promoting an appropriate balance between waste disposal and reduction.

To enable local government to make a more effective contribution to meeting the state-wide reduction targets, a system of regional waste planning and management will be instituted across NSW. Under the Waste Minimisation and Management Act 1995, Waste Planning and Management Boards (Waste Boards) will be formally constituted from groups of Councils to perform waste systems planning, development and operational functions on a regional basis. One such Waste Board has been formed which encompasses the Newcastle Region. One of the requirements of the Waste Board is to develop a Regional Waste Management Plan. This plan has yet to be formed for Newcastle, however, industry has already been targeted as an area where significant gains can yet be made.

Local government is responsible for municipal and domestic waste collection, either providing the service itself or engaging contractors. However, local government is generally not involved in managing waste generated at commercial/industrial premises. These wastes are usually handled by the waste industry on contract, and the focus is typically on collecting wastes for disposal rather than for reprocessing and recycling.

One of the tools for managing industry role in regional waste management is the preparation of Industry Waste Reduction Plans (IWRP). The Minister, the Board of the EPA, the Solid Waste Advisory Committee (SWAC) or an industry itself can nominate to undertake an IWRP. These plans are intended to set waste reduction targets; indicate levels of financial contribution and responsibility; identify and commit opportunities for reducing waste in product design, production and packaging; determine appropriate methods for reducing, reusing, recycling and disposing of wastes; specify timeframes and set in place public monitoring and reporting.

While not required to prepare directly an IWRP for participating industries, the Steel River Eco-Industrial Park still has an important role to play in the region's waste management aspirations.

5.10.2 Eco-Industrial Park

Industries setting up in the Eco-Industrial Park would be expected to conduct a preliminary assessment of their operation and submit the results to the Estate Management Company (EMC) referred to previously in Section 4.4. The results of the assessment should include but not be limited to information on:

- the quantities and classes of items that are manufactured, imported or sold by that business;
- the materials used as input to the industry processes and whatever tolerances may apply;
- the quantities and classes of wastes that are likely to be generated in achieving the above output;
- what markets may exist for waste produced;
- what methods are in place and/or the potential for reducing, re-using and recycling those wastes generated;
- what methods are in place and/or the potential for ensuring efficient and streamlined industrial processes;
- what performance monitoring is in place to monitor targets or strategies; and
- can the final waste product be separated and what special disposal requirements are needed if any.

Each industry would be expected to submit an update of the above information on a six monthly basis to the EMC.

The EMC would be the intermediary between industries on-site and the Waste Board and EPA. The EMC would formulate a waste management plan for the Eco-Industrial Park based on the information returned from the industries. The EMC's basic responsibilities would be:

- ensuring compliance with self assessments by industry;
- formulating a waste management plan for the Eco-Industrial Park;
- introducing and monitoring waste and recyclable collection, transport and disposal;
- arranging waste transfers where possible;
- liaison with the Waste Board, the EPA and other relevant authorities regarding industries within the Eco-Industrial Park;

- taking the self assessments one step further by looking at the combined picture, assessing inputs/outputs from the whole park and considering reduction at the source, re-use and recycling for all industries present including potential markets for waste products; and
- applying external monitoring allowing a extra checking as well as the industry self assessments.

6.0 SUBJECT SITE AND LOCALITY: HAZARDS AND RISKS

6.1 HAZARDS AND RISKS GENERALLY

The requirement for hazard and risk assessment of any incoming industries would be determined by the consent authority based on the nature of the industry, potential for hazard determined on the basis of the Newcastle and Kooragang Island Area Risk Assessment Study and the proposed process, chemical storage, sensitive receptors and potential for cumulative impacts that may result from surrounding land use. The Estate Management Company, noted earlier in Section 4.4.1, is responsible for making contact with Council prior to the preparation and lodgement of a development application.

Hazard analysis may require qualitative and/or quantitative methods. The methodology used should provide:

- formal identification of hazards;
- assessment of cumulative impacts;
- analysis of the magnitude and likelihood of possible hazardous incidents;
- consideration of the relevance and adequacy of proposed safeguards.

Levels of risk may also be quantified and used to form a basis for judgement of the acceptability of the risks imposed by the development.

It is important that the quantification of risk be seen as only one output of the hazard analysis. Quantification of all dimensions of risk is not always possible or necessary to enable judgements to be made on sound hazard management. The results of the various elements of the analytical process - hazard identification, consequence analysis, probability/frequency analysis and risk estimation and analysis - can, and should, be used for 'avoiding avoidable risk', emergency planning, plant modification, and so on.

The hazard analysis process should be based on the following principles:

- **be comprehensive, holistic and systematic**
The analysis should provide a comprehensive assessment of the nature of hazards at the facility as a whole. A systematic approach should be used to ensure that all parts of the plant and operations are covered and that interactions between different operations have been considered even where specific equipment or process units comply with applicable codes and standards. Judgement should be used on the appropriate level of detail.

The analysis should consider whether hazardous events at the site or at neighbouring sites pose a threat and the potential for the discharge of hazardous materials in waste streams. The study should also cover associated operations such as the transportation of hazardous materials.

- **be qualitative, quantitative and site-specific**
The hazard analysis should be complementary to risk and other safety studies.

6.2 LAND USE SAFETY PLANNING: HAZARDS AND RISKS

For land use safety planning the assessment of individual risk levels should be used to ensure that no particular individual is exposed to unduly high levels of risk, and that societal risk is used to ensure that the risk impact on the surrounding environmental community as a whole is not excessive.

The analysis should reveal all major risk contributors, the relevance of proposed or existing safeguards and their adequacy in mitigating effects to people, property and the biophysical environment. It should also indicate the extent of compliance with the qualitative and quantitative risk criteria set out in NSW Department of Planning Hazardous Industry Planning Advisory Paper No 4, "Risk Criteria for Land Use Planning".

Hazard analysis and risk assessment acknowledge the fact that hazard and risk (defined in terms of both the consequence and probability of hazardous events from activities involving hazardous materials) cannot be entirely eliminated. There will always be a 'residual' risk which in many cases will extend beyond site boundaries. It is necessary to understand the nature of this residual risk and to formulate and implement land use strategies and controls to cope with it.

Decisions concerning the location of any hazardous facility and surrounding land uses are planning decisions. When implemented, the management of the issues will become an essential and integral component of land use planning. In this process, land use safety conflicts will be prevented by identifying, quantifying and managing hazards and risks in the context of broader consideration.

The basic methodology to be applied to hazard analysis and quantified risk assessment consists of the following components:

Hazard identification which involves the systematic identification of hazardous events, their potential causes and the consequences (in qualitative terms) of such events. Reference will also be made to the proposed operational and organisation safeguards that will prevent such hazardous events from occurring or should they occur, that would protect the plant, its equipment, people and the environment.

Consequence analysis for the estimation of the effect of potentially hazardous incidents associated with the operations of a proposed development. (Consequence analysis would not in itself be sufficient for determining the location and assessment of potentially hazardous facilities).

Probability/frequency analysis would involve the derivation of both the likelihood of incidents occurring and the likelihood of particular outcomes (or effects) should those events occur. The frequency of such elements as wind and stability conditions may be necessary to determine the probability of concentration in the air or water and hence the potential frequency of fatality, injury or other effects of exposure of people or the environment.

Quantified risk will be obtained from the consequence and probability estimations cumulatively combined for the various hazardous incident scenarios and events.

6.3 ASSESSMENT PROCESS

For development of a potentially hazardous industry early consultation with the Council, (and possibly the Department of Urban Affairs and Planning and other relevant authorities) will be carried out.

The consent authority will need to consider whether the development is designated or otherwise covered by provisions of the Environmental Planning and Assessment Act 1979 requiring the preparation of an Environmental Impact Statement (EIS).

The Environmental Planning and Assessment Regulation 1994 outlines in general terms the requirements for the scope and contents of EIS's. If the designated development is potentially hazardous, the Director's requirements will include a requirement for a preliminary hazard analysis to be prepared.

Where an EIS is not required, but the proposal is still considered potentially hazardous, State Environmental Planning Policy 33 (SEPP 33) requires a preliminary hazard analysis to be prepared. Council or other consent authority will determine the extent to which the whole or parts of the process should be applied.

Under section 111 of the Act, a determining authority must consider the environmental impact of proposals that it plans or regulates. If the authority considers that an assessment of hazards issues is relevant to its environmental considerations, it could use the assessment procedure included in SEPP 33 to assess these issues as well as the advice in other documents referenced in this section.

6.4 PRELIMINARY HAZARD ANALYSIS (PHA)

The PHA involves a comprehensive hazard identification including the identification of hazardous incident scenarios and reference to the proposed operational and organisational safeguards.

The probability/frequency analysis should involve the analysis and estimation of the likelihood of each incident scenario occurring. Also, the likelihood of those scenarios being translated into a particular outcome, having regard to all the proposed technical, organisational and operational safety controls.

The results of the consequence and probability analysis should be combined and the risk results presented in the form of contours, societal risk curves or other appropriate format.

The results should address, where appropriate, impacts on people, property and the environment.

The consent authority should, from the PHA and other relevant information, assess whether the proposed development is capable of being operated by the particular proponent in the particular location without unacceptable risk impacts.

Other land use safety related issues that should be addressed in the PHA include:

- a comprehensive description of all proposed safeguards and hazards control systems, with particular emphasis on the relevancy and effectiveness of such safeguards;
- a comprehensive outline of organisation safety controls include: the principles of emergency procedures and plans; fire prevention and protection measures; and, monitoring, auditing, operations' training and safety management systems.

6.5 OTHER MATTERS

The following requirements may be requested when the proposed development is considered by the consent authority to present potential for hazard:

- a) hazard and operability study;
- b) fire safety study;
- c) preparation of an emergency plan and procedures;
- d) updated hazard analysis.

a) Hazard and Operability Study (HAZOP)

At the design stage of the development project, when detailed design information is available, hazard and operability (HAZOP) studies should be conducted as an integral part of the design process.

HAZOP studies involve the comprehensive and systematic examination of the facility, section by section (usually on the basis of the flow/piping and instrumentation diagrams).

It is essential that the HAZOP relates to the preliminary hazard analysis and risk assessment undertaken at the development approval stage. Where appropriate, the input should also be drawn from the fire safety study and emergency plan preparation.

b) Fire Safety Study

The fire safety study objective is to ensure that the proposed fire prevention, detection, protection and fighting measures are appropriate for the specific fire hazard and adequate to meet the extent of potential fires for the development at the particular location.

The results of HAZOP, PHA and updated hazard analysis should provide the basis for fire safety requirements. The relationship between fire safety systems and emergency plans and procedures should be clear. The NSW Department of Urban Affairs and Planning Hazardous Industry Planning Advisory Paper No 2 - Fire Safety Study Guidelines", published jointly by the Department of Urban Affairs and Planning and the NSW Fire Brigades, details the relevant scope, content and procedures.

Fire safety studies should be prepared and approved by the NSW Fire Brigade Fire Prevention Unit in liaison with Newcastle City Council.

c) *Emergency Procedures and Plans*

It is essential that emergency procedures and plans be specifically developed and tailored to the needs and hazards at the proposed facility, and at its locality. Hazard analysis and HAZOP should provide the basis of hazard identification and the nature and extent of consequences for the formulation of relevant emergency procedure; and, resource requirements and their implications. The results of the fire safety should also be used as an input.

The NSW Department of Urban Affairs and Planning "Hazardous Industry Planning Advisory Paper No 1 - Industry Emergency Planning Guidelines" provides a comprehensive outline of the scope and content of emergency plans and guidance of their preparation.

d) *Updated Hazard Analysis and Risk Assessment*

Throughout the detailed design phase, regard should be given to the effect of design and procedures decisions and modification on hazard and risk as assessed in the preliminary hazard analysis.

The updated hazard analysis and risk assessment should determine risk levels to be used at the basis for future plant operations, updates, extensions, and so on. Refinements to earlier safety control commitments should result in improvements to the risk levels. The risk impact should improve upon that predicted as part of the decision making process to approve the plant, and should in all cases not be significantly worse.

e) *Construction Safety*

A construction safety study should be conducted to provide formalised arrangements which ensure during the construction phase the safety of workers and of surrounding land uses.

Construction safety codes and regulations must be complied with including procedures covering hot and cold work permits as governed by regulations.

In terms of land use safety planning, specific procedures should be prepared for cases where construction involves the modification of existing facilities or the construction of new plants near existing operating hazardous facilities. In such cases formal procedures should be established and documented to account of potentially hazardous incidents and interaction that may affect the surrounding industrial activities and sensitive receptors (residences, schools, and the like).

7.0 SUBJECT SITE AND LOCALITY: SOCIAL AND CULTURAL

7.1 SOCIO-ECONOMIC ASSESSMENT

The socio-economic implications of the development of the Steel River site have been studied to the extent that they are capable of being studied, having regard to the fact that there is no specific industry proposal, at this time, which can be assessed in what might be described as "standard" study.

Rather, the socio-economic study has accepted that there is proposed on Steel River, a development which will occur in stages, as each incoming industry chooses to locate on the site. The total effect of this progressive development of the site will result in a total of 2000 jobs being provided on Steel River.

Additionally, the socio-economic study has acknowledged that, with the development of the subject site, will come opportunities for certain desirable social objectives to be achieved or accommodated.

The study is contained in the report by BBC Consulting Planners, titled "Steel River Socio-Economic Impact Assessment" and, as noted previously, appears in the Report Appendix of this SIAS. That document should be read in its entirety, however, for convenience extracts from the report's executive summary is repeated in this section.

In respect of the coverage of the study, the report states:

The scope of works for this study was initially developed by BHP and finalised after discussions with the Technical Sub-committee and Council's Planner and Social Planner. The agreed scope of works was to:

- *Prepare a profile of the socio-demographic characteristics of the area surrounding the site to provide a social and cultural context for the development of the site;*
- *Project and evaluate potential for off-setting socio-economic impacts of proposed changes in BHP's Newcastle plant operations;*
- *Develop guidelines for social sustainability, particularly in terms of employment trends and characteristics and relationships with surrounding communities;*
- *Identify mitigation strategies which could be put into place to reduce any negative socio-economic and social impacts of change and to enhance positive social impacts of the proposed development.*

The emphasis of this report is on the potential impact of the Steel River project on the community. The report does not provide a full assessment of the social and economic impacts of employment loss at the BHP plant.

In respect of general issues raised by the community in the course of the study, the report lists the following as being the main points.

- *Future industrial development on the site to be "clean industries" eg Pacific Power at Huntingwood Estate, Sony at North Ryde.*

- *Locate a buffer, including landscaping and possibly mounding along Industrial Drive to provide separation between the industrial development and residential areas.*
 - *Establish strict environmental controls to prevent high pollution generating industries locating on the site and to maintain and improve environmental quality in the area.*
 - *Ensure that remediation works are to an appropriate and safe standard.*
 - *Provision be made for safe pedestrian movement to and from the site, particularly across Industrial Drive.*
 - *Provision of cycleways which connect to the broader Newcastle network of cycleway, particularly to provide through routes to the University and Honeysuckle - CBD.*
 - *Employ traffic management techniques to minimise heavy traffic movements along Industrial Drive and streets adjacent to residential areas.*
 - *Ensure that the cultural significance of the site, in particular the south east hill area is recognised and treated sympathetically in the proposed development.*
 - *Ensure that any accelerated approval process allows the necessary level of investigation and consideration of environmental impacts.*
 - *Maintain the heritage value of the former orphanage and the south east hill area.*
 - *Provide an opportunity for a "model" development approach which creates an outstanding environment on the Steel River site and provides a model for future development in the area.*
 - *Consider the operation of a shuttle bus service to the site for workers in order to reduce traffic through Mayfield.*
 - *Provide pleasant open space areas for picnics, walking etc. - "somewhere nice to go".*
 - *The south east hill area to be the major point of entry and contact for the Mayfield residents due to its accessibility and heritage/cultural significance.*
 - *Establish community facility(s) on the site, for the use of the businesses locating there and the community, such as:*
 - *Information Centre*
 - *Community Centre*
 - *Cultural centre - possibly providing a computer linkage between the major libraries in Newcastle*
 - *Gymnasium*
 - *Cafes*
 - *Child care (only on a site which is not contaminated)*
- Open space on the site should be accessible to the community.*

The report discusses the social and economic opportunities of the site development and indicates a number of possible applications of these opportunities in future development. In this regard the report states:

It is clear, from our review of other industrial estates, that a number of benefits arise as a result of a high technology/industrial development, particularly relating to an improved environmental quality and spin-off development. For example, it would appear likely that the Steel River Project will attract retail, service and commercial activities on or near the site. This may include activities such as convenience shops, banks and food outlets which would primarily aim to respond to the demands of local employees while also being accessible to the wider community.

