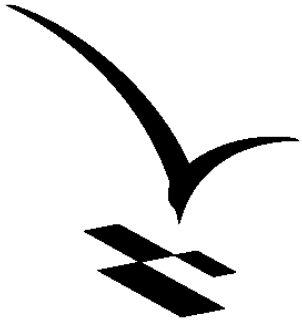

Department of
Urban Affairs and Planning

REPORT ON THE ASSESSMENT OF DEVELOPMENT APPLICATION NO. 268-11-99 PURSUANT TO SECTION 80 OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979

PROPOSAL BY AUSTRALIAN SILICON PTY LTD TO CONSTRUCT AND OPERATE A SILICON SMELTER NEAR WALLERAWANG IN THE GREATER LITHGOW LOCAL GOVERNMENT AREA

Department of Urban Affairs and Planning

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1. INTRODUCTION

Australian Silicon Pty Ltd is seeking consent for the construction and operation of a silicon smelter near Wallerawang, approximately 7 kilometres north-west of the city of Lithgow. The proposed development will allow the production of up to 30 000 tonnes of high-grade silicon metal per annum, for a period of 40 years.

This report represents the environmental assessment of the silicon smelter development proposal by the Department of Urban Affairs and Planning. **The Department recommends DEFERRED COMMENCEMENT approval of the proposed development.**

Note: Australian Silicon Pty Ltd is a joint venture between Portman Mining Ltd (90% interest) and Doral Mineral Industries Ltd (10% interest).

2. BACKGROUND

2.1 Silicon Smelting Process

Silicon is most commonly found in the earth's crust in the form of oxides, such as quartz (SiO_2). For the production of pure silicon metal (Si), quartz must undergo a smelting process during which a reductant is employed to remove oxygen from SiO_2. Carbon (C) is a common reductant used in the silicon smelting process. There are a number of complex chemical reactions involved in silicon smelting, however the overall reaction can be described as given below.

$$SiO_2 + C \rightarrow Si + CO_2$$

Carbon and quartz will not spontaneously react when combined due to the chemical inertness of both compounds under normal conditions. As such, energy must be added to the smelting process to allow the reaction to occur. The addition of energy has the added advantage of maintaining silicon metal in a molten (liquid) state, allowing ease of handling of the metal prior to and during casting in its final form. In addition to the inclusion of quartz and carbon to the furnace burden, materials known as fluxes are usually added. Fluxes act as stabilising agents for the chemistry occurring in the furnace.

Smelting is performed in an electric arc furnace. The furnace is a broad bowl-like vessel with a carbon base. Carbon electrodes are lowered through the top of the furnace and into a quartz-carbon mixture. Electricity is passed through these electrodes, from whence the electricity arcs through the mixture to the carbon base of the furnace. As the electrodes are made of carbon, they are also slowly consumed through reaction with quartz. The electrodes must therefore be replaced on a regular basis.

Carbon dioxide (CO_2) gas produced during smelting is removed from the top of the furnace. Silicon oxide (SiO), a chemical intermediate formed during smelting may become entrained in carbon dioxide stream. Reaction of silicon oxide with oxygen in air converts this compound back into very small particles of quartz, known as silica fume. Silica fume is often filtered from the carbon dioxide waste stream in baghouses.

As may be expected, the quality of quartz and carbon used in the silicon smelting process has a significant effect on final product quality. Impurities in these feed materials report to the silicon product and to slag material (waste) from the furnace.

3. THE DEVELOPMENT PROPOSAL

Australian Silicon Pty Ltd proposes to construct and operate a silicon smelter at Lithgow, employing the smelting process described in Section 2.1. The proposed silicon smelter has been designed for the purpose of producing:

- 30,000 tonnes per annum of high-grade silicon metal for international export and sale on the Australian market;
- 17,000 tonnes per annum of silica fume for sale locally, regionally and possibly interstate; and
- 1,245 tonnes per annum of low grade silicon (slag) for sale locally, regionally and possible interstate.

The primary aim of the smelter is to produce high-grade silicon. As such, high-quality feed materials are required for the process. To this end, the Applicant has proposed to operate two additional developments to supply the smelter with the required feed materials, namely a quartz mine and a charcoal plant. These developments are considered below.

The Applicant proposes to source fluxwood from plantations for use at the smelter. It has also been indicated by the Applicant that low-ash coal may be sourced from international suppliers (no low-ash coal of suitable quality is available in Australia) for use as a reductant, in addition to charcoal. Low-ash coal would be combined with hardwood charcoal for the production of lower-grade silicon metal. The proposed location of the silicon smelter adjacent to the Wallerawang Power Station provides access to the estimated 11,000 - 15,000 kWh of power required to drive the smelting process.

3.1 Quartz Mine

A development application for a quartz mine at Glenella, near Cowra was lodged with the Department on 22 December 1999 (DA No. 295-11-99) and is the subject of a separate assessment report. This quartz deposit has been identified as having the quality, structure and long-term supply capability necessary to supply the smelter. **It is recommended that this report be read in conjunction with the assessment report for the proposed quartz mine to illustrate the integrated nature of the these developments and to gain an appreciation for how the environmental impacts, impact assessment and recommended instruments of consent for the developments are connected and complementary.**

3.2 Charcoal Plant

A development application for a charcoal plant at Gunnedah was lodged with the Department on 28 July 2000 (DA No. 248-07-00). The Applicant indicated that in order to produce high-quality silicon, charcoal (carbon reductant) produced from native hardwood timber is required (refer to Section 3.5).

A total of almost 1,500 submissions of objection (for all three components of the Australian Silicon Project) highlighted public opposition to the proposal to log New South Wales native forests for the production of charcoal to supply the silicon smelter. This opposition, in addition to the Applicant's undertaking to investigate alternatives for charcoal production, led to the Applicant indicating it no longer wishes to proceed with its DA for the charcoal plant at Gunnendah. The Applicant has indicated that investigations into alternative timber sources are not likely to be resolved until early to mid 2001. However, the Applicant has requested that the Department continue to process the development applications for the quartz mine and silicon smelter, for determination by the Minister in due course.

The source of charcoal for the silicon smelter is an important issue to be considered when assessing the overall environmental impacts of the development. Therefore, the approval of the smelter without knowledge of the source of charcoal cannot be justified in the context of the assessment requirements of the *Environmental Planning and Assessment Act, 1979* and consideration of the principles of sustainable development. To address this matter, the

Department recommends deferred commencement consent be granted to the silicon smelter, dependent upon the source of charcoal for the smelter being identified.

Section 80(3) of the Act provides that a consent authority may grant deferred commencement consent to a development application, to be based on the satisfactory completion of certain conditions prior to the operation of the consent. For the silicon smelter, the Department recommends that deferred commencement consent be granted based on:

- the Applicant supplying adequate details of the source of charcoal for the smelter. The recommended instrument of consent has been drafted to provided that these details may be in the form of a development application or development consent for a charcoal production facility, or a commercial agreement for the supply of charcoal from a third party. This condition has been extended to allow for charcoal to be produced outside New South Wales. This condition aims to ensure that any proposed charcoal source has undergone an appropriate environmental assessment.
- the Applicant producing a Transport Impact Study to consider the impacts of transporting charcoal from the proposed charcoal source to the silicon smelter.

Having completed these requirements to the satisfaction of the Director-General will "unlock" the consent and allow the development to proceed. The Department considers that this approach is an appropriate means of ensuring that the Australian Silicon Project is assessed in its components and as a whole.

3.3 Proposed Development Site

The proposed development site is located adjacent to the Wallerawang Power Station, Castlereagh Highway, near the township of Wallerawang. Wallerawang lies seven kilometres west of the city of Lithgow and approximately 140 kilometres west of Sydney. Appendix A provides a map indicating the proposed location of the silicon smelter.

The Castlereagh Highway forms the eastern boundary of the site. The Great Western Highway lies approximately two kilometres to the south, providing access to western NSW, including Cowra. The main western rail line passes along the northern boundary of the site and provides a direct link to Sydney and Cowra.

The proposed development site is located within what is know as the "Lithgow Minerals Processing Park" (LMPP). The LMPP concept was presented by the NSW Government and Lithgow City Council to encourage a range of medium to large mineral processing industries that are employment-generating, value-adding and have export/ import replacement potential to locate adjacent to the Wallerawang Power Station. It should be noted, however, that the LMPP does not in itself present implications for the implementation of planning legislation.

3.4 Description of Proposed Development

3.4.1 Silicon Production

Raw materials (quartz pebbles, charcoal, low ash coal and flux wood) will be transported to the site, weighed, unloaded and stockpiled by a self-propelling stockpile machine with a pneumatic conveyor. Charcoal and coal will be stored undercover, while the quartz pebbles and flux wood will be stored in the open. The stockpile area will be located on the western side of the site and would have capacity for the storage of two-month's stock of imported material (low ash coal) and one-month's stock for domestic material (quartz pebbles, charcoal and fluxwood). Front-end loaders will be used to transport the feed materials to a dump hopper and a conveyor system for movement to the day bins located above the furnace. Day bins are to be located in the furnace building.

Day bins will store sufficient feed material to allow the process to operate for at least 24 hours. Any fugitive emissions (dust, in particular), are to be captured via a dust extraction system. Set quantities of each feed material will be discharged from the day bins onto a transfer conveyor for blending (the conveyor configuration is such that mixing will occur during the transfer of materials). The blended materials, known as burden, can then be transferred to containers. The containers will be lifted by crane to a charge bin. The burden will be

further mixed under controlled conditions, and once a homogenous composition is attained, the burden may be charged to the electric arc furnace.

Two submerged electric arc furnaces are proposed for the smelter. These furnaces will be located in the furnace building, located on the northern side of the site. Each furnace will be approximately eight metres in diameter, will be three metres deep and will have three 1.2 metre diameter carbon electrodes inserted through the top of the furnace. The furnaces will have water cooled rooves and be fully lined with refractory brick (insulation). The carbon electrodes are slowly consumed during the smelting process (as described in Section 2.1) and will therefore need to be replaced approximately every two months. New electrodes are to be screwed onto the top of the old electrodes, with the electrode system being continuously lowered into the furnace. Electrodes will be powered with water-cooled, high-current lines, located symmetrically around the furnace.

To ensure uniform charging of burden to the furnace, the furnace hearth is able to slowly rotate. Hydraulically powered charging and stoking machines around each furnace will ensure that the burden, and resulting molten bath, are adequately mixed.

Each furnace will be covered by a refractory hood that allows the ingress of air to the smelting process, while capturing carbon dioxide (and other gaseous by-products) liberated during the smelting process. These refractory hoods will be cooled with water.

In order to keep the furnace and associated equipment cool, a closed-circuit cooling water system will be employed. Cooling towers, located adjacent to the furnace building will be employed as the heat sink in this system. As a consequence of evaporation of water from the cooling towers, dissolved compounds will concentrate in the cooling water system, and will therefore be necessary to bleed water from the system ("blowdown") once or twice a year, generating approximately 50 m^3 of wastewater from this system.

Molten silicon metal will be tapped from the base of each furnace every two hours and poured into ladles. Oxygen will be injected into the ladles to remove impurities, such as aluminium and calcium, before the molten metal is cast into ingots. Once cooled (and solid), silicon ingots will be broken from the casts with a hydraulic hammer. In addition to pure silicon metal, slag (silicon with impurities) will also be tapped from the furnaces. Slag will be handled in a similar manner to the silicon metal. Pouring and casting operations will be performed inside the furnace building.

Silicon ingots will be automatically fed to an enclosed crushing machine, preset to crush the metal to a specified size. Crushed metal will be screened to remove any undersized material before being bagged. Fugitive emissions will be captured via a dust extraction system. Finished silicon metal product may be either stored or loaded onto trucks for dispatch to the customer, or to the Ports at Newcastle, Sydney or Port Kembla.

Dust-laden hot gases (dust in this sense includes silica fume as well as particulate matter from charcoal and coal) from the furnaces will be extracted from building vents and furnace hoods and will be directed to a de-dusting plant. The gases will be cooled before reaching the de-dusting plant with dilution air drawn in by fans. The de-dusting plant will consist of a series of filter bags ("baghouse") through which the air will pass, leaving dust trapped on the filter bags. "Clean" gas will be vented to atmosphere via a seven metre stack. From time to time, as dust accumulates on the surface of the filter bags, gas flow will be reversed, pushing dust from the filters to be collected in a hopper. Dust will be pneumatically conveyed from the hopper to a silo adjoining the plant to be stored before bagging and subsequent transport off-site for sale.

Appendix B provides a summarised flow diagram of the proposed silicon smelter, indicating major input and output streams.

3.4.2 Ancillary Facilities and Services

In addition to the development infrastructure required for the smelting process, there are a number of ancillary facilities required to address waste streams, emergency systems, process control and site services. The scope of these facilities is summarised below.

- Electricity - Supply of electricity will be from a TransGrid 132kV system, with power installed at an estimated 45MW. The environmental assessment and approval of the transmission line is subject to a separate approvals process administered by Lithgow City Council. The Department has consulted with Council to ensure that any consent issued for the proposed silicon smelter is not inconsistent with any approval that may be issued for electricity transmission.
- Sewerage - Lithgow City Council proposes to establish a reticulated sewerage system for the LMPP. Connection of the proposed silicon smelter to the sewerage system would be subject to approval by Council, in a similar manner to that described for electricity connection. Consideration of water impacts is provided in Section 5.5.
- Water- A maximum of 50 kL per day of water would be required for the proposed silicon smelter, and would be sourced from the council supply. As with electricity and sewerage, connection to the reticulated water system would be subject to a separate approvals process to be undertaken by Council. Consideration of water impacts is provided in Section 5.5.
- Stormwater - A first-flush system and segregated drainage scheme for the site are proposed. The Department has fully considered the impacts of stormwater in Section 5.5.
- Emergency Systems and Process Control - Storage quantities of nitrogen and oxygen will be stored on site. Oxygen will be employed for taphole lancing and ladle refining. Nitrogen-based hydraulics systems will facilitate the controlled shutdown of the smelter in the event of a power failure. Further consideration of emergency management and stored dangerous goods is given in Section 5.4.

3.5 Choice of Carbon Reductant

The Environmental Impact Statement for the proposed smelter states that native hardwood timber would provide a suitable carbon source for the silicon smelting process. The timber, presented in the EIS as nominally sourced from the western forests, would be made into charcoal at a separate charcoal plant (proposed for Gunnedah, refer to the assessment report for DA No. 248-07-00). Following the exhibition of the proposed development, the Department received substantial opposition from the community and environment groups with regard to impacts on biodiversity and a range of issues from the logging of native forests. The harvesting of native hardwood is not within the scope of the Development Application and would be subject to separate legislation, not administered by the Minister or Department.

However, to assist with the assessment of the impacts of supplying 160,000 tonnes of hardwood per annum to the proposed smelter, the Resource and Conservation Assessment Council (RACAC) coordinated a detailed scientific assessment of the western native forests, known as the South Brigalow Forest Assessment. One of the major considerations was the supply of ironbark species for use in charcoal production for the proposed silicon smelter. The assessment considered environmental, social, economic and cultural heritage values of the forests. Under the *Forestry and National Park Estate Act, 1998*, any proposal to increase logging would be dependent on a Forest Agreement being in place. The assessment, finalised in March 2000, concluded that timber would not be available from the western forests, particularly the Goonoo Goonoo or Pilliga forests, for the purposes of charcoal production.

As a result of the strong interest from the community regarding this issue, the Department also commissioned the Energy and Technology Division of the CSIRO at North Ryde in Sydney to undertake an independent expert investigation into the potential alternative carbon sources that may be suitable for the silicon smelting process. This investigation concluded that while hardwood charcoal represents the "best" carbon reductant available to produce high-grade silicon metal, viable alternatives do exist. Two alternatives in particular are considered to have comparable properties to hardwood charcoal:

- Ultra-Clean Coal (UCC) - a chemically washed coal currently at the pilot plant stage with an estimated three year lead time to commercial production; and
- charcoal made from hardwood sawmill waste or recovered waste timber with an estimated lead time of one to two years to produce the quality and quantities required.

The Department considers that the Applicant should investigate these alternatives with a view to introducing their use in the smelting process to reduce reliance on charcoal produced from native forests. A condition has been included in the recommended instrument of consent requiring the Applicant to investigate and report on alternative carbon reductants. This requires the Applicant to fund an independent review of the alternatives report. Both reports would be made available to the public. In addition, the recommended instrument includes a requirement for the Applicant to investigate the feasibility of establishing hardwood plantations, again to reduce the reliance on native forests.

The Applicant has advised the Department that, as a result of the RACAC outcome, it is negotiating with State Forests for an ecologically sustainable and alternative supply of timber. In addition, State Forests has commenced a dialogue with the Applicant to explore investments in planted forests of suitable hardwood species. The Department strongly supports this outcome, and therefore recommends that a condition be imposed requiring the Applicant to establish suitable hardwood plantations that will make the smelter sustainable with its timber supply and which will also offset any potential impacts on biodiversity, salinity and greenhouse gases from the operation of the proposed silicon smelter and charcoal plant.

Department's Position: Alternatives to the use of hardwood charcoal as a reductant in the smelting process do exist. Under the recommended instrument of consent, the Applicant is required to report biennially on these alternatives, and comply with the requirements of the Director-General as a result of the outcomes of these reports. In addition, the recommended instrument requires the Applicant prepare a Greenhouse Gas Management Plan to address issues with the emission of greenhouse gases, as well as the effects of harvesting native hardwood. The Applicant is required to report on the outcomes and effectiveness of the Plan on an annual basis. **The Department is satisfied that the recommended instrument of consent provides conditions that will effectively monitor issues relating to the use of hardwood timber. The instrument includes provision for the Director-General to act on the information reported by the Applicant relating to greenhouse gases and the choice of carbon reductant.**

4. STATUTORY PLANNING FRAMEWORK

The assessment of the proposed silicon smelter is subject to the following environmental planning legislation and instruments:

- *Environmental Planning and Assessment Act 1979* and *Environmental Planning and Assessment Regulation 1998;*
- *State Environmental Planning Policy No. 34 - Major Employment-Generating Industrial Development*;
- *State Environmental Planning Policy No. 33 - Hazardous and Offensive Development*;
- *State Environmental Planning Policy No. 11 - Traffic-Generating Development*;
- *State Environmental Planning Policy No. 44 - Koala Habitat Protection*;
- *State Environmental Planning Policy No. 58 - Protecting Sydney's Water Supply*;
- *Greater Lithgow Local Environmental Plan 1994;*
- *Council of the City of Greater Lithgow Development Control Plan No. 6 - Industrial Development.*

Consideration of the proposed development in the context of the objectives and provisions of these environmental planning instruments is provided below.

4.1 Environmental Planning and Assessment Act 1979 and Regulation 1994

4.1.1 Designated Development

The proposed silicon smelter is a designated development, as provided by Schedule 3 of the *Environmental Planning and Assessment Regulation 1994*. Specifically, the proposed development is a:

> *mineral processing or metallurgical works for the commercial production or extraction of ores (using methods including chemical, electrical, magnetic, gravity or physico-chemical) or the refinement, processing or reprocessing of metals involving smelting casting, metal coating or metal products that smelt, process, coat, reprocess or recover more than 10,000 tonnes per annum of ferrous or non-ferrous metals, alloys or ore concentrates.*

As required for all designated developments, an Environmental Impact Statement was prepared in accordance with Schedule 2 and Clause 54 of the Regulation. Specific requirements for the preparation of the EIS provided in the Director-General's Requirements (DGR's), issued on 24 December 1999, were also addressed.

