New South Wales
Government

# REPORT OF THE INDEPENDENT HEARING AND ASSESSMENT PANEL

# SOMERSBY FIELDS PROJECT

**Prepared for:**

**Director-General**
**Department of Planning**
**New South Wales**

**Mr Garry West (Chair)**
**Dr Nigel Holmes**
**Associate Professor Noel Merrick**

**July 2008**

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## EXECUTIVE SUMMARY

Somersby Fields Partnership (the Proponent) proposes to construct and operate a sand quarry at Somersby on the Central Coast Plateau, approximately 11 km north-west of Gosford. The project (known as the "Somersby Fields Project") involves:

- extracting and processing up to 450,000 tonnes of sand a year for up to 18 years;
- transporting the sand to local and regional markets by trucks via Peats Ridge Road and the F3 Freeway; and
- progressively rehabilitating and revegetating the site.

Following exhibition of the Proponent's Environmental Assessment (EA) for the project, the Minister for Planning constituted an Independent Hearing and Assessment Panel (Panel) under Part 3A of the Environmental Planning and Assessment Act 1979 (EP&A Act) to provide advice to the Department of Planning on air quality impacts, surface water and groundwater impacts, and the impacts of the project on the general amenity of the surrounding land uses and activities. The Panel was also asked to identify and comment on any other significant issues raised in submissions. Other significant issues assessed by the Panel included the justification for the project, flora and fauna impacts, traffic impacts, social impacts, Aboriginal cultural heritage impacts and the rehabilitation of the site.

The Panel comprised the following members:

- Mr Garry West – Chair
- Dr Nigel Holmes – Air Quality expert
- Associate Professor Noel Merrick – Surface water and Groundwater expert

The Panel held public hearings in Kariong in March 2008. The Panel received 2,980 submissions that were received during the exhibition of the EA, and 33 parties made presentations to the Panel during the hearings.

Local residents and interest groups are strongly opposed to the project due to its potentially adverse environmental impacts, and argued that these impacts warrant the refusal of the project. The primary concerns expressed in public submissions and presentations to the Panel related to:

- dust, noise and traffic impacts on the Somersby community, particularly on the Somersby Public School and nearby residences;
- groundwater and surface water impacts on bores, springs, dams, hanging swamps and creeks;
- flora and fauna impacts, particularly on threatened species such as the Somersby Mint Bush ;
- cumulative impacts from sand extraction on local air quality, water resources, and agriculture; and
- the adequacy and accuracy of the modelling and predictions in the EA prepared by the Proponent.

At the conclusion of the hearings the Panel advised it was not in a position to conclude its consideration of the project, and requested that further assessment be undertaken by the Proponent to address a number of residual concerns. In particular, the Panel requested the Proponent:

- undertake additional air quality monitoring to establish background levels of respirable silica in the Somersby area;
- review monitoring data to confirm background noise levels at the closest residence to the quarry;
- undertake additional groundwater modelling to address issues raised by the community and government agencies;
- undertake additional flora and fauna surveys and consideration of additional biodiversity offsets to address issues raised by the Department of Environment and Climate Change; and
- provide further information about the volumes of traffic on Peats Ridge Road.

The Panel has completed its assessment of the project, including detailed consideration of the EA, public submissions, the Proponent's responses to submissions, presentations during the Panel hearings, and the additional information provided by the Proponent. The main findings of the Panel are summarised below.

**Air Quality**

The Panel in reviewing air quality concluded that the assessment followed the Department of Environment & Climate Change (DECC) guidelines in an appropriate manner. The estimated emissions for each of the dust generating activities associated with the proposal appear reasonable and consistent with those expected from an operation of this nature and size.

Assessing the issue of crystalline silica and its potential health effects have proved complicated and has involved the Panel seeking further data in order reduce some uncertainties that were not fully addressed in the EA. This is not to say that the EA treatment of this question was flawed, but further information was required to provide greater confidence in the EA's conclusions. The additional work confirmed the overall conclusions reached in the EA and based on its detailed assessment of this issue, the Panel is confident that the concentration of airborne crystalline silica would remain well below internationally accepted criteria in areas surrounding the quarry including the Somersby Public School.

The Panel considers that if the project is approved, conditions will be required for the Proponent to implement a dust management programme with the main objective being to minimise the emissions of particulate matter and to provide the data to allow the community to have confidence that silicosis risks have been reduced to negligible levels.

The Panel further considers that appropriate air quality controls should be expanded to include real time monitoring of $PM_{10}$ concentrations at the school and a monitoring program to measure long-term average concentrations of crystalline silica at the school. Crystalline silica should monitored following procedures adopted in Victoria as described in their "*Protocol for Environmental Management, Mining and Extractive Industries (PEM MEI)"*.

## Noise

The Panel reviewed the noise impact assessment undertaken on behalf of the Proponent and is satisfied the assessment methodology used follows the DECC guidelines. The assumptions are clearly set out and are well-documented. The scenarios assessed cover an adequate range of future operating modes to capture likely impacts.

If the project is approved it will be necessary for the Proponent to come to a mutually acceptable negotiated noise arrangement with the occupiers of Location N (to the immediate west of the project site) or acquire the property at the request of the landowner.

The Proponent's noise assessment at the school only considered ground-based receivers and did not take account of the elevated position of the upper-floor location of some of the classrooms. The Panel review of the calculations undertaken in the assessment, taking account of the elevated position of some classrooms would increase noise levels by approximately 2 dB(A). This would take the predicted noise levels (under worst case conditions when Stage 2 was being operated and equipment was on the natural land surface) close to the assessment criterion. The noise level would be expected to return to well below the criterion once equipment was operating below the local surface.

The Panel strongly recommends that, if the project is approved real-time noise monitoring should take place at the school and at the level of the second story. In addition the construction of noise bunds should be restricted to school holidays and the commencement of extraction at Stage 2 should only take place after demonstrated compliance with relevant noise criteria.

## Groundwater and Surface water

Subject to reservations on the extent of sensitivity analyses, the surface water modelling and the groundwater modelling have been done competently using industry standard software and best practice protocols. Minimal sensitivity analysis was conducted in the original groundwater assessment. However, the supplementary modelling requested by the Panel showed that the original modelling was conservative.

