Section Six

Project Evaluation and Conclusions

This section concludes the environmental assessment of the Somersby Fields Project. It presents an evaluation of the project in terms of biophysical, economic and social aspects and consistency with the principles of ecological sustainable development.

A series of conclusions are provided regarding the project's acceptability. These conclusions take into consideration the benefits and residual impacts of the project and the environmental and social commitments made by the Proponent.

6.1 INTRODUCTION

This section evaluates the impacts of the project by consolidating and reviewing the predicted impacts recorded in Section 4. Throughout this *Environmental Assessment*, emphasis has been placed upon achieving a sustainable development, ie. a development that not only provides high quality construction sand to meet the present and future needs of the Sydney and Central Coast communities but that also limits the impact upon the local environment and provides for long term ecological benefits. This would be achieved through the design of the project and adoption of a range of practical operational safeguards and management practices.

The approach to designing the project has focussed upon identifying those issues that the local and wider community and the government agencies indicated concern about and then investigating means by which to avoid or reduce the level of impacts to overcome the various concerns. The Proponent commissioned R.W. Corkery and Co. Pty. Limited and a team of nine specialist consultants to investigate and advise upon the most effective manner in which to mitigate or manage the issues raised. Project design was undertaken in an iterative manner to progressively address the potential impacts and to ensure that the residual impacts are within government-specified criteria or goals, accepted industry standards and/or realistic community expectations. Where residual impacts have been identified, eg. for groundwater resources, management options and contingency plans have been developed.

The predicted impacts of the project are initially evaluated in terms of biophysical, economic and social aspects (Section 6.2). This is followed in Section 6.3 by an evaluation of the project against the principles of Ecologically Sustainable Development. Based on these evaluations, and considering the commitments made by the Proponent in relation to impact minimisation and environmental management, Section 6.4 presents general conclusions regarding the acceptability of the project.

6.2 EVALUATION OF THE BIOPHYSICAL, ECONOMIC AND SOCIAL ASPECTS

6.2.1 Biophysical Considerations

The project would have a range of impacts on the biophysical environment. Section 4 of this document identified the potential biophysical impacts of the project, following the adoption of a number of design and operational procedures, mitigation measures and/or offset strategies. Assuming the commitments made by the Proponent in Section 5 are adhered to, these residual impacts are summarised as follows.

Topography

As a result of the proposed sand removal operation and replacement of dewatered clay fines within the final landform, the project would result in localised modification of the Project Site topography. The long term rehabilitation of the Project Site incorporating landform reconstruction would create a visually attractive landform providing for long term nature conservation and rural / residential land uses.

Surface Water Resources

As a result of the project, and the altered final landform, there would be minor changes to the existing boundaries between the various catchments of the Project Site, particularly in the Narara Creek catchment which would increase in area by 11.7ha (2.25% of total catchment). The design capacity of Project Site dams would ensure that there would be no increases in peak flows from the Project Site (to Narara Creek), ie. above existing peak flows, thereby avoiding any adverse impacts on flooding in the lower reaches of Narara Creek. Incorporated in the final landform would be a series of dams which would be able to support the nominated end land uses (including aquatic habitat) whilst also providing emergency fire fighting water supplies for the local rural fire service.

Water Quality

Detailed modelling of existing and proposed water quality leaving the Project Site has established that concentrations of total suspended solids, nitrogen and phosphorus would be lower than at present because of the effectiveness of the controls intended. Consequently, water quality downstream of the Project Site would effectively improve.

Groundwater Resources

The groundwater resources of the Central Coast are located within two principal geological units, namely the Hawkesbury Sandstone and the underlying Terrigal Formation. The Hawkesbury Sandstone has been categorised into three groundwater resource units with poor to fair water holding potential but excellent quality water. The aquifers of the underlying Terrigal Formation are high yielding (>40L/s) and dominantly fracture-controlled. Within the Somersby area, groundwater is largely derived from rainfall infiltrating the friable sandstone exposed at or near the ground surface and accessed primarily from the Hawkesbury Sandstone, typically between approximately 10m and 140m below surface.