4.1.2 Integrated Development

The development proposal constitutes integrated development, as defined by s.91 of the *Environmental Planning and Assessment Act 1979*. The silicon smelter requires the following licences/ approvals:

- an Environment Protection Licence (EPL) from the Environment Protection Authority under the *Protection of the Environment Operations Act, 1997*; and
- approval from the Roads and Traffic Authority under the *Roads Act, 1993*.

Both the EPA and RTA were consulted during the preparation of Director-General's Requirements for the EIS. Consultations were aimed at incorporating agency-specific requirements for the preparation of the EIS.

At the time of lodgement of the development application (DA) for the silicon smelter, copies of the DA and EIS were forwarded to the EPA and RTA. Both agencies were advised of the exhibition period for these documents, and requirements relating to requests for additional information and the issuing of General Terms of Approval.

Submissions, including General Terms of Approval, were received from the EPA and RTA. Comments and requirements of the agencies were duly considered, and their General Terms

of Approval incorporated into the recommended instrument of consent, as outlined in sections 5 and 6.1.

4.1.3 State Significant Development

The proposed silicon smelter is State significant development, as defined by s.76A(7) of the *Environmental Planning and Assessment Act, 1979*. The development proposal is State Significant Development by virtue of it being a development to which *State Environmental Planning Policy No. 34 - Major Employment-Generating Industrial Development* applies (refer to section 4.2). The Minister for Urban Affairs and Planning is the consent authority for State Significant Development.

4.1.4 Exhibition, Notification and Assessment

The Development Application (DA) and Environmental Impact Statement (EIS) for the proposed development were lodged with the Department of Urban Affairs and Planning on 22 November 1999. In accordance with the Act and Regulation, the DA and EIS were exhibited as "State significant, integrated, designated development" at:

- the Department's Information Centre, Sydney
- Greater Lithgow City Council
- Wallerawang Public Library
- Cowra Shire Council
- Nature Conservation Council, Sydney

The DA and EIS were exhibited for the period 6 December 1999 to 24 January 2000. Given the scale of the development proposal and the exhibition timing (over the Christmas period), the Department exhibited the DA and EIS for 7 weeks, as opposed to the statutory 30-day period required for designated developments. The exhibition period was extended by a further 2 weeks at the request of a community representative.

To inform the general public of the proposed development and exhibition locations, advertisements were placed in the following papers on three occasions during the exhibition period:

- Sydney Morning Herald
- Lithgow Mercury
- Cowra Guardian

The Department determined, in consultation with Greater Lithgow City Council, that the impacts of the proposed development may affect a number of properties in the vicinity of the development site. The extent of the affectation was conservatively established as encompassing all properties within a two kilometre radius of the development site. All landowners and occupiers within the affectation area were notified by mail of the development proposal and advised of exhibition locations at which they could view the DA and EIS. In addition, a number of site notices, providing details of the development proposal, exhibition dates and locations were erected on the subject site.

In accordance with the Act, the Department has received and duly considered all submissions made by the public and government agencies in response to the exhibition of the DA and EIS. Consideration of submissions is provided in Section 6.

Section 79C of the *Environmental Planning and Assessment Act 1979* lists a number of issues that a consent authority must consider when determining a development application. A full s.79C consideration is provided in Section 7, as a summary of issues assessed in this report.

Department's Position: The Department considers that the lodgement, notification, exhibition and assessment of the proposed development have been undertaken in accordance with the Act and Regulation.

4.2 State Environmental Planning Policy No. 34

On 1 December 1998, the Minister for Urban Affairs and Planning determined that the proposed smelter was a development to which *State Environmental Planning Policy No. 34 - Major Employment-Generating Industrial Development* (SEPP 34) applies. This determination was based on:

- the development having an estimated capital investment value of $100 million (excluding land), which exceeds the $20 million threshold specified under paragraph (a)(ii) of Schedule 1 of the Policy; and
- the development will create 110 full-time employment positions after construction which exceeds the threshold of 100 employment positions specified under paragraph (a)(i) of Schedule 1 of the Policy; and
- the development is of a type listed under paragraph (b) of Schedule 1 of the Policy (ie metals, minerals or extractive materials processing).

A full consideration of the proposed development, in the context of the objectives and provisions of SEPP 34, is provided in Appendix C.

In accordance with Clause 8 of SEPP 34, the consent authority for this development is the Minister for Urban Affairs and Planning.

Department's Position: The proposed silicon smelter is a development to which *State Environmental Planning Policy No. 34 - Major Employment Generating Industrial Development* applies. **The Department considers that the proposed development is consistent with the objectives and provisions of SEPP 34.**

4.3 State Environmental Planning Policy No. 33

State Environmental Planning Policy No. 33 - Hazardous and Offensive Development aims to identify proposed developments with the potential for significant off-site impacts, in terms of risk and/ or offence (odour, noise etc). A development is defined as potentially hazardous and/ or potentially offensive if, without mitigating measures in place, the development would have a significant risk and/ or offence impact on off-site receptors.

The potential for significant off-site risk impacts may be determined by assessing the quantities of dangerous goods to be stored on a particular site. Proposed quantities of dangerous goods to be stored at the silicon smelter have been compared with the threshold levels for each of the goods outlined in the Department's publication *Applying SEPP 33.*The conclusion drawn is that the development would be potentially hazardous. In addition to this assessment, the operation of the silicon smelter has been examined to establish whether any actions on-site would pose significant off-site risk. Based on operational activities such as furnace tapping (involving the firing of a taphole gun), the development would be potentially hazardous.

SEPP 33 requires a Preliminary Hazard Analysis (PHA) to be prepared for potentially hazardous developments to demonstrate that proposed risk mitigating measures are sufficient to reduce off-site risk impacts of the development to an acceptable level. A PHA has been prepared for the proposed development, which concludes that with mitigating measures in place, risk impacts from the development will be negligible. As such, the silicon smelter is not hazardous development as defined by SEPP 33. The PHA has been fully reviewed by the Department, as described in Section 5.4. The PHA concludes that risk-mitigating measures are sufficient to ensure negligible off-site risk impacts.

A proposed development is considered potentially offensive if the development requires an Environment Protection Licence (EPL) from the Environment Protection Authority under the *Protection of the Environment Operations Act 1997*. As the proposed silicon smelter requires such a licence, it is considered to be potentially offensive. The EPA has indicated that the smelter can be issued with an environment protection licence to monitor and manage offensive impacts. As such, the development is not considered an offensive development, as defined by SEPP 33.

Department's Position: The proposed silicon smelter is a development to which *State Environmental Planning Policy No. 33 - Hazardous and Offensive Development* applies. The development is both potentially hazardous and potentially offensive. A Preliminary Hazard Analysis for the proposed development has been prepared, in accordance with the requirements of SEPP 33. The PHA demonstrates that the smelter will not be hazardous development. The EPA has indicated that through an environment protection licence, the smelter will not be offensive development. **The Department considers that all requirements of SEPP 33 have been met.**

4.4 State Environmental Planning Policy No. 11

The proposed silicon smelter is a development to which *State Environmental Planning Policy No. 11 - Traffic Generating Developments* (SEPP 11) applies. The objectives of SEPP 11 are to ensure that the Roads and Traffic Authority (RTA) is made aware of applications for developments likely to generate significant traffic impacts, and to provide an opportunity for the Authority to make representations in respect of such developments.

Schedule 1 of SEPP 11 provides a list of development purposes to which the Policy applies. The proposed smelter is for the purpose described by paragraph f) of Schedule 1, being:

> *Development for the purpose of or being the erection of a building for the purposes of industry where the gross floor area of the building is or exceeds 20,000 square metres or the enlargement or extension of a building used for the purposes of industry where the gross floor area of that enlargement or extension is or exceeds 20 000 square metres.*

On 24 November 1999, a copy of the Development Application and Environmental Impact Statement for the proposed smelter were forwarded to the Roads and Traffic Authority, as required by clause 3 of SEPP 11. These documents were forwarded to the RTA within seven days of lodgement of the Development Application with the Department.

In accordance with clause 5 of SEPP 11, the Department has received a representation from the RTA in respect of the proposed development. This representation has been fully considered (refer to Sections 5.2.2 and 6.1).

Department's Position: The proposed silicon smelter is a development to which *State Environmental Planning Policy No. 11 - Traffic Generating Developments* applies. **The Roads and Traffic Authority has been notified of the proposed development, and its comments sought, in accordance with the Policy. As such, all requirements of SEPP 11 have been fulfilled.**

4.5 State Environmental Planning Policy No. 44

State Environmental Planning Policy No. 44 - Koala Habitat Protection was gazetted on 6 January 1995 to:

- encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas;
- ensure permanent free-living populations of koalas over their present range; and
- reverse the current trend of koala population decline.

To this end, a number of local government areas in which populations of koalas are known to reside is provided in Schedule 1 of SEPP 44. As the Greater Lithgow local government area is included in the Schedule, the silicon smelter is a development to which SEPP 44 applies.

Part 2 of SEPP 44 requires the consent authority, when determining a development application for land to which the Policy applies, to consider whether the subject land is "potential koala habitat". An independent flora assessment was undertaken by a qualified consultant on behalf of the Australian Silicon Pty Ltd. This assessment did not identify any of

the eucalypt species listed in Schedule 2 of SEPP 44, and as such, the proposed development site is not considered to represent "potential koala habitat".

It should also be noted that the fauna assessment undertaken for the proposed smelter did not identify any koalas. As a result, the proposed development site is not considered "core koala habitat" as defined by SEPP 44.

Having identified that the subject site is neither "potential koala habitat" nor "core koala habitat", all requirements of SEPP 44 have been fulfilled. Further consideration of impacts on flora and fauna is provided in section 5.8.

Department's Position: The proposed silicon smelter is a development to which *State Environmental Planning Policy No. 44 - Koala Habitat Protection* applies. The potential for the proposed development site to support, or potentially support, populations of koalas has been assessed. **The Department considers it unlikely that the proposed silicon smelter will affect potential or core koala habitats. As such, all requirements of SEPP 44 have been met.**

4.6 State Environmental Planning Policy No. 58

State Environmental Planning Policy No. 58 - Protecting Sydney's Water Supply, gazetted on 24 December 1998, applies to a number of local government areas from which Sydney's water supply drains, including the Greater Lithgow local government area. As such, the proposed smelter is a development to which SEPP 58 applies.

Clause 10 of SEPP 58 lists matters that must be considered by a consent authority when determining a Development Application to which the Policy applies. These matters relate to the impacts a proposed development may have on the water quality of rivers, streams or groundwater in the Sydney hydrological catchment; whether water quality management practices are sustainable over the long-term; and whether a proposed development can comply with water quality objectives established by the Government. A full consideration of these matters is provided in Appendix C. The Department considers that the proposed development is consistent with the objectives of SEPP 58.

Department's Position: The proposed silicon smelter is a development to which *State Environmental Planning Policy No. 58 - Protecting Sydney's Water Supply* applies. The Department is satisfied that the proposed silicon smelter will have a neutral impact on the water quality in the hydrological catchment. **The Department considers that all matters required to be considered by the consent authority under SEPP 58 have been duly addressed.**

4.7 Greater Lithgow Local Environmental Plan 1994 and DCP No. 6

Under the *Greater Lithgow Local Environmental Plan 1994*, the proposed silicon smelter development site is zoned 1(a) - Rural (General). The silicon smelter is consistent with the objectives and provisions of this zone, as outlined in Appendix C. The proposed development is permissible with consent.

Council has developed a series of Development Controls Plans (DCP) under the Greater Lithgow LEP. *Development Control Plan No. 6 - Industrial Development* relates to the proposed development. The Department considers that the silicon smelter is consistent with the aims and objectives of the DCP. A full consideration of the development proposal in the context of DCP No. 6 is provided in Appendix C.

Department's Position: The proposed silicon smelter is a development to which the *Greater Lithgow Local Environmental Plan 1994* and *Development Control Plan No. 6 - Industrial Development* apply. **The Department considers that the proposed development is consistent with the objectives and provisions of these environmental planning instruments.**

5. ASSESSMENT OF DEVELOPMENT ISSUES AND ENVIRONMENTAL IMPACTS

The Department has reviewed the Environmental Impact Statement for the proposed development, and duly considered all submissions from the public, government authorities and Councils. From these sources, the Department has identified the following environmental impacts as being significant. The impacts have been classified as being of significance, or high significance, depending upon the magnitude and extent of the impacts, and the responses of the public, authorities and Councils with respect to the impacts.

Impacts identified as being of **major significance**:

- Air Quality Impacts;
- Transport Impacts; and
- Noise Impacts.

Impacts identified as being of **significance**:

- Risk Impacts;
- Water Quality Impacts; and
- Impacts on Visual Amenity.

Other important impacts considered in the assessment of the proposed silicon smelter are:

- Socio-Economic Impacts;
- Impacts on Flora and Fauna;
- Impacts on Heritage Items; and
- Impacts of Waste Production and Management.

Each of the environmental impacts listed above is fully assessed in the following sections, in accordance with the Act and Regulations.

5.1 Air Quality Impacts

5.1.1 The Applicant's Position

The Environmental Impact Statement for the proposed development presents the existing air quality in the Wallerawang area as recorded at the meteorological station of the Mount Piper Power Station. This air quality data is representative of the conditions currently experienced at the proposed development site as the Power Station lies approximately 8 kilometres to the north-west of the site.

Data indicates that the area is characterised by stable atmospheric conditions with winds blowing from the south-west. This is particularly important as the nearby township of Wallerawang is immediately to the south-west. In this context, any air pollutants emitted from the smelter will, for a large proportion of the time, be directed away from residential areas. Stable atmospheric conditions will allow stack emissions to rise several hundred metres above the ground before dispersion.

Air quality monitoring data for the period 1995 - 1998, as presented in the EIS, indicates that current ambient concentrations of sulphur dioxide (SO_2) and nitrogen dioxide (NO_2) are generally well below National Environment Protection Measure (NEPM) one-hour goals. The limited data relating to ambient particulates indicate that concentrations are variable, but generally below relevant air quality goals.

5.1.1.1 Construction Phase Issues

The primary air quality concern during the construction of the smelter is dust generation. Dust would generally be generated from dry, exposed areas of land, with generation being exacerbated by high winds.

The Applicant proposes to minimise the generation of dust in this manner by ensuring that exposed soil is kept to a minimum. Any unavoidable exposed areas will be sprayed with water to suppress dust. Once construction is complete, disturbed areas will be revegetated as soon as practical. The Environmental Impact Statement indicates that a Construction phase Environmental Management Plan, detailing construction phase dust suppression and management measures will be prepared by the Applicant.

5.1.1.2 Operation Phase Issues

The EIS indicates that during operation of the silicon smelter, the major source of air pollutants will be the hot gases vented from the electric-arc furnace. The major components of the vent stream will be:

- sulphur dioxide (SO_2);
- oxides of nitrogen (NO_x);
- silica fume (fine particles of SiO_2); and
- carbon dioxide (CO_2).

Australian Silicon proposes to limit the escape of silica fume in this stream by firstly passing the gases through a cyclone (particle separation device) and then through two baghouses in parallel (particle filtration devices). The EIS indicates that the baghouses have been designed to capture at least 99.5% of the silica fume reporting to the vent stream, and that ultimate fume emissions from the furnace stack will not exceed 25 mg m^{-3}.

Sulphur dioxide emissions will be minimised by controlling the sulphur content of feed materials to the process. Information in the EIS recommends that low ash coal be limited to 1.5% sulphur, and charcoal to 0.5% sulphur to ensure that air quality goals are achieved. Oxides of nitrogen are presented in the EIS as being minor components of the stack gas, and will therefore have a negligible impact on ambient air quality.

The US EPA's regulatory air dispersion models, *Industrial Source Complex, Short Term Version 3* (ISCST3), were employed to predict the maximum ground-level concentration of SO_2, NO_x and silica fume, given the worst-case design parameters of the proposed development. These models were employed to predict expected ground level concentrations of the aforementioned pollutants for comparison with NEPM guidelines. Results of the modelling are summarised below.

Pollutant	Averaging Time	Maximum Concentration (µg m^{-3})	NEPM Guideline (µg m^{-3})
SO_2	1 hour	114	570
	24 hour	23	230
	Annual	1.3	55
NO_x (as NO_2)	1 hour	0.045	360
	Annual	0.0005	85
Silica fume	24 hour	2.0	50

The information resulting from the modelling, presented in the EIS and summarised above, indicates that under worst-case operational and meteorological conditions, NEPM guideline concentrations for SO_2, NO_2 and silica fume will not be exceeded at ground level.

The EIS provides an assessment of potential greenhouse gas contributions (CO_2) from the operation of the smelter. The proposal would directly and indirectly contribute emissions of carbon dioxide. Direct emissions are associated with the use of coal and charcoal in the

smelting process and the consumption of fuel for vehicles. Indirect contributions are associated with the use of electricity. The EIS presents data indicating that the operation of the smelter would emit 456,800 tonnes of carbon dioxide per year, representing a 0.1% increase in Australia's total 1999 emissions. The EIS claims that the use of charcoal and flux wood would be greenhouse neutral over the life of the plant because both are sourced from sustainable managed forests. As part of the development application for the proposed charcoal plant at Gunnedah (DA No. 248-07-00), a Greenhouse Gas Study for all three developments (charcoal plant, quartz mine and silicon smelter) was prepared. The Study concludes that, including electricity generation and the loss of a carbon sink through tree-logging, the entire project (all three developments combined) will emit the equivalent of 804,684 tonnes of carbon dioxide per annum. The proposed silicon smelter would contribute 465,532 tonnes per annum to this figure, some 89% of which would be indirectly contributed through electricity generation at the Wallerawang Power Station. The Study also concludes that the entire project would increase national greenhouse gas emissions by no more than 0.01%.

In addition to emissions from the vent stack associated with the furnace, the Applicant has identified that fugitive dust emissions are possible at a number of points in the silicon smelting process. In particular, feed material and product handling have been highlighted in the EIS as likely sources of fugitive dust emissions. The EIS indicates that fugitive emissions will be managed enclosing materials handling areas.

The Applicant proposes to develop an air emissions management plan to be incorporated in an overall Environmental Management Plan for the development.

5.1.2 Submissions from the Public, Authorities and Councils

In the public submissions received in response to the exhibition of the development application for the proposed silicon smelter, the effect of carbon dioxide as a greenhouse gas was highlighted as a major public concern. In the majority of cases, the public objected to the release of high levels of carbon dioxide concurrently with the harvesting of old-growth forests. This practice, without sufficient measures to replace carbon sinks (forests) was not seen by the public to be sustainable. In addition to carbon dioxide emissions, the public also raised health concerns related to general air emissions.

The submission received from the Blue Mountains City Council indicates that Council is concerned about the validity of air emissions data presented in the EIS. In particular, Council highlighted that the second most predominant wind direction in the area of the proposed development would see air emissions blown over the Blue Mountains City local government area (townships of Mt Victoria, Blackheath and Katoomba specifically).

The Environment Protection Authority did not indicate concern related to emissions of CO_2, SO_2 or NO_x in its submission or General Terms of Approval for the proposal. The EPA stated that the levels of SO_2 and NO_x likely to be emitted from the smelter were very low (much lower than WHO, NEPM and NHMRC guidelines). In its General Terms of Approval, the EPA recommends that no specific limit be set for these compounds. Rather, the requirement for the proposed development to comply with the *Clean Air (Plant and Equipment) Regulation 1997* in force under the *Protection of the Environment Operations Act 1997* would be sufficient to ensure acceptable levels of NO_x and SO_2 were not exceeded. The EPA provided not comment on limits for carbon dioxide.