The decision by the Proponent to retain the planned extraction area Stage 1/3 in its natural form will lessen the predicted impacts. In particular, the risk of water seepage from the Voluntary Conservation Area (VCA) will be reduced.

The public hearings were instrumental in promoting consensus between all parties on the nature of springs surrounding the site and the agreed conceptualisation led to a reduction in predicted impact. There appears to be a common elevation of 270-272m AHD for a number of springs that form a ring around the site, which suggests a fairly horizontal extensive layer of low permeability material that provides a base for a perched groundwater system.

There will be declines in off-site water levels but all neighbouring bores are expected to experience less than 10 percent change in saturated thickness.

The Narara Creek catchment will increase in size by about 0.2 percent and the panel believes there is no cause for concern with respect to the potential for increased flooding risk in the Narara Creek valley.

The Panel considers that if the project is approved, conditions will be required for the Proponent to implement a water management programme that should include surface water model sensitivity analysis for the estimate of spring flow, to assess the risk to DPI dam security of supply, the uncertainty in site water balance, and the flexibility in water management planning.

The Panel further considers that a deep bore should be drilled at the Somersby Public School to ensure the school has an ongoing supply of groundwater. The bore should be sufficiently deep to demonstrate that there is a satisfactory groundwater source at deeper levels, should it become necessary for other district bores to be deepened. An additional bore should be drilled on the DPI site close to the dam, and should be monitored continuously.

**Other Issues**

Other issues raised in the EA, by Government Agencies or in public submissions are considered to be less significant, components of key issues or have minor environmental impact.

The Panel's report has been prepared in accordance with the Terms of Reference provided by the Minister for Planning. Issues raised in submissions to the Panel are highlighted throughout the report, along with the Panel's detailed assessment of the potential impacts of the project. The Panel has also provided a number of recommendations for the Department of Planning to consider in its assessment of the project.

# 1 THE PROJECT

Somersby Fields Partnership (the Proponent) proposes to construct and operate a sand quarry at Somersby on the Central Coast Plateau, approximately 11 km north-west of Gosford (see Figure 1).

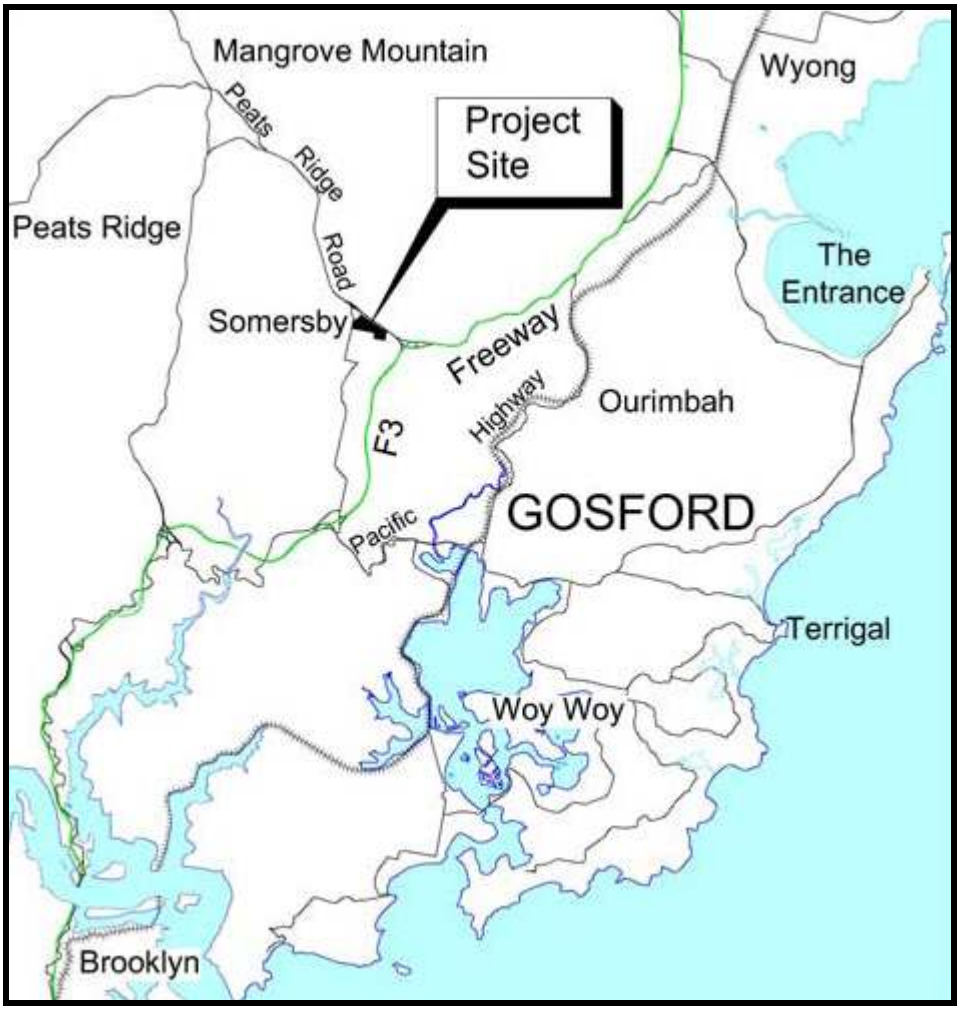


*Figure 1: Regional Context*
*(Source: Somersby Fields Project, Environmental Assessment May 2007)*

The area which is the subject of the project is located on the southern side of Peats Ridge Road, approximately 0.7km west of the Somersby Interchange on the F3 Freeway, and 8km northwest of Gosford on the Central Coast of NSW.

The site layout of the project (known as the "Somersby Fields Project") and the sand extraction stages at the time of lodgement of the Environmental Assessment are illustrated in Figure 2. The project involves:

- extracting and processing up to 450,000 tonnes of sand a year for up to 18 years;
- transporting the sand to local and regional markets by trucks via Peats Ridge Road and the F3 Freeway; and
- progressively rehabilitating and revegetating the site.