Within a 1.0km radius of the Project Site, 39 groundwater bores were identified with yields of typically 2L/s or less. The bulk of the water pumped from groundwater bores in the Somersby area is used for horticultural and domestic uses, although the quantity of groundwater harvested annually is not well recorded.

Groundwater investigations on the Project Site have also identified a layer of perched groundwater, approximately 1.5m below the surface in the eastern section of the Project Site, and spring flows on the southern central section of the Project Site which contribute to base flows to Dam A.

The impact of the project on the local groundwater table was modelled by RCA Australia at three yearly intervals throughout the project life. The modelling took into account all existing, measurable groundwater aspects, assuming worst case scenarios where information was limited or unavailable. In addition, both the modelling and conclusions of the assessment by RCA Australia have been reviewed by Kalf and Associates Pty Ltd and confirmed to be appropriate for the project and the Project Site.

The results of the modelling predict the following impacts as a result of the project.

- For the life of the project, the groundwater drawdown is not predicted to exceed 4m beyond the Project Site. A drawdown of 1m would be limited to approximately 700m from the Project Site boundary with 3m drawdown confined to a maximum of 250m from the Project Site boundary.
- Within 1 year of the cessation of sand removal operations, the long term groundwater level would be re-established.
- Of the 39 bores identified within 1km of the Project Site, only two bores (one within the Somersby Public School grounds and one on the Daniel's property), are predicted to experience a reduction in saturated thickness (equivalent to available drawdown) of ≥10% (~13% and ~10% respectively). A further seven bores were predicted to experience a reduction in standing water level of between 1m and 3m, with this decrease affecting saturated thickness by generally less than 5%.

Of the seven springs identified on properties surrounding the Project Site:

- a significant loss of flow was predicted in two springs on the Cahill and Hawker properties as these are true groundwater springs;
- a moderate loss was predicted in the two springs on the Ozbaglar property; and
- a minor loss was predicted in the remaining springs on the Fischer, Weller and Gregory properties.

In most cases, long term recovery of spring flows would not be expected although the opportunity may exist to replenish some spring flows through deepening the excavations where the springs are present.

While there are no specific mitigation measures to counteract impacts on groundwater drawdown, the Proponent has committed to a comprehensive monitoring program to assess progressive impacts. The Proponent also proposes to 'make good' any significant losses in groundwater availability to local groundwater users should these be shown to be attributable to the sand removal operations. The Proponent has discussed the predicted drawdowns and losses in saturated thickness and spring flows with potentially affected land owners. Although predictions indicate any losses are unlikely to be observed within 6 years, the Proponent has provided written undertakings to each land owner to the deepening of existing or drilling of replacement bores or other possible feasible options. Available hydrogeological data records the presence of significant aquifers at depths of up to 80m and between approximately 110m and 140m within the Hawkesbury Sandstone indicating the likelihood of yield replacement to be highly likely.

Overall, the groundwater assessment has established that the groundwater impacts would be localised and that there are opportunities for the Proponent to "make good" any losses any surrounding land owner experiences as a result of the operation.

Air Quality

The air quality assessment concluded that assuming the implementation of the project design features, operational safeguards and mitigation measures summarised in Section 4.3.5 the potential impact on air quality at surrounding residences and Somersby Public School would be minor and would not exceed the recommended air quality goals. Specifically, the air quality modelling determined:

- incremental monthly dust deposition rates are predicted to be well below the 2.0g/m^2/month (maximum of 1.2 g/m^2/month) at all assessment locations;
- maximum 24-hour average PM_{10} concentrations are predicted to be less than the site specific goal 50µg/m^3 at all assessment locations;
- total annual average PM_{10} concentrations are predicted to be less than 21µg/m^3 at all assessment locations, thereby complying with the site specific goal of 30µg/m^3;