Polychlorinated dibenxo-p-dioxins (PCDD) and polychlorinated dibenzo-p-furans were highlighted by the EPA as being of concern with the proposed development. PCDDs and PCDFs can be formed under certain conditions associated with the combustion of a carbon source. The EPA has provided emissions limits for these compounds for inclusion in the recommended instrument of consent.

The EPA has included requirements in its General Terms of Approval for the mitigation of odours and dust generation that may result from the operation of the smelter.

Monitoring programs, both from point sources at the proposed smelter and ambient receivers have been recommended by the EPA.

5.1.3 The Department's Consideration

The Department generally concurs with the information presented in the EIS in relation to the emission of air pollutants. Emissions of SO_2 and NO_x are considered very low, and are not expected to cause concern. In this respect, the Department agrees with the EPA's position. The Department supports monitoring requirements recommended by the EPA, and these have been incorporated into the instrument of consent. The EPA's requirements with regard to limits imposed on PCDDs and PCDFs have similarly been included in the instrument.

The Applicant's position on greenhouse gases, as presented in the EIS and Greenhouse Gas Study is not support by the Department. The Department cannot concur with the conclusion that the three developments (charcoal plant, quartz mine and silicon smelter), let alone the proposed smelter by itself, are greenhouse neutral. As such, the Department recommends that a Greenhouse Gas Study be included in the instrument of consent. This condition has been worded to require to the Applicant to demonstrate to the Director-General that all practicable measures are being employed to reduce greenhouse gas emissions from the development. Further to this requirement, the recommended instrument requires the Applicant to develop a plan to initiate hardwood timber plantations, and to regularly investigate alternative carbon reductant sources.

Concerns raised by the Blue Mountains City Council relating to the validity of air emissions data, and air emissions impacts on Council's local government area have been noted. In order to verify air emissions data, and mitigate any impacts as a result of emissions from the smelter, the Department has required the Applicant to prepare an Air Quality Management Plan. This Plan shall incorporate any requirements of the EPA and be approved by the Director-General.

General Terms of Approval supplied by the EPA in relation to odour and dust generation have been included in the instrument of consent.

Department's Position: The Department considers that all potential air quality impacts resulting from the construction and operation of the proposed smelter have been considered. Through consultation with the EPA a suite of conditions has been included in the instrument of consent aimed at mitigating, monitoring and managing air emissions. **The Department is satisfied that the recommended conditions of consent will mitigate air emissions impacts to an acceptable level.**

5.2 Transport Impacts

The Department recognises that it is important to consider the overall traffic impacts of the Australian Silicon Project (comprising the proposed silicon smelter, quartz mine and potentially a charcoal production facility in New South Wales). However, to minimise overlap between the information presented in each assessment report, only traffic impacts of local deliveries and downstream haulage will be considered in the respective reports. That is, this report considers local deliveries of materials to and from the proposed smelter, and the haulage of finished silicon products from the development site. The assessment report for the proposed quartz mine (DA No. 295-12-99) considers the transport of quartz from the mine to the smelter as well as local deliveries of mine by-products.

5.2.1 The Applicant's Position

The proposed development site is currently only accessible via a dirt track along its southern boundary, which connects with the Castlereagh Highway to the east. The site is, however, well placed in a regional and State context for transport to and from other major centres. The Castlereagh Highway to the east of the site connects with the Great Western Highway some 2-3 kilometres south of the proposed development. The Great Western Highway is the principal route connecting Sydney to Lithgow and Central Western New South Wales (and subsequently Cowra via the Mid Western Highway). The Environmental Impact Statement indicates that a large proportion of the silicon produced at the smelter will be exported overseas. The Great Western Highway provides access to port facilities in Sydney and with further transport, port facilities in Port Kembla and Newcastle.

The site is also adjacent to the Main Western Rail Line, located to the north. This rail line provides a direct link between Sydney and Orange (passing through Lithgow and Bathurst). With the reopening of the Harden Blayney Rail Line in early 2000, the smelter is also connected by rail to Cowra. From Sydney it is also possible to access port facilities as Port Kembla and Newcastle by rail.

The Environmental Impact Statement indicates that the Applicant undertook a financial evaluation of the transport options during feasibility investigations for the Australian Silicon Project. The financial evaluation concluded that rail transport would incur substantially greater capital expense (through construction of rail loading and unloading facilities) and higher operating costs than road haulage. Consequently, road transportation was determined by the Applicant to be the preferred option for haulage of raw materials and finished products for the entire Australian Silicon Project. The Applicant claims that consideration of transport options included evaluation of environmental, social and economic factors. It has also been highlighted that a perception of low rail reliability has deterred the Applicant from rail haulage.

In order to contextualise the impacts of traffic generation on routes used to transport materials to and from the proposed development site, the EIS presents current (supplied by the RTA as at 1999) levels of service for these roads.

- The Great Western Highway between Lithgow and Bathurst currently experiences a level of service of A/ B, indicating stable traffic flow with reasonable freedom to manoeuvre and select the desired speed;
- The Castlereagh Highway from the site to the Great Western Highway currently experiences a level of service of C, indicating stable flow with restricted freedom to manoeuvre and select the desired speed;
- The Castlereagh Highway north of the development site currently experiences a level of service of B/ C, indicating stable with some restrictions on freedom to manoeuvre and select desired speed;
- No level of service was indicated in the EIS for the Great Western Highway between Lithgow and Sydney.

It is expected that the majority of labour for the proposed development during construction and operation will live locally (Lithgow, Lidsdale and Wallerawang). This will require employees to either travel from Lithgow along the Great Western Highway and the Castlereagh Highway south of the site, or from Wallerawang and Lidsdale along the Castlereagh Highway to the north of the site. There is also potential for employees to be sourced from Bathurst and Mudgee, requiring travel along the Great Western Highway and Castlereagh Highway (north of the site) respectively.

Other than for quartz deliveries from Cowra (refer to the assessment report for DA No. 295-11-99) and charcoal (from a location to be determined), all material deliveries to the smelter will be from Sydney or from local sources. Fluxwood will be sourced from the local area, while "value-added" materials such as electrodes, liquid oxygen, LPG, diesel fuel etc will be transported from Sydney. The Applicant indicates that low ash coal that must be imported from overseas will be transported from either Port Kembla or Sydney. Similar, much of the large process components of the smelter will be transported from port locations in Sydney.

5.2.1.1 Construction Phase

Traffic generated during the construction of the proposed development will include contractor and employee vehicles, supply of equipment and materials and traffic movements related to the supply of support services. The Environmental Impact Statement indicates that traffic generation will be variable over the 16-month construction period. At the peak of construction, approximately 43 heavy vehicle movements will be contributed to surrounding roads, in addition to some 320 vehicle movements for the transport of employees.

The Applicant suggests that given shifts will be staggered during construction, it is unlikely that additional traffic generation will have a significant effect on either the Castlereagh Highway or the Great Western Highway. In particular, the additional traffic movements are not expected to affect the current levels of service for these roads.

There is likely to be a number of over-sized deliveries to the site during the early stages of construction. These deliveries will be associated with the movement of large plant equipment and supply of bulk quantities of building materials. The Applicant indicates that all major construction equipment will come to the site from Sydney, via the Great Western Highway. Such deliveries will be the subject to prior planning and consultation with the RTA and Council to establish safe and appropriate times and methods for the movement of large items.

With an aim to mitigate against any negative traffic impact associated with the construction of the proposed smelter, the Environmental Impact Statement indicates that the following measures will be employed:

- sufficient parking will be supplied on-site for all construction employees and construction equipment;
- the temporary construction car park will be covered suitably to minimise tracking of dirt and mud, and unnecessary movement of vehicles around the site will be discouraged;
- staggering of shifts will be such that peak hour travel is avoided;
- the existing dirt access track to the site will be upgraded to a rural seagull junction, to the satisfaction of the RTA; and
- oversize loads will be moved during appropriate times and with suitable signage and escorts where necessary.

5.2.1.2 Operation Phase

The EIS states that during the operation of the proposed smelter, approximately 212 vehicle movements (one-way) will be generated per day, equating to an annual average daily traffic figure (based on axle pairs) of about 326. Approximately 75% of these movements are expected to be contributed by employees driving privately owned vehicles. Of the remaining movements, about 43 will represent heavy vehicles, equivalent to an annual average daily traffic figure of 151 (based on axle pairs). The approximate composition of these vehicle movements is provided in the Environmental Impact Statement and reproduced below.

Transport Purpose	Origin/ Destination	Predicted Average Daily Movements
Heavy Vehicle Movements to the Site		
Quartz	quartz mine at Cowra to the site	14
Fluxwood	local deliveries to the site	5
Charcoal	from a yet-to-be-located charcoal production facility to the site	5
Low ash coal	Port Kembla to the site	4
Electrodes	Sydney to the site	1
Refractory material	Sydney to the site	0.3
Liquid oxygen	Sydney to the site	0.1
LPG	Sydney to the site	0.1
Fuel	Sydney to the site	0.1
Other consumables	various locations to the site	2
Heavy Vehicle Movements from the Site		
Silicon metal	from the site to Port Botany, Port Kembla and/ or Newcastle Port	7
Silica fume	from site to various locations	4
Second grade silicon metal	from site to various locations	0.4
Non-Heavy Vehicle Movements		
Waste Services	from the site to local areas	0.5
Employees	from local areas to the site	159
Miscellaneous	from various locations to the site	10

The table above indicates that the greatest number of traffic movements generated by the proposed development will be directly related to travel of employees to and from the site. Supply of raw materials for the smelter (quartz, charcoal, low ash coal and fluxwood) also creates a significant number of heavy vehicle movements, as does the transport of finished silicon products to coastal port locations.

The Applicant concludes that the overall impact of the development on traffic will be minor, given the small number of vehicle movements compared with existing traffic. It is claimed that regardless of whether semi-trailers (26 tonne capacity) or B-doubles (38 tonne capacity) are employed, the proposed development will not affect the level of service on any of the routes travelled. Proposed mitigation measures to ensure that the conclusions drawn in the EIS are achieved, the Applicant proposes to:

- develop a Transport Policy and Code of Conduct to identify various requirements pertaining to transport, including routes, speeds, load limits and behavioural requirements;
- provide sufficient on-site parking to accommodate all likely vehicles; and
- where possible, employ B-doubles in place of semi-trailers to minimise traffic movements.

5.2.2 Submissions from the Public, Authorities and Councils

Approximately 85% of all public submissions received by the Department during the exhibition of this development application objected to the proposed silicon smelter on the basis of traffic impacts. Traffic impacts were seen as the second-most important issue by the public, after logging of native forests for charcoal production. Submissions were received from all local government areas along the quartz haul route from the mine to the smelter. The majority of these were received from the Cowra area. Downstream of the smelter, a number of submissions were received from the Blue Mountains local government area, related to the transport of finished silicon products from the smelter to coastal port locations (Port Botany, Port Kembla and Port of Newcastle). The public objected to traffic impacts including road congestion, noise, exhaust emissions and road safety.

The submission received from the Roads and Traffic Authority, an integrated approval body, indicated that this agency supported the proposed silicon smelter. General Terms of Approval were limited to the construction of a rural seagull intersection for access to the site, at no cost to the RTA. It was requested that the design of the intersection and pavement type be approved by the RTA, and that B double sweep paths are accommodated in the design of all access infrastructure. The RTA made no comment with respect to the choice of road over rail haulage.

Lithgow City Council indicated that it was satisfied that road haulage of raw materials to the smelter and finished silicon products from the site was appropriate. However, recognising the potential cumulative traffic impacts of road transport on its own and adjacent local government areas, Council requested that the Applicant consult with Rail Access Corporation (RAC) with the aim of eventual rail transport to and from the site. To ensure that any road transport was appropriately managed, Council requested that the instrument of consent for the proposal include a requirement for the preparation of a Transport Code of Conduct.

Rail Access Corporation, in its submission, indicated it was concerned that the recommended choice of road transport had been put forward in the Environmental Impact Statement without demonstrated foundation. RAC stated that insufficient information had been provided by the Applicant to assess the validity of the claim that rail haulage is not viable. RAC highlighted a number of inadequacies in the consideration of rail transport by the Applicant and offered to consult with the Applicant to investigate an economically viable and practically feasible rail haulage option.

Blue Mountains City Council (BMCC) highlighted the issue of cumulative traffic impacts on the Blue Mountains local government area as being of significant concern. Council indicated that although the Applicant undertook to consult with local councils during the preparation of the

EIS, BMCC was not one of these councils. The primary concern was that rail transport had not been adequately considered in the EIS.

Both Cowra Shire Council (location of the proposed quartz mine) and Blayney Shire Council objected to the proposed smelter on the basis of traffic impacts. In particular, these councils were concerned with the haulage of quartz from the proposed mine, through their local government areas, to the silicon smelter. Neither council considered the consideration of rail transport possibilities had been adequately undertaken.

5.2.3 The Department's Consideration

The Department highlights the fact that this assessment report does not aim to detail the assessment of traffic impacts of vehicle movements from the proposed quartz mine at Cowra (DA no. 295-11-99) or any proposed charcoal plant intended to supply the silicon smelter. The traffic impacts of the quartz mine are fully detailed and assessed in the relevant assessment report. Due to the fact that the Applicant withdrew the development application for the proposed charcoal production facility at Gunnedah, it is not possible to assess the impacts of the transport of charcoal from such a facility to the proposed smelter. To ensure that the impacts of charcoal transport are fully considered, the recommended instrument of consent requires the Applicant to prepare a Transport Impact Study before the deferred commencement consent can be “unlocked”. This Study will ensure that the impacts of charcoal transport can be considered, prior to the construction of the smelter, even if the charcoal production facility is not located within New South Wales (and therefore does not undergo an assessment process for the determination of the Minister).

The Department generally concurs with the position presented in the EIS that traffic impacts as a result of the construction and operation of the proposed smelter will have a minor effect on local roads and product dispatch routes towards Sydney. However, it is noted that there will be some impacts, particularly of a cumulative nature, with regard to future road congestion, exhaust emissions and safety. These issues were raised in the majority of submissions received by the Department in response to the exhibition of the development. Although many of the submissions received in objection to the silicon smelter (approximately 65%) were most concerned about the traffic impacts of quartz haulage from Cowra to the proposed development site, it is noted that a significant number also highlighted traffic impacts from the overall development, and through the Blue Mountains, as being of importance. The Department considers that these concerns, and the cumulative impacts of traffic could be addressed by considering the use of rail haulage for all or part of the Australian Silicon Project.

The NSW Government has a general planning policy of encouraging developments to utilise rail transport wherever feasible. This policy is based on the lower environmental impacts of rail over road, and consideration of the public interest (with respect to noise, safety and air pollution). During the assessment of both the proposed quartz mine and silicon smelter, the Department has not been able to fully concur with the Applicant's position that rail transport is prohibitively expensive. This was due to an apparent lack of consultation with the Rail Access Corporation (RAC) during feasibility studies and the preparation of the EIS, as well no conclusive evidence of the added expense of rail being presented in the Applicant.

In response to considerable pressure from residents and councils along the quartz haulage route between Cowra and the proposed silicon smelter, the Applicant undertook to investigate rail transport further. As part of these further investigations, the Applicant also chose to more closely assess the possibility of rail transport of finished silicon products between the proposed smelter and Port Botany (indicated by the Applicant to be the most likely silicon export point). The Applicant called for quotations from a selection of road and rail carriers through a formal tender process, conducted during August 2000. The results of this tender process indicate that not only is rail transport between the smelter and Port Botany competitive, it is actually cheaper than road transport. As a consequence, the Applicant has indicated it is willing to accept the use of rail transport for the route between the site and Port Botany.

The Department has therefore included in the recommended instrument of consent, a condition requiring the Applicant to transport all finished silicon metal products by rail between the site and any port location in New South Wales. This condition also requires rail to be used for any local or interstate deliveries where the use of rail is commercially and practically feasible. As a result of this condition, almost 17% of the heavy vehicle movements along the Great Western Highway between the site and Sydney will be removed from roads and replaced by rail. The Department considers this is a significant positive environmental outcome that also takes into account public interest, particularly in the Blue Mountains. The Applicant may revert to using road transport if it can demonstrate to the Director-General that rail transport is no longer commercially or practically feasible, and that all reasonable attempts have been made by the Applicant to allow rail transport to continue.

Where rail transport cannot be used, for example local deliveries of small quantities of materials, the Applicant is required to prepare a Transport Code of Conduct. The Environmental Impact Statement presented an undertaking that such a Code would be prepared for all heavy vehicle movements associated with the proposed smelter. Lithgow City Council supports this measure, and specifically requested the preparation of the Code in its submission.

The recommended instrument of consent requires the construction of a rural seagull junction for access to the site, as requested by the RTA in its General Terms of Approval. The instrument reflects the fact that the Applicant is currently in negotiation with the Department of State and Regional Development regarding the magnitude of capital each the Applicant will contribute to the junction and the magnitude of assistance received by the NSW Government.

Conditions requiring the covering of loads and the provision of adequate on-site parking have been included in the recommended instrument of consent.

Department's Position: The Department considers that the haulage of finished silicon metal products by rail is a significant environmental improvement over haulage by road. Where rail transport is not feasible, the Department is satisfied that a Transport Code of Conduct will adequately address and mitigate traffic impact issues. **The Department is satisfied that all traffic impacts have been mitigated to an appropriate level.**

5.3 Noise Impacts

5.3.1 The Applicant's Position

It order to establish the existing acoustic environment in the vicinity of the proposed development site, noise level monitoring was undertaken at seven distinct locations around the proposed site (labelled R1 to R7). The majority of monitoring locations corresponded with residential premises to the East of the proposed smelter (being the nearest receivers to the site). The results of the background noise surveys are summarised below. Noise pressures have been given as $L_{A10(15\ minute)}$ values, which represent the noise pressure exceeded 10% of the time, averaged over a 15 minute sampling period.

Monitoring Location	$L_{A10(15\ minute)}$ (dB(A)) 7:00 am to 10:00 pm	$L_{A10(15\ minute)}$ (dB(A)) 10:00 pm to 7:00 am
R1 - Millers Road	56	51
R2 - Springvale Lane	54	49
R3 - Springvale Lane	54	49
R4 - Bunyarra Spring	49	47
R5 - 80 Springvale Lane	49	47
R6 - Springvale Lane	54	49
R7 - Barton View	54	49

As can be seen from the table above, the monitoring locations can be separated into two distinct categories. The Environmental Impact Statement labels R1, R2, R3, R6 and R7 as "residential areas near industry", as these locations are directly affected by noise generated

at the nearby Wallerawang Power Station and Springvale Colliery. R4 and R5 have been labelled as "rural areas" as these monitoring locations are shielded from the noise of local industry by a natural ridgeline.

In order to predict the likely noise impacts of the proposed development on surrounding land uses, the Applicant undertook computer-based noise modelling. The RTA's Environmental Noise Model, developed in conjunction with the EPA, was employed to model the impacts during:

- **daytime construction** (construction will not be undertaken at night), considering the operation of all equipment during the most intensive period of construction;
- **daytime smelter operation** (7:00 am to 10:00 pm), considering the operation of all smelter components, a single B-double truck and two front-end loaders; and
- **night-time smelter operation** (10:00 pm to 7:00 am), considering the operation of all smelter components, a single B-double truck and two front-end loaders.

All modelling was performed for a number of worst-case meteorological scenarios (calm, adverse wind and temperature lapse). For each scenario, the noise impacts of the proposed development were modelled for the monitoring locations R1 to R7. In addition, the Applicant modelled the noise impacts of the proposed development on the nearest sensitive receptor (Wallerawang Public School). This location has been labelled R8. Results of the modelling and noise mitigating measures proposed by the Applicant are outlined below.