The Project site covers an area of approximately 42.3 hectares. Of this, the Proponent proposes to disturb 22 hectares throughout the life of the quarry. A two-staged approach to the sand extraction is proposed to enable the environmental performance of the first stage to be evaluated prior to the commencement of operations in the second stage which is closer to Somersby Public School and the nearby residences.

The site is largely vegetated with natural bushland and regenerating bushland. Some areas of the site have previously been cleared for gravel extraction and for a safety zone at the northern end of the nearby air strip. This latter area is periodically slashed as an approach for the air strip.

A conventional sand removal operation is proposed whereby the sand would be excavated, transported to on-site processing plants, processed, stockpiled and dispatched to market by conventional highway trucks. No blasting would be required. Sand removal is proposed to commence on the eastern side of the Project Site. A bulldozer would be required for topsoil/subsoil removal prior to sand removal. Sand removal would be conducted using an excavator near the surface and a bulldozer for ripping at depth. The depth of sand removal, based on drilling data, would vary from about 10m near the eastern end of the Project Site, increasing to about 20m near the western end.

The excavated material would be transported by off-road trucks to the processing area located near the centre of the Project Site. Two processing plants would be used, namely an enclosed wash plant with a capacity of 200 tonnes per hour and a mortar sand plant with a capacity of 100 tonnes per hour. All fine residues from the wash plant would be dewatered with a belt filter press and used for landform reconstruction.

Annual sand production would be likely to commence at 250 000 tonnes during the first year of operations, increasing to 450 000 tonnes by about the end of Year 3. It is envisaged that sand removal would be undertaken over a 15 to 18 year period.

Progressive rehabilitation, revegetation and enhancement of existing fauna / flora corridors within the Project Site is proposed for a long term rural / residential and nature conservation land use.

The proposed activities on the Project Site are permissible within the provisions of the Gosford / Wyong Local Environment Plan (LEP) 2001 – Central Coast Plateau Areas. This LEP removed a conflict between areas identified as prime agricultural land within the Sydney Regional Environmental Plan No 8 (Agriculture) (SREP 8) and areas with extractive resources of regional significance (SREP 9 – Extractive Industry).

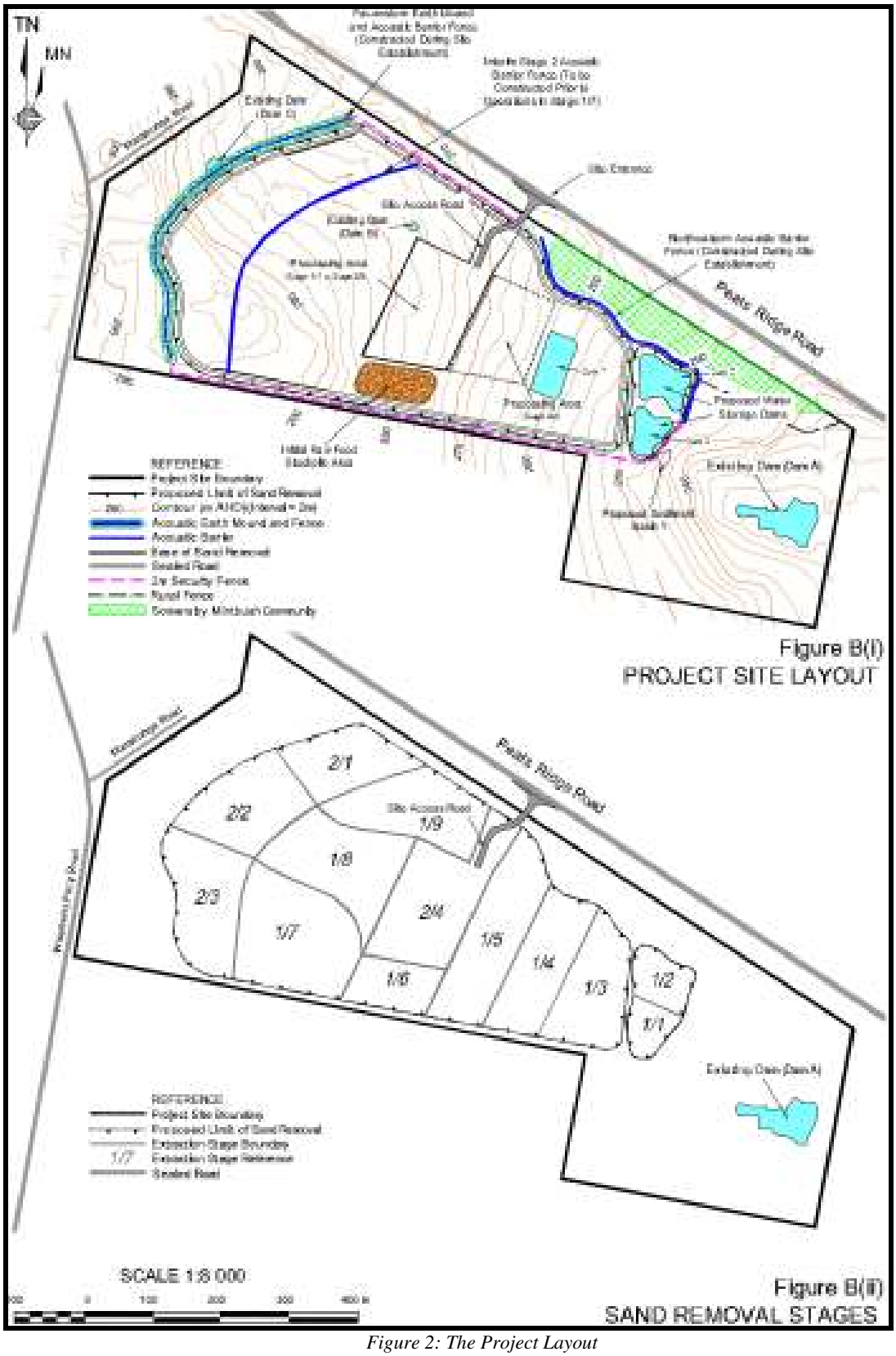


*Figure 2: The Project Layout*
*(Source: Somersby Fields Project, Environmental Assessment May 2007)*

## 2 BACKGROUND

On 19 December 2007, the Minister for Planning directed that an Independent Hearing and Assessment Panel (the 'Panel') be constituted under section 75G(1)(a) of the Environmental Planning and Assessment Act 1979 (EP&A Act). The terms of reference for the Panel required the Panel to assess the following aspects of the Somersby Fields Project (SFP):

- Consider and advise on the:
  (a) following impacts of the project on:
    - air quality, in particular dust impacts;
    - groundwater and surface water resources; and
    - general amenity of the surrounding land uses and activities, in particular impacts on the Somersby Public School;
  (b) relevant issues raised in submissions in regard to these impacts; and
  (c) adequacy of the Proponent's response to the issues raised in submissions; and

- Identify and comment on any other significant issues raised in submissions or during the Panel Hearings.