- as approximately 28.6% of the PM_{10} particle size fraction can be assumed to constitute $PM_{2.5}$, the worst case 24-hour average $PM_{2.5}$ levels were predicted to be in the order of 14µg/m^3 and annual average $PM_{2.5}$ in the order of 5.8µg/m^3, thereby satisfying the 24-hour average $PM_{2.5}$ goal of 25µg/m^3 and annual average $PM_{2.5}$ goal of 8µg/m^3;
- neither the Chronic Reference Exposure Level (REL) or Silicosis Potency criteria are predicted to be exceeded as a result of project dust / particulate emissions at either the most affected residences or the Somersby Public School;
- time weighted average concentrations for respirable silica would be below OHS goals; and
- all project air quality goals relating to SO_2 and NO_2 would be safely met.

Flora

The project would require the removal of 9.2ha of the Somersby Plateau Forest, of which 491ha have been mapped in the Gosford LGA, and 3.6ha of the Hawkesbury Banksia Scrub-Woodland, of which 4 341ha or similar communities have been mapped in the Gosford LGA. These losses represent 2% and 0.1% of each community within the Gosford LGA respectively, a comparatively minor decrease, albeit in the short term as both enhancement of existing native vegetation and progressive revegetation of endemic flora species would gradually minimise the impacts of these losses.

Of the threatened flora identified on the Project Site, the project would result in the removal of approximately 30 recorded *Prostanthera junonis* plants (11 to 16% of the population), 25% of the identified *Hibbertia procumbens* plants and neither of the two *Tetratheca glandulosa* plants recorded on the Project Site. A licence is to be sought to enable the translocation of some of the *Prostanthera junonis* plants to be removed within the Voluntary Conservation Area or western fauna / flora corridor. The implementation of the proposed Voluntary Conservation Area would provide protection and security for the remaining threatened plants on the Project Site and improve habitat management through the fencing of the entire Voluntary Conservation Area. As such, it has been assessed that the impact on these threatened species is considered acceptable and adequately mitigated.

Fauna

The disturbance of native vegetation on the Project Site would have a minor impact on the availability of habitat to local and regional native fauna. This habitat is not, however, considered of significance such that its removal would have implications to the long-term survival of any the Threatened species recorded or likely to be found on, or use, the Project Site and immediate environs.

An important component of the Proponent's Biodiversity Offset Strategy would be the creation / maintenance of two fauna corridors on the eastern and western sides of the Project Site – both of which would assist with the north-south movement of local fauna.

Noise

The Somersby Fields Project has been designed with consideration given to minimising noise impacts on surrounding residents, enterprises and teachers and students of Somersby Public School. With only one exception, the incorporation of the design features and operational noise controls identified in Section 4.6.5 would restrict noise levels to generally within the nominated criteria. Two exceedances have been predicted at the residence of B. & L. Daniel, namely for a short period during the site establishment phase and whilst earthmoving equipment is operating on the surface during Stage 2. No noise exceedances are predicted to occur at the Daniel's residence during Stage 1. The Proponent intends to negotiate an agreement with Mr and Mrs Daniel prior to the commencement of Stage 2 relating to noise levels to be experienced during the periods when operations are underway at or near the surface in Stage 2.

Traffic noise criteria would not be exceeded during the early morning and all subsequent time periods. This would be achieved by restricting the number of truck movements during each period.

Transportation

At full production, the despatch of an average of 54 loads per day, 6 days per week would represent 2.7% of total traffic and 12.3% of heavy vehicle traffic on the 700m section of Peats Ridge Road to the F3 Freeway. The impacts were considered in relation to the functional impacts of the proposed modifications to the local road network, and the operational impacts as a result of the additional heavy vehicles using Peats Ridge Road. As part of a specialist assessment of the transportation-related impacts of the project, Cardno NSW (2006) identified one benefit, namely improved access to the F3 Freeway, 11 minor impacts (including increased noise, dust and vehicle emission generation) and four substantial impacts on the environment (including traffic delays due to the construction of the Project Site entrance, increased pavement deterioration, potential mud tracking and increased vehicle emissions) on the environment. In all cases, the implementation of the proposed design features of the site entrance intersection, and operational safeguards and management controls to be enforced by the Proponent, the identified traffic and transport-related impacts associated with the project were assessed as acceptable.