5.3.1.1 Construction Phase Impacts

The construction of the proposed silicon smelter will be characterised by higher levels of noise than during the operation of the development. However, the duration of noise exposure will be relatively short, and the construction phase is only expected to last approximately three months. The effects of construction noise were modelled as indicated above. The results of this modelling, as presented in the Environmental Impact Statement, are summarised below.

	$L_{A10(15\ minute)}$ (dB(A))		
Location	**Calm**	**Adverse Wind**	**Temperature Lapse**
R1 - Millers Road	44	47	43
R2 - Springvale Lane	41	44	40
R3 - Springvale Lane	37	41	36
R4 - Bunyarra Spring	21	35	20
R5 - 80 Springvale Lane	23	35	21
R6 - Springvale Lane	34	39	32
R7 - Barton View	37	39	36
R8 - Wallerawang Public School	34	32	33

The Applicant is of the opinion that the construction of the proposed development will not significantly impact on the acoustic amenity of residents in the vicinity of the subject development site. The predicted construction phase noise pressures indicated in the table above are below the existing noise levels at each of the monitoring locations R1 to R8. As modelling was performed for the worst-case noise impact scenarios, the EIS states that noise impacts for the entire construction period will be acceptable. The EIS also notes that the EPA's Construction Noise Guidelines recommend that construction activities should not produce noise pressures at R4 or R5 in excess of 48 dB(A) ($L_{A10(15\ minute)}$). Similarly, receptors at R1-R3 and R6-R8 should not be exposed to levels above 47 dB(A). It is highlighted in the EIS that these recommended levels are not expected to be exceeded, based on the noise modelling conducted.

The EIS does not indicate specific noise mitigating measures proposed for the construction phase. The Applicant does, however, recognise that construction times will be restricted, in accordance with the EPA's noise policy.

5.3.1.2 Operation Phase Impacts

The proposed silicon smelter is intended to be operated 24-hours a day, seven days per week. Modelling to reflect this continuous operation resulted in the following predicted noise pressures, during the day (7:00 am to 10:00 pm), and at night (10:00 pm to 7:00 am), for receptors at locations R1 to R8.

	$L_{A10(15\ minute)}$ (dB(A)) 7:00 am to 10:00 pm			$L_{A10(15\ minute)}$ (dB(A)) 10:00 pm to 7:00 am		
Location	**Calm**	**Adverse Wind**	**Temp. Lapse**	**Calm**	**Adverse Wind**	**Temp. Lapse**
R1 - Millers Road	39	41	38	39	40	40
R2 - Springvale Lane	38	40	37	37	39	39
R3 - Springvale Lane	30	33	29	30	32	32
R4 - Bunyarra Spring	20	26	12	14	23	24
R5 - 80 Springvale Lane	20	29	18	19	24	26
R6 - Springvale Lane	30	33	28	30	31	32
R7 - Barton View	33	35	31	33	33	36
R8 - Wallerawang Public School	28	26	27	29	27	32

The Environmental Impact Statement for the proposed smelter notes that during the day (7:00 am to 10:00 pm), the operation of the smelter would not lead to noise pressures above the EPA's noise assessment criteria. That is, 43 dB(A) ($L_{A10(15\ minute)}$) at locations R4 and R5, and 42 dB(A) at all other points listed in the table above.

Operation of the smelter at night, however, requires that noise levels at R4 and R5 not exceed 30 dB(A) and 38 dB(A) at R1-R3 and R6-R8, in order to be in accordance with the EPA's noise policy. Predicted night-time noise impacts, as detailed in the EIS and summarised above, exceed the recommended levels by 1-2 dB(A) at R1 under all weather conditions, and 1dB(A) at R2 under adverse wind and temperature lapse conditions The Applicant believes that given the low frequency of the adverse wind and temperature lapse conditions in the area, and the small magnitude of exceedences of the recommended noise levels, the acoustic impacts of the smelter at night will be acceptable.

In order to mitigate any adverse impacts from the operation of the smelter, the Applicant proposes to implement the following noise mitigating measures:

- construction of a bund wall along the south-east side of the stockpiling area to minimise noise propagation from front-end loaders;
- construction of a solid sound barrier on the south-east side of the furnace house;
- installation of single-skin walls and roof for the furnace house, crushing house and bagging house;
- installation of reverberation control including absorptive lining to 50% of the total internal surface of the furnace house;
- acoustic treating of front-end loaders;
- enclosure of conveyor drives;
- restriction of B-double trucks to 40 kmh^{-1} while on site; and
- enclosure or silencing of shotguns.

5.3.1.3 Traffic Noise Impacts

The Environmental Impact Statement presents a consideration of the noise impacts generated from the movement of vehicles to and from the proposed development during both construction and operation. The Applicant indicates that based on likely peak vehicle movements (night and day) associated with the operation of the smelter, the increase in noise pressures will be of the order of 0.6 dB(A). Based on average daily traffic movements this

figure will not exceed 0.4 dB(A). For construction activities, vehicle movements will result in an increase in noise impacts of no more than 0.6 dB(A).

The Applicant believes that these noise impacts are acceptable and comparable to existing traffic noise. No specific mitigating measures have been proposed by the Applicant to address traffic noise.

5.3.2 Submissions from the Public, Authorities and Councils

Noise impacts were not identified as being a significant issue in the public submissions received in response to the exhibition of the development application for the silicon smelter. There were, however, a number of submissions from residents in the Cowra (proposed location of the quartz mine) that highlighted traffic noise as being an issue.

In its submission, Lithgow City Council requested that the nearest residence to the proposed smelter (location R1) be treated, at the Applicant's expense, to meet the relevant noise assessment criteria. Further, Council requested that any affected residents have the windows of their premises double-glazed, at the Applicant's expense.

The EPA, in its submission and as a component of its General Terms of Approval, highlighted noise generation as a key issue to be considered in the assessment of the proposed development. In general, the EPA concurred with the noise data presented in the EIS and imposed GTA's consistent with the noise level goals in the EIS.

For construction noise impacts, the EPA recommended including, as a condition of consent, the requirement for construction noise pressures not to exceed those values modelled in the EIS under adverse wind conditions. It should be noted that these values were the highest predicted construction noise pressures. The EPA also required construction times in accordance with its construction noise policy.

In a similar manner, the EPA recommended the imposition of maximum noise levels for operation during the day and at night. Noise pressure limits supplied by the EPA in its GTAs were either equal to, or slightly higher than, the maximum noise pressures modelled and presented in the EIS.

The EPA also required the preparation of noise management plans for the construction and operation of the proposed development.

5.3.3 The Department's Consideration

The Department supports the noise modelling results presented in the Environmental Impact Statement. It is also noted that the modelling was undertaken by an independent, qualified noise consultant commissioned by the Applicant. The results of the modelling indicate that the proposed development will not lead to a significant decrease in the acoustic amenity at any of the monitoring locations identified (R1 to R8). All changes to site infrastructure (noise walls etc), recommended by the independent consultant, and presented in the EIS are fully supported by the Department.

The Department accepts the assessment of noise impacts performed by the EPA. Noise pressure limits for construction and operation provided in the EPA's General Terms of Approval have been included in the recommended instrument of consent. During discussions with the EPA, the Department was advised that the lowest noise level that can be accurately measured is 35dB(A). Noise modelling results from the EIS indicate that at a number of locations, noise impacts will be significantly less than the lowest measurable noise level (at R4 and R5 under all meteorological conditions, for example). The EPA has advised that in these situations, a 35dB(A) level should be imposed. The Department accepts the EPA's advice, and recognises that based on the data presented in the EIS, this noise criterion should be easily achievable.

The Department supports the EPA's recommended imposition of restrictions to construction times. These restrictions have been included in the recommended instrument of consent, in addition to a condition allowing these times to be exceeded only with the prior written approval of the EPA, or during an emergency.

Noise Management Plans for the construction and operation of the proposed smelter, as required by the EPA's General Terms of Approval are supported by the Department. These requirements have been included in the instrument of consent, to be prepared to meet the requirements of the EPA and to be approved by the Director-General.

Lithgow City Council's request that the Applicant cover the costs of noise protection at the nearest affected residences has been incorporated into the instrument of consent. However, the subject condition has been worded to require the Applicant to noise treat those residences whose residents have experienced unacceptable noise impacts, as defined by the EPA's recommended noise pressures. Council has indicated that this approach is acceptable.

Department's Position: The Department is satisfied that the noise impacts of the proposed development will not significantly reduce the acoustic amenity of surrounding land uses. To ensure that the predictions of the noise modelling are not exceeded, Noise Management Plans for construction and operation are required as conditions of consent. These Plans shall include noise monitoring, management and mitigation measures. All General Terms of Approval provided by the EPA and requested conditions supplied by Council, with respect to noise impacts, have been incorporated into the recommended instrument of consent. **The Department is satisfied that the recommended conditions of consent will ensure that noise impacts are managed and mitigated to an appropriate level.**

5.4 Risk Impacts

5.4.1 The Applicant's Position

As outlined in Section 4.3, the proposed development would pose significant risk to surrounding land uses in the absence of any risk mitigating measures. As such, the proposed development constitutes "potentially hazardous" development, as defined by SEPP 33, and a Preliminary Hazard Analysis (PHA) was prepared. The results and recommendations of the PHA were incorporated into the Environmental Impact Statement.

The EIS presents the results of a hazard identification (HAZID) session undertaken to highlight potential hazards associated with the development, and qualitatively assess the likely risk level resulting from each hazard. The HAZID highlighted 37 potentially hazardous scenarios associated with the development. The risk associated with each of these scenarios is summarised in the table below.

Risk Level	Number of Scenarios Identified
No Offsite Impact	11
Negligible Risk	15
Lower Marginal/ Negligible Risk	8
Marginal Risk	3
Unacceptable Risk	0
TOTAL	**37**

In accordance with the Department's *Multi-Level Risk Assessment* guidelines, only those events with credible off-site effects (marginal risk) underwent the process of quantification of the risk impacts. All other events were assessed in a qualitative manner. The EIS indicates that the three scenarios posing a marginal risk impact to offsite receptors are:

- Boiling Liquid Expanding Vapour Explosion (BLEVE) of an LPG storage tank;
- BLEVE of an LPG tanker while on-site; and
- BLEVE of an LPG tanker while off-site.

Other hazardous events identified as only requiring qualitative assessment include:

- scenarios involving leaks from, ruptures of and collisions with the development's liquid oxygen storage vessel;
- a number of fire events at various locations on-site;
- incidents involving the industrial shotgun used for opening furnace tapholes; and
- small leaks of LPG.

5.4.1.1 Operational Risk (On-Site Operations)

The Environmental Impact Statement indicates that the final configuration of LPG storage for the development has yet to be determined. As such, BLEVE (Boiling Liquid Expanding Vapour Explosion) of the site's LPG vessel was considered for two separate situations - assuming a 30 tonne LPG storage bullet and a 15 tonne storage bullet respectively. The Applicant expects that the likely LPG inventory for the site will be significantly less than either of these storage quantities, and therefore the risk impacts quantified for the two scenarios will overestimate the actual situation (assumption of "worst case").

The *Riskplot* computer risk-modelling program was employed to establish the risk impacts for all quantified hazardous events. The results of the modelling are presented below, in terms of the radiation effects and annual fatality risk contribution at the nearest site boundary, 175 metres away. The nearest residence is approximately 500 metres from the site.

	Radiation Effects (kWm^{-2})	**Fatality Risk (per million per year)**
30 tonne LPG Bullet	15.5	0.075
15 tonne LPG Bullet	10	0.006

The EIS highlights the fact that the modelled fatality risks do not exceed the Department's recommended assessment criteria of 0.5 per million per year for sensitive receivers. It is also noted that the Department's radiation and overpressure assessment criteria for residential and industrial receptors are not exceeded. In the event of an LPG BLEVE, the structural integrity of the Wallerawang Power Station will not be jeopardised, nor will the closest residents or their premises be adversely affected.

In a similar manner to the modelling of an LPG bullet BLEVE, the potential impacts of an LPG tanker BLEVE while on the development site were modelled with *Riskplot*. The EIS indicates that the most likely mode of transport for LPG to the site would be with a B-double road tanker (comprising a 16 tonne and a 15 tonne LPG bullet), or with 20 tonne semi-trailers. As such, modelling was performed to investigate a BLEVE of a 20 tonne and a 16 tonne bullet respectively. The results of the tanker BLEVE modelling, as presented in the EIS are summarised in the following table.

	Radiation Effects (kWm^{-2})	**Fatality Risk (per million per year)**
20 tonne LPG Tanker Bullet	12	0.0003
16 tonne LPG Tanker Bullet	10.4	0.00012

The EIS highlights that incidents involving the BLEVE of an LPG tanker parked on the development site would not result in the Department's land use safety criteria (in terms of fatality risk, radiation effects, or explosion overpressure) being exceeded at the nearest site boundary. Wallerawang Power Station and residents in the vicinity of the proposed development would not be adversely affected during such an event.

The Applicant recognises that, although the risk modelling undertaken for the worst-case on-site incidents indicates that surrounding land uses will not be adversely affected, there is a need to mitigate against such incidents occurring to:

- reduce risk impacts to as low as reasonably possible (best practice);
- ensure the safety of site employees and infrastructure.

Therefore, the Applicant proposed to implement the following mitigation measures to ensure that the aims above are achieved:

- LPG storage and transfer areas will be designated ignition source free;
- remote shutdown valves will installed for LPG storage vessels;
- brisk walls will be constructed around tanks to prevent damage to pipework;
- site speed limit of 15 km h^{-1};
- compliance with AS1596 1997 - Australian Standard for Storage and Handling of LP Gas;
- preparation and implementation of a Safety Management System and Emergency Plan;
- hazards studies, including a Hazard and Operability Study and a Fire Safety Study to be undertaken.

In addition to quantification of events with significant off-site impacts, the EIS presents a number of qualitative assessments of incidents that are unlikely to have significant off-site impacts as a result of the incident's magnitude (consequence) and/ or its frequency of occurrence. A brief summary of the qualitative assessments provided in the EIS is given below.

- Shotgun for taphole opening - while firing the shotgun to open furnace tapholes, it may be possible to misdirect shots or produce ricocheting shots that may cause injury to people off-site. This risk has been addressed by mounting each shotgun on a firing pedestal in such a manner as to ensure that there is no direct line of exit from the furnace building.
- Rupture of oxygen tank - rupture of the site's liquid oxygen storage tank and consequent release of oxygen may result in a higher probability of combustion of nearby stockpiles of coal, charcoal and fluxwood. Fire protection measures will be installed around stockpile areas, and robust vehicle crash barriers will be installed around the oxygen storage tank.
- On-site fire - as described above, fire protection measures, including water sprays and adequate stockpile separation distances will ensure that the potential for fire is minimised.
- Natural disasters - the proposed development will be located in an area with low earthquake probability. However, the smelter will be designed and constructed in full accordance with AS1170.4 1993. The development is not in a cyclone-affected region.
- Aircraft risks - the proposed development does not lie under any commercial flight paths, and therefore risk from aircraft collisions is negligible.

5.4.1.2 Transport Risk (Off-Site Operations)

The HAZID undertaken as part of the Preliminary Hazard Analysis indicated that the risk impact of an incident involving an LPG tanker to or from the development site is marginal. This incident was therefore investigated further in the PHA, through the process of risk quantification.

LPG was assumed to travel to the development site from Lithgow along the same route as that for other materials deliveries and product dispatch (refer to Section 5.2). The worst-case scenario of a 20 tonne LPG bullet undergoing a BLEVE at a location distinct from the development site was considered. Modelling in the EIS indicates that should an LPG tanker of this capacity undergo a BLEVE, people within a 107 metre radius of the tanker will be affected. However, given the frequency of such an incident occurring (tankers are constructed to minimise the frequency of damage), the risk to a resident adjacent to the LPG transport route is 0.0039 per million per year.

The Applicant proposes to mitigate any risk associated with the transport of LPG to the site by ensuring LPG transport contractors follow a management plan to travel via the safest route to the development site.

5.4.2 Submissions from the Public, Authorities and Councils

A number of public submissions raised concerns regarding the risk impacts related to the transport of materials to and from the proposed development site. There were no public submissions, however, that mentioned risk impacts from the operation of the smelter.

New South Wales Fire Brigades reviewed the Environmental Impact Statement with respect to the provision and adequacy of fire safety measures for the proposed smelter. The Fire Brigades indicated in its submission to the Department that it was satisfied that all fire safety issues related to this stage of the development were adequately addressed.

5.4.3 The Department's Consideration

The Preliminary Hazard Analysis for the proposed silicon smelter has been assessed by the Department's Hazards Unit. The Unit has indicated that it concurs with the conclusions and recommended risk mitigating measures presented in the PHA and the EIS.

The PHA has been prepared generally in accordance with relevant Hazardous Industry Planning Advisory Papers, and the process of multi-level risk assessment employed for the Analysis is supported by the Department. It is noted that the fatality risk levels produced as a result of risk modelling are significantly below the land use safety guidelines employed by the Department. The Unit concurs with the finding that explosion overpressures and radiation effects would not cause structural damaging to buildings in the vicinity of the development site.

In order to manage, mitigate and monitor potential hazards throughout the life of the development, a suite of hazards reporting requirements have been incorporated in to the recommended instrument of consent. These requirements include studies to examine hazards issues prior to construction, prior to commissioning and on-going hazard auditing of the development. The Hazards Unit has indicated that these requirements are sufficient to address risk impacts associated with the proposed development.

Department's Position: The Department is satisfied that the risk impacts of the proposed smelter have been adequately addressed through a Preliminary Hazard Analysis, required under SEPP 33. It is noted that risk impacts would not exceed relevant guidelines accepted by the Department. **The Department believes that any risk impacts can be adequately mitigated, monitored and managed through the recommended conditions of consent.**

5.5 Water Quality Impacts

5.5.1 The Applicant's Position

The proposed silicon smelter is to be situated adjacent to Lake Wallace in the upper Cox's River Catchment. Therefore, the proposal is a development to which *State Environmental Planning Policy No. 58 - Protecting Sydney's Water Supply* applies (refer to section 4.6 of this report for consideration of the provisions and objectives of the Policy). Lake Wallace drains directly to Cox's River, which in turn flows into Warragamba Dam, the primary water source for Sydney. Lake Wallace is not used as a domestic water source, although the quality of water in the Lake may directly affect water quality in Warragamba Dam.

The Wallerawang Power Station, operated by Delta Electricity, uses water from Lake Wallace for cooling purposes and discharges blowdown from the cooling water system directly back to the Lake. Delta Electricity has therefore been monitoring water quality in Lake Wallace since 1979 to ensure that the Power Station does not have a significant detrimental effect on water quality. The Environmental Impact Statement for the proposed development presents data from this water quality monitoring as an indication of existing surface water quality.

It is noted that chemical species monitored in the Lake are generally below those concentration levels recommended by ANZECC. However, manganese levels are usually

above the recommended concentration, as is iron on occasion. This is generally attributed to the local geology, which is high in both of these elements. There have been reports of temporarily high concentrations of sulphate in Lake Wallace as a result of blowdown from the Wallerawang Power Station in particularly dry years (low turn-over of water in the lake). The Environmental Impact Statement presents the conclusion that the water in Lake Wallace and Cox's River is generally of good quality, meeting relevant guidelines. There are no trends to suggest that water quality would decline with continued existing use of surrounding lands.