Planning for the Steel River Site could further enhance these benefits by considering the inclusion of some additional facilities although the cost implications of this approach have not been explored within this study. Some examples of the types of things which could be facilitated on the site include the following:

- *the provision of open space on the site to extend the existing open space network;*
- *the provision of an open space area along and public access to the foreshore of the Hunter River;*
- *the extension to the existing network of community facilities and services through the provision of community facilities to principally service the needs of workers at the site while contributing in any way possible to the needs of the surrounding community;*
- *provision for cycleways through the site will provide for an extension of the existing network of cycleways established in Newcastle;*
- *to foster and preserve the heritage and cultural significance of the site and BHP's involvement with the community over a very long period of time;*
- *generation of an estimated 2,000 jobs to minimise the impact of job loss from the BHP Steelworks site;*
- *the creation of alternative employment opportunities and provision of a stimulus to the local economy;*
- *providing a catalyst for further employment growth, initially in sectors such as construction, following through to support industries and other sectors of the economy; and*
- *establishing strong high technology links with education and training institutions, and similar centres world wide.*

An assessment of the potential socio-economic impacts of the development of Steel River was undertaken and the results, both positive and negative were identified. In respect of employment loss and employment gain the report states:

Employment Loss

According to the Hunter Valley Research Foundation, in addition to the 2,800 jobs at the BHP Steelworks, there are an estimated 1,820 jobs created by BHP Steelworks through flow on employment connected with the Steelworks. Another 3,370 jobs are reported to be "consumption induced" stimulated from the flow-on effects ("the pay-packet effect") of the Steelworks. Thus, in total the steelworks creates an estimated total of 8,330 full time jobs in the Hunter Region. Most of these jobs, (apart from those at the Steelworks) are in mining, manufacturing, wholesale and retail trade, finance, community services, recreational and personal services, and agriculture. Based on this analysis it is clear that the proposed reduction of 2,000 jobs at the steelworks is likely to have significant flow-on consequences for employment in the region; however these will be mitigated to some extent by the fact that some steel production and sales generation will still occur from the Newcastle plant. No immediate widespread employment effect is expected on Mayfield itself.

Employment Gain

BHP has set a target to generate in the order of 2,000 jobs by the year 2000 through the development of the Steel River Site. Further indirect employment growth may be created by the project through development activity on the site. If industries which use local inputs or attract related industries to locate in the area located at Steel River, there is likely to be further positive spin-off effects for the local economy and local employment growth.

The extent to which employment growth on the Steel River Site is able to reduce the impact of the projected employment loss from the BHP Steelworks is uncertain given that the nature of the jobs to be created at the Steel River Site is uncertain. Some of the impacts of employment loss may be mitigated by retrenchment packages and retraining programmes, possibly linked to the Steel River Site.

The report examines the physical relationship of the site to the existing community, the implications of the site's development on community and recreation facilities, the potential benefits of the development on the quality of life and cultural issues.

In addressing the subject of the possible strategies and guidelines seen as appropriate to have regard to in the development of the site, the report deals with the provision of community and recreation facilities and services, listing recommended items. In addition the report deals with the issues of visual amenity, access, cultural identity, on-going community consultation and education and training, concluding with a discussion of the guidelines for social sustainability.

In this regard the report identifies the objectives for social sustainability, applicable also to the Steel River Site, as being:

- Access for People
- Jobs for People
- Places for People
- Better Outcomes for the Environment

The report, in this context, discusses neighbourhood and residential amenity, community and recreation facilities and services, access, employment and urban design implications.

7.2 HERITAGE AND ARCHAEOLOGY

The existing heritage and archaeological characteristics of the site were examined and reported upon in two separate documents. The first is titled, "An Archaeological Survey for Aboriginal Site at Tourle Street Newcastle, NSW" by Theresa Bonhomme dated August 1996. The second document is titled "An Assessment of the Historical and Archaeological Values of BHP Land at Tourle Street Newcastle" by Bonhomme Craib and Associates, and Sue Rosen Pty Ltd, dated February 1997. As noted previously, these documents are located in the Report Appendix to this SIAS.

7.2.1 Aboriginal Archaeology

In respect of Aboriginal archaeology a study was undertaken to determine the presence and significance of any Aboriginal archaeological sites which may effect the development potential of the subject site.

The aims of the study were given as being:

- a) to determine the presence/absence of archaeological sites within the study area and assess their condition, where present;
- b) to set out recommendations regarding the management or mitigation of any sites found.

The study involved background research on the past land use in the area, with particular emphasis on Aboriginal use of the area, an inspection of the NPWS register records and reports, field survey and consultation with the local Aboriginal Land Council representative. Field inspection was also undertaken.

Consultation with the Awabakal representative was conducted. Survey maps of the area and aerial photos were provided by BHP and discussions regarding the nature of the fill across the study area were held with BHP surveyors.

No Aboriginal archaeological sites were found. The Awabakal representative discussed the project with the consultant and inspected all the documentation and maps. He knew the area and was of the opinion that no sites existed in the study area. He declined an inspection of the area on the basis of his personal knowledge and the information presented to him. A copy of the report on the study was sent to the Awabakal Land Council.

7.2.2 Historical and Archaeological Values

Whilst the subject site contained no Aboriginal archaeological sites (due to the site filling operations over the years) the past land use after Aboriginal occupation did produce historic elements which were the subject of an additional, separate study. These past land uses are confined to the area of the site known as, generally, the "south-east hill" area.

For convenience the executive summary of the report dealing with these historical and archaeological values is repeated as follows:

"The study area at Tourle Street, Newcastle is the site of one of the first grants to a free settler at Newcastle. While the grant was officially made on 30 June 1823 John Laurio Platt, in fact, took up residence in early 1822 and established a farm and milling operation there. By 1829 coal mining was also underway and in 1831 the rich shell middens - a remnant from the Aboriginal occupation of the area - were being mined.

It was the existence of coal on the grant and the possibility of rival companies acquiring the site and mining coal there, that motivated the Australian Agriculture Company to purchase Platt's grant in 1838, to ensure their continued monopoly of coal production.

Platt's mill was in operation until at least 1842, it being run firstly by Platt, then his son and finally the AA Company. In the 1850's a traveller's account indicates that the grant was occupied by people of some respectability. The AA Company controlled a vast amount of land in Newcastle extending to Port Stephens and in 1875 a house for the general superintendent of the AA Company was built on the study site. This house burnt down in 1901, but another was built shortly after, being completed by October 1902.

By the early twentieth century the mill paddock and the river bank had become a favourite picnic and recreation area. During the 1930's a small community of unemployed people are reported to have taken up residence in Shelley Beach Park. In 1946 Platt's grant was noted in a tour of the historic sites of Newcastle by the Royal Australian Historical Society.

In 1933 the AA Company's superintendent's house was purchased by the Catholic Bishop of Maitland who established the Murray-Dwyer Orphanage there which was run by the Daughters of Charity of Saint Vincent de Paul. The building was extended twice in the 1930's and again in the 1950's when British child immigrants were accommodated there. During WWII the orphanage was evacuated and then occupied by military personnel. From 1940 BHP began to purchase parts of Platt's original grant. By the end of the 1960's the eastern portion of Platt's Channel had been infilled. BHP purchase the orphanage site and in 1970 demolished the 1902 house.

The Orphanage site is located on CMA Map U6357-8 at position L1810605 (reproduced in part as Figure 1). Analysis of the historic plans and surveys has led the authors to believe that the mill position given by most nineteenth century maps corresponds to 20m NSW of the 24.7m high reference point and 100mm WSW of the NSW corner of the orphanage building. The house as indicated by Surveyor White in 1830 is located 70m north of this CMA orphanage reference, ie. Map U6357-8 at position L1810605. The White 1830 data is precise in locating both the mill and the house relative to the Eastern Boundary of Platt's property and the Maitland Road. The notes of Surveyor Dangar's 1822 traverse provide some correlation of the house (and no mention of the mill). That the hills and gullies south of the channel area appear to be marked in a reasonably similar in position to their placement in the early surveys lends corroborative support to our hypothesis that Platt's Mill and House were located here. Nevertheless it is strongly recommended that a qualified cartographer or surveyor verify the cartographic analysis undertaken here. The site's archaeological potential is dependent on identifying the location of the site of Platt's house, mill and any likely outbuildings on the ground and in relation to existing structures. Then, in the light of all subsequent site development (as documented in this report) a determination needs to be made as to whether any archaeological evidence is likely to have survived.

The study site is regionally culturally significant because of its historic associations with one of the first free settlers at Newcastle and in the Hunter Valley; because of its historic associations with the Australian Agricultural Company; and because of the early industrial activities (milling and coal mining) undertaken there. The site may have research significance because of its potential as an archaeological site and its capacity to reveal information concerning the activities of one of Newcastle's first free settlers. The site has social value because of its historic links with major

historic phases of Newcastle's history from free settlement through the AA Company's occupation; as a picnic and recreation area valued for its aesthetic amenity; as a site linked with the Great Depression and WWII and latterly its links with BHP. The site's historic significance has been recognised by Newcastle historians from at least the 1930's."

Following the completion of the historical assessment of that part of the Steel River site, further work is about to be undertaken. The expected outcomes of this work is listed as being:

- compliance with the law
- identification and excavation of significant archaeological features and provision for appropriate management of archaeological features, particularly those protected under Section 139 of the NSW Heritage Act
- measured drawings and written records
- black and white and colour photographs
- curated and catalogued artefacts lodged with a repository
- comprehensive report on the excavations detailing a comprehensive strategy for dealing with the sites archaeological resources in a manner that will maximise future options and opportunities for the site

This work has commenced with a Ground Penetrating Radar (GPR) survey to determine the existence or otherwise of extant remains. Following this survey, the extent and nature of further work for testing and salvage will be determined on the basis of the GPR survey results. Essentially the work will be aimed at developing a comprehensive strategy for managing the site's archaeological resources; devising a staged process that can adjust to suit site conditions; and ensuring compliance with all statutory requirements.

PART D: FINDINGS

8.0 THE ENVIRONMENTAL ENVELOPE

8.1 BACKGROUND

In the Introduction to this SIAS its purpose and objectives were identified. Among these were:

- To support the local environmental plan, titled Newcastle LEP 1987 (Amendment No. 105) applying to the subject land providing for a mechanism which will allow a rapid (28 day) development approval period for industries which comply with the requirements of the environmental envelope.
- To define an environmental envelope consisting of environmental standards, requirements and objectives to which the new LEP refers, and with which future development (including designated development) on the subject land must comply, or be subject to a further, development-specific environmental assessment.
- To define a mechanism by which the environmental performance of future development on the subject land can be monitored and by which the environmental standards initially established can be subsequently reviewed on a regular basis.
- To ensure on-going community participation in the planning, monitoring, review and environmental performance of development at Steel River.

Accordingly, the nature and content of the various studies carried out, and contained in reports noted as being in the Report Appendix to this SIAS have all been aimed at establishing a base upon which an environmental envelope can be identified and implementation mechanisms devised.

This environmental envelope is the term used to describe the aggregation of all of the environmental standards, requirements and objectives to be applied to the Steel River site, and with which incoming industries shall comply in order to qualify for a rapid approval period for development proposals.

These standards relate to air quality, noise control and water quality. Requirements, objectives and procedures for addressing waste, energy, socio-cultural issues, development design, and traffic and transport are also included in the envelope.

All of the matters relating to air, noise, water, waste and energy have been the subject of discussions with the Environment Protection Authority, and the standards and requirements which have evolved out of those consultations are described in this section.

8.2 SCOPE OF ENVIRONMENTAL ENVELOPE

8.2.1 Types and Standards

The environmental performance required of the Steel River Estate is defined by an integrated set of environmental standards or criteria, which is termed the environmental envelope for the estate. These criteria may include numerical

standards, management standards and design standards and collectively they are intended to define the cumulative limit of impacts which the estate will have on both physical and socio-economic aspects of the local environment (both adjacent land uses and the natural environment). Any individual industry proposing to locate within the estate shall demonstrate that its pollutant load and other impacts shall not cause any of the environmental criteria listed in the envelope to be exceeded to be given the advantage of gaining consent in 28 days or less. It will also be necessary, to demonstrate that the development complies with the various, relevant, environmental objectives established.

In respect of air quality and noise management, specifically, the impact of individual development proposals shall be assessed on the basis of suitably detailed and calibrated air dispersion and acoustic modelling. This will occur at the development application stage. A range of ongoing monitoring and reporting activities will be used to confirm that modelling predictions continue to be met in actual performance.

The environmental envelope includes four types of standards to be used in controlling the environmental impact of the proposed development.

- absolute numerical criteria which define the permitted cumulative impact on the ambient environment;
- design criteria which govern the types of technology and technological mechanisms which shall be applied to achieve certain pollutant and performance levels within individual sites;
- management criteria and design and development objectives which provide further guidance on how quantifiable criteria may be achieved and which assist in defining and limiting impacts for aspects of the environment and human health which are difficult to quantify; and
- for some industries, an EPA licence governing specific point source emissions will provide a further level of performance control once the development is approved.

8.2.2 Industries to which the Environmental Envelope Applies

The environmental envelope will apply to all proposals for the Steel River site. Development applicants must demonstrate compliance with the envelope to gain consent, by lodging a study prepared by a suitably qualified person. Where Council decides that a proposal does not conform to the envelope, conditions will be imposed to ensure compliance. If this is unfeasible the application will be refused.

Some industries may also be required to obtain Pollution Control Approval in relation to the control of water pollution prior to commencing construction.

8.2.3 Role of the EPA

This SIAS outlines a group of absolute standards or requirements for ambient air quality, ambient water quality, environmental noise, waste, energy, socio-cultural issues, development design and traffic and transport which define the cumulative environmental effects of industries locating on the Steel River Estate. These standards apply to all development locating in the estate, whether or not they are scheduled under the pollution control acts.

The consent authority for this development is Newcastle City Council. For the majority of industries which have been identified as possible occupiers of the Steel River estate, Newcastle Council will also be the regulatory authority, using its powers under the Local Government and Environmental Planning and Assessment Acts and the pollution control acts. Any industry regulated by the EPA shall meet all conditions of its pollution control licence in addition to any requirements of the LEP.

Some industries (identified in Schedule of Clean Air Act Regulations and Noise Control Act) locating on the Estate will be required to obtain Pollution Control Approvals and Pollution Control Licences from the EPA before they commence operation. It is intended that the emission limits applied in these approvals and licences will be consistent with the Clean Air Regulations applicable at the time of approval and with the ambient air quality and noise standards identified in this document or its successors.

EPA licences provide an opportunity to utilise statutory pollution reduction programs to provide a structured, negotiated path for industry to improve performance if the standards specified in the environmental envelope need to be revised in the future to reflect international scientific understanding of environmental and public health impacts and new nationally endorsed standards.

The Steel River Estate Management Company (EMC) discussed below, shall develop an equivalent negotiated process to guide and manage actions by non-scheduled industries to improve their performance in the same circumstances.

8.2.4 Role of the Council

Council's role, namely its functions and responsibilities under the Environmental Planning and Assessment Act (EPA Act), 1979, will be no different to its functions in assessing and determining development applications for any other site.

There is, however, a distinction between application assessment for the Steel River site and other land in Newcastle City. More specific and stringent controls on development are introduced by way of a new zone, application assessment process, the environmental envelope, as well as monitoring, review and community involvement provisions being included in Newcastle's LEP. This SIAS provides the rationale and criteria for the envelope which is embodied in these provisions, so as to create certainty for the community and developers, while facilitating a more streamlined and rapid applications lodgement, assessment and determination process.

The development assessment process will enable Council to consent within 28 days of receipt of the application, to only those proposals that meet the envelope's standards and other criteria. Development applications will be accompanied by a study prepared by suitably qualified persons to demonstrate that the 'pre-assessment' of the proposal has occurred in accordance with this Assessment and Section 90 of the EP&A Act. Where a permissible development proposal is unable to meet the requirements of the LEP and this SIAS, then the normal assessment

procedure provided by Part 4 of the EPA Act will be undertaken. Council will also assess and approve site management plans, systems and procedures required by the SIAS for environmental monitoring and reporting and achieving industrial ecology.

8.2.5 Steel River Estate Management Company

A co-ordinated environmental management policy involving all industries located within the Steel River estate is an essential requirement for achieving the environmental performance objectives specified in the environmental envelope for the site.

The environmental policy shall be administered by a single site management authority, which shall have responsibility, amongst other things, for:

- the development and implementation of an environmental management system (EMS),
- maintenance of modelling,
- pre-approval negotiations with potential industrial developers,
- monitoring of the environmental performance of the estate,
- initial investigation of non-compliance,
- reporting on performance to government and the community,
- co-ordination of eco-industrial resource sharing.

In this SIAS, the estate management authority is referred to as the Steel River Estate Management Company (EMC). Further detail about the structure and responsibilities of the EMC is presented elsewhere in the SIAS, at Section 4.4.

8.2.6 Environmental Management System

The EMC shall prepare and implement an environmental management system (EMS) for the estate. The system shall address all activities on the estate likely to impact on the environment. Each individual industry locating in the estate shall be required to commit to the development and implementation of an environmental management plan for its activities, which link its activities to the EMS developed for the estate.

8.3 AMBIENT AIR QUALITY STANDARDS

8.3.1 Criteria Pollutants

The ambient air quality at the estate boundary and at the most affected receiving location outside the estate boundary, ie the ambient air quality which results from emissions from all premises within the estate, shall not exceed the ambient air quality standards as shown in Table 1. These five standards have been identified as the parameters, most likely to protect the environment and community health in urban areas. No ambient air quality standards are available for the very broad range of organic compounds which may be omitted by some industries and which may impact on urban air quality. These will be controlled at the design stage for each point source (see section 8.3.3).