Aboriginal Heritage

No sites of indigenous origin were found during a survey conducted over the Project Site. However, in compliance with recommendations of the Darkinjung LALC, a 30m wide buffer zone would be retained along the eastern boundary of the Project Site to protect an archaeologically sensitive area identified in a survey of the Project Site undertaken in 1995. This area would be incorporated within the Voluntary Conservation Area to be created adjacent to the northeastern and eastern boundaries of the Project Site.

Soils and Land Capability

The project would require the removal, relocation and replacement of approximately 150 000m^3 of topsoil and subsoil throughout the project life. Adherence to the recommended soil stripping, handling and storage procedures would result in a minimal impact from a soils and land capability perspective at the Project Site.

6.2.2 Economic Considerations

The economic considerations of the project are assessed in the context of the benefits to the regional economies (greater Sydney / Central Coast) and local economy (Somersby and surrounds) and the long term land use of the Project Site. These considerations are drawn from a more detailed economic assessment included as **Appendix 4** of this document.

Regional Economy

- There is a diminishing supply of fine to medium-grained construction sand for the Sydney market. An important source of this type of sand (600 000tpa), being the Penrith Lakes Development is forecast to cease fine sand production within the next two years. Furthermore, the long term security of supply from the other major source, the Kurnell peninsula (up to 1.5Mtpa), is uncertain. Ultimately, the Somersby Fields Project would contribute to maintaining the continuity of supply of this fine sand raw material and thereby avoid a future shortage, which would affect the construction industry and in turn the wider community.
- The project would also be ideally placed to supply the growing construction market of the Central Coast and by doing so reduce the costs to the construction industry in this area.
- The project would contribute to Council finances through the payment of various rates and charges.
- The preferred policy of the Proponent to purchase equipment and consumables locally would benefit local suppliers with an estimated $25-30 million expenditure over the life of the project.

Local Economy

- A major economic benefit would be experienced by the local Somersby and district community through the creation of a long term permanent work force of 33 people who would contribute a proportion of their annual wages to housing, general consumables, local activities etc. Additionally, expenditure by the Proponent on fuel, services and other consumables (through local businesses) would add further to the local economy.
- The flow-on effects in the local area for a period of 15 to 18 years providing permanent employment and injection of funds into the local economy through wages and purchases of fuel, oil and other consumables would be significant for supply type industries such as café/restaurants, grocery stores etc.

6.2.3 Social Considerations

The Proponent has conducted a comprehensive community consultation program during two distinct periods, 2000/2001 and 2005/2006, involving local land owners, Gosford City Council, the Department of Planning (and the former Department of Urban Affairs and Planning), other NSW government agencies, representatives of the Somersby Public School and local community representatives groups. As described in Section 3 of this document, this consultation program has been fundamental in the identification of issues of concern to the local and wider community, which in turn has led to modifications in the design of the project and provides the focus upon successful environmental outcomes.

Based on this consultation, and the iterative approach taken to the preparation of the specialist environmental studies and refinement of the project design, the project description presented in Section 2 is considered to provide the basis to successfully manage the concerns the community has expressed. The project, as designed, provides for the practical and economic removal and processing of the sand while minimising the associated impacts on the local environment. The assessment of impacts on the biophysical environment based on this project design, presented in Sections 4.2 to 4.7 and 4.9 to 4.11 and summarised in **Tables 5.1** and **5.2**, support this conclusion.