5.5.1.1 Process Water

Silicon smelting can be considered a "dry process". There will be no water used for the primary function of silicon production. Water will however be employed for such uses as cooling, stockpile spraying, domestic consumption, laboratory use and for general washing during the operation of the smelter. The Applicant indicates that the proposed development site has existing connection to the Lithgow City Council raw water supply. It is proposed to use this water supply at a rate of approximate 50,000 litres per day, distributed in the manner presented in the table below.

Water Use	Approximate Daily Average (litres per day)
Domestic consumption	18,630
Washdown/ general use	5,000
Stockpile sprays	12,000
Cooling water make-up	12,000
Maintenance workshop	1,000
Laboratory	500

Water used for stockpile sprays and washdown/ general use will drain naturally from the site and accumulate in the collection ponds (first flush system). The EIS indicates that all other water will be directed to sewer. A sewer has yet to be built, although Council and the Applicant have suggested that Council will construct and operate a dedicated wastewater treatment plant to treat sewerage from developments in the Lithgow Minerals Processing Park. Construction of the treatment plant is currently dependent on the determination of the proposed development. Water to be disposed to sewer is approximated to be 14,000 litres per day, with cooling water being sent to the sewer twice annually at a rate of 25,000 on each occasion.

The Applicant has proposed a number of measures to minimise the use of water on-site and the impact of wastewater:

- the cooling water system will be enclosed and recirculating, minimising blowdown;
- water collected in settlement ponds will be reused on-site where possible (refer below);
- preparation of a Soil and Water Management Plan aimed at ensuring appropriate water cycle management techniques;
- all cooling water blowdown will be in accordance with a trade waste agreement with Lithgow City Council.

5.5.1.2 Storm Water

The Environmental Impact Statement presents a number of drainage areas proposed for the site. These areas have been proposed based on the likely operations and sources of contaminants in each area. Drainage water has been classed as either "clean", "potentially contaminated" or "dirty".

Clean areas include those areas of the site that are undeveloped. The quality of natural water runoff from these areas is expected to be the same as with the existing undeveloped site. All stormwater classified as clean will be diverted to Springvale Creek (a tributary of Cox's River) or Cox's River, upstream of Lake Wallace.

Potentially contaminated stormwater will drain from process areas associated with polluting materials. These areas include the raw material storage area (quartz, fluxwood, charcoal, low ash coal) and maintenance workshop areas. Water from these areas may be contaminated with pollutants washed from stored coal, charcoal or fluxwood, or may include entrained oils

and grease from workshop areas. Each potentially contaminated water drainage area will flow to a dedicated sump where pollutants may be gravity-separated from the water. The sumps also serve as an appropriate point to allow the Applicant to test the quality of drainage water to ensure it meets relevant criteria before discharge.

Dirty water, as defined by the Applicant, will be that runoff from normal process areas including the smelter furnace building, administration area, carpark and product handling area. This stormwater will most likely contain inert solids such as dirt/ dust or inert silicon particles. Dirty water will be directed to settlement ponds where the water will be held temporarily to allow entrained inert solids to settle out. Once solids have settled out, the clean water will be released to Springvale Creek or Cox's River. In large storm events, it is possible that the initial wash of stormwater from the site will carry with it significant quantities of suspended solids. Water subsequently draining from the site will gradually have lower and lower quantities of entrained solids as these materials are washed from the site. The Applicant proposed to construct and operate a "first-flush" drainage system to address this issue. First-flush drainage acts on the principle that the dirtiest stormwater is that which drains from the site at the beginning of a storm (later drainage passes over ground washed clean at the beginning of a storm). The Applicant indicates that the first-flush system has been designed to collect the first two hours of dirty stormwater from the site (based on a 1 in 50 year storm). After this time, it is assumed that essentially clean water will be draining from the site, which can be discharged to adjacent receiving waters as with normal clean water.

To mitigate against the impacts of stormwater runoff, the Applicant proposes the following measures:

- stabilisation of all discharge points to prevent erosion;
- bunding of all dangerous goods and materials that pose a threat to the environment;
- cleaning of the viaduct under the Castlereagh Highway to prevent flooding;
- undertake monitoring of water discharges from the site to ensure that relevant water quality criteria are met.

5.5.1.3 Surface Water Reuse

Each of the collection ponds (first flush system) to be constructed on site will be installed with manually operated pumps. Stormwater and site drainage can therefore be pumped from the ponds for beneficial reuse on-site, or if appropriate, discharge offsite or to sewer. The Applicant proposes to minimise the use of water at the smelter by substituting collected water for the raw water supply in the following situations:

- irrigation of vegetated areas across the site;
- dust suppression and stockpile spraying;
- plant washdown;
- firefighting water, if necessary.

The Applicant is of the position that these measures are effective in water cycle management, will reduce operating costs, and minimise discharge of water from the site.

5.5.2 Submissions from the Public, Authorities and Councils

With regard to water quality impacts, a number of public submissions raised the issue of potential surface water contamination of Lake Wallace and Cox's Creek. Of particular concern was the potential for stormwater from the development site to contaminate Sydney's drinking water source. Public submissions also indicate some concern regarding the use of cooling and process water biocides at the smelter. It is believed by some members of the public that these biocides may contaminate sewers and surface water, potentially affecting the environment some distance from the development.

The Environment Protection Authority, through its General Terms of Approval, have required the Applicant to prepare plans for the construction and operation phases of the development aimed at managing stormwater, sedimentation and erosion. The EPA has also indicated that it will impose pollutant concentration limits on point source discharges from the site (BOD, suspended solids, nitrogen, phosphorous and oil/ grease). To ensure that the discharge limits

are met, the EPA has required the Applicant to development water quality monitoring procedures. With respect to reuse of collected water for irrigation on the site, the EPA supports such an initiative. However, the EPA's General Terms of Approval indicate that the extent, method of application and monitoring of on-site irrigation will need to be conducted in the manner required by the EPA.

Sydney Catchment Authority highlighted the objectives and provisions of *State Environmental Planning Policy No. 58 – Protecting Sydney's Water Supply* in its submission. It also presented that fires, logging of local forests for use as fluxwood and stormwater quality from the site may have the potential to adversely affect the quality of water in Cox's River, Lake Wallace, and subsequently, Warragamba Dam. Sydney Catchment Authority did not raise an objection to the proposed development.

5.5.3 The Department's Consideration

The Department is satisfied that the Applicant has adequately identified and addressed water quality issues with respect to process and stormwater. In particular, the Department supports measures proposed by the Applicant to employ "best practice" water cycle management techniques through collected water reuse, drainage quality segregation and construction of a first flush system.

It is noted that the existing surface water quality in the vicinity of the proposed development site is good, and that local waterbodies drain to Warragamba Dam. However, given the information presented in the EIS and discussions with the Environment Protection Authority, the Department considers that the proposed smelter will not have a detrimental effect on water quality. In fact, water discharged from the site may have a diluting effect on the concentration of contaminants from the Wallerawang Power Station.

The Department has duly considered the objectives and provisions of SEPP 58, as highlighted by the Sydney Catchment Authority (refer to section 4.6 of this report). The Authority's comments with regard to associated activities impacting on catchment water quality have been noted. Fluxwood for the smelter is to be sourced from plantations to ensure that impacts on catchment drainage are minimised. Equally, the Department is satisfied that through the required Fire Safety Study, the issue of fires impacting on water quality can be effectively mitigated. These requirements have been incorporated into the recommended instrument of consent.

General Terms of Approval supplied by the EPA have been accepted and included in the recommended instrument. It is noted that the EPA will impose discharged concentration limits on water leaving the site, enforceable through regular monitoring. The Applicant is also required to undertake site irrigation in accordance with direction from the EPA.

Department's Position: The Department is satisfied that the proposed smelter will have no worse than a neutral impact on water quality. This is a result of the inherent dry nature of the smelting process and the water cycle management measures proposed by the Applicant. **The Department considers that the conditions of the recommended instrument of consent will mitigate water quality impacts to an appropriate level.**

5.6 Impacts on Visual Amenity

5.6.1 The Applicant's Position

The area in the vicinity of the proposed development site is characterised by a gently sloping landform in a predominantly rural setting. There is also a sparse industrial population in the area, represented by coal mining and energy-generating activities. With respect to the visual environment, the Wallerawang Power Station dominates the area with two stacks (each 175 metres high), a cooling tower (115 metres high) and two boiler-generating units (each approximately 80 metres high).

The Environmental Impact Statement indicates that the final form of the proposed smelter will not exceed 45.5 metres high. The smelter has been designed to be located on the development site so that the highest components of the smelter will be located towards the

northern boundary of the site, near the Power Station. The Applicant believes that the smelter will "blend in" with the Power Station, thereby minimising any decrease in the visual amenity of the area.

Due to the topography of the area, the EIS states that the proposed development will only be visible from the following aspects:

- Road users on Castlereagh Highway to the north and east;

  A vegetation screen currently exists along the boundary of the development site adjacent to the Highway. There is approximately 20 metres of unvegetated boundary towards the northern side of the site, through which road users may view the proposed development, depending upon direction of travel. The Applicant proposes to upgrade this vegetation screen through a Landscape Management Plan for the development, to effectively screen the site from the Highway.

- Residents to the south and south-east;

  The nearest residence to the proposed development site is approximately 500 metres to the east. Due to the flat topography of the area, this residence will be screened from the development by the vegetation strip along the eastern boundary of the site. Further south of the nearest residence, the landform slopes upwards, affording residents views of the smelter access area and carpark. The EIS states that, given the view of the Wallerawang Power Station from this aspect, the visual impact of any view of the proposed smelter would be minimal. The Applicant proposes to further reduce the impact on the visual amenity of these residences by landscaping the site access and carpark, ensuring that any lighting is appropriately placed to avoid nuisance.

- Residents of Forest Ridge Estate to the west; and

  The EIS highlights that there are a number of residences located in the elevated area of Forest Ridge, to the west of the development site. Despite the elevation of these residences, the Applicant believes that the visual impact of the development will be minimised due to the distance of residences from the site and the screening afforded by the line of vegetation between Lake Wallace and the site boundary. In addition, the Applicant claims that the proposed silicon smelter will blend considerably into the backdrop of the Wallerawang Power Station.

- Wallerawang Power Station workers to the north and north-west.

  The Wallerawang Power Station, operated by Delta Electricity and located adjacent tot he proposed development site, will have the most direct and closest views of the smelter. The EIS highlights that effect of the smelter on the Power Station employees will be minimal, given the similar nature of the two developments. There is little opportunity to place a built or vegetative screen between the developments as they are only separated by a rail line. All receptors to the north of the proposed development site will, however, be screened from the smelter by the Power Station.

In order to minimise visual impacts wherever possible, the Applicant proposes to implement the following measures:

- preparation and implementation of a Landscape Management Plan to ensure that existing vegetation screens are maintain, management and expanded where necessary;
- proposed project components will be clad in hues similar to the natural environment in order to optimise the visual integration of the proposed plant with the existing setting;
- lighting will be shaded to minimise light impacts on off-site receptors, and in all cases will located within landscaped areas.

5.6.2 Submissions from the Public, Authorities and Councils

There were no submissions received from the public, authorities or Councils that raised the issue of impacts on visual amenity as a result of the proposed development.

5.6.3 The Department's Consideration

The Department concurs with the data presented in the EIS indicating that the proposed development will have a minor impact on visual amenity. In particular, it is noted that the smelter will be located adjacent to the Wallerawang Power Station which currently dominates the locality. As the smelter is significant smaller (in terms of height), the Department agrees that the Power Station will afford the development a substantial "visual absorption". Through a Landscape Management Plan required under the recommended instrument of consent, the colour scheme for the smelter can be approved so that it readily blends with both the Power Station and surrounding vegetation.

The Applicant's proposed measures to maintain and extend the current vegetative screens along the boundaries of the development site are strongly supported by the Department. The Landscape Management Plan will be required to detail the scope of these screens. In particular, the Plan will require the Applicant to investigate endemic species to be used in any landscaping activities on the site. This shall ensure consistency of the site's landscaping with surrounding areas, and may act as minor habitat pockets for native wildlife.

With respect to lighting, the Department agrees with measures proposed by the Applicant to avoid light pollution of neighbouring properties and roads. The recommended instrument of consent has been worded to reflect this position.

Department's Position: The proposed development will have a minor impact on visual amenity, given the flat topography of surrounding land and the development's proximity to the Wallerawang Power Station. **The Department is satisfied that, with the recommended instrument of consent, any minor impacts on visual amenity as a result of the proposed smelter can be effectively mitigated.**

5.7 Socio-Economic Impacts

5.7.1 The Applicant's Position

The Environmental Impact Statement presents information from the 1996 Australian Bureau of Statistics indicating that the population of Greater Lithgow is in the vicinity of 19,248 people. Of this population, approximately 400 are of indigenous Australian or Torres Strait Islander descent. The percent of the Greater Lithgow of working age is approximately 76%, slightly less than the average for Sydney (80%) and the State (77%). The unemployment rate for the region is above that for the Nation, at 10.1%.

The Lithgow Skills Audit and SWOT Analysis conducted by Charles Sturt University, was commissioned by the Central West Area Consultative Committee in 1997. This study highlights the major strengths of the Lithgow economy as being a highly-skilled workforce, under utilised natural resources and infrastructure, and proximity to Sydney, the Blue Mountains and the Central West Region. It also indicated, however, that the economic strength of the area is hindered by the fact that its industrial base is not greatly diversified, being concentrated in coal mining and electricity generation.

The proposed silicon smelter will be constructed over a period of approximately 20 months, during which time some $100 million will be invested in site preparation, labour and building infrastructure. The Applicant estimates that in the vicinity of $15 million dollars of this investment will flow directly to regional contractors and suppliers. During construction, over 200 workers will be employed, with about 30% of these coming from outside the local area, therefore increase the demand for accommodation (with subsequent positive economic effects).

In excess of 100 permanent, full-time employment positions will be created to operate the proposed development. This equates to roughly $3.5 million per annum contributed to the regional economy through the payment of wages. The Environmental Impact Statement highlights the significant economic flow-on effects of the development, particularly through stimulated expenditure on housing, entertainment and retail spending.

The Applicant has not identified any negative socio-economic impacts as a result of the construction and operation of the proposed smelter.

5.7.2 Submissions from the Public, Authorities and Councils

Lithgow City Council strongly supports the proposed smelter on the basis that the development will have a significant positive impact on the social and economic vitality of the region. Council has requested that the Applicant contribute capital towards bushfire services for the area, in accordance with Section 94 of the *Environmental Planning and Assessment Act 1979*. Council indicates that based on the capital cost of the proposed smelter, its Section 94 contribution plan for bushfire services dictates a contribution of $20,400.

A submission from the Department of State and Regional Development (DSRD) was received in response to the exhibition of the proposed development. The submission highlighted DSRD's strong support for the proposal. DSRD undertook an economic modelling evaluation of both the proposed silicon smelter at Lithgow and the proposed quartz mine at Cowra, concluding that in addition to the direct employment and investment effects of the developments, there will be significant indirect effects. It is estimated that a total of 380 jobs (direct and indirect) will be generated during the operational phase of the silicon smelter alone. In terms of the impacts on the State's economy, DSRD estimates that the entire project will contribute some $500 million to Gross State Product over the first five years of operation.

5.7.3 The Department's Consideration

The Department concurs with the conclusion drawn by the Applicant that the proposed smelter will have a significant positive impact on the socio-economics of the Lithgow area. It is noted from the data supplied by both the Applicant and the Department of State and Regional Development that if approved, the smelter will contribute significantly on a local, regional and State level. There is also likely to be economic implications at a Commonwealth level as a result of the export of finished silicon metal products.

Consideration of the socio-economic impacts of the development presented in the Environmental Impact Statement has generally failed to recognise the fact that the substantial levels of employment generated during the construction and operation of the smelter will place added demand on community facilities. The Department considers that it would be appropriate for the Applicant to contribute capital to offset this increased demanded. As such, the Department supports any reasonable request of Lithgow City Council under Section 94 of the Act. The recommended instrument of consent has been drafted to require the Applicant to contribute $20,400 towards bushfire services in the Lithgow area. Council has indicated that no other contributions are considered necessary.

Department's Position: The Department considers that the proposed silicon smelter will have major positive socio-economic impacts on the region, State and Nation. To mitigate against increased demand on public services, the recommended instrument of consent requires the Applicant to contribute to provision of bushfire services in the area. **The Department is satisfied that the net socio-economic contribution of the smelter, and the silicon project as a whole will be positive for New South Wales.**

5.8 Impacts on Flora and Fauna

5.8.1 The Applicant's Position

The Environmental Impact Statement for the proposed smelter presents the findings of an independent natural resources consultant commissioned by the Applicant to investigate the existing flora and fauna in the vicinity of the development site and the likely impacts of the smelter on these flora and fauna.

In accordance with Section 5A of the *Environmental Planning and Assessment Act 1979*, the 8-part test was applied to flora and fauna species from the Wallerawang area to assess the

impact of the proposed development on these species. The conclusion of this test for both flora and fauna was that the proposed development is unlikely to have a significant effect on any threatened species, populations or ecological communities, or their habitats.

5.8.1.1 Impacts on Flora

During an initial survey of the representative flora on the development site, it was noted that there were three distinct vegetation types characterising the site. Along the boundary with the Castlereagh Highway to the east, there is a planted tree lot comprising a mixture of *Eucalyptus* and *Pinus* species. To the west of the site, closest to the adjacent railway right-of-way, there is a strip of regenerating white sally trees (*Eucalyptus pauciflora*). The remainder of the site is open grassland. It was noted during this flora survey that of the 24 groundcover species identified, 14 of these (60%) were introduced.

The *Threatened Species Conservation Act 1995* indicates that the threatened species *Eucalyptus pulverulenta and Persoonia marginata* may occur on, or in the vicinity of the development site. In addition, the National Herbarium Database lists *Eriostomon obovalis* and *Eucalyptus pulverulenta* as being rare or threatened species with potential to be found within the area. The flora survey of the subject development site specifically sought to locate these species should they occur on the site. The Environmental Impact Statement indicates that no members of these species were found.

The Applicant has identified the construction phase of the proposed development as having the most significant impact on flora. The existing tree barriers along the eastern and western boundaries of the site will not be altered during construction or operation. Open grass areas of the site will, however, be cleared. Given the high proportion of introduced ground cover species on the site, and the overall degraded nature of the flora to be cleared, the Applicant believes that the impacts of the development will be minor. In fact, the EIS highlights that once construction of the smelter is complete and the site is landscaped, the development will have a net positive effect on flora. The Applicant proposes to landscape the site and extend existing native vegetation barriers to shield neighbouring residences from the visual impacts of the proposed smelter.

Specific measures proposed by the Applicant to mitigate impacts on flora are listed in the EIS as follows:

- any tree removed will be replaced by another tree of reasonable size and maintained until mature;
- clearing will be minimised;
- progressive rehabilitation of all disturbed surfaces will be undertaken; and
- management strategies will be put in place to ensure suppression of noxious weeds, as per the *Noxious Weeds Act 1993*.