While ozone production is considered to be a potentially significant issue. It has not been included in the list of parameters relating to the estate, because it is a secondary pollutant which results from photochemical reactions and the contribution of the site to any regional ozone problem will be reflected in nitrogen dioxide and sulfur dioxide levels.

The standards adopted in Table 1 are those currently established by the National Health and Medical Research Council (NHMRC), except for the 12 month standard for NO₂ and the standards for PM₁₀ which are adopted from the USEPA.

Table 1 - Ambient Air Quality Standards

Pollutant	Standard	Average Time
Total Suspended Particulates	90 g/m ³	12 months
PM ₁₀	150 g/m ³ 50 g/m ³	24 hours 12 months
Lead	1.5 g/m ³	3 months
Nitrogen dioxide	16 pphm 5 pphm	1 hour 12 months
Sulphur dioxide	25 pphm 20 pphm 2 pphm	10 minutes 1 hour 12 months

8.3.2 Dust Deposition

During the development and construction of the estate a dust deposition standard of 4 g/m²/month (annual average) will apply. An air quality management plan is required in order to prevent short-term dust events during the construction period. For the purposes of the environmental envelope, "development and construction" applies to the first three years after the gazettal of the new LEP for Steel River. It is expected that the majority of site preparation works and primary construction will be completed within this period. Dust deposition shall be monitored for compliance purposes as a part of the ambient air quality monitoring during this phase.

Both the dust deposition standard and the requirement for ongoing monitoring shall be reviewed as required by the LEP.

Table 2 sets the maximum acceptable increase of dust fallout levels over existing mean annual levels in residential and commercial/industrial areas surrounding the estate.

Table 2 - Dust Deposition Standard

Existing Dust Level (g/m ² /month)	Maximum Acceptable Increase Over Existing Dust Level (g/m ² /month)	
	Residential Areas	Commercial & Industrial Areas
2	2	2
3	1	2
4	0	1

Note: If any existing dust level is greater than 4g/m²/month then no increase in dust fallout is acceptable as a result of any dust emitting works.

8.3.3 Design Ground Level Concentration Criteria

There are currently few Ambient air quality goals in relation to air toxics and odour. For this reason, air toxics have not been included in the list of performance criteria which must be monitored and reported to the community.

The Victorian EPA (1988) has developed a suite of ground level concentration criteria which are to be used in sizing stacks and prescribing appropriate controls for individual industrial premises. These criteria have not been developed for application as performance standards in relation to local cumulative ambient air quality.

The odour and organic compound impacts within the estate which result from emissions from individual premises within the estate, shall not exceed the design ground level concentration criteria as shown in Table 3. Compliance with these criteria will initially be assessed at the design stage of a development using air dispersion modelling. At the commissioning stage, industries which emit these pollutants will be required to monitor stack emissions for relevant compounds to demonstrate compliance with the design ground level concentrations. In the event of individual industries exceeding the design criteria at the commissioning stage, adjustments shall be made to the pollution control technology until the design standards are met.

Ongoing monitoring of organic and odorous compounds within the estate shall not be required unless :

- there are sensitive receptors within the estate such as child care facilities. In this case, the design ground level concentration criteria shall also apply at these locations and compliance must be demonstrated by an appropriate ongoing monitoring program.
- there are complaints from the surrounding community in relation to odours. In this case short term monitoring to clarify the nature and resource of the impacts shall be required.
- if there are occupational health and safety issues associated with these pollutants within the estate. In this case, standards and procedures shall be those designated by the Work Cover Authority.

Table 3: Victorian EPA Schedule

SCHEDULE C
C-1 Class 2 Indicators and Design Ground Level
Concentrations

This section prescribes the Class 2 indicators and their design ground level concentrations referred to in Part IV of the policy. These concentrations are to be applied as design criteria in the calculation of chimney heights by the procedure outlined in Schedule E.

Design ground level concentrations for other Class 2 indicators which do not appear in the table will be derived by the Authority on a case-by-case basis.

Indicator	Design Ground Level Concentrations		Indicator	Design Ground Level Concentrations	
	ppm ^d	mg/m ³		ppm ^d	mg/m ³
Acetaldehyde ^b	0.042	0.076	Ethyl Butyl ketone	1.7	7.7
Acetic acid ^b	0.20	0.50	Ethyl chloride	33.3	86.6
Acetone	20	48	Ethylene glycol (vapour)	3.3	8.7
Acrolein	0.0033	0.0083	Ethylene oxide	0.03	0.05
Acrylic acid ^b	0.094		Fluorine	0.033	0.067
Acrylonitrile	0.067	0.15	Formaldehyde	0.033	0.05
Ammonia	0.83	0.6	n-Hexane	1.67	6.0
Aniline	0.17	0.63	2-Hexanone	0.83	3.3
Asphalt (petroleum) fume		0.17	Hydrogen chloride	0.2	0.2
Barium (soluble compounds)		0.017	Hydrogen cyanide	0.3	0.4
Benzyl chloride ^b	0.0094	0.047	Hydrogen sulphide ^b	0.0001	0.00014
Biphenyl	0.0067	0.033	Iron oxide fume	-	0.17
Bromochloromethane	6.7	35	Magnesium oxide fume	-	0.33
Bromoform	0.017	0.17	Maleic anhydride	0.00083	0.033
Bromotrifluoromethane	33	203	Methanol ^b	4.26	5.5
1,3-Butadiene ^b	0.45	1.0	Methyl acrylate	0.33	1.2
n-Butanol ^b	0.3	0.9	Methylamine ^b	0.0042	0.0005
Butyl mercaptan ^b	0.004	0.012	Methylene chloride	3.3	12.0
Carbon black	-	0.1	Methyl ethyl ketone ^b	2.0	5.9
Carbon disulphide ^b	0.042	0.13	Methyl mercaptan ^b	0.00042	0.00084
Carbon tetrachloride	0.17	1.1	Methyl methacrylate ^b	0.05	0.21
Chlorine	0.033	0.1	^{cc} -Methyl styrene ^b	0.052	0.25

Table 3 continued.

Indicator	Design Ground Level Concentrations		Indicator	Design Ground Level Concentrations	
	ppm ^d	mg/m ³		ppm ^d	mg/m ³
Chlorine dioxide	0.003	0.01	Methyl isobutyl ketone ^b	0.1	0.41
Chlorobenzene ^b	0.042	0.20	Nickel carbonyl	0.0017	0.012
Chloroform	0.33	1.59	Nitric acid	.067	0.17
Chloromethane	3.3	7.0	Nitrobenzene ^b	0.00094	0.0047
Chromic acid and chromates, as CrO ₃	-	0.0017	Pentachlorophenol	-	0.017
Chromium, soluble chromic and chromous salts, as Cr	-	0.017	n-Pentane	20	60
Copper: fume	-	0.0067	2-Pentanone	6.7	23.3
dusts and mists		0.033	Perchloroethylene ^b	0.94	6.3
Cotton dust (raw)	-	0.0067	Phenol ^b	0.0094	0.036
Crotonaldehyde	0.067	0.2	Phosgene	0.0033	0.013
Cumene ^b	0.008	0.039	Phosphine ^b	0.0042	0.0056
Cyanide (as CN)	-	0.2	Phthalic anhydride	0.033	0.20
Cyclohexane	10	35	n-Propanol ^b	0.03	0.075
Cyclohexanol	1.7	6.7	Propylene glycol monomethyl ether	3.3	12.0
Cyclohexanone ^b	0.12	0.48	Propylene oxide	3.3	8.0
Diacetone alcohol ^b	0.28	1.3	Pyridine ^b	0.0042	0.013
o-Dichlorobenzene	1.7	10	Silver metal and soluble compounds (as Ag)	-	0.00033
1,2-Dichloroethylene	6.7	26.3	Styrene (Monomer) ^b	0.05	0.21
1,2-Dichloroethane	1.7	6.7	Sulphuric acid	-	0.033
Dichlorvos	0.0033	0.033	Toluene ^b	0.17	0.65
Diethylamine ^b	0.02	0.06	1,1,1-Trichloroethane	11.7	63.3
Dimethylamine ^b	0.0094	0.017	1,1,2-Trichloroethane	0.33	1.5
Dinitrobenzene (all isomers)	0.005	0.033	Trichloroethylene	1.67	9.0
Dinitrotoluene	-	0.050	Trichlorofluoromethane	33.3	187
Dusts ^c	-	0.33	Triethylamine ^b	0.09	0.36

Table 3 continued.

Indicator	Design Ground Level Concentrations		Indicator	Design Ground Level Concentrations	
	ppm ^d	mg/m ³		ppm ^d	mg/m ³
Diphenyl ether ^b	0.02	0.14	Trimethylbenzene (mixed isomers)	0.83	4.0
Epichlorhydrin	0.067	0.25	Vinyl toluene	3.3	16.0
Ethanol ^b	2.0	3.8	Welding fume (total particulate)	-	0.17
Ethanolamine	0.10	0.2	Wood dust, non-allergenic	-	0.17
Ethylacetate	6.3	22.1	Xylene ^b	0.08	0.35
Ethyl acrylate ^b	0.0002	0.0008	Zinc chloride fume	-	0.033
Ethylbenzene	3.3	14.5	Zinc oxide fume	-	0.17

Changed in 1988 Gazette-June

^a based on consideration of toxicity unless otherwise specified.

^b based on consideration of odorous properties of the indicator.

^c other than cotton, coal, quartz bearing, asbestiform, talc, mica, cristobalite and trichymite.

C-2 Biologically Accumulated Indicators and Local Objectives

This section prescribes local objectives for fluorides. Fluoride concentrations in the air environment and in forage shall not exceed the following local objectives.

Indicator	Gaseous Fluorides in the Air Environment ^b		Fluorides in Forage ^{a c}	
	Averaging Period	Local Objective ^d		Local Objective ^d
		ppb	g/m ³	
Fluoride	24 hours	3.4	2.9	40ppm average for any 12 consecutive months
	7 days	2.0	1.7	60ppm each month for more than two consecutive months
	90 days	0.59	0.5	80ppm more than once in any two consecutive months

^a The fluoride content is calculated by dry weight and expressed as fluoride (F)ppm.

^b Concentrations in the air are calculated as hydrogen fluoride (HF) and expressed at 0°C and one atmosphere (101.325kPa).

^c Requirements for sampling shall be developed and published by the Authority.

^d Lower values may be specified for sensitive receiving environments, such as vineyards.

SCHEDULE D CLASS 3 INDICATORS AND DESIGN GROUND LEVEL CONCENTRATIONS

This schedule prescribes the Class 3 indicators and their design ground level concentrations referred to in Part X of the Policy. These concentrations are to be applied to emissions of Class 3 indicators permitted under the provisions of Clause 10(e) in the calculation of chimney heights by the procedure outlined in Schedule E.

Table 3 continued.

Indicator	Design Ground Level Concentrations		
	ppm ^d	mg/m ³	Other
Asbestos	-	-	33 fibres/litre
Benzene ²	0.033	0.10	-
Beryllium	-	0.00007	-
Mercury - organic - inorganic	0.00003 -	0.0003 0.017	- -
Radionuclides	-	-	-
TDI (toluene2, 4-di-iso-cyanate)	0.0007	0.005	-
Vinyl Chloride	0.033	0.1	-
MDI (diphenylmethane di-iso-cyanate)	0.0007	0.007	-

² Excluding petrol and liquid mixtures containing 1 per cent or less of benzene.

8.3.4 Air Emission Limits

i) Design Ground Level Concentration Criteria

The design ground level concentration criteria shown in Table 3 above shall be used to develop source specific emission limits for each of the pollutants covered and for each industry entering the site.

ii) Clean Air Regulations

Industries which require licensing under the Clean Air Act 1961 (scheduled premises), shall also be required to comply with the emission limits prescribed in the Clean Air Regulations. Non-scheduled premises shall be expected to use appropriate modern technology and shall be assessed on a case by case basis.

In relation to scheduled industry, EPA licence conditions may be amended at any time. Where the conditions of the EPA licence have been amended to reflect new scientific understanding of environmental and health impacts and nationally agreed standards, and are more stringent than the consent conditions contained in the environmental envelope at that time, the EPA pollution control conditions shall take precedence.

A Pollution Reduction Program may be attached to a pollution control licence where a negotiated process and timeframe would be useful to guide performance improvement towards revised environmental performance criteria.

8.3.5 Computer Air Dispersion Model for the Estate

The EMC shall establish and maintain an air dispersion model of the entire estate and surrounding land within a 1km radius of the estate boundary in order to predict the additive and cumulative air quality impacts of each successive industry proposing to enter the estate. The ambient air quality monitoring data and the

results from the computer dispersion modelling shall be used during the planning process to evaluate the potential impact of each proposal and, therefore, determine the appropriate level of emission control technology, stack height and optimum site location to permit each industry to operate within the estate.

8.3.6 Ambient Air Quality Monitoring - Compliance

Compliance with the ambient air quality standards shall be determined from the analysis of ambient air quality monitoring data.

The Steel River EMC shall ensure that sufficient ambient air quality monitoring stations are established in and/or around the estate in order to determine compliance with the ambient air quality standards shown in Tables 1 and 2 above. The ambient monitoring stations shall be sited and operated in accordance with the relevant Australian standards. The EMC shall consult with the EPA, Council and the local community in determining the number and location of the monitoring stations. The ambient monitoring strategy shall be approved by Newcastle City Council, and shall be reviewed by Council in consultation with the EPA, EMC and the local community at each review of the LEP.

The stations shall be established as soon as possible and in any event within three months of the gazettal of the new LEP for the Steel River site in order to establish baseline ambient air quality data.

8.3.7 Meteorological Station

A meteorological station shall be sited and operated in accordance with the relevant Australian Standards. The meteorological station shall be located in an area where the meteorology is representative of the estate and the surrounding areas.

8.3.8 Reporting

- i) The EMC shall collate air quality monitoring records in relation to the monitoring stations specified and the parameters listed in Tables 1 and 2, and prepare a report which shows:
 - results for all criteria which are required to be monitored;
 - any exceedences of the ambient air quality standards set in 8.3.1 and with the ground level concentrations for pollutants specified in 8.3.3;
 - an explanation of the likely causes of these exceedences. Where the source of an exceedence is an industry located within the Steel River estate, this premises shall be identified;
 - any action taken to address instances of exceedences;
 - meteorological data in the form of wind roses.
- ii) The information required in (i) shall be submitted to Newcastle City Council and the EPA in the form of three quarterly reports and an annual report each year. These reports shall be made available within 28 days of the end of each quarterly monitoring period.

- iii) All monitoring records shall be kept in a legible form by the EMC and shall be available for inspection on request by:
- any authorised EPA officer;
 - officers of Newcastle City Council;
 - any member of the general public.
- iv) The annual monitoring report shall be advertised in local newspapers shall be exhibited in NCC public libraries and shall be available to any member of the public on request. The annual report shall include a "plain English" interpretation of the monitoring results, and present an assessment of the performance of the model, and a review of new developments arising which may affect air quality on the site.

8.3.9 Review of Air Quality Criteria

As scientific understanding regarding the health affects of air pollutants increases, revised performance standards may be specified.

In order for the LEP for the Steel River Site to incorporate revised air quality standards as they are developed and adopted in New South Wales, the air quality criteria in the LEP shall be reviewed within one year of gazettal. Subsequent reviews of the standards defining the environmental envelope for the Steel River Project shall occur at intervals not exceeding five years. Revised environmental standards proposed to be incorporated into the revised LEP shall be developed in consultation with the EPA.

The LEP environmental envelope incorporates the minimum acceptable ambient air quality in the vicinity of the estate. The existence of these performance standards shall not prevent industries within the estate negotiating an air emission improvement plan with the relevant regulatory authority at any stage in order to achieve eco-industrial or other objectives, or to prepare for compliance with revised standards which may be established from time to time.

An industry which gained development consent under a superseded component of the environmental envelope, and cannot immediately achieve a revised standard, shall negotiate an air emission improvement program with the EMC, NCC and the EPA. Where the industry is scheduled under the Clean Air Act (1961), the negotiated omission improvement program may be attached to the company's operating licence as a Pollution Reduction Program.

8.4 NOISE EMISSION STANDARDS

8.4.1 Noise Criteria - Overview

The noise criteria for the Steel River estate are based on planning noise levels set for each of the different receiver zones surrounding the estate. These receiver zones follow the land zonings of 2(a), 4(b), 5(a), (b), (c) and (e), 6(a) and 3(d) with the exception of an additional zone, 2(a)1. This zone is the first row of residences in zones 2(a) which are adjacent to Industrial Drive and opposite the estate. This additional zone of 2(a)1 allows for noise criteria which corresponds to the Environment Protection Authority's Environmental Noise Control Manual planning category of residential area on a busy road or near an industrial area.

The noise criteria in this SIAS protect against intrusive noise where intrusive noise is that which exceeds the background noise level by more than 5dB.

8.4.2 Noise Criteria

Table 4 below sets the maximum daytime and night-time L_{A10} noise levels for each zone shall not be exceeded by noise from the estate when measured at, or calculated for, any point within the zone. Similarly noise from the estate shall not exceed the sleep disturbance criteria L_{A1} for night-time for zones 2(a), 2(a) 1, 6(a) and 3(d) as shown in Table 4.