Despite this assessed acceptability of biophysical impacts, the project would still result in a number of residual acceptable impacts effecting local water resources, noise, air quality and a small section of the local road network. It is acknowledged that these residual impacts, in combination with the real and perceived changes to the social setting, have the potential to cause negative social impacts on the local (Somersby) community, particularly in the short term. Key Insights Pty Ltd, a specialist social impact consultant was able to review the residual biophysical impacts and assess the potential for these to affect the social setting of the Somersby area and the Somersby Public School in particular through a comparison made to a recent similar case study at Maroota where a sand quarry has commenced operations near Maroota Public School.

Based on an assessment of the project, consultation undertaken with local stakeholders, and examination of the experience at Maroota, the following conclusions on social impact were drawn.

Noise

In the event noise monitoring confirms compliance with the nominated criteria, there is unlikely to be any adverse noise impact(s) on the teachers and students at Somersby Public School.

Road Safety

Trucks would not present a safety or noise issue for school children or motorists / pedestrians using Wisemans Ferry Road.

Air Quality and Health Issues

With the implementation of the identified air quality controls, and confirmation through monitoring of air quality, social issues relating to perceptions of air quality and health issues would diminish.

Visual Impacts

The project would be largely invisible from local roads and vantage points and therefore of little social impact.

Reduced School Numbers

Experience at Maroota suggests that if future actual impacts and community perceptions of the project are less pronounced than indicated, Somersby Public School should continue to function along its typical fluctuating trajectory of growth, peak and trough.

Based on the current social climate and experiences with a recently developed sand quarry at Maroota, it has been assessed that in the short term, the Somersby Fields Project, if approved, would have some adverse social impacts for the Somersby Public School community and on some people throughout the wider Somersby community. This would lessen to neutral impacts in the mid term as the local community understands the project's operation and its actual impacts more fully. Ultimately, the project may produce positive long-term impacts depending upon the end use(s) of the site developed in consultation with the community and Gosford City Council. Such a conclusion is considered appropriate in light of the Maroota experience, where, despite initial community angst, concern and protest, there is now a reasonably harmonious relationship between the operator of the Maroota sand quarry and the local school community.

6.3 EVALUATION OF ECOLOGICAL SUSTAINABILITY

6.3.1 Introduction

Sustainable practices by industry, all levels of Government and the community are recognised to be important for the future prosperity and well-being of the world. Schedule 2(6) of the *Environmental Planning and Assessment Regulation 2000*, requires the environmental impact assessment process to evaluate projects in terms of the principles of Ecologically Sustainable Development (ESD). The principles of ESD that have been recognised for over a decade were based upon meeting the needs of the current generation while conserving our ecosystems for the

benefit of future generations. In order to achieve sustainable development, recognition needs to be placed upon the integration of both short-term and long-term environmental, economic, social and equitable objectives.

Throughout the design of the project, the Proponent has endeavoured to address each of the sustainable development principles. The following sub-sections draw together the features of the project that reflect the four principles of sustainable development, namely:

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

6.3.2 The Precautionary Principle

To satisfy this principle of ESD, emphasis must be placed during project design upon anticipation and prevention of environmental damage, rather than reacting to it when it occurs. During the planning phase for the project and throughout the preparation of the *Environmental Assessment*, the Proponent has engaged specialist consultants to examine the existing environment, predict possible impacts and recommend safeguards and operational procedures to ensure that the level of impact satisfies statutory requirements or reasonable community expectations. Environmental safeguards, as discussed in Section 4 of this document, are measures that have been planned with a comprehensive knowledge of the existing environment and an appreciation of the potential impacts, in order to prevent environmental degradation. Throughout the design of the project, the Proponent and its consultants have adopted an anticipatory approach to risk, particularly the risk of irreversible ecological damage, by undertaking an appropriate level of research and baseline investigations and environmental evaluation.

Examples of matters relating to the precautionary principle that were considered during the various stages of the project design are listed below.