5.8.1.2 Impacts on Fauna

To establish the existing fauna characterising the proposed development site and surrounding areas, a fauna survey was undertaken by an ecological consultant, on behalf of the Applicant. The survey covered an area of approximately 130 hectares within the Lithgow Minerals Processing Park. The principle habitat type identified was grassland, with some mixed pine, eucalypt and white sally vegetation. Fauna identified during the survey, and possible endemic species classified as vulnerable or endangered are summarised below:

- Amphibians - A total of 8 frog species were identified during the fauna survey, primarily associated with farm dams and power station cooling water channels in the region. None of these species are considered vulnerable or endangered. The *Threatened Species Conservation Act 1995* (TSC Act) lists a single frog species endemic to the Wallerawang area, *Pseudophryne australis*, as being vulnerable. There was no evidence of this frog found on or in the vicinity of the development site. It is noted in the EIS that this species is restricted to montane streams in sandstone areas and it is therefore unlikely that it will be found on the subject site.
- Birds - Within the survey area, 49 bird species were identified. Of these, two are introduced species. None of the species identified are classified as vulnerable or

endangered under the TSC Act. Within the Wallerawang area, a total of 199 species of birds are known to occur. One of these species is listed as endangered and an additional six are classed as vulnerable.

- Mammals – The Threatened Species Act lists a total of 34 species of native mammals known to occur in the Wallerawang area. None of these species are classed as endangered, although 12 are vulnerable. The EIS highlights that five species of introduced mammals were identified on, or in the vicinity of, the development site (domestic cattle, feral dog, fox, rabbit and house mouse). Other than these species, a total of ten bat species were recorded, of which two, *Falsistrellus tasmaniensis* and *Scoteanax ruepellii*, are considered vulnerable under the TSC Act.
- Reptiles – The TSC Act lists 33 reptile species likely to occur within the Wallerawang region, of which only the Blue Mountains Water Skink is considered endangered. The EIS suggests that the likelihood of this species being found on, or in the vicinity of, the development site is very low, given that the Skink only occupies highland heath. The fauna survey conducted on the development site identified four reptile species, none of which are classed as endangered or vulnerable.
- Invertebrates – Although the site occurs within the range of the Bathurst Copper-Winged Butterfly, no suitable habitat for this species was identified on the site. As such, it is considered unlikely that this species will be impacted by the proposed smelter.

The Environmental Impact Statement concludes from the fauna survey, and research into the endemic species of the Wallerawang area, that the development site is highly degraded agricultural land. As such, it is unlikely that the proposed smelter will have a significant impact on any endangered or vulnerable species, or their likely habitat. The Applicant suggests that once construction is complete and the site is fully landscaped, the re-introduction of native flora species will have a positive effect on the quantity and quality of potential local habitat.

Specific measures proposed by the Applicant to minimise any impact of construction activities on identified or potential fauna on the development site include:

- tree removal activities will be undertaken in late summer and autumn to avoid disturbing spring-nesting birds and over-wintering hibernating microbats;
- any tree removed that exhibits hollows will be relocated to a similar location outside the areas of proposed disturbance.

5.8.2 Submissions from the Public, Authorities and Councils

The National Parks and Wildlife Service (NPWS) did not provide any specific comments related to the impacts of the proposed development on flora and fauna. Generally, the assessment of flora and fauna was undertaken in manner supported by NPWS. The Service did, however, highlight the fact that although the impacts of the smelter component of the Australian Silicon project are likely to be negligible, there is significant concern with regard to the impacts of the overall project. In particular, the logging required to produce the feed charcoal for the silicon smelting process is considered to have potentially significant effects on native flora and fauna, depending on the location and the manner in which logging is undertaken.

The City of the Blue Mountains highlighted the net effect of the entire proposal on biodiversity as being a major issue. The vast majority of the approximately 650 public submissions also highlighted this issue as being of concern. Generally these submissions did not specifically flag the silicon smelter as imposing significant flora and fauna impacts, but the overall project, particularly charcoal production as having a large net effect.

5.8.3 The Department's Consideration

The Department is satisfied that the Applicant has adequately considered the impacts of the proposed development on flora and fauna. The effects of the development on threatened species, populations or ecological communities, and their habitats was addressed by the Applicant in accordance with Section 5A of the *Environmental Planning and Assessment Act 1979* (the 8-part test).

From the information presented in the Environmental Impact Statement, it is evident that the flora and fauna present on, and in the vicinity of the proposed development site is highly degraded. There are a number of introduced species in the area, both flora and fauna, and the absence of appropriated habitat areas on the site makes it unlikely that the few species listed as vulnerable or endangered in the Wallerawang area would be detrimentally affected by the proposal. The Department does, however concur with the Applicant's belief that proposed landscaping measures for the site would enhance the habitats appropriate to encouraging native species back to the area. As such, the recommended instrument of consent includes the requirement for the Applicant to develop a Landscape Management Plan aimed at optimising the potential "native regeneration" of the site. The Plan must be prepared in consultation with Council and be approved by the Director-General. The condition relating to the Plan requires the Applicant to maximise the use of endemic native flora species when landscaping the site.

The Department recognises that although the flora and fauna impacts of the smelter component of the silicon project are negligible, the overall impacts of the project (quartz mine, silicon smelter and charcoal) may be significant. This issue has been highlighted in the vast majority of submissions received for each of the three component developments. Logging of native forests for the production of charcoal may have immeasurable and irreparable consequences in the context of species loss through loss of habitat and indirectly through salination, erosion and global warming as a result of the loss of carbon-sinks.

As the flora and fauna impacts of the overall development are most closely related to the production of charcoal for the silicon smelter, the Department considers that the most appropriate process for the assessment of these impacts would be through a development application for a proposed charcoal production facility. As discussed in section 3 of this report, a development application was lodged by Australian Silicon Pty Ltd on 28 August 2000 for the construction and operation of a charcoal production facility (DA No. 248-07-00) at Gunnedah. This development application was subsequently withdrawn by the Applicant to allow further investigations into wood-sourcing options to be investigated.

To ensure that the flora and fauna impacts of the overall project are appropriately mitigated, the Department recommends that the key component of the project, the proposed silicon smelter at Lithgow, be granted as a deferred commencement consent, as described in section 3 of this report. Condition 1 of the recommended instrument of consent requires the Applicant to supply, for the approval of the Director-General, details of where charcoal will be produced before the consent becomes operative. The aim of the consent, in this respect, would be to ensure that the charcoal supply to the proposed silicon smelter would come from a charcoal production facility that had undergone a full assessment of environmental impacts (or equivalent outside NSW). That is, the flora and fauna impacts of the charcoal production facility have been fully considered.

Department's Position: The Department is satisfied that the proposed silicon smelter will have negligible impact on flora and fauna. This position is supported by the National Parks and Wildlife Service. The recommended instrument of consent includes the requirement for the Applicant to prepare a Landscape Management Plan that maximises the use of native flora species for landscaping.
In considering the silicon project as a whole, the Department considers it important to assess the downstream effects of logging on flora and fauna. To this end, the Department recommends a deferred commencement consent that requires the Applicant to indicate where charcoal for the proposed smelter will be sourced. Any charcoal production facility proposed to supply the silicon smelter must be subjected to an assessment process in which the flora and fauna impacts have been considered.
The Department is satisfied that the recommended instrument of consent incorporates mitigation measures that ensure the proposed smelter, and overall silicon project do not operate to the detriment of flora and fauna.

5.9 Impacts on Heritage Items

5.9.1 The Applicant's Position

5.9.1.1 Indigenous Heritage

In order to determine the potential for indigenous heritage sites to be found on or near the development site, the Applicant commissioned an independent archaeology and heritage consultant to undertake research and field investigations.

A number of investigations into local indigenous heritage have been conducted as part of various development proposals for the area. In particular, National Parks and Wildlife Service databases indicate that three such investigations have been conducted for proposed coal mining operations, all within a five-kilometre radius from the proposed smelter site. None of these investigations have discovered evidence to suggest indigenous heritage items near the subject site. In addition, an investigation was performed in 1998 as part of a proposal to relocate a railway bridge along the Castlereagh Highway. The southern part of the survey area for this investigation was within 50 metres of the proposed smelter site. No evidence of indigenous heritage items was found.

Further to the results of these investigations, National Parks and Wildlife Service databases indicate that there are three important former indigenous open campsites located adjacent to Cox's River, approximately 1.5 kilometres to the north-west of the site. A destroyed burial/ carved tree is situated on the northern outskirts of Wallerawang, 1.8 kilometres to the west of the development site. There are also four campsites located five kilometres to the southeast of the site.

A field survey was performed on the proposed smelter site. Prior to this survey, the Bathurst Local Aboriginal Land Council was consulted. A representative of the Land Council was also in attendance during the survey. The Environmental Impact Statement indicates that no indigenous heritage items were identified on the site during the survey. This has been attributed to the fact that an estimated 75% of the site is considered to be inappropriate for the location of such heritage items, and the fact that 90% of the site is already highly disturbed.

The Applicant concludes that it is unlikely that any aboriginal heritage item would be discovered on the site during construction or operation. It is indicated, however, that if such an item should be uncovered, construction/ operation would cease immediately and the National Parks and Wildlife Service would be contacted for advice. Any direction made by NPWS would be followed by the Applicant.

5.9.1.2 Non-Indigenous Heritage

A search of relevant heritage databases, undertaken by a heritage consultant on behalf of the Applicant, four non-indigenous heritage items were identified as being located within the vicinity of the proposed development site:

- the abandoned Newnes Junction-Sodwalls Rail Line;
- the disused Cox's River Rail Bridge;
- the Walker/ Barton Family Private Cemetery; and
- the Lidsdale Railway Overpass.

Both the abandoned Newnes Junction-Sodwalls Rail Line and the Walker/ Barton Family Private Cemetery are listed as heritage items under Schedule 1 of the *Greater Lithgow Local Environmental Plan 1994*. As such, these items are also subject to the provisions of the LEP, as considered in section 4.7 of this report.

The Cox's River Rail Bridge is some 200 metres from the site boundary while the Walker/ Barton Family Private Cemetery lies 600 metres from the site. The Environmental Impacts Statement indicates that given the location of these items, and their distance from the

development site, it is unlikely that they will be impacted during the construction or operation of the smelter.

The Lidsdale Railway Overpass was assessed by the Roads and Traffic Authority in 1998 as part of investigations into a proposed road realignment and bridge replacement. In the RTA's assessment, it was concluded that the Overpass only represented local heritage significance and could not be defined as a heritage item. However, under the *Heritage Act 1977*, the Overpass is over fifty years old and therefore classified as a relic. The Applicant recognises the importance of this item and indicates that it will not be affected by the proposed development.

Only part of one of the items identified, the Newnes Junction-Sodwalls Rail Line, is located on the proposed development site. The EIS suggests that a number of measures will need to be employed during construction and operation of the proposed development to ensure that the Rail Line is not adversely affected. In addition to erecting a fence around the Rail Line, the Applicant proposes to:

- clean the drain under the Rail Line embankment to prevent flooding;
- pump stormwater to the drain at a rate able to be accommodated by the drain;
- provide erosion control measures at the inlet and outlet of the drain.

The Applicant believes that the proposed measures will ensure that the Rail Line is not impacted, nor will its integrity be compromised by erosion of the underlying stormwater drain. It has also been indicated in the EIS that should additional items of non-indigenous heritage be uncovered on the site during construction and operation, the Heritage Office will be contacted regarding the most appropriate conservation measures to be employed.

5.9.2 Submissions from the Public, Authorities and Councils

The National Parks and Wildlife Service highlighted in its submission that it had no specific comments related to indigenous heritage issues.

In its submission, the NSW Heritage Office noted that the assessment of impacts of the proposed development on non-indigenous heritage items was undertaken in a satisfactory manner. The impacts of the development on identified heritage items would be negligible, and therefore, approval from the Heritage Office would not be required for any component of the proposal. However, the Heritage Office requested that, should consent be granted for proposal, a condition be included in the consent requiring the Applicant to consult with the Office in the event that any non-indigenous items are discovered during the construction or operation of the smelter.

5.9.3 The Department's Consideration

The Department concurs with the conclusion presented in the Environmental Impact Statement that the proposed development will not have a significant impact on indigenous or non-indigenous heritage. It is noted that the only heritage item located on the development site is the Newnes Junction-Sodwalls Rail Line, which the Applicant has clearly indicated will not be affected by the development. Rather, it is more likely that the Rail Line will be positively impact by the improvements to drainage required during the construction and operation of the smelter.

The Applicant's position on heritage is supported by both the NSW Heritage Office and the National Parks and Wildlife Service. Both agencies are satisfied that heritage items will either not be affected, or will be treated in an appropriate manner. The Department notes that a representative of the Bathurst Local Aboriginal Land Council was in attendance during the site survey to identify potential indigenous relics. The Land Council has indicated that it has no objection to the proposed development.

In the event that heritage items are uncovered during the construction or operation of the propose smelter, the recommended instrument of consent requires all work to cease and the Applicant to consult with the appropriate authority regarding the most appropriate course of action. These authorities are the NSW Heritage Office for non-indigenous heritage, and the National Parks and Wildlife Service for indigenous heritage.

Department's Position: The Department is satisfied that the Applicant has fully considered the potential impacts of the proposed smelter on heritage items. This position is supported by the National parks and Wildlife Service and the NSW Heritage Office. Although the development is not expected to impact on known heritage items, the recommended instrument of consent requires the Applicant to consult with the relevant authority should additional items be discovered. **The Department considers that the recommended instrument of consent fully mitigates any potential impacts on matters of indigenous and non-indigenous heritage.**

5.10 Impacts of Waste Management and Production

5.10.1 The Applicant's Position

5.10.1.1 Construction Waste

The Applicant states that there will be no demolition work required during the preparation of the development site. As such, the only waste expected to be generated during the construction of the smelter will be scrap building material including wood, metal and materials used in packaging. Where economically feasible, the Applicant intends to recycle these materials. All soil disturbed during the preparation of the site for construction will be retained and employed for the landscaping of the site.

5.10.1.2 Operation Waste

In addition to high-grade silicon metal product, the Applicant indicates that second-grade silicon material, including 17,000 tonnes per annum of silica fume and 1,245 tonnes per annum of slag, will be produced. Both of these by-products will be bagged and sold to metal merchants for use in low-grade silicon applications, or for the recovery of trace metals in the case of slag. Other "waste" products from the smelting process, in particular charcoal fines and dust collected from the process ventilation system, will be bagged and sold as potting mixer. The EIS indicates that these potting mixer materials will account for approximately 800 tonnes per annum.

It is estimated that in the vicinity of 550 tonnes per annum of material will be yielded from the operation of the furnace that is of insufficient quality for sale or reuse. This material may result from operational difficulties with the smelter, or through the regular replacement of furnace refractory material. It is in the economic interest of the Applicant to minimise this waste stream (as it represents lost product and additional maintenance expenditure). The EIS states that any material produce in this manner will be sold to scrap merchants and not sent to landfill.

The Environmental Impact Statement also indicates that waste material will be reused wherever possible. This will be the aim for materials such as pallets and wooden boxes, which can be collected and recycled by the respective contractors and/ or suppliers. Other materials, including cardboard boxes, paper and machinery oil and grease can be similarly collected for recycling. The Applicant expects that almost 2.5 tonnes per annum of waste can be recycled or reused.

There will only be minor amounts of waste generated during the operation of the proposed development that are unable to be sold, recycled or reused. This will include less than 1 tonne per annum of laboratory waste that the EIS indicates will be collected by a licensed waste contractor for appropriate treatment. In addition, minimal quantities of non-hazardous general waste resulting from daily human activities will be collected by an external contractor for disposal to landfill. A Waste Management Plan is proposed by the Applicant. This Plan will outline measures to promote reuse and recycling, as well as handling procedures for specific waste streams.

5.10.2 Submissions from the Public, Authorities and Councils

There were no submissions received that highlighted the management or generation of waste as being a concern to the public. The EPA did, however, include in its General Terms of Approval, a requirement that the proposed smelter shall not receive waste, nor dispose of waste on the development site. In addition, the EPA required the Applicant to ensure that any hazardous waste was stored, handled and disposed in an appropriate manner, and by a party licensed by the EPA.

5.10.3 The Department's Consideration

The Department is generally supportive of the measures proposed by the Applicant to manage waste at the smelter. In general, initiatives follow the best practice principles of reducing, reusing and then recycling waste streams. The Waste Management Plan proposed in the EIS is considered to be an appropriate means by which the Applicant can establish waste management procedures at an early stage of construction and operation of the smelter. This Plan has been incorporated into the recommended instrument of consent.

The EPA's General Terms of Approval relating to waste management have been included as conditions of consent. The Department concurs fully with the EPA's approach in this respect.

Department's Position: It is recognised that waste generation at the proposed smelter will be low, due to the implementation of waste management strategies proposed by the Applicant. These strategies will be incorporated into a Waste Management Plan required under the recommended instrument of consent, and be approved by the Director-General. **The Department is satisfied that the conditions imposed through the consent for this proposal will be sufficient to ensure that waste is managed in an appropriate manner and that any potential impacts as a result of waste generation are adequately mitigated.**

6. CONSIDERATION OF ISSUES RAISED IN SUBMISSIONS

The Department received a total of 659 submissions in response to the exhibition of the Environmental Impact Statement and development application for the proposed silicon smelter.

Ten submissions were received from State government authorities, two of which are integrated approval bodies for the development:

- Environment Protection Authority (integrated approval body);
- Roads and Traffic Authority (integrated approval body);
- Sydney Catchment Authority;
- National Parks and Wildlife Service;
- Department of Mineral Resources;
- Rail Access Corporation;
- NSW Heritage Office;
- NSW Fire Brigades;
- State Forests; and
- Department of State and Regional Development.

Four submissions were received from local councils, one of which represents the local government area in which the silicon smelter is proposed. It is noted that the proposed quartz mine intended to supply the silicon smelter is to be located in Cowra Shire:

- Lithgow City Council (local government area);
- Cowra Shire Council;
- Blayney Shire Council; and
- Blue Mountains City Council.

A total of 645 submissions were received from individual members of the public:

- 39 from interest groups;
- 6 from business groups; and
- 600 from individual members of the public.

A summary of the major issues raised by each of these parties is provided below.

6.1 Submissions from Authorities

All submissions received from authorities indicated support for the proposed silicon smelter. A number of submissions raised concerns regarding the impacts of the smelter and the overall Australian Silicon Project. To address these concerns, the respective authorities requested the inclusion of a number of conditions in the consent. All of these conditions have been incorporated into the recommended instrument of consent as detailed below.

As integrated approval bodies, both the Environment Protection Authority and the Roads and Traffic Authority have supplied General Terms of Approval for the proposed development. Both agencies have indicated that the relevant integrated approvals/ licences can be issued. General Terms of Approval have been incorporated into the recommended instrument of consent. The EPA and RTA were supplied with a draft copy of the instrument for comment, and both agencies indicated that the recommended conditions reflect the scope and intent of their General Terms. The EPA indicated that it saw major issues with the proposed development as being noise, air quality, pollution of nearby waterways and disposal of waste. The RTA indicated a major issue is construction of infrastructure to access the site.

Sydney Catchment Authority highlighted the objectives and provisions of *State Environmental Planning Policy No. 58 – Protecting Sydney's Water Supply* (considered in section 4.6 of this report). SCA also supported the preparation of a Soil and Water Management Plant for the proposed development. It was noted that the Plan should detail connection of the site to the reticulated sewerage system, stormwater control, design of the first-flush system and control of erosion during construction and operation. The potential impacts of fire and logging for fluxwood on water quality in the catchment were also highlighted. The recommended instrument of consent requires the preparation of a Soil and Water Management Plan, a Fire Safety Study and the logging of only plantation sources for use as fluxwood. The Sydney Catchment Authority sees the protection of water quality in Cox's Creek and Lake Wallace as being a major issue related to this development.