The Minister appointed to the Panel:

- Mr Garry West (Chair), former NSW Government Minister;
- Dr Nigel Holmes, Air Quality Expert, a director of Holmes Air Sciences; and
- Associate Professor Noel Merrick, Hydrology Expert, and acting director of the University of Technology Sydney's National Centre for Groundwater Management.

The EP&A Act provides for the appointment of an Independent Hearing and Assessment Panel to receive or hear submissions from interested persons and to submit a report to the Director General of the Department of Planning (DoP).

The Panel is to exercise its functions in accordance with the arrangements approved by the Minister, but the Panel is not subject to the direction of the Minister on the findings or recommendations in its report.

The proposal is classified as a Major Project under the State Environmental Planning Policy (Major Projects) 2005 and will be assessed under the Part 3A approval process of the EP&A Act. The Minister for Planning is the approval authority.

The Environmental Assessment (EA) for the project was publicly exhibited for six (6) weeks from 1 August 2007 until 12 September 2007. The Department received 2980 submissions on the project, comprising 11 from public authorities, 11 from special interest groups and 2958 public submissions, including 2757 form letters. The Proponent, Somersby Fields Partnership, submitted a Response to Government Agency Submissions and Non-Confidential Public Submissions on 22 February 2008. The Response:

- Outlined the proposed changes to the project to further minimize environmental impacts;

- Contained responses to the issues raised in non-confidential public submissions and government agencies; and
- Provided a revised Statement of Commitments for the project.

A preliminary site inspection by the Panel took place on 27 February 2008 and further site inspections and the public hearings took place during the period 4th – 7th March 2008. Over 52 submissions were received during the public hearings, with 27 organisations and persons presenting to the Panel. Presentations were also made by Gosford City Council, the Department of Education & Training, NSW Health, the Department of Primary Industries, the Department of Environment and Climate Change, and the Department of Water and Energy.

This report presents the assessment by the Panel members of the EA, the submissions, the Responses to Submissions and the Public hearings.

## 3 THE PANEL PROCESS

Table 1 summarises the key steps in the independent review process for the project.

*Table 1: Key steps in the Panel process for the project.*

| | |
|---|---|
| 1/8/2007 – 12/9/2007 | EA was on public display.<br>The public was invited to make written submissions to the Department of Planning. |
| 19/12/2007 | Minister for Planning announced establishment of an Independent Hearing and Assessment Panel. |
| 1 and 15/2/2008 | Public notification of Panel announcing time of public hearings and inviting interested parties to make presentations. |
| 8/2/2008 | The Panel received a briefing from the Department of Planning and a presentation from the Proponent and their consultants on the project. |
| 9/2/2008 – 3/3/2008 | The Panel undertook its own assessment of the adequacy and accuracy of the EA. The specialist Panel members raised a number of issues in writing and sought further clarification from the Proponent and their consultants. |
| 27/2/2008 | The Panel visited Rocla quarry at Calga, conducted a preliminary site inspection with the Proponent and conducted a regional inspection with DoP representatives. |
| 4/3/2008<br>am | Site inspection by Panel led by the Proponent and accompanied by representatives of the Somersby Action Group. The inspections included a visit to the Somersby Public School and several neighbouring properties predicted to be impacted by changes in groundwater conditions. |
| 4/3/2008 – 6/3/2008 | Public hearings conducted in Kariong, NSW. |
| 7/3/2008 | The Panel met in Kariong to consider the issues raised during the public hearings and determine the additional information and clarification required from the Proponent, their consultants and several government agencies.<br>Panel members conducted a further inspection of level 1 classrooms at the school and Dog Trap Road to consider traffic impacts from Peats Ridge Road. |
| 24/4/2008 | The Panel received Response regarding ecological issues and biodiversity offsets |

# 4 SUBMISSIONS

## 4.1 Generally

The Department of Planning received 2980 submissions on the project, comprising 11 from public authorities, 11 from special interest groups and 2958 public submissions, including 2757 form letters. These submissions identified the issues under the following headings:

1. Groundwater and surface water impacts
2. Noise
3. Dust (including crystalline silica)
4. Air quality
5. Increased traffic
6. Cumulative impact of quarrying
7. Amenity of the local area including the Somersby Public School
8. Impact on local agriculture
9. No justification for additional sand extraction to meet construction industry needs
10. Social, economic and other general impacts on residents and community
11. Excessive noise for residents and school during construction
12. Flora and fauna impacts
13. Hours of operation
14. Inappropriate zoning
15. Lack of consultation on zoning changes to permit extractive industries
16. Detrimental impact on land values
17. Loss of teaching resources at school if student numbers decline
18. Greenhouse gas and climate change
19. Inaccuracies in EA and misinformation from Proponents
20. Compliance and enforcement of DA conditions
21. Visual amenity.

The Proponent issued a "Response to Government Agency Submissions and Non-Confidential Public Submissions" in February 2008.

The Proponent issued a further response regarding "Ecological Issues and Biodiversity Offsets" in April 2008 which committed several new elements in its Biodiversity Offset Strategy including the retention of the previously nominated extraction Stage 1/3 in its natural form, albeit with a minor realignment with the adjoining Stage 1/4

## 4.2 Public Hearing

A total of 52 submissions were received, with 27 organisations and persons presenting to the Panel. Presentations were also made by Gosford City Council, the Department of Education & Training, NSW Health, the Department of Primary Industries, the Department of Environment and Climate Change, and the Department of Water and Energy. Many of the submissions were identical to their original written submissions to the Department of Planning in response to the EA. However, considerable effort was made by the Somersby Action Group (SAG) representatives to present detailed submissions that addressed the Terms of Reference, the EA and the Proponents Response to Government Agency Submissions and Non-Confidential Public Submissions. Their presentations were delivered in a professional manner which made the IHAP process effective for both the presenters and the Panel.