Identification of Project Objectives

The proposed Somersby Fields Project has been designed with the principal objective being to produce quality sand products for the construction industry in a safe and environmentally responsible manner, meeting the requirements of local and State government agencies, accepted industry standards and wherever possible, reasonable community expectations. The Proponent recognises that only through comprehensive environmental assessment and an environmentally responsible approach to the design and operation of the project can the risk of harm to the environment be minimised.

Design of Project Components

The design of the project presented in Section 2 of this document has been substantially refined since the initial proposal was presented to the Department of Urban Affairs and Planning in 2000. Consultation and an iterative approach to impact assessment / project design has ensured the identification and assessment of all relevant issues and the minimisation of impacts to the greatest practicable extent. Notable design features include the following.

- The placement of all processing plant and sand stockpiles within the centre of the Project Site, equidistant from sensitive receivers (to noise and dust) in all directions.
- The design of the project as a two-stage development, whereby environmental performance during Stage 1 would be evaluated prior to commencement in Stage 2.
- Establishment of a Voluntary Conservation Area for the Threatened flora species identified on the Project Site.
- The provision of both the eastern and western fauna / flora corridors as part of the Proponent's overall biodiversity offset strategy.
- The design of the site entrance and transport operations to minimise local impacts.
- The final landform has been designed to provide a low maintenance, geotechnically stable and safe landform, which would support long term nature conservation and rural / residential land uses on the Project Site.
- Complete enclosure of the processing plant, incorporation of a closed circuit, recycled water system and elimination of the industry traditional large area settling dams through the use of the latest belt filter press technology for the processing and environmental use of dewatered clay fines.

Integration of Safeguards and Procedures

If the project is approved, the Proponent would adopt an integrated environmental management plan for the site. This plan would incorporate the following elements.

- The site would be managed in accordance with the commitments listed in Section 5.
- A range of site-specific environmental procedures would be adopted to achieve consistency with specified outcomes and to avoid serious damage.
- All on-site procedures would be regularly reviewed, particularly in light of the results of monitoring and any feedback through the Proponent's ongoing community consultation program.

Progressive Rehabilitation and Subsequent Land Use

Long term adverse effects on the local environment would be avoided through the design of a rehabilitated landform that adequately meets the requirements of the likely long term land use of rural / residential and areas of native vegetation/bushland.

Conclusion

The precautionary principle has been considered during all stages of the design and assessment of the Somersby Fields Project. The approach adopted, ie. initial assessment, consultation, specialist investigations and safeguard design, provides a high degree of certainty that the project would not result in any major unforeseen impacts.

6.3.3 Social Equity

Social equity embraces value concepts of justice and fairness so that the basic needs of all sectors of society are met and there is a fair distribution of costs and benefits to the community. Social equity includes for both inter-generational (between generations) and intra-generational (within generations) equity considerations.

Equity within generations requires that the economic and social benefits of the development be distributed appropriately among all members of the community. Equity between generations requires that the non-material well-being or "quality of life" of existing and future residents of the local community would be maintained throughout and beyond the life of the project.

Both elements of social equity are addressed in the project through the design of the project itself, the implementation of operational safeguards to mitigate any short-term or long-term environmental impacts, and a progressive rehabilitation program. Examples of matters relating to social equity that are relevant to the various stages of the project are as follows.

Identification of Project Objectives

- The major objective of the project is the recovery of the fine sand resource from the Project Site to ensure the continued provision of a construction material currently in short supply to the Sydney and Central Coast construction markets, at a reasonable price and in an efficient, environmentally responsible manner.
- The project has been designed with the objective of maximising the economic benefits to the local community through provision of employment, and a purchase policy specifying the local purchase of project-related consumables such as fuel, oil, cleaning products etc.
- The project has been designed with the objective to ensure the continued viability of surrounding land uses, in particular the Somersby Public School, throughout and beyond the life of the project.

Design of Project Components

The project has been designed to maintain inter-generational equity, ie. in recognition that the removal of the sand resource is a short term land use, and to ensure components of the existing biological, social and economic environment available to existing generations would also be available to future generations.