Table 4 - Noise Limits

Zone	Day-Time dB(A)	Night-Time dB(A)
2(a) 1 Residential on a main road or near an industrial area	$L_{A10} = 48$	$L_{A10} = 30$ $L_{A1} = 55$
2(a) Residential	$L_{A10} = 42$	$L_{A10} = 30$ $L_{A1} = 49$
4(b) General Industrial	$L_{A10} = 65$	$L_{A10} = 65$
5(a) Special Uses (Church, School)	$L_{A10} = 48$	NA
5(b), (c) and (e) (Railway, Road)	$L_{A10} = 65$	$L_{A10} = 65$
6(a) Open Space and Recreation	$L_{A10} = 50$	$L_{A10} = 40$ $L_{A1} = 50$
3(d) Commercial	$L_{A10} = 50$	$L_{A10} = 40$ $L_{A1} = 50$

Daytime is defined as 7am to 10pm Monday to Saturday and 8am to 10pm on Sundays and Public Holidays. **Night-time** is defined as 10pm to 7am Monday to Saturday and 10pm to 8am on Sundays and Public Holidays.

8.4.3 Compliance and Modelling

As noise emissions from the Steel River estate are likely to be relatively low in comparison to existing ambient noise levels, compliance shall be demonstrated through a combination of modelling and, in time, field monitoring.

The EMC shall establish, within three months of the gazettal of the new LEP, for the site, a computer noise model for the estate. The model shall allow for the prediction of cumulative noise emissions from the estate in relation to the surrounding zoning limits as shown in Table 4. The model shall be updated by the EMC with noise emission information as each new development enters the estate.

A number of noise monitoring sites at the most sensitive receiving locations outside the Steel River Project shall be selected on the basis of the acoustic model and in consultation with the EPA, Council and the local community. The location of each site shall be representative of the noise levels within the zone being measured and agreed to by the affected community.

The purpose of this field monitoring is to monitor ambient noise levels, confirm modelling predictions and identify any significant rise in background noise levels. Should such a rise occur, more detailed monitoring may be required in order to identify the extent of the contributed noise level from the Steel River estate.

When field monitoring occurs, it need not necessarily be on a continuous basis. Quarterly, half yearly or annual monitoring may be sufficient. The details of the noise monitoring program shall be included in the environmental management system for the estate, and be developed in consultation with the EPA, Council and the local community.

In order to manage complaints about excessive noise from the estate or high noise level results from field monitoring, the EMC may need to undertake investigative monitoring from time to time.

8.4.4 Negotiated Noise Management Agreements

Where the noise criteria set out in Table 4 are unable to be met and a proponent seeks development consent, the approach to managing noise impacts from the proposed industry may be by way of negotiated agreement. This approach permits, after all feasible and reasonable noise mitigation measures have been applied, a process of negotiating an agreed outcome between the proponent and the affected community to address elements of the local noise profile which may be problematic. Independent mediators may be used to assist the negotiation process.

If development consent is granted on the basis of a negotiated agreement proposals subject to the 28 day consent process shall still be required to demonstrate compliance with the environmental envelope.

8.4.5 Reporting and Review

The reporting requirements listed for air quality shall be followed for the reporting of noise monitoring results.

It is expected that changing land use in the area surrounding the Steel River estate may result in significant changes to the ambient noise environment. In order to ensure ongoing compatibility between the ambient noise environment and the noise standards prescribed in the LEP, the noise standards shall be reviewed at intervals of not more than five years.

8.5 WATER QUALITY STANDARDS

8.5.1 Stormwater Quality

Any stormwater discharged from the estate to the Hunter River (or any tributary drain) shall be of a quality which is consistent with the ANZECC guidelines for protection of aquatic ecosystems. The ANZECC guideline for protection of aquatic ecosystems is reproduced as Table 5.

Stormwater shall be managed to minimise the potential for recharge of shallow groundwater on the Steel River Estate.

Table 5: Summary Guidelines for Protection of Aquatic Ecosystems

Indicator	Units	Fresh Waters	Marine Waters
Biological		It is premature to recommend specific values for these indicators. The need for biological evaluation is recognised, and these indicators are identified as important characteristics of ecosystem function (Section 2.2).	
Physico-chemical		<10% change in euphotic depth ¹ .	<10% change in euphotic depth.
Colour & clarity			
Dissolved oxygen ²	mg/L	>6 (>80-90% saturation) (Section 2.3.3)	>6 (>80-90% saturation) (Section 2.3.3)
Nutrients/nuisance growths			
pH		6.5-9.0	<0.2 pH unit change
Salinity	mg/L	<1000 (about 1,500 S/cm)	
Suspended particulate matter/turbidity		<10% change seasonal mean concentration (see also colour and clarity)	<10% change seasonal mean concentration (see also colour and clarity)
Temperature ³		<2°C increase	<2°C increase
Toxicants			
Inorganic toxicants	all g/L		
Aluminium		<5.0 (if pH≤6.5) <100.0 (if pH>6.5)	NR
Ammonia		20.0-30.0 (Table 2.3)	NR
Antimony		30.0	500.0
Arsenic		50.0	50.0
Beryllium		4.0 ⁴	NR
Cadmium		0.2-2.0 ⁵	2.0
Chromium		10.0	50.0
Copper		2.0-5.0 ⁵	5.0
Cyanide		5.0	5.0

Table 5 continued.

Indicator	Units	Fresh Waters	Marine Waters
Iron		1,000.0 ⁶	NR
Lead		1.0-5.0 ⁵	5.0
Mercury		0.1	0.1
Nickel		15.0-150.0 ⁵	15.0
Selenium		5.0	70.0
Silver		0.1	1.0
Sulfide		2.0	2.0
Thallium		4.0	20.0
Tin (tributyltin)		0.008	0.002
Zinc		5.0-50.0 ⁶	50.0
Organic toxicants			
Acrylonitrile		NR	NR
Benzidine		NR	NR
Dichlorobenzidine		NR	NR
Diphenylhydrazine		NR	NR
Halogenated aliphatic compounds			
Hexachlorobutadiene		0.1	0.3
Halogenated ethers		NR	NR
Isophorone		NR	NR
Monocyclic aromatic compounds			
Benzene		300.0	300.0
Chlorinated benzenes		(Table 2.8)	NR
Chlorinated phenols		(Table 2.9)	(Table 2.9)
Phenol		50.0	50.0
Toluene		300.0	NR
Nitrosamines		NR	NR
Pesticides			
Organochlorine		(Table 2.10)	(Table 2.10)
Organophosphate		(Table 2.10)	(Table 2.10)
Acrolein		0.2	0.2
Phthalate esters			
di-n-butylphthalate		4.0	NR

Table 5 continued.

Indicator	Units	Fresh Waters	Marine Waters
di-(2-ethylhexyl)phthalate		0.6	NR
other phthalate esters		0.2	NR
Polyaromatic hydrocarbons			
Chlorinated naphthalenes		NR	NR
Polychlorinated biphenyls		0.001	0.004
Polychlorinated dibenzo-p-dioxins		NR	NR
Polycyclic aromatic hydrocarbons		3.0	3.0

SPM: Suspended particulate matter; NR: no recommendation made at this time.

Notes:

1. For systems where depth is greater than 0.5 x euphotic depth (Z_{...}). For waters shallower than 0.5₂ the maximum reduction in light at the sediment bed should not exceed 20%.
2. Measured over at least one, but preferably several, diurnal cycles.
3. Or use formula in Section 2.3.7; no data for temperature reductions.
4. Higher values may be acceptable in hard waters.
5. Depends upon hardness of water.
6. Provided iron not present as Fe(II).

Recommended guidelines for chlorinated benzenes in fresh waters

Chlorinated benzene	Guideline (g/L)
Monochlorobenzene	15.0
1,2-dichlorobenzene	2.5
1,3-dichlorobenzene	2.5
1,4-dichlorobenzene	4.0
1,2,3-trichlorobenzene	0.9
1,2,4-trichlorobenzene	0.5
1,3,5-trichlorobenzene	0.7
1,2,3,4-tetrachlorobenzene	0.1
1,2,3,5-tetrachlorobenzene	0.1
1,2,4,5-tetrachlorobenzene	0.2
Pentachlorobenzene	0.03
Hexachlorobenzene	0.007

Table 5 continued.

Recommended guidelines for chlorinated phenols in fresh and marine waters

Chlorinated phenol	Guideline (g/L)	
	Fresh water	Salt water
Monochlorophenol	7.0	-
2,4-dichlorophenol	0.2	-
Trichlorophenol (total)	18.0	-
2,4,5-trichlorophenol	-	8.0
Tetrachlorophenol	1.0	-
Pentachlorophenol	0.05	0.2

**Recommended maximum concentrations for pesticides
in unfiltered water samples**

Pesticides	Guideline (g/L)	
	Fresh water	Salt water
Organochlorines		
Aldrin	10	10
Chlordane	4	4
DDE	14	14
DDT	1	1
Dieldrin	2	2
Endosulfan	10	10
Endrin	3	3
Heptachlor	10	10
Lindane	3	3
Methoxychlor	40	40
Mirex	1	1
Toxaphene	8	8
Organophosphates	1	1
Chlorpyrifos		
Demeton	100	100
Cuthion (Azinphos-methyl)	10	10
Malathion	70	100
Parathion	4	4
Other pesticides		
Acrolein	200	200

8.5.2 Industrial Process Water

No contaminated industrial process water shall be discharged from any industry on the estate to surface waters on the estate or to the Hunter River. No process water shall be discharged to groundwater. All industrial process water which cannot be re-used on the site shall be disposed of to the reticulated sewage system, or removed from the site by the tanker for re-use or disposal at an approved facility.

8.5.3 Groundwater and Water Re-use

No contaminated groundwater shall be discharged from the estate to the Hunter River.

Any industry which generates industrial waste water shall contribute to ongoing research and development to explore new mechanisms for minimising water consumption and maximising water re-use opportunities within the estate.

8.5.4 Sewer Reticulation System Management

The sewage reticulation system on the estate shall be designed and managed to minimise the risk of overflows from pumping stations. An emergency management system shall be in place to prevent any discharge of the raw sewage to stormwater or to the Hunter River in the event of an overflow.

8.5.5 Monitoring and Reporting

The reporting requirements listed for air quality shall also be followed in relation to water quality.

- i) The EMC shall monitor and maintain records of the volume and quality of surface water entering and being discharged from stormwater control ponds on the site.
- ii) The EMC shall monitor and maintain records of the volume and quality of groundwater discharging from the site to the Hunter River.
- iii) The EMC shall monitor rainfall events on the site.
- iv) The EMC shall conduct annual surveys of shellfish along the bank of the Hunter River which borders the estate. The aim of these surveys is to monitor the levels of metals and other contaminants which may accumulate in shell fish. The objective is to achieve and maintain the standards reported in the Pure Food Act.

8.6 WASTE MANAGEMENT

The subject of waste management for the Steel River Site was discussed in Section 5.10 of this SIAS. That section drew attention to the various existing and possible future requirements in the management of waste in New South Wales.

Essentially, the requirements for waste with which future industries on Steel River shall comply can be listed as follows:

- i) The production, transport, reprocessing and disposal of wastes are regulated by the Waste Minimisation and Management Act (1995).
- ii) Generators of hazardous or industrial waste may be required to obtain a licence from the EPA.
- iii) Transporters of hazardous or industrial waste may be required to obtain a licence from the EPA.
- iv) Any activity treating or reprocessing hazardous or industrial waste may be required to obtain a licence from the EPA
- v) Each industry locating on the Steel River estate shall prepare and implement a waste management plan which is consistent with the estate EMS.
- vi) The estate EMS shall be linked to other regional waste re-use or recycling initiatives and information systems.
- vii) Where an Industry Waste Reduction Plan applies to an industry classification located on the site, the industries activities shall be consistent with the IWRP.
- viii) In respect of reporting, the EMC shall prepare an annual report which documents waste generation and management initiatives.
- (xi) At the planning stage, each industry shall conduct a waste audit. Results shall be entered in the data base maintained by the EMC.

8.7 ENERGY MANAGEMENT

Section 5.7 of this SIAS described the way in which energy, in the form of electricity and gas, will be provided to the future industries locating on Steel River. That description included mention of the opportunities and desirability for recycling of energy (as well as other by-products of industrial activities) as well emphasising the need for energy-efficient buildings.

These and other requirements in respect of energy on the Steel River site can be summarised as follows:

- i) Individual proponents shall demonstrate that relevant national guidelines for energy efficient industrial design have been used in the layout and design of buildings and equipment located on that premises.
- ii) The EMC shall contribute to research into regional sourcing of renewable energy supplies.
- iii) The EMC shall develop and implement an energy efficiency plan for the estate, as part of the EMS for the estate.

- iv) In respect of reporting, the annual report of the performance of the estate shall include information on initiatives to improve the efficiency of energy use within the estate.

8.8 SOCIO-ECONOMIC AND CULTURAL OBJECTIVES

A number of social and economic strategies and objectives have been recommended in Section 7.1 of this SIAS to enhance the social benefits of the development. While these are less quantifiable than for many physical requirements, nevertheless, some socio-economic and cultural objectives can be established to complement the physical environmental envelope.

8.8.1 Objectives for Community and Recreation Facilities and Services

- i) The availability of community and recreation facilities and services is a key factor in influencing quality of life, resident and worker satisfaction, community interaction and the building of community identity. The development of the Steel River site shall be consistent with the objective of ***providing community and recreation facilities and services***. Some of the ways in which this is to be achieved are listed as follows:

- ancillary commercial activities such as banks, food outlets and convenience shops, primarily to meet the needs of the local employees while also being available to the wider community;
- a Long Day Care Centre, principally providing Work Based Child Care although open to the community;
- multipurpose meeting rooms, providing both for the training and education needs of the estate as well as possibly the needs of community groups;
- an on-site Strategic Information Centre, providing estate as well as public access to electronic information, whether commercial, educational or through another "provider";
- a permanent heritage/historical display, including artefacts and information relevant to both the history of the site and the history of BHP in Newcastle;
- commercial and estate passive and active recreation facilities such as a foreshore recreation and picnic area, a touch football or kick-around area, a cycleway, walking trails and exercise track, tennis courts, basketball courts, half courts, squash courts, gymnasium etc, primarily provided to service the needs of employees on the site, however as far as possible, accessible to the wider community; and
- the areas of open space and associated recreation and other community facilities to be made accessible by the public shall be provided as generally shown in figures 7 and 8 of the SIAS.

- ii) Development on the Steel River site shall be consistent with the objective of the ***locating community facilities and services*** appropriately. This will mean that they are:

- highly accessible to both the local community and employees on the site;
- linked with open space and commercial development on the site.

- iii) Development on the Steel River site shall be consistent with the objective of ***designing community facilities and services*** appropriately this will mean that they need to:
- reflect and contribute to the character, identity and amenity of the estate;
 - be integrated with the character of the surrounding residential areas;
 - provide opportunities for social and community interaction;
 - provide appropriate after hours use and off-peak use for residents if practicable;
 - enhance public safety and security; and
 - facilitate ease of pedestrian movement between various components of the Steel River Site and to the adjoining areas.
- iv) Development on the Steel River site shall be consistent with the objective of ***ensuring accessibility to community facilities and services***. This will be implemented:
- by public and private transport;
 - by clearly defined and safe pedestrian paths and cycle routes.

Where recreation facilities are provided, they shall contribute to the passive, active and leisure requirements of the proposed development and the needs of youth and others in the community.

8.8.2 Neighbourhood and Residential Amenity

- i) Satisfaction with the living and working environment is a major element in creating a sustainable community. The amenity of an area is a key determinant of residential satisfaction. The amenity of the estate itself can also contribute to this, as well as creating a high quality work environment. Many of these aspects are covered in detail in Section 8.9. In respect of neighbourhood and residential amenity, the development of the Steel River site shall be consistent with the objective of ***integrating the site with the surrounding community***. This is to be achieved by:
- careful attention to resolution of potential land use conflicts eg noise, traffic, generation;
 - community and cultural development initiatives (see below);
 - encouraging community use of community and recreation facilities where practicable;
 - ongoing local community participation in planning and development of the site.
- ii) Development on the Steel River site shall be consistent with the objective of ***enhancing the neighbourhood identity*** and providing opportunities for social interaction and participation. This will be achieved through:
- design and development controls which facilitate social interaction and provide an opportunity for community activity;
 - sensitive design and development control to reflect the goals and aspirations of local residents as far as possible;

- encouragement of the shared use of space and facilities by workers on the estate and local residents.
- iii) Development on the Steel River site shall be consistent with the objective of ***providing a safe environment*** for residents, employees and other users of the site. This will be achieved by:
- using urban design initiatives to minimise crime and enhance safety;
 - providing public access to those parts of the site which offer benefits to the community including the proposed recreation, cultural and community facilities, while maintaining security on the estate.

Some of these above objectives are expressed in the design/development strategy which evolved out of the community workshops, arranged by Council, held in May 1997 and noted previously in Section 3.2 of this SIAS.

8.8.3 Access

Regardless of the need to manage the interface of industrial and residential land uses, it will be essential to establish links between the neighbouring communities and the site. This shall be achieved through the development of physical infrastructure such as pedestrian movement systems which provide safe crossing of Industrial Drive, cycleways and open space links, and linkages to the wider transportation network. Many of these aspects are covered in detail in the Traffic and Transport matters appearing in Section 8.9.