The Somersby Action Group indicated concern at the short time available to them to prepare their presentations to the Panel incorporating a considered response the Proponent's Response to Public Submissions. The Panel acknowledges this timing difficulty as the Proponent's Response was only provided to the Department of Planning, the Panel and the public on 22 February 2008 (11 days before the public hearings). Notwithstanding this difficulty the local community were well prepared with submissions and the Panel was able to conduct the Public Hearings in a satisfactory manner.

The Somersby Action Group also submitted to the Panel that the Proponent's Response merely rebuffed many points raised by the community; - "did not give specific reasons for their concern"; "the majority of the submissions received were not supported by any technical evaluation and provided no new evidence to refute the conclusions of the consultants". The Panel acknowledges that such dismissive comments by a Proponent do little to advance community relations and consultations. Local communities usually do their best to present their concerns without the financial resources and expertise available to a Proponent. Notwithstanding this limitation on resources the local community were able to provide expert submissions particularly on groundwater and surface water and extensively researched submissions on air quality, which during the Public Hearings were a source for meaningful discussions and potential resolutions on impacts.

Appendix A summarises the presentations made to the Panel. The dominant areas of concern to the Somersby Action Group representatives and the community arising from the project are:

- Insufficient justification by the Proponent of the need for the project.
- Impacts on groundwater and surface water with resulting impacts on sustainability of local springs, creeks, bores, hanging swamps, habitat, agriculture and amenity of the area.
- Impact of noise, dust (including crystalline silica), air quality, social impacts and amenity on the Somersby Public School and local residents. Particular emphasis was made of the impacts on the students and the potential for reduced enrolment and subsequent loss of teaching resources.
- The re-zoning of the Project Site and a number of other areas on the plateau rendering extractive industries permissible (SREP 9) and in conflict with the agriculture and tourism zoning (SREP 8).

- Impact of increased traffic on Peats Ridge Road, the F3 and concern for potential increases in the vicinity of the school.
- Impact on Flora and Fauna with particular emphasis on identified endangered species and the inadequacy of the proposed Voluntary Conservation Area.
- Concern with the adequacy of the Proponent's monitoring in the preparation of the EA, the proposed monitoring during the operational phase and compensation proposals.
- Concern with the adequacy of community consultations with key stakeholders.
- The cumulative impacts of quarrying on the plateau.
- Concern with the feasibility of the proposed progressive rehabilitation and re-vegetation of the Project Site.
- Concern that approval conditions are often not complied with and that this results in impacts on residents who lack the resources to identify and prove breaches.
- Impact of the proposed hours of operation.
- Local Aboriginal concerns that whilst a buffer zone has been identified, such zones create 'islands' of preserved areas without linkages or adequate 'community' access.
- Concern regarding increased surface water flows in the Narara Creek Catchment and potential flooding risk.
- Rejection of the Proponent's suggestion in the EA and the Response to Submissions that the impact at the Maroota Public School showed no impact at that school from the adjacent sand quarry.

Gosford City Council and five (5) agencies presented to the Panel. An employee of Workcover presented a submission as well; however, he indicated he was not authorised to make a submission on behalf of the agency.

The Gosford City Council representatives canvassed several issues in their presentation. They advised that the Wyong Shire Council and Gosford City Council as a joint Water Supply Authority resolved to oppose the proposed project due to the diversion of surface water away from the water supply catchments of the Central Coast. Council believes a condition of consent issued by the Minister for Planning for Calga Sands in 2005 should be replicated so that if the proposal affects the adjoining Somersby Public School or nearby residences by air quality and/or noise impacts, the Proponent, subject to the service of notice by the owner, should be required to acquire the land and pay appropriate compensation.

Council expressed concern that the Proponent's Response to Public Submissions did not address flora, fauna or biodiversity offset issues. Council also drew attention to their concern that the Proponent's Response to Submissions too easily dismissed submissions by local residents. Council questioned the Proponent's statement in regard to the impact on land values. Council advised the Somersby Public School is a heritage item in council's Local Environment Plan and the assessment of the proposed sand quarry should take into consideration the impact on the heritage value of the School.

The Department of Education and Training raised the issues of noise and dust impacts at the Somersby Public School as well as the social impact, given the potential impact on enrolment numbers. Monitoring at the school was said to be essential. The Department's representative advised that he felt the Proponent had proposed a satisfactory resolution if the impact on the school bore is as stated in the EA. Concern was expressed to the potential for increased traffic movements in the vicinity of the school and needs to be further

addressed. A risk assessment on the security of the site was said to need upgrading to satisfy concerns of children accessing the site. The Department maintained that the Proponent's projected involvement with student projects needs to be more specific before support or approval can be offered and that the Proponent needs to communicate their proposals to the school. Reference was also made to the Maroota comparison indicating the situations were different due to the employment opportunities offered.

The Public Health Unit (Northern Sydney Central Coast Area Health Service) made a submission in relation to the EA noting criteria for noise and air quality would not be met; concerns about groundwater and dust impacts and the overall adverse impacts these have on the social welfare of the community which includes the health of the community. The presentation to the Panel indicated ongoing concern that the Proponent does not appear to provide options for how these impacts can be prevented and that most of their health concerns still stand.

The submission went on to make a number of comments in regard to monitoring, communication with the community and commitments particularly in regard to air quality, dust and noise. Particular relevance of the impact of noise at the school was made. The Department advised that background silica levels in ambient air need to be measured and a health risk assessment should be undertaken prior to approval of the project. The Department recommended that ambient $PM_{2.5}$ sampling also be carried out to determine background silica levels, and ongoing monitoring would be required if the project should proceed. It was maintained also that the hours of operation should be amended to at least mirror the hours of operation for the nearby Rindean quarry.