- The proposed sand removal area has been designed to ensure that disturbance to local populations of Threatened flora would be minimised.
- A Voluntary Conservation Area would be established to further safeguard the populations of Threatened flora species and provide a higher level of protection and management to these threatened flora.
- The availability of groundwater to surrounding landholders, although not predicted to be significantly affected by the project, would be monitored throughout the life of the project and compensatory measures taken in the event reductions in the availability (yield) are identified.
- The rehabilitation of the Project Site has been designed to provide a visually acceptable landform available for future use by the local community.

Integration of Safeguards and Procedures

The Proponent recognises that all members of the local Somersby community should benefit appropriately from the project either directly or indirectly. In order to ensure a realistic distribution of benefits, the Proponent would continue to consult with the local community and maintain a pro-active approach to issues of interest. This dialogue would also include a system to record, manage and respond to any complaints relating to the operation.

Progressive Rehabilitation and Subsequent Land Use

The proposed final landform would provide for future use of the Project Site, either in an economic capacity through the development of rural / residential housing or tourist facilities or for recreational use as sporting fields or nature conservation areas in keeping with Gosford City Council's planning and development requirements at that time.

Conclusion

The principle of social equity has been addressed throughout the design of the project. The proposed Somersby Fields Project would contribute significantly to the economic activity of the Somersby and district community through the generation of employment, and increased demand for local goods and services and flow-on effects. As such, the benefits of the project would be distributed throughout the local community. The project was also designed such that elements of the existing environment available to this generation, including water and local biodiversity would continue to be available to future generations. The Proponent would adopt a pro-active approach in identifying and addressing any concerns identified by the local community.

6.3.4 Conservation of Biological Diversity and Ecological Integrity

The protection of biodiversity and maintenance of ecological processes and systems are central goals of sustainability. It is important that developments do not threaten the integrity of the ecological system as a whole or the conservation of threatened species in the short or long term. Details of how the project has been designed to achieve compliance with these principles are set out below.

Identification of Project Objectives

The Proponent is committed to undertake all activities in an environmentally responsible manner, and recognises the need to fully understand the ecological components and inter-relationships that exist on and surrounding the Project Site and ensure that changes to other natural components of the environment (e.g. soils, surface water and groundwater) do not adversely affect biological diversity or ecological integrity. As such, the project has been designed to incorporate measures that would:

- minimise impacts on the flora and fauna of the Project Site, whilst allowing the recovery of an economically viable sand resource;
- maintain the viability of vegetation habitat available through progressive rehabilitation and improved management of existing native vegetation – ultimately creating two north-south fauna / flora corridors on the eastern and western sides of the Project Site; and
- implement a revegetation program focussing upon the re-establishment of a greater area of native vegetation than there is presently on site.
- conserve and protect the threatened flora species on site.

Design of Project Components

- Water management structures would be designed and constructed to ensure that only clarified water leaves the Project Site and enters the catchments of local creeks and that peak flows are not increased.
- The proposed area of sand removal was designed to minimise disturbance to native vegetation and local populations of threatened flora species.
- The project includes the establishment of a Voluntary Conservation Area to protect local populations of threatened flora.

Integration of Safeguards and Procedures

- Approximately 50% of the native vegetation would be disturbed.

- Pre-clearing surveys of any mature native trees would be undertaken and any threatened fauna species encountered would be translocated prior to clearing.
- Felled and fallen native timber would be placed on the ground in suitable places as logs, ground cover habitats and refuges for native fauna.
- The clearing of vegetation especially the felling of hollow-bearing trees would be conducted in late summer (from February) and early autumn (to April) to avoid winter breeding mammals, spring nesting birds and over-wintering bats.
- All revegetation would be carried out with seed stock from local trees and would be consistent with the composition or diversity of the respective vegetation communities.
- The exotic pines beyond the proposed area of sand removal would be progressively removed to allow better regeneration of native plant communities to improve the fauna habitat quality on the Project Site, particularly within the western fauna / flora corridor.
- Weed eradication programs would be developed and implemented, as required.