The development of the Steel River site shall be consistent with the objective of ***providing access to the site by the neighbouring community***. This will be achieved by:

- integrating the development with the wider transport network to provide access and linkages to bus, rail and cycleways;
- establishing, if feasible, a shuttle bus service to link more distant parts of the site with the south east hill;
- operating, if feasible, the shuttle bus service during morning and afternoon peak periods to provide an effective transport link between the Steel River site, Mayfield Town Centre and Warabrook Station;
- providing pedestrian access to the South-East Hill area via an at-grade crossing controlled by traffic signals, from Werribi Street.

8.8.4 Cultural Development

The social value of the site for the local and wider Newcastle community can be considerably enhanced by cultural development initiatives. In this regard the development of the Steel River site shall be consistent with the objective of ***promoting the area's cultural identity***. This will be achieved by:

- involving the community in the development of a Cultural Plan for the south east hill area;

- promoting the area's cultural identity through urban design, landscaping, built form, public art and the above proposed cultural facilities;
- enhancing and preserving features considered to be of social and cultural significance;
- employing a Cultural Worker funded for 2-3 years to set up and co-ordinate the above display, community art, cultural initiatives and any youth and disability employment programmes which may be possible on the estate;
- ensuring that the heritage of the site is interpreted artistically and sympathetically on the south-east hill portion of the site.

8.8.5 Employment

- i) A principle objective of the development of the Steel River site is the target to generate in the order of 2000 jobs by the year 2000. The development of the Steel River site shall be consistent with the objective of ***contributing to the employment target***. This will be achieved by:
- effective marketing of the site;
 - streamlined approval processes;
 - creation of opportunities for "spin-off" development, particularly of ancillary commercial services which do not adversely effect other commercial centres.
- ii) Development on the Steel River site shall be consistent with the objective of ***selecting industries to enter the site on the basis of their employment generating capability, by the target date***. In particular, industries shall be sought which:
- contribute significantly to achieving the target of 2000 jobs by the year 2000;
 - yield a minimum short term employment density of 20 employees per site hectare;
 - use local inputs or attract related industries to locate in the Newcastle area, thereby maximising potential multiplier effects.

8.8.6 Education and Training

The development of the Steel River site shall be consistent with the objective of ***establishing strong links with tertiary and other education institutions*** as a means of both promoting the concept of eco-industrial development, as well as strengthening the training basis of the estate. This shall be linked with a Strategic Information Centre, when practicable. Where possible, training and education linked with the site development will be encouraged to increase the skills of the Newcastle workforce.

8.8.7 Heritage and Conservation

Statutory Framework

Cultural heritage values for the Steel River site are regulated by two main pieces of NSW legislation.

These are:

- the NSW National Parks and Wildlife Service Act (1974). This act governs the activities which affect Aboriginal sites and relics. It is an offence to disturb or destroy any Aboriginal material without prior approval by the Director of NPWS - approval is gained through the Consent to Destroy process.
- the NSW Heritage Act (Sections 139 - 145). This act regulates activities concerning historical sites. It is an offence to disturb land for the purpose of discovering, exposing or removing a 'relic' older than 50 years. Approval to do so must be issued by the NSW Heritage Council.

Background

Two phases of assessment of the cultural heritage values of the Steel River site have been undertaken. The first was an assessment to determine if any Aboriginal archaeological values existed on the site. Consultation with the Awabakal Aboriginal Land Council was undertaken during the assessment. No physical evidence was found during the survey. Historical research indicated that there had formerly been considerable Aboriginal activity in the vicinity of the Tourle St hill. Middens (now destroyed) were located along the river foreshore and people were observed gathering, hunting and fishing nearby.

After the occupation of the location by Platt in 1823 there was evidence of a continuing Aboriginal presence in the area. Platt's letters indicate that he was subjected to considerable harassment by the local inhabitants. On the basis of the available historical evidence, the survey results and the assessment of the landscape modification which had taken place across the site the potential for the area to contain extant Aboriginal sites was rated as *low but not nil*.

Subsequent to the survey for Aboriginal sites further research was undertaken to determine the nature of the historical values of the site. This work substantiated the occupation of the location by the recipient of the first free land grant in Newcastle in 1823. John Laurio Platt established a home and farm in the position previously occupied by the old Orphanage buildings and grounds. It was determined that the top of the hill had the potential to contain significant historical subsurface remains, namely, the Platt house and associated buildings such as quarters for the assigned servants, barns, store houses, stables and outhouses.

A ground penetrating radar survey was conducted across five areas on the hill. This work has supported the proposition that areas that may contain historical subsurface material lie adjacent and under the existing building.

The area on the top of the hill around the recently demolished former orphanage building has been rated as having a *high* potential for the presence of subsurface historical material. The survey indicated that areas away from the building on the top of the hill could be rated as having *low* potential for containing subsurface historical material.

Issues

Issues relating to the Aboriginal and historical material that may be present on the site are dependent on the results of physical excavation of the locations determined to have a high potential for the existence of sub surface remains. If nothing of significance is located then the area would be rated as low significance and development could proceed in line with the actions described below. Testing of the locations identified in the ground penetrating radar survey is planned to occur before development commences.

If significant material is located then any activity which concerns the material is governed by the Heritage Act (Sections 139 - 145) or the NSW NPWS Act, if the material is Aboriginal. It is not uncommon when dealing with historic contact sites (that is, sites where Aboriginal and European activities were occurring on the one location) that Aboriginal material is located in the early deposit. This has occurred on other historic sites recently excavated in Newcastle and in western Sydney.

Should any Aboriginal material be located during excavation or later development, that material is subject to the NSW National Parks and Wildlife Act.

If Aboriginal or European (or both) material of significance is located (in the test excavation or during later activity on the site) the developer has two courses of action available.

Development on the Steel River site shall, accordingly, be consistent with the ***obligations, implications and consequences of whichever of the two actions described below is required of the developer.***

Action 1: The developer must ensure that the relics are not disturbed by any aspect of the proposed development and are preserved intact

Strategy

- develop a process for handling any heritage issues that may arise during development
- notify the relevant authority of the existence and condition of the material and the plans for its management.
- develop a management plan for those areas to ensure adequate protection and management of the relics occurs in the present and the future; that is, ensure that relics will not be disturbed.

In the site development plan excise the areas of high significance from any development activity and establish appropriate buffers and security to protect the location during works.

- incorporate the significant areas into the development in a manner sympathetic to the conservation of the remains.

Action 2: The developer must (with consultation and subject to approval from the Heritage Council if necessary) decide that removal of the material is the best course of action. The developer may apply for the appropriate approvals from the relevant agencies and have salvage excavation of the site undertaken by suitably qualified expert according to the requirements of the relevant Act and any condition imposed by the Heritage Council as part of the permit issue.

Strategy

- develop a process for adequate handling of any ongoing heritage issues during the development phase
- notify the relevant authority and apply for the appropriate permits. This will involve submitting substantiating documentation which the developer will be required to provide at the developer's own cost.
- on receipt of the appropriate approvals undertake salvage excavation of all identified significant heritage material within the location. This work should be undertaken by a qualified archaeologist. The salvage involves excavation, cataloguing, reporting and long term curation and storage of any excavated material by a qualified expert at the developer's cost
- if material of Aboriginal origin is located during salvage work on the historical material, work should cease at that location. The NPWS should be notified and advice sought. A Consent to Destroy will need to be applied for if the material is to be excavated.
- notify and consult with the Awabakal Aboriginal Land Council. Consultation with the appropriate Land Council is a policy of the NPWS and written evidence of such consultation is required in the approvals process.
- during any later development and construction phase which involves earth works, undertake monitoring of areas to be disturbed on the site which have not been salvaged and have been assessed as being of low significance for European and Aboriginal material. Monitoring work should be undertaken by a qualified archaeologist

8.9 DEVELOPMENT GUIDELINES AND OBJECTIVES

8.9.1 Design Guidelines

Guidelines have been prepared in order to assist those involved in the design, construction and management of industrial developments within individual allotments to achieve a quality environment consistent with the master plan and eco-industrial park concept.

These guidelines are intended to achieve the following objectives:

- ensure a development of a consistently high standard, which protects and enhances the investment of businesses within the Steel River Project;

- aid those responsible for individual project development within the site, implement and display environmental and eco-industrial design principles on both an allotment and inter allotment basis;
- promote quality design within individual allotments which contributes positively to the public domain and the amenity of adjoining residential areas;
- achieve a consistent style, character and quality of product;
- assist in the achievement of a safe, secure and enjoyable work environment for employees, visitors and the community alike.

Development on the Steel River site shall therefore ***be consistent with the above specified objectives through observance of the guidelines set out in this document.*** The guidelines should be considered as flexible development standards, rather than absolute requirements. Departure from the guidelines will be considered in response to design objectives, industry-specific matters and the individual site planning and design merits of proposals. Proposed departure will be considered where it can be demonstrated that the overall landscape, urban design and environmental quality and amenity of the Steel River project will not be adversely compromised.

All building construction and site improvements proposed by individual development applicants shall be reviewed and approved by the Steel River Estate Management Company before any on-site construction commences.

8.9.2 Allotment and Building Design

Development on the Steel River site shall be consistent with ***the following objectives and guidelines relating to allotments and building design.***

i) Allotment Size and Configuration

Objectives

The objectives are:

- *to provide a range of allotment sizes which can adequately accommodate buildings, manoeuvring, storage areas, car parking and landscape treatment for the efficient operation of industry while not detrimentally affecting the amenity of adjoining land and the public domain; and*
- *to provide allotments of sufficient size to enable future expansion of development and potential uses within abutments.*

Guidelines

- Industrial allotments should generally be greater than 10,000m² (a minimum of 5000m²) and of a square or rectangular shape to maximise the efficient use of land.
- Allotments for other purposes shall be of such a size and shape as maybe required to optimise the efficient use of land.
- Allotments should generally provide a minimum road frontage of 60m.
- Allotments should not have direct access off Industrial Drive, Tourle Street or the Pacific Highway.

- Allotment size and configuration should be designed having regard to the implications on site coverage, site layout and set back guidelines.
- Consideration should be given to potential for shared access and future subdivision arrangements.

ii) **Site Layout**

Objective

The objective is to ensure that allotments are developed in an orderly manner having regard to the visual impact of structures and facilities and the legibility of vehicular and pedestrian movement.

Guidelines

- Loading, storage and external work areas should be located generally to the rear of allotments.
- Buildings, fencing and landscape treatment should be used to screen visually obtrusive activities.
- Components of the buildings which incorporate offices, caretaker dwellings, show rooms and customer services areas which are generally of a high architectural design standard, should be located towards the front of the allotment to present an attractive facade to the street frontage.

iii) **Site Coverage**

Objectives

The objectives are:

- *to ensure a consistent maximum density of development and utilisation of sites for efficient operation; and*
- *to ensure sufficient site area is provided for buffers and landscape treatment to achieve a quality visual environment and effective habitat areas.*

Guidelines

- The combined building and external hard paved surfaces (including access, car parking, storage, work, turning areas), should not exceed 80% of the site.
- Not less than 20% of the site area should be landscaped. This area should not contain car parking, vehicular access, turning, loading, storage and work areas. Landscaping should include tree planting, mulched planting areas, grass and pedestrian/cycle pathways. As a minimum requirement, mulch planting beds containing trees, shrubs and groundcovers should occupy 5% of the total site area.
- The total ground floor area of all buildings on an allotment generally should not exceed 70% of the area of the allotment.
- The ground floor area of all buildings is measured using the exterior face of all walls, with canopies, verandahs and other overhanging components that are an integral part of the architectural design being excluded from the measurement.

iv) Set Backs

Objectives

The objectives are to:

- *set buildings back from boundaries at a distance which ensures that there is no detrimental impact on the public domain and where appropriate allows for provision of access car parking and extensive landscape areas between the building and the road; and*
- *set building and external paved areas back to provide a landscape buffer to areas to effectively screen external storage, work areas and on site car parking from nearby residential areas and the public domain.*

Guidelines

- A minimum front building setback of 10m should be provided from all internal roads indicated on the master plan Figure 7 in this SIAS. However, this may be reduced to a 5m setback for 40% of the site width, provided that all site access and landscape treatments set out in these guidelines can be achieved and provided that the building design contributes to the enhancement of the streetscape.
- Front or side building setbacks should be increased where allotments abut future secondary roads or on corner allotments.
- A minimum development setback (including external work, storage and car parking areas) of 5m shall apply to all external site boundaries of the Steel River site. This setback shall be heavily landscaped with screen planting, except where landscaping may reduce surveillance of public areas by adjacent development.
- A minimum development setback from side and rear property boundaries of 6m shall be provided to buildings and external work and storage areas.

v) Building Form

Objective

The objective is to provide buildings that have a strong theme or design concept through the element of form that can carry a palette of materials in an articulated fashion.

Guidelines

- Blank unarticulated walls should be avoided.
- The functions of the building may be reflected in the articulation of the building envelope.
- Creative roof designs are encouraged.
- There should be a smooth and preferably a seamless transition of the building appearance from the front of building functions to the rear of building functions.
- Building mass can also be articulated through use of sunshades, terraces, balconies, canopies, columns and other elements that provide depth.

vi) Building Height

Objective

The objective is to create a harmonious streetscape and visual environment, and to achieve a consistency between buildings by limiting the height of buildings.

Guidelines

- Buildings fronting main roads should be greater than 6.5m in height.
- Generally, buildings should be 1-2 storey constructions to a maximum height of 12m above finished ground level immediately below that point.
- Variations to permit buildings with more storeys or a height of greater than 12m, may be allowed where it can be demonstrated that no harm will be caused to the amenity of the surrounding locality. Development that is greater than 12m should generally be well set back from the front facade of the building.
- Building service appendages, such as lift motor room, air conditioning equipment, and exhausts, should generally not project beyond the same height limitations. It is preferred that any protruding services/ equipment should either be concealed from view behind parapet walls or be housed within the building envelope entirely.
- Rooftop radio, television and microwave antennas/towers must be approved by the Estate Management Company.

vii) Building Address

Objectives

The objectives are to:

- *ensure that the entrances to buildings on allotments are clearly defined and well articulated.*
- *ensure the private built form contributes positively to the public domain.*

Guidelines

- The building should have its entrances clearly defined through form, materials and colours used.
- Entries for vehicles/goods should be clearly defined yet secondary in design strength.
- Entries into buildings should have a hierarchy of design strength (articulation of form, materials and colours used) with the main pedestrian entry being most prominent followed by goods entries and emergency exits etc.

viii) Floor Space Ratio

Objective

The objective is to ensure compatibility of scale of buildings within the allotment boundaries.

Guidelines

- The maximum floor space ratio for any allotment should not exceed 1.5:1.
- The floor space ratio is the total area of all buildings on an allotment divided by the total area of the allotment.
- The total floor area of all buildings is measured to the exterior face of all walls with balconies and decking being excluded.

ix) Storage and Work Areas

Objective

The objective is to ensure storage and external work areas are adequately catered for within allotments in a manner which is aesthetically pleasing and does not detrimentally affect the visual amenity of the area.

Guidelines

- All storage, work areas and garbage receptacles should be located at the rear of allotments and screened from public streets and residential areas by the use of buildings, screen fences or landscaping.
- All storage and work areas should be contained wholly within the confines of the allotment. The temporary storage of materials or carrying out of external work within the public road reserve is not permitted.
- Consideration may be given to shared storage and work areas with adjoining developments where clear site planning and efficient land use benefits can be demonstrated without impacting adversely on public amenity.
- Materials storage should generally occur within buildings. Where external storage is permitted, materials should not be stacked greater than a total height of 3m above natural ground level, unless adequate screening measures are implemented.

x) Building Materials

Objective

The objective is to ensure that materials used contribute positively to the image and ecological sustainability of the Steel River Eco Industrial Park.

Guidelines

- Material selection should generally consider the following issues:
 - innovative and contemporary design;
 - energy efficiency, both in terms of embodied energy and ongoing performance;
 - low maintenance qualities.
- Where plain masonry block work, galvanised iron, zincalume or timber are to be used, they should be innovative and creative in use.
- New materials will be considered on their merits.
- Generally roof material will be pre-coloured metal where the roof is visible (ie. above 10° pitch).
- Reflective glazing in windows or walls is not encouraged.

xi) Building Colour Schemes

Objectives

The objectives are:

- *to ensure a co-ordinated and harmonious appearance for buildings on individual allotments in relation to each other and the public domain; and*
- *to assist in promoting a clean and eco-friendly image for the Steel River Eco Industrial Park.*

Guidelines

- A colour scheme for all buildings on an allotment shall be submitted to the Estate Management Company for approval prior to construction.
- Consideration of adjoining buildings within the Park (whether constructed or approved for construction) should be made when determining a colour scheme.
- Generally lighter colours are preferred over darker colours as the major base colour for buildings.
- Innovative and creative use of colour on the various components of the building is encouraged.

xii) Energy Efficient Building Designs

Objective

The objective is to minimise energy use in all parts of buildings while providing a comfortable working environment.