The Department of Primary Industries (DPI) submission to the Panel confirmed their proposal to consolidate research activities for the Central Coast at the Research Station which joins the Project Site to the East. A groundwater / seepage water assessment conducted by Brink & Associates was presented which made several conclusions as follows:

- no assessment of the effects of groundwater drawdown, seepage flow losses or reduction of runoff on the DPI Dam has been undertaken to date. Mitigation measures should be included for the DPI Dam;
- recharge conditions have not been adequately addressed;
- effects of groundwater and surface water variations on the DPI Dam have not been addressed;
- impact of groundwater drawdown on the DPI Dam has not been assessed; and
- cumulative impact of groundwater drawdown from the Rindean quarry and the project on the DPI site has not been assessed.

The Department of Environment & Climate Change (DECC) presentation indicated the proposal is unlikely to have a significant impact on Aboriginal heritage; the proposal adequately addressed issues of surface water pollution and mitigation measures proposed are likely to improve surface water quality; the proposal can satisfy DECC's assessment criteria for air quality, however it recommends a robust monitoring network including real time monitoring for particulate matter; there was significant variation in background noise monitoring results, and the DECC does not concur with stated Project Specific Noise Levels. The construction of a noise barrier would also result in noise exceedances at some

receivers, operational noise exceedance at Receiver N (Daniel residence) and there would be marginal road traffic noise exceedances at Receiver V (Douglass residence).
DECC recommended further assessment of noise impacts at Receiver N and consideration of options to reduce noise impacts at Receivers N and V. DECC also considered that there were major deficiencies in the survey methodology and assessment of the flora and fauna impacts of the project, and consequently the proposed offset/compensatory habitat measures were based on inadequate information. DECC therefore recommended that the Proponent undertake additional flora and fauna surveys, and to revise its compensatory habitat measures for the area to be disturbed in accordance with DECC's "Offset Principles Draft Guidelines for Biodiversity Certification and Environmental Planning Instruments."

The Department of Water and Energy (DWE) briefed the Panel on the current regulatory arrangements that apply to the Somersby Plateau and the project. DWE also raised some concerns about the proposed surface water management arrangements in the EA in particular that Dams D and E do not fulfil the exemption as set out in the Farm Dams Guidelines and as such, will require to be licensed pursuant to Part 2 of the *Water Act 1912* prior to construction. It also raised a number of concerns with the Proponent's assessment of groundwater impacts, including:

- that the Proponent needs to make adequate arrangements to manage potential future conflict between land holders and quarry operators;
- that the depressurisation of geological structures has only been partially addressed in the EA, and that groundwater levels may not recover following the cessation of extraction;
- that the EA does not adequately address down-gradient groundwater impacts and hence the long term impacts on local groundwater users and the regional groundwater aquifer; and
- that the project would result in the permanent loss of the groundwater aquifer on the site.

Given these considerations, DWE did not support the project as proposed and recommended that further assessment and modelling be undertaken by the Proponent to address its concerns.

The Proponent represented by Mr John Lockett and the Proponent's key consultants – Ms Fiona Robinson (groundwater issues), Mr Damon Roddis (air quality issues) and Mr Rob Corkery (traffic, flooding, noise and rehabilitation issues) – also presented to the Panel. The Panel members asked a number of questions relating to their specific areas of expertise.

### 4.3 Hearing Outcomes

At the conclusion of the hearings the Panel advised it was not in a position to conclude its consideration of the project, and requested that further assessment be undertaken by the Proponent to address a number of residual concerns. In particular, the Panel requested the Proponent:

- undertake additional air quality monitoring to establish background levels of respirable silica in the Somersby area;

- undertake additional monitoring to confirm background noise levels at the closest residence to the quarry;
- undertake additional groundwater modelling to address issues raised by the community and government agencies;
- undertake additional flora and fauna surveys and give consideration to additional biodiversity offsets to address issues raised by the Department of Environment and Climate Change; and
- provide further information about the volumes of traffic on Peats Ridge Road.

# 5 AIR QUALITY

## 5.1 Overview

The key air quality issues relate to the potential for emission of dust (in particular $PM_{10}$) and respirable crystalline silica to affect the health of the neighbouring community and for dust (via deposition) to adversely affect amenity and commercial activities in the area including horticultural production (growing of cut flowers and green tea among other activities).

The Proponent's air quality assessment was undertaken by Heggies Pty Ltd on behalf of R. W. Corkery & Co Pty Ltd.

The Air Quality Assessment Study followed the assessment procedures set out in the DECC's "Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales" (DECC, 2005).

The potential health effects of respirable crystalline silica were assessed in a separate Health Risk Assessment Report. This drew on the predictions of particulate matter concentrations made in the Air Quality Report in order to estimate the maximum concentrations of respirable crystalline silica that the neighbouring community is likely to experience.

While the DECC methodology is sound, it relies on the availability of information on:

- existing background air quality;
- representative meteorological data; and
- reliable information on emissions.

In reviewing the air quality assessment, the Panel has examined carefully the assumptions made in the modelling. It is concluded that the assessment followed the DECC's guidelines in an appropriate manner, but that three matters needed further examination to assure the Panel that the model outputs would be sufficiently reliable to form the basis for the assessment. These were:

- Whether the meteorological data file correctly represented conditions in the area.
- Whether the correct value had been assumed for the existing background concentration of respirable crystalline silica.
- Whether realistic assumptions had been made concerning the expected emissions of respirable crystalline silica.

The latter two points were clearly also of concern to the community and the Department of Health. To satisfy the Panel, the Department of Planning commissioned studies to determine the percentage of crystalline silica in emissions from sand extraction operations. Emissions from two activities were tested. These were the ripping of weathered sandstone using a dozer and the dust liberated from haul trucks. The dozer ripping operation is likely to be associated with the highest emission of crystalline silica because it involves the highest energy transfer to the material and has the potential to create new particles of crystalline silica. The dust liberated from vehicle movements was considered to be

representative of the dust from other activities which did not involve high energy input. In addition, the Panel requested the Proponent undertake further measurements to determine the existing background concentrations of crystalline silica at the school.