The NSW National Parks and Wildlife Service stated in its submission that it has no specific comments related to the impacts of the proposed smelter on flora, fauna or indigenous heritage. It did however, indicate concern that the development application for the smelter may be determined before the environmental impacts of the overall project (particularly related to logging and charcoal production) could be assessed. As detailed in section 3 of this report, the withdrawal of the development application for the proposed charcoal plant at Gunnedah, and the absence of resolution between the Applicant and State Forests regarding viable wood sources in New South Wales has prevented the impacts of logging being assessed. However, the Department recognises the high importance of this issue, particularly in the context of the overall sustainability of the Australian Silicon Project. As such, it is recommended that should approval be granted for the proposed smelter, the approval be granted as a deferred commencement. Condition 1 of the recommended instrument of consent (the "unlocking" condition) aims to ensure that the source of charcoal for the smelter has, or will, undergo a comprehensive assessment process. Inherent in this condition is the assumption that for approval of a charcoal production facility, the facility would need to be assessed as being environmentally sustainable, and an appropriate wood source (having undergone assessment by the relevant authority) would need to be available. The Department considers that this approach will ensure that the overall impacts of the Australian Silicon Project are fully determined and mitigated where necessary.

The Department of Mineral Resources (DMR) indicates that it "strongly supports the development application". This support is based on the proposal representing a responsible minerals processing project that will utilise high quality NSW minerals. DMR considers the

proposed processing technology is proven and environmentally sound. DMR has no issues of concern with the proposed development.

The major issue with the proposed development, as determined by Rail Access Corporation (RAC), is the lack of full consideration of the potential to haul raw materials and finished products by rail. RAC indicated its willingness to discuss rail options with the Applicant further. The Department encouraged these discussions with the result that the recommended instrument of consent now requires all major loads of materials from the site are to be transported by rail. The recommended instrument for the quartz mine also requires quartz transport from the mine to the smelter to be by rail. RAC has no further issues of concern with the proposed development.

Having considered the heritage assessment prepared for the proposed development, the NSW Heritage Office indicates that it has no objection to the proposal. The Department has included the Office's requested condition, regarding consultation in the event that further non-indigenous heritage items are uncovered on the site, in the recommended instrument. The Heritage Office has no further issues of concern with the proposed development.

The NSW Fire Brigades submitted correspondence to the Department indicated that they were satisfied that fire safety on the development site had been adequately addressed. A Fire Safety Study is required to be prepared under the recommended instrument of consent for approval by the Director-General and the NSW Fire Brigades.

State Forests supports the proposed development. In its correspondence, State Forests outlined the fact that negotiations with the Applicant were on-going with regard to an appropriate wood source for the production of charcoal to supply the smelter. The condition in the recommended instrument of consent requiring the Applicant to plant and maintain a native wood plantation is supported by State Forests. State Forests sees significant potential for the Australian Silicon Project to drive commercial establishment of planted forests in NSW, combating dry-land salinity and providing economic benefits to rural NSW.

The Department of State and Regional Development (DSRD) supports the proposed development on the basis of the significant benefits it will bring to NSW. DSRD has not highlighted any issues of concern.

Department's Position: The Department considers that all submissions from authorities have been duly considered. All recommended conditions and General Terms of Approval have been included in the recommended instrument of consent.

6.2 Submissions Made by Councils

Four submissions were received from local councils by the Department in respect of the proposed silicon smelter. Of these submissions, only Lithgow City Council supported the smelter. Cowra, Blayney and Blue Mountains Councils strongly objected to the development, based on the up- and downstream effects of the smelter on their local government areas. Issues raised by each of the Councils are summarised below.

Lithgow City Council strongly supported the proposed smelter based on the significant socio-economic impacts of the development on the Lithgow area. Council recommended a number of conditions of consent, related in particular to traffic impacts. These conditions included a requirement for the Applicant to further investigate the use of rail haulage for both raw materials and finished products. Where rail was not used, Council requested the Applicant develop a Transport Code of Conduct to mitigate and manage traffic impacts. With respect to noise impacts, Council requested the recommended instrument of consent be drafted to require the Applicant to act in the event that noise criteria at nearby residences is exceeded. These recommendations have been incorporated into the instrument.

Blue Mountains City Council raised concerns regarding the potential for the proposed smelter to negatively impact air quality in its local government area. Through discussions with the EPA, the Department considers that air quality impacts from the proposed smelter will be minimal, and will not affect the Blue Mountains local government area. Council also raised

concerns related to the transport of finished silicon products through the Blue Mountains. This has been addressed by requiring the materials to be hauled by rail.

Both Cowra and Blayney Shire Councils objected to the proposed development due to the impacts of traffic on their local government areas. This issue has been addressed by requiring the Applicant to use rail for transport of all raw materials (refer to the assessment report for the proposed quartz mine) and finished silicon products.

Department's Position: The Department has duly considered comments made by local councils, in particular Lithgow City Council with regard to the proposed silicon smelter. Lithgow City Council's comments are generally supported by the Department and all recommended conditions of consent have been included in the instrument of consent. **The Department is satisfied that all issues raised by local councils, particularly Lithgow City Council, have been addressed in the instrument of consent.**

6.3 Submissions Made by the Public

In response to the exhibition of the development application and Environmental Impact Statement for the proposed silicon smelter, the Department received 645 submissions of objection from the public. There were no public submissions supporting the proposal. It should be noted that a significant number of the submissions did not specifically object to the silicon smelter. Rather, they objected the Australian Silicon Project (quartz mine, silicon smelter and charcoal plant) as a whole. Major issues related to the impact of the whole Project were the impacts of logging of native forests for the production of charcoal and the transport of quartz from the mine to the smelter. Approximately 375 of the 645 submissions against the smelter were received from residents in the Cowra area (location of the proposed quartz mine).

The key issues raised in public submissions are summarised below. The location within this report of consideration of each of the issues is also indicated.

- Consideration of alternative carbon sources - section 3.5;
- Lack of community involvement - section 4.1.4;
- Dust emissions - section 5.1;
- Greenhouse gas emissions - section 5.1;
- Road safety - section 5.2;
- Impact of B-doubles on local roads - section 5.2;
- Lack of consideration of rail transport - section 5.2;
- Increased traffic flow through the centre of Cowra - refer to assessment report on the quartz mine (DA No. 295-12-99);
- Noise impacts on neighbouring properties - section 5.3;
- Pollution of Cox's River - section 5.5;
- Disposal of blowdown to sewer - section 5.5;
- Impacts of logging on native forests - section 5.8;
- Loss of biodiversity and impact on threatened species - section 5.8.

Department's Position: The Department has duly considered submissions made by the public in response to the exhibition of the development application for the silicon smelter. Public concerns have been noted, and where relevant, the Department has drafted conditions of consent to address these concerns. All public submissions were forwarded to the Lithgow City Council, the RTA and EPA. **The Department considers that the public interest has been fully considered in the drafting of the recommended instrument of consent.**

6.4 Consultation with the Applicant

The Applicant has been supplied with a copy of the draft instrument of consent. Comments made by the Applicant have been given due consideration. The recommendations of the aforementioned authorities and the Applicant's requested alterations to the conditions of the instrument of consent have been reconciled to produce conditions to the satisfaction of the authorities, the Applicant and the Department.

7. SECTION 79C CONSIDERATION

The Department has assessed the development application in the context of Section 79C of the Act, having regard to the identified heads of consideration. The Department's assessment is given below, with references to sections of this report providing further consideration, where relevant. The Department is satisfied that the merits of the proposed development warrant approval subject to the recommended instrument of consent.

Section 79C requires that the consent authority, when determining a development application, takes into consideration the following matters.

(a) The provisions of:

(i) any environmental planning instrument;

In relation to the proposed silicon smelter, the following environmental planning instruments apply.

- *Environmental Planning and Assessment Act 1979 and Regulation 1998*
- *State Environmental Planning Policy No. 34 - Major Employment-Generating Industrial Development*
- *State Environmental Planning Policy No. 33 - Hazardous and Offensive Development*
- *State Environmental Planning Policy No. 11 - Traffic Generating Developments*
- *State Environmental Planning Policy No. 44 - Koala Habitat Protection*
- *State Environmental Planning Policy No. 58 - Protecting Sydney's Water Supply*
- *Greater Lithgow Local Environmental Plan 1994*
- *Council of the City of Greater Lithgow Development Control Plan No. 6 - Industrial Development*

Consideration of the aims and provisions of these instruments, in the context of the proposed development is outlined in section 4.

(ii) any draft environmental planning instrument that is or has been placed on public exhibition and details of which have been notified to the consent authority;

There are no draft environmental planning instruments relating to the development.

(iii) any development control plan;

The *Council of the City of Greater Lithgow Development Control Plan No. 6 - Industrial Development* applies to the proposed development. The Development Control Plan has been considered in section 4 of this report.

(iv) any matters prescribed by the regulations that apply to the land to which the development application relates.

In relation to (iv), clause 66 of the Environmental Planning and Assessment Regulation 1994 requires the following matters to be taken into consideration by a consent authority in determining an application:

66(a) The Government Coastal Policy (where relevant)

The *Government Coastal Policy* is not relevant to the proposed development.

66(b) In the case of a DA for the demolition of a building, the provisions of Australian Standard AS 2601-1991: The demolition of structures, as in force 1 July 1993.

No buildings will be demolished for the proposed development.

(b) the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality,

As outlined in this report, the major environmental impacts of the proposed development include those associated with air quality, traffic generation and noise. Through consultation with the EPA, it is considered that the impacts of the development on air quality and noise can be appropriately mitigated. All finished silicon products are required to be hauled by rail, reducing the impacts of the development on road traffic (particularly heavy vehicle movements) significantly. Other significant issues, including risk management, water quality impacts and impacts on flora and fauna have been fully considered in section 5. The Department considers that all environmental impacts have been fully addressed and that the recommended instrument of consent provides mitigating measures against those impacts which would otherwise have a significant on surrounding land uses.

The proposed development will have a positive impact on the socio-economics of the region. Given that the Lithgow area currently experiences higher unemployment than the State average, the silicon smelter, employing some 110 people full-time, will have a significant positive impact.

(c) the suitability of the site for the development,

The proposed silicon smelter is to be located in an area referred to as the Lithgow Minerals Processing Park. The proposal is permissible with consent under the *Greater Lithgow Local Environmental Plan, 1994*. The proposed development site is suitable for the construction and operation of a silicon smelter.

(d) any submissions made in accordance with this Act or the regulations,

A total of 659 submissions were in response to the exhibition of the development application for the silicon smelter. All matters raised in these submissions have been given due consideration, as summarised in section 6.

(e) the public interest.

It is in the public interest for operations at the proposed silicon smelter to be undertaken in a responsible and socially appropriate manner. The silicon smelter will directly and indirectly aid in generating employment within the Lithgow area. The Department considers that the net impact of the proposed development will be positive.

The substantial public interest with respect to conservation of native forests has been addressed by requiring any charcoal production facility proposed to supply the smelter to undergo an appropriate assessment process. This is facilitated with the deferred commencement provisions of the recommended instrument of consent.

Department's Position: The Department has considered the relevant matters outlined in Section 79C of the *Environmental Planning and Assessment Act 1979* when assessing the proposed silicon smelter. These matters have been duly considered in this report. **The Department is satisfied that the relevant requirements of the *Environmental Planning and Assessment Act 1979* have been met.**

8. RECOMMENDED CONDITIONS OF CONSENT

The recommended instrument of consent, including 95 conditions, is tagged "A". The draft conditions take into account the issues raised in submissions from the public, authorities and councils.

The conditions of consent have been drafted with the aims of controlling and monitoring the future environmental performance of the silicon smelter. In addition, a number of conditions have been recommended to restrict the operation of the smelter (particularly with respect to sourcing feed materials and transporting finished products), or impose mitigation measures, with the purpose of reducing potential environmental impacts to as low as reasonably possible. Key issues covered by the conditions include:

- **Deferred Commencement** - the Applicant is required to identify the source of charcoal for the smelter and consider the traffic impacts of transporting charcoal from that source before the consent becomes active.
- **Feed Materials** - fluxwood for the smelter has been restricted to plantation sources only. The Applicant is also required to regularly investigate and report on potential replacement carbon sources for charcoal. To offset the effects of logging, the Applicant is required to plant 20,000 acres (8093.7 hectares) of plantation forest.
- **Hazards Management** - a suite of hazards reporting requirements have been imposed to ensure the smelter does not pose a significant off-site risk. Hazards management is to be reviewed every three years through an independent Hazard Audit.
- **Noise Management** - construction times have been restricted in accordance with the EPA's recommendation. In addition, threshold noise criteria have been imposed for surrounding receivers.
- **Air Quality Management** - air quality limits have been set for a number of pollutants, including polychlorinated dibenzo-p-dioxins and polychlorinated bibenzo-furans. The Applicant is also required to develop a Greenhouse Gas Management Plan.
- **Water Management** - quality restrictions have been placed on discharges from the site. The use of collected for site irrigation is to be undertaken in accordance with the EPA's requirements.
- **Transport Management** - all finished silicon products transported from the smelter to port locations in NSW are to be hauled by rail. Where road transport is employed, a Transport Code of Conduct is to be prepared.
- **Community Involvement** - a Community Consultative Committee is to be formed and meet on a regular basis to discuss issues of concern related to the performance of the smelter.
- **Environmental Management** - the Applicant is to employ a qualified Environmental Officer to manage a series of Environmental Management Plans for the smelter. Environmental performance with respect to these plans will be reported annually in the Annual Environmental Management Report.
- **Environmental Auditing** - an independent environmental audit of the smelter, in accordance with ISO 14000, is to be undertaken every three years.

As highlighted in section 6.4, all relevant parties are satisfied with the draft instrument of consent and the scope and intent of the conditions. The Department considers that the recommended instrument consent will mitigate the environmental impacts of the smelter to an appropriate level.

9. CONCLUSIONS

The Department of Urban Affairs and Planning considers that the proposed silicon smelter is consistent with State and regional planning objectives. The development application accords with the objectives and provisions of regional and local planning instruments.

The Department considers that all key environmental concerns have now been adequately addressed. It is recommended that the development application be approved in accordance with the deferred commencement provisions of Section 80(3) of the Act and subject to the conditions of the recommended instrument of consent. Conditions have been formulated to manage, monitor and mitigate potential environmental impacts.

10. RECOMMENDATIONS

It is RECOMMENDED that the Minister:

(i) consider the findings and recommendations of the Department's Assessment Report for DA No. 268-11-99 (this document, tagged "B");
(ii) grant DEFERRED COMMENCEMENT consent to development application No. 268-11-99, as submitted by Australian Silicon Pty Ltd, subject to the conditions set out in the instrument of consent (tagged "A");
(iii) sign the instrument of consent (tagged "A")

Scott Jeffries
Major Hazards Specialist
Development and Infrastructure Assessment

ENDORSED:

Sam Haddad
Executive Director
Sustainable Development

Appendix A - Silicon Smelter Locality Map

INSERT MAP HERE

Appendix B - The Silicon Smelting Process

INSERT PICTURE HERE

Appendix C - Consideration of Environmental Planning Instruments

Follow are considerations of the proposed silicon smelter in the context of the objectives and provisions of relevant environmental planning instruments.

- *State Environmental Planning Policy No. 34 - Major Employment-Generating Industrial Development*
- *State Environmental Planning Policy No. 58 - Protecting Sydney's Water Supply*
- *Greater Lithgow Local Environmental Plan, 1994*
- *Council of the City of Greater Lithgow Development Control Plan No. 6 - Industrial Development*

STATE ENVIRONMENTAL PLANNING POLICY NO. 34 - MAJOR EMPLOYMENT-GENERATING INDUSTRIAL DEVELOPMENT

In assessing the applicability of SEPP 34 to the proposed silicon smelter, the following aims and provisions were considered.

Aims of the Policy

State Environmental Planning Policy No. 34, gazetted on 26 March 1993 aims to:

- *promote and coordinate the orderly and economic use and development of land and economic welfare of the State;*

  The proposed silicon smelter is proposed to be located in an area referred to as the Lithgow Minerals Processing Park. Development of the proposed site would be appropriate and orderly, given the area has been investigated as an appropriate location for energy-intensive industries (specifically minerals processing). The Silicon smelter would positively contribute to the economy and employment of the Lithgow area, and have roll-on economic effects for the region and the State. The Department considers that the silicon smelter represents an appropriate (in terms of social, environmental and economic considerations) use of available land.

- *facilitate certain types of major employment-generating industrial development of State significance;*

  The proposed silicon smelter represents an industrial development of major State significance. Through an expected $100 million investment, and the creation of approximately 110 permanent, full-time positions, the proposed development will offer positive impacts on the employment opportunities and economy of the Lithgow area and the State. Associated developments aimed at supply the smelter with raw materials, and possible future value-adding industries will further multiply this positive effect.

- *facilitate the carrying out of labour intensive rural industrial development of State significance;*

  This provision is not relevant to the proposed development.

- *achieve appropriate planning controls in respect of such development;*

  Consideration of the objectives and provisions of relevant environmental planning instruments detailed in this assessment report indicate that all planning controls would be achieved with respect to the proposed silicon smelter.

- *provide for public participation and involvement in the assessment of applications for consent to carry out such development.*

  The public has been provided with opportunities to be involved with the assessment of this development, through the extended exhibition period for the development application. It is considered that this proposal has received substantial publicity, and in all cases the public has been encouraged to become involved.

Provisions of the Policy

- *Nothing in this Policy authorises the carrying out of a development if the carrying out of the development is not otherwise permitted, whether with or without development consent.*

  Under the *Greater Lithgow Local Environmental Plan 1994*, the silicon smelter is permissible with development consent within the 1(a) - Rural (General) zone. No

environmental planing instrument prohibits the construction or operation of the proposed development on the proposed site.

- *The provisions of Sections 84, 85, 86, 87(1) and 90 of the Act apply to and in respect of development (not being designated development) to which this policy applies in the same way as those provisions apply to and in respect of designated development.*

  The proposed smelter is considered designated development within the meaning of Schedule 3 of the *Environmental Planning and Assessment Regulation 1994*. As such, Sections 84, 85, 86, 87(1) and 90 of the Act automatically apply to the development.

- *The consent authority must give notice to a council of any application for consent to carry out any development to which this Policy applies which is proposed to be carried out in the council's area.*

  Lithgow City Council was officially notified of the lodgement of a development application for the silicon smelter on 29 November 1999. This notification included copies of the Environmental Impact Statement and documentation relevant to the development application. Prior to this notification, Council had been actively involved in pre-lodgment consultative processes, including a Planning Focus Meeting (PFM) for the proposed development.

- *The notice is to invite the council to make a submission to the consent authority in respect of the application and is to specify the manner in which and the period, being not less than 30 days, during which a submission may be made.*

  At the time of notification of the development application, Council was invited to prepare a submission regarding the development. Council was advised that a submission, if prepared, should be forwarded to the Department by 24 January 2000. The period allowed between the notification and the submission deadline was in excess of 30 days.

- *In determining an application for consent to the carrying out of a development to which this Policy applies, the consent authority must consider any submissions made pursuant to Clause 10 or 11.*

  In recommending that the proposed silicon smelter be approved, the Department has considered all submissions made by the public, agencies and government bodies. Consideration of submissions is provided in sections 5 and 6 of this report.

STATE ENVIRONMENTAL PLANNING POLICY NO. 58 - PROTECTING SYDNEY'S WATER SUPPLY

Aims of the Policy

State Environmental Planning Policy No. 58, gazetted on 24 December 1998 aims to:

- *ensure that development in the hydrological catchment from which Sydney draws its drinking water supply does not have a detrimental impact on water quality;*

  From the information presented in the EIS for the proposed smelter, it is evident that the smelter will not detrimentally affect water quality in the hydrological catchment. The EPA has issued General Terms of approval relate to discharge water quality. The Department considers that the recommended instrument of consent will adequately mitigate any water quality impacts associated with the development.