Guidelines

- Buildings with a north-south orientation are preferred.
- Buildings should minimise the amount of exposed glass to the western face.
- Air conditioning should be zoned to enable the most efficient heating/cooling of the building.
- Roof and wall insulation should be used to reduce winter heat loss and summer heat gain. Correct sealing of doors and windows will also assist.
- Low energy lighting and appliances should be used.
- When selecting air conditioning systems and other energy using systems, evaluation should be undertaken on a life cycle cost basis.
- Selection of materials used in the buildings should be made from the least polluting and renewable/sustainable sources. Materials that have a high thermal mass (eg concrete, stone) can be used to store heat from sunlight and must be positioned correctly.
- The use of renewable energy technologies is encouraged, including photovoltaic cells, battery storage, solar water and solar space heaters.
- Designs that maximise the economic life of buildings by allowing changes in use with the minimum of alternation/retro-fitting are encouraged.
- Material selection should operate on the principle of choosing a material that has low embodied energy in comparison to other materials.

Requirement

- A building energy efficiency audit statement shall accompany any development application.

xiii) Landscape Development

Objectives

The objectives are:

- *to ensure a high standard of visual amenity and environmental quality of industrial developments, while enhancing the general streetscape and amenity of the Steel River Eco Industrial Park..*
- *to provide a consistent landscape treatment which enhances the corporate identity of the Steel River Eco Industrial Park.*

Guidelines

- Landscape plans must accompany each submission by individual allotment developers/designers and be prepared by a qualified landscape architect.
- Landscape development in accordance with an approved plan must be installed before building occupancy.
- A minimum width of 5m of landscaping should be provided along all road frontages. Where possible, mounds shall be provided in order to screen visitor car parking at the fronts of buildings. Alternatively, where mounds are not possible due to space limitations, the parking shall be screened through the use of evergreen trees and/or appropriate shrub planting, screen walls or through an adjustment in the grade of parking area relative to the adjacent road subject to security, safety and surveillance requirements.
- Emphasis should be placed on the use of trees, ground covers and shrubs at allotment entries in preference to grassing, to maintain a visual continuity in the streetscape.
- Emphasis shall be placed on the use of flowering native shrub species and native trees to produce a consistent character. The use of local native species is preferred as they provide habitat for native fauna and generally have a lower water demand than exotic species.
- Trees to be planted within landscaped areas fronting public roads or which are visible from public areas should be semi-mature specimens not less than 2 metres in height when installed.
- Shrubs and groundcovers should be advanced specimens consistent with the size and quality of plants supplied in nursery containers not less than 200mm in size.
- All areas not built upon or paved should be planted with trees, shrubs or grass. All shrub planting beds should be mulched with a gravel or bark mulch. Uninterrupted areas of gravel or bark mulch and bare soil are prohibited.
- All landscaped areas should be irrigated with an automatic pop-up sprinkler irrigation system.
- Undeveloped areas which are not immediately required for development need not be irrigated or fully landscaped. These areas must, however, be seeded with a drought-resistant grass mix in accordance with a Soil Erosion Control Plan to prevent weed regrowth and wind and water erosion.
- Particular attention should be paid to the landscaping of external storage and work areas. Where on-site buildings and fences are insufficient to provide adequate screening, vegetation buffer strips of at least 5m in width should be provided along adjacent boundaries.
- Vegetation screening and shade trees should be provided for all car parking areas (refer Section 3.1 and 3.2 for guideline).
- Mail boxes and delivery boxes should be placed within the buildings and not located within the building setback zone.

xiv) Flora and Fauna Protection

Objective

The objective is to improve the habitat value of the Mayfield area by providing habitats for nature species (especially birds) within the Steel River site.

Guidelines

- To maximise the habitat enhancement opportunities of landscaping on the site, native plant species should be used in the landscaping of rear and side

allotment boundaries and along service corridors. Local flora should be emphasised.

- Open space areas, such as around the proposed water quality ponds, should incorporate dense plantings of shrubs as well as trees to provide cover for smaller birds.
- To minimise the risk of bird collisions no further electricity transmission lines, additional to those existing on site, should be allowed.

xv) Fencing and Screening

Objective

The objective is to ensure fencing and screen walls contribute to the amenity of the estate and meet the individual operational requirements of industries.

Guidelines

- Proposed fences and walls shall be approved by the Estate Management Company prior to construction.
- The design of installations such as water towers, storage tanks, processing equipment, cooling towers, communication dishes, vents and other structural equipment should be compatible with the building architecture or screened from adjacent properties, roads and pedestrian paths by using fences and/or walls.
- Fencing is generally to be limited to low height structures unless it can be adequately demonstrated that security fencing is essential for the operation of the development.
- Screen fences and walls should be at least equal to the size of the materials or equipment which require screening.
- Screen fencing to external work and storage areas should be masonry or pre-coloured, double sided metal cladding, having a minimum height of 2.0m.
- The materials and colours of fences and walls should be compatible to the building architecture.
- Security fencing such as chainmesh is not permitted in areas visible from internal roads, pedestrian paths or public areas. Black colour chainmesh (including posts and all fixings) fencing only is permitted along side and rear property boundaries in combination with landscape screening buffers. The maximum height of this fence is to be 2.0m.
- No articles, materials, machinery, equipment, vehicles, plant, wastes or animals should be stored or kept in the open or exposed to view from adjacent roads or pedestrian paths. Articles or goods to be stored other than in an enclosed building should be enclosed with either a screen fence or wall.
- Vehicles should be stored in specifically designated areas only. If vehicles are to be stored for more than 48 hours, they should be stored in an area screened from adjacent properties, roads and pedestrian paths.

xvi) Lighting

Objectives

The objectives are to:

- *provide a functional and coordinated site lighting system which contributes to a safe and visually attractive environment; and*

- *ensure lighting does not cause distraction to vehicle drivers on internal or external roads or to the occupants of adjoining properties and residential land.*

Guidelines

- Lights should be placed so as to cause no glare or excessive light spillage on neighbouring sites. External light should comply with the Australian Standard 4282 (INT) 1995 Control of the Obtrusive Effects of Outdoor Lighting.
- Exterior wall mounted flood lights are prohibited except for security lighting to the rear of buildings.
- Accent illumination should be provided at key locations, such as building entries, and driveways and pedestrian paths and spaces should be illuminated. The tops of footings of all lighting standards should be a minimum of 100mm below the adjacent surface levels.
- All parking areas and driveways should be illuminated to a minimum level of between 25 and 50 lux at ground level. The standard adopted for the surrounding roads is 50 lux.
- Security lighting fixtures are not to project above the facade of the nearest adjacent building and are to be shielded. Shields shall be painted to match the surface to which they are attached. Security lighting fixtures are not to be substituted for parking area or pedestrian path lighting fixtures and are restricted to lighting only loading and storage locations or other limited service areas.
- All illuminated signs are to be internally illuminated or in special circumstances may be lit with on ground flood lights.
- All proposals for lighting are to be submitted to the Estate Management Company for approval prior to installation.
- Buildings to be externally lit using a system of lighting that accentuates the architectural features.
- Light furniture should be selected, the range of fixtures determined by the Estate Management Company.

xvii) Pedestrian and Cycle Access

Objective

The objective is to provide safe, convenient, attractive on-site pedestrian and cycle access linking each development to the site's circulation system.

Guidelines

- Pedestrian and cyclist access should be provided from public roads to individual allotment or building entries and where appropriate linking adjacent development site.
- Each development should provide for co-ordinated, continuous pedestrian connections which are accessible to the public 24 hours per day and link activity areas and destination points such as parking areas, plazas, open space or recreation areas with the allotments and adjoining buildings.
- Cycle parking shall be provided in each precinct at the rate of 1 space per 1,000 square metres of allotment area. These areas shall be screened from the building entry and adjacent public roads.
- Paving materials should be compatible with the architecture, durable, non-slip and easily maintained.

- Pathways should be designed for disabled access.
- Clear separation between vehicles and pedestrian/cycle pathways should be provided to minimise potential conflicts. Where pedestrian and cycle paths cross vehicular paths, a visual distinction should be made.
- Pedestrian/cycle paths linking the allotments with the public road should have a minimum unobstructed width of at least 2.5m except where the pedestrian/cycle path is contiguous with a kerb where the minimum width shall be 3.0m.

xviii) Signage

Objective

The objective is to provide a co-ordinated signage language throughout the public and private domain which is distinctive, memorable and aesthetically pleasing.

Guidelines

General

- Advertising signs within the Steel River site are to be limited to identifying the user/tenant of the industry by their name, logo or trademark. No illustrative advertising of products or services will be allowed.
- Signs are to be clear, concise and static. Flashing or moving displays will not be permitted.
- Illumination of signs shall not cause nuisance or annoyance to pedestrians, vehicles or adjoining residential properties.
- Signs must be placed so that they do not obscure vehicular sightlines and vehicular control signs.
- Non illuminated signs are to use reflective material for typography and directional arrows.
- Word spacing should be regular, excessive variation in length of lines should be avoided.
- All lines should be left justified without indentation.
- Only the first word in a line of text is to have a capital letter, unless there are proper names.
- Proprietary Limited may be shortened to Pty Ltd, not P/L.
- Do not use a full stop at the end of a heading, sub heading, title, date or any text occupying a line by itself.
- Do not insert a comma between numbers and street names, insert commas in numbers over three figures.
- Only one pylon sign per site should be erected.
- A pylon sign should not be higher than the front façade of the building and in any event should not be higher than 8m above ground level.
- Pylon signs should not have a sign face area greater than 6m².
- Signs on the front façade of the building should not be greater than 1m² for every 3m of primary street frontage and in any event should exceed 12m².
- Signs on facades of buildings that face the secondary street frontage should be 50% of the size of signs on the primary street frontage.
- Signs should not be placed above the roof line or parapet, whichever is the lower, of the building.
- Allotment Identification Signs.
- Signs shall be used to identify major allotments and the main tenants within them. The basic form is designed to complement the form adopted for signs within the public domain.

- The site name (ie Steel River) and the precinct name (to be advised) are to appear on all identification signs in the designated location.
- A maximum of 8 tenants may be identified on the same sign. Where there are more than 8 tenants to an allotment, the 8 largest tenants shall be displayed. Internal information signs should be provided to identify individual tenants when there are greater than 8 tenants per allotment.
- All identification signs are to be internally illuminated, monoliths constructed of 'Alucobond' an aluminium alloy/thermoplastic composite sandwich (colour to be advised). All lettering, styles and colours should be consistent with the guidelines.
- The identification sign may be a variety of sizes to suit owner/tenant identity needs and to be compatible with sites and buildings of various sizes. There are no pre-determined rules concerning size selection, however no signs shall exceed 5m² per face, be rectangular in shape and have the longest dimension vertical. It is the intention of the guidelines that the sign sizes shall be complementary to the size and modelling of the buildings and public domain signs.
- Identification signs shall be placed perpendicular to approaching traffic, no closer than 3m to any property line or kerb.
- Generally one identification sign is to be provided. More than one may be used where a site has more than one vehicular entrance, on different sides of the building or where the nature of the site and adjacent roads require more than one sign for adequate identification.

Information Signs

- Information signs shall be used both within the public areas of the Steel River site and within the major allotment. In the public areas, they will carry information about the location of various precincts by name within the allotments. Within the allotments, they will provide directional and other information about the tenants.
- The standard design for information signs is to be consistent with the identification signs. An 'Alucobond' sandwich or aluminium monolith is to be used. Background colour, lettering and directional arrows to be determined by the estate management company.
- Information signs may be internally illuminated or non-illuminated depending on importance.
- If the signs are for vehicular traffic purposes, they shall be placed so that they are visible and legible to approaching vehicles.
- They shall be positioned so that there is a clear line of sight well before the point in which the direction must be changed or action taken.
- Information signs shall be placed no closer than 2m from a kerb and no closer than 1m from a pathway.
- Information signs shall be positioned to avoid confusing backgrounds, particularly when direct to vehicular traffic.

Vehicular Control Signs

- These signs shall be consistent with the requirements of the Road Traffic Authority.
- The rear of the sign panel and pole shall be painted with a recoatable urethane enamel or approved two part polyurethane recoatable paint in the colour adopted for the Steel River Project logo.

- All traffic control signs shall be carefully sited to provide adequate sight lines for cars, buses and trucks.

Temporary Signs

- Temporary signs can be used during the construction period to provide information about the design/construction team or future tenants.
- All temporary signs should be consistent with the graphics standards established herein for other signs.
- The number of temporary signs allowed per allotment is as follows:
 - allotments less than 1 ha - 1 sign;
 - allotments between 1 and 4 ha in area - 2 signs; and
 - allotments greater than 4 ha in area - 3 temporary signs permitted.
- No real estate signs on either a permanent or temporary basis are permitted without the approval of the Estate Management Company. All temporary signs permitted must be approved by the Estate Management Company prior to installation.

8.9.3 Parking and Unloading Areas

Development on the Steel River site shall be consistent with ***the following objective and guidelines, in respect of parking and loading and unloading areas.***

i) Parking

Objective

The objective is to provide efficient, safe and convenient movement for vehicles and pedestrians in an aesthetically pleasing landscaped setting.

Guidelines

- The aisle and parking stall dimensions shall be in accordance with current Newcastle City Council requirements.
- Parking is restricted to paved, designated parking spaces only, each owner or lessee shall be responsible for the compliance of their respective employees and visitors.
- Visitor drop off zones and parking should be provided near visitors entrances.
- All day employee parking should be separated from visitor parking and entrance traffic. The parking of trucks should not be permitted within building setback areas.
- Landscape islands should be provided within parking areas adjacent to boundary areas at a maximum interval of seven parking stalls and at the end of each run of stalls. These islands should have a minimum width equal to that of one parking stall.
- Within internal parking areas, landscape islands should be provided at the ends of all rows of parking. The parking islands should be provided at maximum interval of every 20 parking spaces. Minimum width of an island should be equal to two car parking spaces.
- A continuous vertical concrete kerb not less than 150mm in height should be provided around all parking islands and the perimeter of car parking areas to prevent vehicular intrusion. Allowance should be made for wheelchair/pram/cycle ramps as necessary.

- Barriers or wheel stops on the surface of parking areas and vehicular barriers within landscaped areas should not be permitted.
- Bollards are permitted adjacent to building entrance portals and loading docks within buildings to protect adjacent vertical surfaces.
- All parking spaces must be designated by contrast paving, reflective tiles or painted lines in accordance with Newcastle City Council requirements.
- All parking area and road pavements within the precincts shall be designated by a qualified engineer and be consistent with design standards for heavy vehicles.
- Shared parking should be provided at the rear of buildings where possible, to optimise land usage and reduce parking demand on individual sites.

ii) Loading, Unloading and Servicing Areas

Objective

The objective is to provide for the design of loading and servicing areas in a functional and aesthetically pleasing manner.

Guidelines

- All loading and servicing areas should be located to the side or rear of buildings and effectively screened from any street frontage, adjoining buildings and residential areas.
- Each individual allotment should provide sufficient on-site loading facilities to accommodate its activities within the allotment but where sharing facilities is possible, it will be encouraged. All loading movements, including turnaround areas, should be made within allotments.

8.9.4 Geotechnical Requirements

The Steel River site was originally a low-lying swampy area. An old river channel (Platts Channel) once ran through the site, with Spit Island lying between this old river channel and the present South Arm of the Hunter River. The majority of the site has been raised to its present level of approximately 7.5-9.0m AHD by the placement of various industrial wastes and filling materials (mainly slag and coal washery rejects) over a number of years. This has resulted in a filling embankment of up to 8.5m height along the South Arm of the Hunter River at the northern boundary of the site.

Over recent years a number of geotechnical investigations have been undertaken for developments on the site and in June 1997 Robert Carr and Associates prepared a Preliminary Geotechnical Investigations Report. This reported on the following aspects of the site:

- Soil conditions
- Groundwater/Hydrogeology
- Bank Stability
- Pavements
- Site filling
- Foundations
- Settlement

The site is filled to achieve both remediation and drainage goals. This planned site filling and regrading using imported materials will result in ground settlement which will vary depending on the depth of fill and the location of the filling. Most of the settlement will occur over the short term but some will continue over the long term.

Consequently, development on the Steel River site shall demonstrate that it is able to **comply with the following geotechnical requirements:**

- i) **Geotechnical Inspection**
Prior to the development of individual lots it is a requirement that a site - specific geotechnical inspection be undertaken to identify requirements for foundations to suit the proposed buildings and pavements and the expected ground settlement within the lot.

- ii) **Foundations**
Foundations for buildings and ground floors will depend on a number of factors such as loadings, acceptable tolerances in floor levels, and the profile of the subsurface materials. Foundation types will therefore range from high level pad or strip footings to deep piled foundations.

FOUNDATION TYPES	Bearing Pressure	Comments
High Level footings a) Pad & Strip b) Slab on Ground (lightly loaded) c) Slab on Ground (heavily loaded)	150 kPa(max) 5 kPa as required	Approx settlement of 10-15mm Approx settlement 5-10mm Large settlements can be expected
Piled Foundations Bored piles, grout-injected piles, driven concrete sections, driven steel sections and driven cast in-situ piles.	N/A	Required where there are heavy column loads and structures are sensitive to settlement. Depending on loads the pile will be founded in dense sand or bedrock. Depth of pile will vary over the site and will need to be checked with a geotechnical investigation for each lot.

- iii) **Impact on River Bank**
Generally it is preferable to locate buildings 20m away from the existing bank beside the river to avoid additional loadings on the bank. Therefore, it is a requirement that an additional geotechnical analysis is carried out in order to design building foundations which will not impact on the bank.