Although the work commissioned by the Department of Planning was able to provide data to improve the reliability of the estimated fraction of crystalline silica in dust emissions from sand extraction operations, the field work to determine the background levels of crystalline silica conducted by the Proponent proved unsuccessful. To overcome this the Panel has made use of data collected by the Australian Nuclear Science and Technology Organisation (ANSTO) to provide the required information (see Section 5.3.4).

## 5.2 Modelling

### *5.2.1 Choice of Scenarios*

In applying the DECC's approach to the assessment, the Proponent has analysed the project and developed two scenarios (referred to as Scenarios 1 and 2) to represent the effects of the project on the environment. These two scenarios are intended to capture the worst-case impacts of the project on residential receptors. Scenario 1 is intended to capture the worst-case impacts to the east of the project site and Scenario 2 is intended to capture the worst-case impacts for the Somersby Public School and the residences located to the west of the project.

The Panel requested the Proponent supply the model configuration files used for the assessment of the two scenarios. These files were checked to ensure that the assumptions concerning emissions, as detailed in the report, matched those applied in the dispersion model. These checks were undertaken for Scenario 2 which represents the worst-case at the school and residences to the west. The two scenarios appear to provide a reasonable representation of the quarrying operations when worst-case impacts are likely to arise in the nominated areas. Examination of the placement of dust sources in the two scenarios and the activities that are assumed to be occurring in the simulations appear to be appropriate.

The Proponent has undertaken the modelling using the Ausplume model which is the DECC's preferred model for this class of assessments in NSW and, in the Panel's view, is an appropriate model for this purpose.

### *5.2.2 Emissions*

The assessment procedures require the Proponent to estimate emissions for each of the dust generating activities associated with the proposal. This has been done using the emission factors published in the National Pollutant Inventory (NPI) Emission Estimation Technique for the Mining Industry Version 2.3. In addition, the assessment has made use of the Emission Estimation Technique Manual for Mineral Sands and Processing Version 1.0 and the US Environmental Protection Agency Equations for Miscellaneous Sources, Aggregate Handling and Storage Piles which forms part of AP-42. These are appropriate approaches.

The calculations and their results are summarised in the EA. The equations and the calculations have been reviewed. The estimated emissions appear reasonable and consistent with those expected from an operation of this nature and size.

### *5.2.3 Meteorological Data*

Meteorological data is another factor that is important to obtaining reliable estimates of future particulate matter concentration and deposition levels. No on-site meteorological data are available and the proponent has relied on meteorological data generated by the CSIRO's TAPM model using data for 2004.

To investigate the representativeness of the data further, the Panel has undertaken its own reviews which have included:

- reviewing direct measurements of wind speed and wind direction made at the Rocla quarry at Calga between April 2006 and March 2007 and published in an air quality assessment undertaken for that company; and
- discussion with local residents concerning their observations.

The Rocla site at Calga is approximately 10 km to the southwest of the project site and at an altitude of approximately 200 m above mean sea-level compared with 290 m for the project. Winds at the Rocla site show a high frequency of winds from the south-southwest and southwest which are not experienced at the project site.

These winds are likely to be due to local topographical effects that affect winds at the Calga site and not at Somersby. Once these winds are removed, the general pattern of winds at Calga and the TAPM generated winds at the project site show the same broad features. Discussions with local residents confirmed that the distribution of winds in data used by the Proponent's consultant in the assessment was consistent with local experience. Several residents noted that topographical effects were significant, however the TAPM model incorporates procedures that incorporate the effects of terrain.

### *5.2.4 Existing Air Quality*

The Proponent's consultant has determined by direct measurement dust deposition levels at five locations in the vicinity of the project, including one site on the school grounds. Observations of monthly deposition levels over the period 29 August 2005 to 29 November 2006 were presented in the assessment. These showed that historical dust deposition levels have been low and indicative of good air quality with respect to nuisance dust.

In addition to dust deposition, 24-hour $PM_{10}$ concentrations at the school have been monitored every sixth day in two separate campaigns one spanning the period 29 September 2000 to 28 November 2000 and the other the period 18 September 2005 to 30 November 2006. The averages of the 24-hour observed $PM_{10}$ concentrations over these two periods were 22.5 and 17.7 $\mu g/m^3$ respectively. The weighted average of these two data sets was 18.5 $\mu g/m^3$. These figures are consistent with a clean rural environment. The Panel is satisfied that these data allow an adequate characterisation of existing air quality.

To accommodate the DECC's assessment methods the Proponent's consultant has looked for a continuous record of $PM_{10}$ concentration measurements that have the same statistical properties as the on-site data. They examined data collected by the DECC at Richmond and Wallsend. Both of these data sets showed similar characteristics to the on-site data and they selected the Richmond data because the land use surrounding the Richmond monitor has a greater similarity to the semi-rural conditions at Somersby.

Total suspended particulate (TSP) concentrations were estimated by assuming that they would be approximately twice the $PM_{10}$ concentrations. These assumptions appear reasonable.

### *5.2.5 Assessment Criteria*

The assessment criteria are the concentration and deposition levels that should not be exceeded as a result of emissions from the project. They include the effects of the project and the existing levels of pollution. The Proponent has little discretion in setting these. They are determined by the type of emissions that will arise from the project and the DECC standards. The Proponent has identified emissions of nitrogen dioxide (NO2), sulphur dioxide (SO2), deposited dust, total suspended particulate matter (TSP), particles with equivalent aerodynamic diameters less than 10 micrometres ($PM_{10}$) and particles with equivalent aerodynamic diameters less than 2.5 micrometres ($PM_{2.5}$).

### *5.2.6 Selection of Receptors*

The Proponent has undertaken the dispersion modelling using the Ausplume model and has made predictions of:

- the maximum 24-hour $PM_{10}$ concentrations;
- annual average $PM_{10}$ concentration;
- annual average TSP concentrations; and
- annual average dust deposition levels.

The predictions have been made at a rectangular grid of receptors spaced at 100 m by 100 m intervals and covering the area over the proposed quarry and the surrounding land. The results were presented as contour plots and in tabular form showing the increase in dust concentration and deposition levels at eleven (11) key sites selected to represent privately and community owned facilities including residences and the school. Both the tabulated data and the isopleth plots showed the effects of the project considered by itself and considered with background levels as appropriate. The DECC requested some minor changes in the presentation of the results to show more clearly the effects of the project and this has been done in an appropriate way.