- *provide, pending the commencement of the* Sydney water Catchment Management Act 1998*, a concurrence or notification role for the Director-General of the Department of Urban Affairs and Planning in relation to development in the hydrological catchment that is likely to have an impact on water quality;*

  The consent authority for the proposed development is the Minister for Urban Affairs and Planning, and as such this aim is not relevant.

- *ensure that there is a consistent approach to the assessment and control of development in the hydrological catchment that is likely to have an impact on water quality;*

  The Department is satisfied that the approach taken in assessing the development application is consistent with other developments of a similar undertaken previously, or likely to be assessed in future. The proposed development is consistent with all provisions and objectives of environmental planning instruments applying to the site and surrounding areas.

Matters for Consideration

In relation to any development or activity proposed to be carried out on land to which this Policy applies, a consent authority in exercising functions under Part 4 of the Act, a proponent or determining authority in exercising functions under Part 5 of the Act, and the Director-General in exercising functions under this Policy, must consider the following:

- *whether the development or activity will have a neutral or beneficial effect on the water quality of rivers, streams or groundwater in the hydrological catchment, including during periods of wet weather;*

  The Department is satisfied that the mitigation measures proposed by the Applicant, and those imposed through the instrument of consent will ensure that, at worst, the smelter will have a neutral effect on rivers, streams and groundwater within the hydrological catchment. It is possible that water discharged from the development site will have a net positive effect on the catchment by diluting contaminants in cooling water blowdown from the Wallerawang Power Station. Stormwater will be effectively managed through a first flush system to minimise the impact of suspended solids washed from the site.

- *whether the water quality management practices proposed to be carried out as part of the development or activity are sustainable over the long term;.*

  Management practices proposed for the site have been developed in accordance with relevant guidelines published by DLWC and the EPA. The recommended instrument of consent requires the Applicant to develop and implement Management Plans to ensure

water management practices are sustainable over the long term. Both the EPA and the Department supports the Applicant's implementation of water cycle management measures such collected water reuse for irrigation.

- *whether the development or activity is compatible with relevant environmental objectives and water quality standards for the hydrological catchment when these objectives and standards are established by the Government.*

  The water quality objectives for the catchment have yet to be established. The Department is advised that the water quality objectives will be based on the findings of the Healthy Rivers Commission inquiry into the Hawkesbury-Nepean River system. These objectives will form part of the Regional Environmental Plan. The EPA has indicated that the imposed discharge water quality criteria are likely to be more stringent than those presented as water quality objectives for the catchment.

GREATER LITHGOW LOCAL ENVIRONMENTAL PLAN 1994

Aims of the Plan

The *Greater Lithgow Local Environmental Plan 1994*, gazetted on 2 December 1994 aims to:

- *recognise and promote the City of Greater Lithgow as a desirable and viable place in which to live and to visit and invest;*

  The construction and operation of the proposed smelter will have a significant effect on the economy and employment generation of the Lithgow area. The Department considers that the recommended instrument of consent will ensure that the environmental impacts of the development are appropriately mitigated to ensure the continued desirability and viability of the local government area. Overall, it is expected that the roll-on effects of the smelter will have a positive effect on investment at a local, regional and State level.

- *encourage the proper management, development and conservation of natural resources and the built environment within the City of Greater Lithgow by protecting, enhancing or conserving:*

  i) prime crop and pasture land,

  The proposed development site, although previously used for grazing, does not represent prime crop and pasture land. The construction and operation of the smelter will not result in the loss of a significant quantity of agricultural land, nor will it fragment prime crop and pasture land.

  ii) timber, minerals, soil, water quality, stream environment and other natural resources,

  Fluxwood for the proposed smelter is to be sourced within the Greater Lithgow local government area. The recommended instrument of consent requires the Applicant to source all fluxwood from plantations. The Department considers that this condition requires the proper management and conservation of timber resources in the area.

  iii) places of significance for nature or heritage conservation,

  The Applicant had undertaken an extensive survey of indigenous and non-indigenous. The only heritage item identified on the development site, and potentially being affected, is the Newnes Junction-Sodwalls Rail Line. The Applicant has proposed a number of measures to ensure that this heritage item is adversely affected. The Department considers that drainage work proposed at the development site will act to prevent flooding of the item, and minimise its future damage.

  The proposed development site is highly disturbed. As such, there is little of natural significance on the site.

  iv) places or features of high scenic ore recreational value, and

  Although the visual aspect around the proposed development is heavily dominated by the form of the Wallerawang Power Station it is noted that the area retains a significant scenic value. As such, the Applicant has been required, through the recommended instrument, to develop and implement a Landscape Management Plan with the aim of blocking the minor negative impacts of the smelter on local visual amenity. A condition is also recommended that requires lighting to be directed in such a manner as to minimise off-site nuisance. This

condition has been extended to include mitigation of lighting impacts on Darbys Creek Observatory.

- *replace the former local planning controls with a comprehensive local environmental plan to help facilitate growth and development of the City of Greater Lithgow in a manner which is consistent with the aims specified above and which:*

  i) minimises the environmental cost to the community of fragmented and isolated development of rural land which has less than full provision of services,

  The proposed smelter is to be located in an area earmarked as the Lithgow Minerals Processing Park. This area is proposed for the location of future energy-intensive industries. As such, it is unlikely that the smelter will be an isolated development contributing to fragmented development. The site is currently connected to a raw water supply. Depending on the determination of this proposal, Council has undertaken to construction and operate a reticulated sewerage system for the Minerals Park, including a wastewater treatment plant. The site is fully service with rail and road access, and given the proximity of the Wallerawang Power Station, does not pose any issues with regard to connect with an electricity supply.

  ii) facilitates the efficient and effective provision of amenities and services,

  Lithgow City Council, in accordance with Section 94 of the *Environmental Planning and Assessment Act 1979* has requested $20,400 from the Applicant to be used to improve bushfire services. The Department considers that this is a significant contribution to local services.

  iii) facilitates a range of residential and employment opportunities in accordance with demand,

  The proposed smelter will employ approximately 110 people on a full time basis. These positions will be filled predominantly by the local community.

  iv) facilitates farm adjustments,

  This aim is not relevant to the proposed development.

  v) ensures the safety and efficiency of arterial roads is not adversely affected by development on adjacent land,

  The Applicant has been required, as a General Term of Approval of the RTA, to construct a rural seagull type junction for access to the site. All associated roadworks will be completed to the satisfaction of the RTA, as integrated approval body under the Roads Act. The recommended instrument of consent requires the development to be screened from adjacent roads with appropriate vegetation screens, and for lighting to be directed away from roadways. The Department is satisfied that these measures will ensure that the proposed smelter will not adversely affect roads or traffic.

  vi) minimises the impact of flooding and bushfires,

  Through appropriate drainage management, flooding of the site and adjacent land will be avoided. Flooding potential will be further minimised as a result of cleaning and maintenance of the drainage line under the Newnes Junction-Sodwalls Rail Line. The issue of bushfires is to be considered as part of the Fire Safety Study required under the recommended instrument. The Landscape Management Plan will also be required to address natural bushfire barriers (fire breaks and vegetation separation, for example).

vii) encourages the separation of conflicting land uses,

Given the location of the smelter within the Lithgow Minerals Processing Park, it is likely that other energy intensive industries will locate adjacent to the smelter in the future. Concentration of such industrial developments in this location does not pose a significant conflict with the current surround rural grazing land use.

viii) establishes measures to preserve water quality in the City's streams and waterways, and

The EPA's General Terms of Approval have imposed a series of discharge water quality criteria on the development to ensure nearby waterways are not adversely affected. The Soil and Water Management Plan required under the recommended consent will outline measures to be employed to preserve water quality in Cox's River and Lake Wallace.

ix) facilitates the protection of the catchment areas within and downstream of the City area in accordance with the principle of total catchment management.

The Department considers that the smelter is consistent with the objectives and provisions of *State Environmental Planning Policy No. 58 – Protecting Sydney's Water Supply*.

Objectives of Zone 1(a) - Rural (General)

The object of the 1(a) Rural (General) Zone is to promote the proper management and utilisation of natural resources by:

- *protecting, enhancing and conserving:*

i) rural land, in particular prime crop and pasture land, in a manner which sustains its efficient and effective agricultural production potential,

The proposed development site is not considered prime crop or pasture land. The site is currently used for low-scale grazing and the development of the site would not lead to fragmentation of grazing or crop land.

ii) soil, by controlling and locating development in accordance with soil capability,

Information presented in the Environmental Impact Statement indicates that the site is solid and suitable for development. There is no evidence of landfill having occurred on site. Site irrigation will be undertaken in accordance with EPA guidelines to prevent nutrient overload of soils.

iii) forests of existing and potential commercial value for timber production,

Fluxwood for the smelter is required to be sourced from plantations, as a condition of the recommended consent. It is considered that this condition will not only aid the preservation of native forests in the Lithgow area, but may encourage commercial timber plantations.

iv) value deposits of minerals, coal and extractive materials, by controlling the location of development for other purposes in order to ensure the efficient extraction of those deposits,

The proposed development site does not represent a likely location for significant deposits of minerals, coal or extractive materials. Therefore the position of the smelter on the site will have no effect on the future extraction of any such materials.

v) *trees and other vegetation in environmentally sensitive areas, where the conservation of the vegetation is significant for scenic amenity or natural wildlife habitat or is likely to control land degradation,*

The smelter is not proposed to be located in an environmentally sensitive area. However, as a result of site landscaping after the construction of the smelter, it is expected that vegetation screens will enhance both the scenic amenity of the area and encourage native wildlife back to the area.

vi) *water resources for use in the public interest, preventing the pollution of water supply catchment and major water storages,*

The EPA's General Terms of Approval have imposed a series of discharge water quality criteria on the development to ensure nearby waterways are not adversely affected. The Soil and Water Management Plan required under the recommended consent will outline measures to be employed to preserve water quality in Cox's River and Lake Wallace. The Department considers that the smelter is consistent with the objectives and provisions of *State Environmental Planning Policy No. 58 – Protecting Sydney's Water Supply*.

vii) *localities of significance for nature conservation, including places with rare plants, wetlands and significant wildlife habitat, and*

Neither the proposed development site, nor surrounding areas represent localities of significance for nature conservation.

viii) *items of heritage significance,*

The Applicant had undertaken an extensive survey of indigenous and non-indigenous. The only heritage item identified on the development site, and potentially being affected, is the Newnes Junction-Sodwalls Rail Line. The Applicant has proposed a number of measures to ensure that this heritage item is adversely affected. The Department considers that drainage work proposed at the development site will act to prevent flooding of the item, and minimise its future damage.

- *preventing unjustified development of prime crop and pasture land for purposes other than agriculture,*

  The proposed development site, although previously used for grazing, does not represent prime crop and pasture land. The construction and operation of the smelter will not result in the loss of a significant quantity of agricultural land, nor will it fragment prime crop and pasture land.

- *facilitating farm adjustments,*

  This objective is not relevant to the proposed development.

- *minimising the cost to the community of:*

  i) *fragmented and isolated development of rural land, and*

  The proposed smelter is to be located in an area earmarked as the Lithgow Minerals Processing Park. This area is proposed for the location of future energy-intensive industries. As such, it is unlikely that the smelter will be an isolated development contributing to fragmented development. The site is currently connected to a raw water supply. Depending on the determination of this proposal, Council has undertaken to construction and operate a reticulated sewerage system for the Minerals Park, including a wastewater treatment plant. The site is fully service with rail and road access, and given the proximity of the

Wallerawang Power Station, does not pose any issues with regard to connect with an electricity supply.

ii) providing, extending and maintaining public amenities and services,

Lithgow City Council, in accordance with Section 94 of the *Environmental Planning and Assessment Act 1979* has requested $20,400 from the Applicant to be used to improve bushfire services. The Department considers that this is a significant contribution to local services.

- *providing land for other non-agricultural purposes, in accordance with the need for that development, and*

  The silicon smelter is a non-agricultural purpose for which the development has been identified as being suitable. It is considered that there is justified need for the smelter in the Lithgow area given the current levels of unemployment above the State average, and the lack of a diversified industrial base.

- *providing for the separation of conflicting land uses.*

  Given the location of the smelter within the Lithgow Minerals Processing Park, it is likely that other energy intensive industries will locate adjacent to the smelter in the future. Concentration of such industrial developments in this location does not pose a significant conflict with the current surround rural grazing land use.

Heritage Provisions

The heritage provisions of the *Greater Lithgow Local Environmental Plan 1994*, are to:

- *conserve the environmental heritage of the City of Greater Lithgow;*

  A comprehensive heritage assessment was undertaken for both indigenous and non-indigenous items during the preparation of the EIS. No heritage item will be adversely affected. The Newnes Junction-Sodwalls Rail Line will be conserved on the development site.

- *better plan integrated heritage conservation in to the planning and development control processes;*

  This provision is not relevant to the proposed development.

- *provide for public involvement in matters relating to the conservation of the area's environmental heritage; and*

  The public was involved with the heritage considerations of the proposed smelter through the exhibition of the development application and Environmental Impact Statement. It is noted that the Bathurst Local Aboriginal Land Council was actively involved in the assessment of indigenous heritage impacts.

- *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, as well as streetscapes and landscapes and the distinctive character that they impart to the City of Greater Lithgow.*

  The Newnes Junction-Sodwalls Rail Line will not be adversely affected by the proposed development. In fact, the Department considers that drainage works associated with the smelter will have a positive effect on the future conservation of this heritage item.

COUNCIL OF THE CITY OF GREATER LITHGOW DEVELOPMENT CONTROL PLAN No. 6 - INDUSTRIAL DEVELOPMENT

Objectives of the Plan

The specific objectives of the *Council of the City of Greater Lithgow Development Control Plan No. 6 - Industrial Development* are to:

- *identify suitable land in non urban and village areas, and set standards for all industrial development;*

  The "Lithgow Minerals Processing Park" has been identified as being an appropriate location for the development of energy-intensive industries, such as the proposed silicon smelter.

- *encourage growth in the industrial sector, provided that new industrial development does not present unacceptable risks to residential areas or other land, water or streams by way of pollution, hazards or otherwise;*

  The proposed smelter will have a significant positive effect on the area by encouraging further industrial development (the smelter is the first such development proposed for the area). It is possible that this development will encourage downstream processing industries in the region. This assessment report has assessed the risk posed to the biophysical environment through pollution, hazards etc and considers the risk minimal.

- *encourage applicants to act in their own interests by submitting fully substantiated and documented proposals, including hazards analysis where appropriate;*

  The Applicant submitted an EIS for the proposed development that fully complies with the requirements of the Act and Regulation. In accordance with *State Environmental Planning Policy No. 33 - Hazardous and Offensive Development*, a Preliminary Hazard Analysis was prepared to accompany the development application.

- *encourage a process which minimises problems with development proposals, through appropriate consultation prior to applications being submitted;*

  The Applicant undertook appropriate consultation prior to the development application being submitted. Notably this included consultation with relevant agencies at a Planning Focus Meeting, and consultation with the Bathurst Local Aboriginal Land Council.

- *encourage visual and operational compatibility between industrial development and residential areas;*

  The Landscape Management Plan required under the recommended instrument of consent is aimed at maximising visual screening of the smelter from surrounding residential development.

- *encourage improvements to the character and appearance of industrial development.*

  This issue will be addressed as part of the Landscape Management Plan.

Requirements Related to Visual Character

The Plan aims to ensure that industrial development in rural areas does not materially alter the open rural character of the particular locality. To achieve this aim, the IDO requires that:

- *industrial development should be sited, designed, screened and setback from site boundaries so that the visual impact of buildings, parking areas and other structures/*

alterations to natural landform, is minimal when viewed from adjoining land and public areas, particularly arterial roads, and the general rural character of the locality is maintained;

As considered in this assessment report, the visual impact of the proposed development will be minimal in the local setting. This impact will be further reduced with appropriate vegetation screening.

- *landscaping setbacks or other buffers should be provided to visually insulate adjoining development from the industry.*

  The proposed smelter is to be setback from the site boundary and landscaped in such a manner as to minimise visibility from adjacent land uses.

Requirements Related to Ribbon Development

The Plan aims to ensure that new industrial development in rural areas does not create a condition of ribbon development on arterial and major local roads. To achieve this aim, the IDO requires that:

- *no new points of access to arterial roads should be created;*

  A new access point is to be created on the Castlereagh Highway. Through consultations with Council, it was highlighted that this requirement is not relevant to the proposal as the access point will be used to serve the entire Lithgow Minerals Processing park.

- *buildings should be set back from the alignment of arterial or major local roads the maximum practical distance to offset any visual impact when viewed from those roads, and to maintain an open rural character;*

  The smelter will be setback from adjacent roads to minimise the visual impact of the development and lighting on these roads.

- *vehicular access should be arranged so that there is adequate sight distance and road pavement capacity for safe turning movements of industrial traffic into and out of the arterial road network.*

  The Roads and Traffic Authority, as the integrated approval body for the proposal under the Roads Act has indicated that the intended vehicle access route is appropriate.

Requirements Related to the Relationship with Agricultural Use

The Plan aims to ensure that industrial development in rural areas does not prejudice commercial agricultural production on the land or adjoining land. To achieve this aim, the IDO requires that:

- *industrial development should preferably be located on land of low agricultural suitability, as defined by the Department of Agriculture;*

  The site is not deemed to be of high agricultural importance.

- *industrial development should be sited so that it does not inhibit normal agricultural practice on adjoining land, for example, by inhibiting aerial spraying;*

  The development will not inhibit the use of adjacent land for agriculture, nor will it fragment existing agricultural land.

- *industrial development should be sited, designed and managed so that agricultural production potential of adjoining land is not inhibited by way of air, water, noise, odours or other pollution, siltation, hazards, traffic or otherwise.*

  The Department has assessed the environmental impacts of the proposed smelter within this assessment report. Surrounding land uses will not be significantly impacted as a result of the development.

Requirements Related to the Concentrations of Industrial Use

The Plan aims to avoid significant alterations to the character and function of rural areas through the concentration of industrial or similar development. To achieve this aim, the IDO requires that:

- *unless otherwise required by the particular circumstances, industrial developments should not be concentrated in a locality, in order to maintain a predominantly open rural character.*

  Industrial development is to be concentrated in the locality, following the principle of the Lithgow Minerals Processing Park.

Requirements Related to Services

The Plan aims to ensure that industries in rural areas are self contained in terms of utilities and other services, and do not create requirements for additional public spending on roads, bush fire safety or other services. To achieve this aim, the IDO requires that:

- *applications for industrial development should demonstrate how water supply, sewage and other waste disposal, power and drainage services are to be provided on-site, and how adjoining property is to be protected from any effects of these services.*

  The development application for the proposed smelter included this information.

- *applicants will be required to upgrade public roads and intersections and to make contributions to other services, so that industry has no net adverse impact on the road system or the funding of other services.*

  The Applicant is required to undertake roadworks for access to the site, to meet the requirements of the RTA. Council has also requested $20,400 for augmentation of bushfire services.

Requirements Related to Advertising Signs

The Plan aims to minimise any adverse impact from signage required for industrial development in rural areas. To achieve this aim, the IDO requires that:

- *advertising structures required for identification and directions adjoining arterial roads should be limited in size and to one structure only;*

  The Applicant proposes to employ a small sign at the entrance of the site for identification purposes. Council considers the sign appropriate.

- *advertising structures adjoining other roads will be limited in number, size and location to minimise any adverse visual impact.*

  The Applicant does not propose to employ signs other than for identification of the site.