Progressive Rehabilitation and Subsequent Land Use

The final landform has been designed to incorporate native vegetation conservation as part of any future use. This would include the retained Voluntary Conservation Area and the protection of approximately 21ha of existing and regenerated native vegetation under Section 88B of the *Conveyancing Act 1919.*

Conclusion

The project would address the principle of conservation of biological diversity and ecological integrity through the minimisation of disturbance to areas of native vegetation, and re-establishment of areas of native vegetation or sections of the final landform. A Voluntary Conservation Area would assist in maintaining local populations of threatened flora. Weed eradication programs would be implemented as appropriate and would further assist in addressing the principle of sustainable development.

6.3.5 Improved Valuation, Pricing and Incentive Mechanisms

The issues that form the basis of this principle relate to the acceptance that the "polluter pays", all resources are appropriately valued, cost-effective environmental stewardship is adopted and the adoption of user-pays principle based upon the full life cycle of the costs. A reflection of these issues on the proposed Somersby Fields Project is set out below.

Identification of Project Objectives

The Proponent's principal objective is to operate the project in a profitable, safe and environmentally responsible manner, which demonstrates that an appropriate value has been placed on elements of the existing environment.

Design of Project Components and Integration of Safeguards and Procedures

The extent of research, planning and design of environmental safeguards and mitigation measures to prevent irreversible damage to environmental resources, other than the sand to be removed, is evidence of the value placed by the Proponent on these resources.

Progressive Rehabilitation and Subsequent Land Use

The design of the final landform providing rural / residential and nature conservation land uses illustrates the value placed by the Proponent on both the economic and ecological elements of the Project Site.

Conclusion

The value placed by the Proponent on environmental resources is evident in the identification of project objectives, extent of site-specific research, planning and environmental safeguards and measures to be implemented to prevent irreversible damage to the environment on and surrounding the Project Site. It is planned that the income received from the sale of the sand products would be sufficient to enable the Proponent to achieve an acceptable profit level whilst undertaking all environmentally-related tasks and meeting all commitments in all approvals and licences and those made to the local community.

6.4 CONCLUSIONS

The proposed Somersby Fields Project has, to the extent feasible, been designed to address the issues of concern to the local community and all levels of government. The project provides for the removal, processing and despatch of sand products recognised to be in short and diminishing supply within the Sydney / Central Coast market. The project would be significant in generating local employment opportunities and boosting the local economy of Somersby and other communities on the Somersby Plateau. The final landform would provide for the future use of the Project Site as rural / residential and nature conservation areas.

The overall environmental impact assessment process has assisted the Proponent to design a project that would have a range of acceptable residual impacts on the local environment and provide for the long term enhancement of native bushland to the benefit of local and regional fauna / flora and the overall environment.

Acknowledging these residual impacts on the biophysical and social environment, this document and the range of specialist consultant studies undertaken have identified that the proposed Somersby Fields Project should proceed because it would:

(i) contribute towards alleviating the diminishing supply of fine to medium-grained sand in the Sydney / Central Coast construction market;

(ii) satisfy sustainable development principles;

(iii) provide for the conservation of threatened flora species within a Voluntary Conservation Area and a worthwhile biodiversity offset strategy;

(iv) have manageable impacts on the biophysical environment;

(v) address eventually, the perceived social impacts;

(vi) contribute to the continued economic activity of Somersby and the Gosford LGA; and

(vii) provide for the substantial regeneration program to maintain local biodiversity and fauna habitat / corridors.

It is acknowledged that with approval of the project, there would be a perceived negative impact on the social climate of local Somersby community. However, with the implementation of the Proponent's commitments detailed in this document, the actual and perceived negative impacts would reduce and, as is the case at Maroota, a harmonious relationship would develop between the Proponent and the Somersby community.

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