8.9.5 Traffic and Transport

Development on the Steel River site shall be consistent with the objective of minimising vehicular traffic generation.

- i) **Individual Industries**

In respect of individual industries, some of the ways in which this objective can be achieved are as follows:

- Forecast peak hour traffic generation should not exceed 16 vehicles per hour per site hectare two way (in plus out) (12 vehicles per hour per site hectare if reduced car use objectives are to be met).
- Parking should be provided in accordance with the parking code of Newcastle City Council or as otherwise required by Council. Council will consider a reduction in on-site parking requirements when:
 - on-street parking is maximised by street design (angle or right angle parking);
 - parking can be shared by developments with peak demands at different times of the day;
 - there is easy access to parking and a high turnover rate.
- Provision should be made for bicycle parking at the rate of 5 spaces per 100 employees.

ii) Estate Management Company

The Estate Management Company will be committed to the general objective of vehicular traffic minimisation. Some of the ways of achieving this are as follows:

- The provision of a shuttle bus link to the railway station.
- The holding of negotiations with bus operators to provide regular bus services to the estate.
- The preparation and provision of information on public transport services.
- The provision and maintenance of adequate public transport infrastructure, bus shelters, seating, timetables and route information.
- The preparation and provision of information on public transport services and information to employees on car pooling, including a service to "match" potential users.
- The provision of transportation information to industries to assist and encourage the use of waste products from one industry as the raw material for another within the site, or within the region.
- The provision of safe pedestrian and cycle crossings to the site across Maitland Road, Industrial Drive and Tourle Street.

Assessment of development proposals on the Steel River site shall ensure that the objective of ***vehicular traffic minimisation has been addressed for both individual industries and the Estate Management Company.***

8.10 HAZARDS AND RISK MANAGEMENT

The requirement for hazard and risk assessment of any incoming industries will be determined by the consent authority based on the nature of the industry, potential for hazard determined on the basis of the Newcastle and Kooragang Island Area Risk Assessment Study and the proposed process, chemical storage, sensitive receptors and potential for cumulative impacts that may result from surrounding land use.

Hazard analysis may require qualitative and/or quantitative methods. The methodology used was discussed in Section 6.0 of this SIAS, and provides for:

- formal identification of hazards;
- assessment of cumulative impacts;
- analysis of the magnitude and likelihood of possible hazardous incidents; and
- consideration of the relevance and adequacy of proposed safeguards.

The results of the various elements of the hazard analysis shall be used for 'avoiding avoidable risk', such as, emergency planning and plant modification.

Development on the Steel River site shall be consistent with the following specifications in respect of the management of hazards and risks.

- (i) For land use safety planning the assessment of individual risk levels should be used to ensure that no particular individual is exposed to unduly high levels of risk, and societal risk used to ensure that the risk impact on the surrounding environmental community as a whole is not excessive. It should also indicate the extent of compliance with the qualitative and quantitative risk criteria set out in NSW Department of Planning Hazardous Industry Planning Advisory Paper No. 4, *Risk Criteria for Land Use Safety Planning*.
- (ii) For development of a potentially hazardous industry, early consultation with the Council, (and possibly the Department of Urban Affairs and Planning (DUAP) and other relevant authorities) should be carried out.
- (iii) If the development is potentially hazardous, a preliminary hazard analysis (PHA) should be prepared either under the EP&A Act or SEPP 33.

The PHA involves a comprehensive hazard identification including the identification of hazardous incident scenarios and reference to the proposed operational and organisational safeguards.

The following may be requested when the proposed development is considered by the consent authority to present a hazard potential:

- hazard and operability study;
- fire safety study;
- preparation of an emergency plan and procedures;
- updated hazard analysis;
- construction safety study;
- cumulative risk assessment (using baseline information in the Newcastle and Kooragang Island Area Risk Assessment Study) to form the basis of a management approach to cumulative risk.

- (iv) An evaluation of risks associated with the transport of dangerous goods that could result from accidental release of those materials and cause harm to the environment or public health may be required for potentially hazardous developments. The analysis should be based on the methodology outlined in the *Guidelines for Land Use and Environmental Safety Planning for Hazardous Materials - Road Transport Considerations* issued by DUAP.

8.11 ENVIRONMENTAL MANAGEMENT

All of the requirements which define the environmental envelope, shall be continually managed and maintained.

This shall be the responsibility of the Estate Management Company (EMC) described earlier in Section 4.4 of this SIAS. It was noted in that Section that the responsibilities of the EMC included the advancement and facilitation of eco-industrial principles as well as the monitoring and management of the environmental performance of industries located on the estate.

Some of the requirements which are expected to be the responsibility of the EMC are discussed in this Section. Where they relate to the maintenance of the environmental envelope, in respect of air, water, noise, waste, and energy, those requirements have been the subject of discussions with the Environment Protection Authority and Council.

8.11.1 Environmental Performance Monitoring

This requirement concerns the environmental performance of individual industries within the site and the cumulative effect of the Steel River project as a whole.

The monitoring of environmental standards, requirements and objectives is proposed to be part of an environmental management system (EMS) established by the Steel River Estate Management Company (EMC). This was discussed above in Sections 8.2.5 and 8.2.6 which listed some of the responsibilities and obligations of the EMC.

Specifically, these included the responsibility for ensuring that **air quality monitoring** stations are established and operated in and around Steel River.

The EMC shall also become part of the review of the ambient monitoring strategy, involving Newcastle City Council, the EPA and the Local Community. In addition, the EMC shall be responsible for collating air quality monitoring records and prepare periodic reports all as outlined in Section 8.3.

Similarly, the EMC shall be responsible for establishing and operating **noise monitoring** stations in accordance with the procedures outlined in Section 8.4 above. In addition the EMC shall be responsible for monitoring compliance with the standards set for the Steel River site as a whole including establishing a computer noise model for the estate which must allow for the prediction of cumulative noise emissions in relation to surrounding land use zoning.

Requirements for the management of **water quality** and **energy** are described in Sections 8.5 and 8.7 above as well as elsewhere in this SIAS at Sections 5.4 and 5.7 respectively. The management of **waste** is discussed in Section 8.6 and at Section 5.10. All of the requirements outlined in those sections shall become the responsibility of the EMC.

Requirements for the monitoring of **flora and fauna** for potential adverse effects of future development on site are included in Section 4.4.1 and discussed in detail in Section 5.2, where it is also noted that water and air quality standards set by the EPA (for human health) are considered to be generally appropriate for the protection of flora, fauna and ecosystems surrounding the development.

Hazards and Risks for the Steel River estate shall also be part of the EMC management responsibilities. In this regard, Section 6.0 of this SIAS described fully, the way in which this issue shall be addressed, Section 8.10 summarises that discussion. The EMC shall be expected to follow the procedures outlined in the section.

In addition to these specific requirements the environmental management of the site will include ensuring that individual development proposals address all of the relevant objectives listed in this Part D "Findings" section of this SIAS. These consist of **Socio-Economic and Cultural Objectives** as discussed in Section 8.8, and Section 7.0, and **Development Guidelines and Objectives** as discussed in Section 8.9, which includes specific requirements for measures to be taken for flora and fauna protection.

8.11.2 Facilitation of Industrial Ecology Principles

This requirement involves not only the facilitation and management of materials transfer on-site and between the site and other locations in the region, but also the facilitation of the communications networks on and off site. Additionally it involves transportation initiatives internal and external to the site and maintenance of the water quality management infrastructure such as water quality ponds and recycled water.

The responsibility of the EMC in these areas of management have been discussed throughout this SIAS in Sections 5.0 (specifically 5.10.2) and Sections 8.2.4 and 8.2.5 above.

In addition to these responsibilities, the Estate Management Company shall produce an industrial ecology statement to accompany any development application. This statement is to detail the sources and sinks of raw materials, emissions, waste and by-products produced by the proposed development. The Statement is to also propose strategies to achieve interactive relationships between industries aimed at optimising the use of energy and resources and minimising pollution and waste, in such a manner that the raw materials and waste products produced by industries and other development progressively achieve a closed cycle. The Hunter Waste Corporation is to be consulted in the development of this Statement.

8.11.3 Community Participation and Development Assessment

This requirement concerns the need to maintain continuing community involvement and consultation into the development and management of the Steel River estate.

It also concerns the mechanism for assessment of development proposed for the estate by incoming future industries.

In this regard, two issues are involved. Firstly, there is the need for continuing environmental monitoring of the standards used in the envelope and the way industries continue to comply with these standards. Secondly, there is the extent to which development proposals comply with the guidelines contained in this SIAS.

It is expected that formal, continuing, community involvement would consist of a mechanism by which the EMC for Steel River would establish regular procedures for consultations as part of the overall management responsibilities. This shall be reflected in the Environmental Management System (EMS) previously referred to in Section 8.2.6 of this SIAS and is required by the LEP.

9.0 ENVELOPE INDEX

9.1 PURPOSE OF INDEX

The total range of matters identified in the environmental envelope is extensive. Consequently, for each industry wishing to develop on Steel River, not all will be relevant to that particular industry. In order to simplify reference to the requirements of the environmental envelope, this Index has been prepared, showing where each of the various types of standards and objectives can be found. The index referring to the responsibilities of individual industries is included in Section 9.2.

The index also indicates a summarised list of the obligations of the Estate Management Company, proposed to be formed to oversee and manage the estate. This index is included in Section 9.3.

These two indices summarise the comprehensive environmental assessment that has been carried out in respect of the site and its surrounds. The assessment took account of physical, social, economic, aesthetic and cultural issues, and brought together a number of stand-alone reports prepared in respect of the range of matters studied. A summary of the conclusions and requirements implicit in each of the subjects studied has been identified, all in terms of the implications of the assessment for future development on the site.

These have been assembled together as a complete section within the SIAS, the section being called "Part D Findings". This "Findings" Section brings together all of the objectives, conclusions and requirements in the form of an "Environmental Envelope", which consists of two types of compliance requirements. The first type is the numerical standards establishing the cumulative limits, for all development on the site, for industrial emissions in respect of air, water and noise.

The second type of compliance requirements involve all of those development impacts which cannot be easily measured or quantified but which effect Newcastle in terms of safety, and a range of social, economic, aesthetic, and cultural implications. These have been identified in the environmental envelope as objectives or requirements which an incoming industry to the estate must be consistent with when preparing its development application.

Also included in these second type of compliance requirements are those pertaining to the obligations and environmental management role of the Estate Management Company, including a commitment to pursue the principles of industrial ecology.

9.2 STANDARDS AND REQUIREMENTS (INDIVIDUAL INDUSTRIES)

9.2.1 Participation in Environmental Envelope

The various parties which have responsibility relating to the environmental envelope are described in Section 8.2 of this SIAS. These parties are individual industries, the Environment Protection Authority, Newcastle City Council and the Steel River Estate Management Company (EMC). The responsibility of the individual industries locating in Steel River are listed in the following sections:

8.2.1 Types and Standards, which describes the various kinds of environmental standards in the environmental envelope.

8.2.2 Industries to which the Environmental Envelope Applies, which includes the status of designated development in relation to the environmental envelope.

8.2.3 Role of the EPA, which discusses the need for individual industries to comply with all requirements relating to pollution control as administered by Council and all licences required to be obtained for the EPA.

8.2.4 Role of the Council, which discusses the way in which the Newcastle City Council continues to exercise its function as the consent authority in the implementation of the environmental envelope.

8.2.6 Environmental Management System, which requires individual industries locating on the site to commit to participate in an environmental management system (EMS) for the estate.

Responsibilities for the Estate Management Company in respect to the environmental envelope are listed later in Section 9.3 of this SIAS.

9.2.2 Ambient Air Quality Standards

Ambient air quality standards are discussed and identified in following Sections:

8.3.1 Criteria Pollutants including Table 1 - Ambient Air Quality Standards.

8.3.2 Dust Deposition, including Table 2 - Dust Deposition Standards

8.3.3 Design Ground Level Concentration Criteria, including Table 3 - Victoria EPA Schedule, which deals with Class 2 Indicators and Design Ground Level Concentrations, and Class 3 Indicators and Design Ground Level Concentrations.

8.3.4 Air Emission Limits, which requires the above Table 3 to be employed to develop emission limits. It also requires that industries which need licensing, to comply with the Clean Air Act.

9.2.3 Noise Emission Standards

Noise emission standards are discussed, described and identified in the following Sections:

8.4.1 Noise Criteria Overview, which identifies the different noise receiver zones surrounding the site.

8.4.2 Noise Criteria, including Table 4 - Noise Limits listing the respective noise limits of each of the receiver zones.

8.4.4 Negotiated Noise Management Agreements, which describes the procedure available when an incoming industry can not comply with the noise criteria set out in Table 4.

9.2.4 Water Quality Standards

Water quality standards are discussed and described in the following sections:

8.5.1 Stormwater Quality, which requires that the quality of stormwater being discharged to its Hunter River is consistent with ANZECC guidelines for the protection of aquatic ecosystems, all as indicated in Table 5.

8.5.2 Industrial Process Water, which identifies prohibitions on the discharge of industrial process water not required for re-use.

8.5.3 Groundwater and Water Re-use, which prohibits contaminated groundwater being discharged into the Hunter River from the estate, and which requires individual industries to contribute to continuing water research and development.

9.2.5 Waste Management

Waste management requirements on the Steel River Site are identified in the following section:

8.6 Waste Management, which describes how individual industries are required to prepare and implement a waste management plan and how they may be required to obtain certain licences from the EPA and the obligations of industries to participate in an environmental management system.

9.2.6 Energy Management

The requirements in respect of the management of energy consumption are described in this Section:

8.7 Energy Management, which requires individual industries to demonstrate that national guidelines for energy-efficient building design have been used.

9.2.7 Development Guidelines and Objectives

The requirements for individual industries in respect of the guidelines and objectives for development are described in the following sections:

8.9.1 Design Guidelines, which requires an industry to submit development proposals to the Estate Management Company for review.

8.9.2 Allotment and Building Envelopes, which requires an industry to be consistent with objectives listed for a number of different development components including the building itself and the site upon which the building is constructed.

8.9.3 Parking and Unloading Areas, which requires an industry to be consistent with a list of objectives concerning parking and unloading on site.

8.9.4 Geotechnical Requirements, which require an industry to carry out certain geotechnical investigations as part of its building and site design preparation, and accommodate the structural implications of these investigations.

8.9.5 Traffic and Transport, which requires an industry to be consistent with parking and other codes provided by Council and the Roads and Traffic Authority.

9.2.8 Hazards and Risk Management

The requirements in respect of hazards and risk management are described in the following section:

8.10 Hazards and Risk Management, which requires industries to prepare a hazard analysis of their operations, and to comply with a list of criteria for the development related to, and transportation of, hazardous materials.

9.3 MANAGEMENT REQUIREMENTS (ESTATE MANAGEMENT COMPANY)

Throughout Section 8.0 of Part D of this SIAS are references to certain requirements and obligations specifically concerning the management of the Steel River estate by the Estate Management Company. The following index lists the various matters for which the Estate Management Company will be responsible.

The section reference number within Section 8.0 of Part D of this SIAS is given in all cases.

1) Estate Management

8.2.5 Steel River Estate Management Company, which requires this entity to be created, and then to establish a co-ordinated environmental management policy for the whole of the estate, including the development of an environmental management system, monitoring, reporting and on-going liaison with Council, government agencies and the community.

8.2.6 Environmental Management System, which requires the Estate Management Company to prepare and administer an environmental management system (EMS) for the estate and to ensure that individual industries comply with this EMS in their operations.

2) Air Quality

8.3.5 Computer Air Dispersion Model for the Estate, which requires the Estate Management Company to set up a computer air dispersion model for the estate and surrounding land within a 1.0km radius in order to predict the additive and cumulative air quality impacts of each successive industry proposing to enter the site.

8.3.6 Ambient Air Quality Monitoring - Compliance, which requires the Estate Management Company to set up sufficient ambient air quality monitoring stations in order to determine compliance with the standards in the above Tables 1 and 2.

8.3.7 Meteorological Station, which requires the setting up of a meteorological station in an appropriate location.

8.3.8 Reporting, which requires the Estate Management Company to collate air quality monitoring records in respect of the monitoring stations specified and the standards listed in the above Tables 1 and 2.

8.3.9 Review of Air Quality Criteria, which requires review of the air quality standards one year after gazettal of the LEP for the Steel River site, and subsequently at three yearly intervals.

3) **Noise Control**

8.4.3 Compliance and Modelling, which requires the EMC to establish, within three months of the gazettal of the new LEP for the Steel River site, a computer noise model for the site. It also requires the EMC to set up and maintain, a number of noise monitoring sites external to the site, and to conduct investigatory monitoring within the estate from time to time.

8.4.5 Reporting and Review (Noise), which requires the EMC to follow the same reporting and review procedures as those specified in respect of our quality above, with noise standards being reviewed atleast every 5 years.

4) **Water Quality**

8.5.4 Sewer Reticulation System Management, which requires the EMC to design, establish and manage, a sewer reticulation system.

8.5.5 Monitoring and Reporting, which requires the EMC to follow the same reporting procedures as those identified for air quality control, above. It also requires the EMC to conduct surveys of shellfish along the banks of the Hunter River.

5) **Waste Management**

8.6 Waste Management, which requires the Estate Management Company to prepare and implement an environmental management system, including a waste management plan, and to be responsible for annual reporting in respect of waste management.

6) **Energy Management**

8.7 Energy Management, which requires the Estate Management Company to contribute to research in respect of renewable energy, to prepare an energy efficiency plan; and to carry out annual reporting of estate performance.

7) **Socio-economic and Cultural Objectives**

8.8.1 Objectives for Community and Recreation Facilities and Services, which requires the Estate Management Company in the development of Steel River as a whole to ensure the development of the estate is consistent with and ultimately achieves a list of objectives for the way of providing, locating, designing, and the way of assessing, a number of community and recreation facilities and services.

8.8.2 Neighbourhood and Residential Amenity, which requires the Estate Management Company to ensure development contributes to the objectives of site integration with the surrounding community, enhancing neighbourhood identity and interaction, and providing a safe environment.

8.8.3 Access, which requires the Estate Management Company to ensure development is consistent with the objectives listed in respect of access to facilities.

8.8.4 Cultural Development, which requires the Estate Management Company to ensure development is consistent with objectives relating to the cultural development of the community.

8.8.5 Employment, which requires the Estate Management Company to ensure development is consistent with a list of employment objectives in selecting industries to locate on the site, including objectives relating to an overall employment target and employment generating capability.

8.8.6 Education and Training, which requires the Estate Management Company to ensure development is consistent with the objective of education and training and establishing links with Newcastle Tertiary institutions.

8.8.7 Heritage and Conservation, which requires the Estate Management Company to ensure development is consistent with the obligations, implications and consequences of certain heritage and conservation requirements resulting from archaeological research in respect of the south-east hill area.

8) **Development Guidelines and Objectives**

8.9.1 Design Guidelines, which indicate how the Estate Management Company is to implement design guidelines and objectives for individual industries, including flora and fauna protection and habitat enhancement.

9) **Traffic and Transportation**

8.9.5 Traffic and Transport, which requires the Estate Management Company to ensure development is consistent with objectives relating to public transport, vehicle reduction strategies, and appropriate infrastructure for pedestrians and bicycles.

10) Hazards and Risks

8.10 Hazards and Risk Management, which requires incoming industries to prepare a hazard analysis as part of their development proposal. This analysis needs to be considered by the Estate Management Company in its overall pre-assessment of individual development proposals.

11) Environmental Management

8.11.1 Environmental Performance Monitoring, which requires the Estate Management Company to take responsibility for monitoring the environmental performance of industries on the Steel River site as part of the environmental management system. The Estate Management Company is also required to participate, with various bodies, in the review of the ambient monitoring strategy and the overall/environmental performance of the Estate. The EMC and Council's are jointly responsible for ensuring the community has access to environmental monitoring and performance reports, as well as ensuring the community has opportunities to be involved in the environmental review process, as required by the LEP.

8.11.2 Facilitation of Industrial Ecology Principles, which requires the Estate Management Company to facilitate the practice of industrial ecology on and off the site, including communication networks.

8.11.3 Community Consultation and Development Assessment, which requires the Estate Management Company to establish a formal mechanism aimed at continuing community consultation, as well as being responsible for ensuring that proposals for the development of individual industries comply with all standards, objectives, requirements and guidelines, described in this SIAS.

10.0 DEVELOPMENT ASSESSMENT

10.1 LOCAL ENVIRONMENTAL PLAN REQUIREMENTS

The environmental envelope identified in Chapter 8.0 of this Strategic Impact Assessment Study (SIAS) creates the quantitative and qualitative standards against which development on the Steel River site is measured. Only applications that comply with the requirements of the environmental envelope can be approved. When the applicant demonstrates compliance, Council should approve the application within 28 days of the application's receipt by Council.

Where a development proposed for the Steel River site does not demonstrate to Council that it complies with the requirements of the environmental envelope in all relevant respects, that development is assessed according to the environmental envelope and the procedures of the EP&A Act. Council is unlikely to grant consent in 28 days or less, and may either impose conditions to ensure compliance with the environmental envelope or refuse the application. All applications must be accompanied by a study to demonstrate conformity with the environmental envelope.

The consent authority for the Steel River land is Newcastle City Council and it is important that the role of the Council in the development assessment process for Steel River is noted. It is also important that the roles of the Environment Protection Authority (EPA) and the Steel River Estate Management Company (EMC) are also noted. In this regard, the SIAS identifies these respective roles as, briefly:

i) **The Role of the Council**, which, in respect of development on the Steel River site will be no different to its role and functions and responsibilities under the Environmental Planning and Assessment Act for every other site in Newcastle. However, the LEP for the Steel River site, requires Council to deal with development application and assessment differently to other industrial areas, in that where the development complies with the environmental envelope, Council should grant consent in 28 days or less, subject to the requirements outlined above.

ii) **The Role of the EPA**, being the authority to issue Pollution Control Approvals and Pollution Control Licences where industries identified in the Schedule of Clean Air Act Regulations and Noise Control Act seek to locate on the Steel River site.

These licences provide an opportunity to utilise statutory pollution reduction programs so that industry can improve performance if the standards specified in the environmental envelope described in the SIAS need to be revised in the future.

iii) **The Role of the Estate Management Company (EMC)**, is to take responsibility for ensuring that the development requirements of in-coming occupiers of individual sites are incorporated into the development application, as well as ensuring that the environmental impact of individual development has been adequately assessed and documented in the study which must accompany all development applications (including the requirements specified earlier in the SIAS).

In order to ensure that all requirements of the environmental envelope have been addressed, it will be necessary for the EMC to complete a check-list of items for each development. This check-list, which must form part of the documentation of each development application, will be based upon the "Development Assessment Chart" at the conclusion of this Chapter, at Pages 129 to 134.

It should also be noted, that in addition to being responsible for the preparation and lodgement of development applications, the EMC is responsible for continuing estate environmental management and for the continued monitoring and recording of environmental data. This is to ensure that the standards identified in the environmental envelope can be periodically reviewed and up-dated. The responsibility and accountability for carrying out this task has been assured by structuring the above Development Assessment Chart, intended to be used in the application preparation and assessment process in such a way that the monitoring, recording and estate management requirements must be carried out in order that this checklist can be fully completed and thus an assessment of an individual development can actually be made at all.

The responsibility for carrying out this periodic review of standards has also been assured by making the consent authority, in the LEP, responsible for reviewing standards in the SIAS environmental envelope within one year of the gazettal of the LEP, and periods not exceeding five years thereafter.

10.2 DEVELOPMENT APPLICATIONS: PREPARATION AND ASSESSMENT

Because of the existence of the environmental envelope for the Steel River site, and the advantages which development that complies with that envelope enjoy, the preparation of the development proposals and the subsequent assessment of the development application for each incoming industry is of critical importance.

The preparation of development applications for industries proposing to develop on the site will, as stated earlier, be the responsibility of the EMC. Each industry will also involve a different range of environmental issues, according to the nature of the activity, the extent of the development and type of operation which the industry seeks to pursue.

As a guide however, the following steps describe the basic procedure for the preparation and assessment of development applications on Steel River.

10.2.1 Development Generally

- Step i) Industry seeks a lease from the EMC to locate in Steel River, and provides an initial outline of its activities and operational characteristics.
- Step ii) The EMC assists the industry to prepare a development application noting the requirements of the environmental envelope and ensuring that an adequate investigation of the environmental impacts of the development is carried out. Where required, consultations are carried out with any relevant authorities, including Council and the EPA.

- Step iii) The development application documentation is completed and referred to a "qualified person" to assess. This person examines the development application and prepares a study, included in which is the Development Assessment Chart indicated later in this Section. The study is also supported or supplemented by a project-specific report for the particular development application, referring to the requirements of Clause 26F of Newcastle LEP 1987.
- Step iv) The development application is then lodged with Council. Officers then verify that the environmental envelope is complied with. A consent should then be issued by the Director-Development and Environment within 28 days, under authority delegated from Council. Where the verification indicates non-compliance, conditions may be attached to ensure compliance, or the application may be refused.

10.2.2 Designated Development

The process described in this section of the SIAS is proposed to the NSW Government to deal with dedesignation should the Government decide to dedesignate development on the site covered by the LEP. It should not be inferred that Council is supportive of the concept of dedesignation.

Designated development is that which is listed in Schedule 3, referred to in Clause 49(1) of the Environmental Planning and Assessment Regulation 1994.

- Step i) Industry seeks a lease from the EMC to locate in Steel River, and provides an initial outline of its activities and operational characteristics.
- Step ii) The EMC assists the industry to prepare a development application noting the requirements of the environmental envelope to ensure that an adequate assessment of the environmental impacts of the development is carried out. Preliminary consultations are carried out with any relevant authorities, including Council and the EPA.
- Step iii) As part of the study to accompany the development application, development which is classed as designated development, seeking to locate on the Steel River site prepares an environmental assessment of its nature, operations and its effect on the surrounding environment.

The scope and contents of this assessment is prescribed at the time of preparation by requirements specific to that development, issued by the Director General of the Department of Urban Affairs and Planning. These requirements are the same as those which would be issued if the development was to be the subject of an environmental impact statement.

- Step iv) When the environmental assessment has been prepared, it is subject to the same certifying examination as that proposed for non-designated development, to determine whether or not the development complies with the requirements listed in the environmental envelope for the site. This environmental envelope is as described in the "Part D Findings" section of the Strategic Impact Assessment Study referred to in the Newcastle LEP 1987 (Amendment No. 105).

In the case of designated development, it will be a requirement that the "qualified person" must consult with the Director-General of the Environment Protection Authority before the study to demonstrate the development complies in all respects with the environmental envelope and other provisions of the LEP is prepared.

- Step v) The development proposal, accompanied by the study is then forwarded to the Director General of the Department of Urban Affairs and Planning. After review of this documentation the Director-General certifies that the development complies in all respects with the environmental envelope.
- Step vi) Following certification by the Director General, that particular development is deemed to be no longer designated development even though it is originally included in Schedule 3 of Clause 49(i) of the Regulation to the Act.
- Step vii) Should the particular development (which initially is designated development in accordance with the definitions in Schedule 3 of Clause 49(i) of the Regulation) fail to demonstrate that it complies with the requirements of the environmental envelope to any extent, it would remain designated development and the provisions of the Act apply in full, with advertisements, exhibitions, and third party appeal rights fully applicable.
- Step viii) Since the particular development would no longer be designated development, the requirements of the Act, involving notifications, advertising, exhibiting and third party appeal rights would no longer apply. The applicant could then be dealt with by Council in accordance with the provisions of the LEP.

ENVIRONMENTAL ENVELOPE DEVELOPMENT ASSESSMENT CHART

Reference Number(S) indicates SIAS Environmental Envelope Section dealing with the particular item).

ASSESSMENT GROUP 1.0: ENVIRONMENTAL MATTERS

	Environmental Envelope Item	Compliance		Additional Approvals Provided	Comments
		Met	Not Relevant		
	Air Quality				
1.1	Criteria Pollutants (Table 1: S8.3.1)				
1.2	Dust Deposition (Table 2: S8.3.2)				
1.3	Design Ground Level Concentration Criteria (Table 3: S8.3.3; S8.3.4(i))				
1.4	Clean Air Regulations (S8.3.4(ii))				
	Noise Emission				
1.5	Noise Criteria (Table 4: S8.4.2)				
	Water Quality				
1.6	Protection of Aquatic Ecosystems-Stormwater (Table 5: S8.5.1)				
1.7	Industrial Process Water Discharge (S8.5.2)				
1.8	Ground Water Management (S8.5.3)				
	Waste Management				
1.9	EPA Licence Required (S8.6(ii), (iii), (iv))				
1.10	Waste Management Plan Submitted (S8.6(v))				
1.11	Consistency with Industry Waste Reduction Plan (S8.6(viii))				
1.12	Waste Audit Provided (S8.6(xi))				

	Environmental Envelope Item	Compliance		Additional Approvals Provided	Comments
		Met	Not Relevant		
	Energy Management				
1.13	Energy Efficient Design (S8.7(i))				
	Socio-Economic/Cultural Objectives				
1.14	Provision of Community and Recreation Facilities and Services (S8.8.1(i))				
1.15	Location of Community Facilities and Services (S8.8.1(ii))				
1.16	Design Character of Community Facilities and Services (S8.8.1(iii))				
1.17	Accessibility to Community Facilities and Services (S8.8.1(iv))				
1.18	Social Integration with Surrounding Community (S8.8.2(i))				
1.19	Enhancement of Neighbourhood Identity and Interaction (S8.8.2(ii))				
1.20	Provision of a Safe Environment On-Site (S8.8.2(iii))				
1.21	Access to Site by Neighbouring Community (S8.8.3)				
1.22	Promotion of the Area's Cultural Identity (S8.8.4)				
1.23	Contribution to Employment Target (S8.8.5(i))				
1.24	Selection of Industries for Employment Objective (S8.8.5(ii))				
1.25	Education and Training Contribution (S8.8.6)				
1.26	Compliance with Heritage Statutory Requirements (S8.8.7)				
	Hazards and Risk Management				
1.27	NSW Department of Planning Hazardous Industry Planning Advisory Paper No 4 (S8.10(i))				

	Environmental Envelope Item	Compliance		Additional Approvals Provided	Comments
		Met	Not Relevant		
1.28	Consultation with Relevant Authorities (S8.10(ii))				
1.29	Preliminary Hazard Analysis Prepared (S8.10(iii))				
1.30	Transportation Risk Evaluation (S8.10(iv))				

ASSESSMENT GROUP 2.0: BUILDING AND DEVELOPMENT MATTERS

	Environmental Envelope Item	Compliance		Additional Approvals Provided	Comments
		Met	Not Relevant		
	Allotment and Building Design				
2.1	Allotment Size and Configuration (S8.9.2(i))				
2.2	Site Layout (S8.9.2(ii))				
2.3	Site Coverage (S8.9.2(iii))				
2.4	Site Set-Backs (S8.9.2(iv))				
2.5	Building Form (S8.9.2(v))				
2.6	Building Height (S8.9.2(vi))				
2.7	Building Entrances (S8.9.2(vii))				
2.8	Floor Space Ratio (S8.9.2(viii))				
2.9	Storage and Work Areas (S8.9.2(ix))				
2.10	Building Material (S8.9.2(x))				
2.11	Building Colour Scheme (S8.9.2(xi))				
2.12	Energy Efficiency (S8.9.2(xii))				
2.13	Landscape Development (S8.9.2(xiii))				
2.14	Flora and Fauna Protection (S8.9.2(xiv))				
2.15	Fencing and Screening (S8.9.2(xv))				
2.16	Lighting (S8.9.2(xvi))				
2.17	Pedestrian and Cycle Access (S8.9.2(xvii))				
2.18	Signage (S8.9.2(xviii))				
	Parking and Unloading Areas				
2.19	Parking (S8.9.3(i))				
2.20	Loading, Unloading and Servicing Areas (S8.9.3(ii))				
	Geotechnical Requirements				
2.21	Geotechnical Inspection (S8.9.4(i))				

	Environmental Envelope Item	Compliance		Additional Approvals Provided	Comments
		Met	Not Relevant		
2.22	Foundations (S8.9.4(ii))				
2.23	Impact on River Bank (S8.9.4(iii))				
	Traffic and Transport				
2.24	Vehicular Traffic Minimisation: Individual Industries (S8.9.5(i))				
2.25	Vehicular Traffic Minimisation: Estate Management Company (S8.9.5(ii))				

ASSESSMENT GROUP 3: ECOLOGICAL SUSTAINABILITY

	Environmental Envelope Item	Compliance		Additional Approvals Provided	Comments
		Met	Not Relevant		
3.1	Environmental Management System Compliance (S8.2.6)				
3.2	Computer Air Dispersion Model Compliance (S8.3.5)				
3.3	Ambient Air Quality Monitoring Stations: Siting and Number (S8.3.6)				
3.4	Meteorological Station (S8.3.7)				
3.5	Air Quality Monitoring Records: Reporting Procedures (S8.3.8)				
3.6	Air Quality Criteria Review (S8.3.9)				
3.7	Computer Noise Model Updated With Category 1 Development (S8.4.3)				
3.8	Computer Noise Model Updated with Category 2 Development (S8.4.4)				
3.9	Noise Emission Standards Review and Reporting (S8.4.5)				
3.10	Sewer Reticulation Management (S8.5.4)				
3.11	Water Quality Monitoring and Reporting (S8.5.5(i), (ii), (iii), (iv))				
3.12	Estate Waste Management System Regional Links (S8.6(vi))				
3.13	Waste Management: Annual Reporting (S8.6(viii))				
3.14	Energy Management: Efficiency Plan for Estate Management Plan (S8.7(iii))				
3.15	Energy Management: Reporting (S8.7(iv))				
3.16	Facilitation of Eco-industrial Principles (S8.11.2)				

APPENDIX

- 1) Draft Consultant's Scope of Work (original Steering Committee's brief for project)**
- 2) Draft Scope and Indicative Contents (Strategic Impact Assessment Study)**
- 3) Statement of Residents Groups' Perspectives and Views, including Concept Understanding by Northern Parks and Playgrounds Movement**
- 4) Minutes of the Steering Committee's Meeting**
- 5) SIAS Consultant Team**

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**STATEMENT OF RESIDENTS' PERSPECTIVES
AND VIEWS**

**MINUTES OF THE STEERING COMMITTEE'S
MEETINGS**