### *5.2.7 Model Results and Interpretation of Impacts*

Model results were presented as a set of isopleth diagrams showing the predicted:

- annual average increment in dust deposition levels caused by the project for Cases 1 and 2;
- maximum 24-hour average $PM_{10}$ concentration due to existing maximum 24-hour $PM_{10}$ concentrations plus the expected increment from the project for Cases 1 and 2; and
- annual average $PM_{10}$ concentrations due to existing annual average background $PM_{10}$ concentrations plus the increment caused by emissions from the project for Cases 1 and 2.

In addition, the modelling results were presented in tabular form showing the effects of the project on air quality at selected receptors such as the school and nearby residences. The

modelling procedures, the presentation of results and the interpretation of results followed the standard requirements of the DECC's "Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales".

One community submission questioned the results for the predicted annual average dust deposition levels as presented in a figure shown as Appendix 6-1 in the EA. The concern was about the shape of the contours close to the school. To investigate this matter the model input files and the meteorological data used in the EA were obtained and the model rerun and the contour plot regenerated. The results were similar, although not identical to those presented in the EA. The differences could be explained by the different smoothing processes applied to the contour plots. These small discrepancies do not affect the overall assessment.

The model results indicate that the project would comply with the DECC's assessment criteria for all pollutants including the effects of background levels of particulate matter that could reasonably be expected in the area as well as existing dust deposition levels that occur.

From time-to-time the DECC's 24-hour $PM_{10}$ assessment criterion could be exceeded, but this can occur in all areas in NSW when bushfires or remote dust storms affect air quality. The modelling results indicate that emissions from the quarry would not unreasonably exacerbate these situations.

## 5.3 Crystalline Silica

### *5.3.1 Background Discussion*

From a number of submissions to the Panel (see Section 5.3.2) it was clear that the issue of crystalline silica and its potential health effects were of concern to the community including the Department of Health. Assessing this issue has proved complicated and has involved the Panel seeking further data in order to reduce some uncertainties that were not fully addressed in the EA. This is not to say that the EA treatment of this question was flawed, but it did not completely address the concerns raised by the community and the Panel did not feel confident that it could draw a reliable conclusion on this question with the data available. The concerns and the way in which these have been addressed are discussed below.

### *5.3.2 Specialist Submissions*

The potential health effects of emissions of crystalline silica were raised by a number of parties on behalf of the community. One community submission provided the results of field work undertaken around quarries and other sand quarries on the Central Coast. The field work involved the collection of samples of settled dust using swipes. The dust was removed from the swipes and transferred to slides to allow microscopic analysis of the dust. As would be expected this analysis showed a large portion of the dust was silica, but it is not easy to use this method to discriminate between crystalline silica and amorphous silica nor is it possible to use such data to estimate the quantity of respirable material that is present.

The potential silicosis risks to the community will depend on the concentration of respirable crystalline silica that occurs in the area around the quarry as a result of operation

of the project and the existing background levels. The submissions by Mr Cantrall and Dr Burmiester did not address this aspect. Their submissions focussed on the disease caused by exposure to crystalline silica in a general way rather than the specific risks associated with the project. This was useful to the Panel and provided guidance as to suitable assessment criteria that could be used to assess risk. There was a consensus amongst the specialists (Mr Cantrell, Dr Burmiester and the Department of Health) that the Californian Reference Exposure Level (REL) and risk assessment procedures adopted by the U.S. Office of Environmental Health Hazard Assessment (OEHHA) would be an appropriate basis for assessing the effects of the proposal.

### *5.3.3 EA Assessment*

The EA assessed the risk that members of the public could be exposed to high enough concentrations of respirable crystalline silica to cause silicosis. This was done by estimating the concentration of respirable crystalline silica that was likely to arise at the receptor predicted to experience the highest annual average $PM_{10}$ concentration.

To do this the EA needed information on (1) the existing background concentrations of respirable crystalline silica and (2) the increase in annual average concentration of crystalline silica due to emissions from the sand quarry. It made use of the following basic assumptions:

1) From monitoring data onsite and other DECC data, the annual average $PM_{10}$ existing background concentration is estimated to be 18 $\mu g/m^3$.
2) From analysis of the sand on-site, 4% of the background is expected to be respirable quartz.
3) From the modelling done for the EA, the maximum predicted increase in annual average $PM_{10}$ concentrations at the most affected receptors is 2.5 $\mu g/m^3$.
4) From the analysis of the sand on-site, the fraction of the increase in $PM_{10}$ concentrations due to the operation of the project that is crystalline silica is 4%.

The assumption in (1) above is reasonable and it is difficult to see how this could be improved. The assumption in (2) above, that 4% of the existing background $PM_{10}$ concentration is likely to be crystalline silica is questionable and may well over-estimate the fraction given that it would seem that very little of the particulate matter in the existing ambient air is derived from sand quarrying. The assumption in (3) above, that the annual average $PM_{10}$ concentration is 2.5 $\mu g/m^3$, has been used by the Proponent to estimate the likely crystalline silica. This has been done by assuming that 4% of the $PM_{10}$ emissions from the project will be crystalline silica. This is questionable and might underestimate the proportion. (Indeed as will be seen in the next section the proportion of crystalline silica in emissions from sand extraction operations are likely to be higher than 4% and in the range of 6% to 90% depending on the operation). These matters will be returned to later. Point (4) is simply a statement of fact based on a test undertaken by the proponent on the sand in-situ (not on airborne dust).

Uncertainties in the EA assessment are not as serious as it might appear at first sight. This is because a simple extension of the basic analysis in the EA shows that even if 100% of the $PM_{10}$ emission from the project was in the form of respirable crystalline silica, and all particles in the $PM_{10}$ size range were conservatively classed as in the respirable size range (which should be taken to be $PM_4$ when referring to the Californian REL) the concentrations expected at the most-affected receptor would still comply with the

Californian assessment criteria. The margin of safety would of course be less than calculated in the EA. The margin of safety in the compliance is discussed later. Thus the purpose of the additional work is to improve the reliability of the estimate rather than fundamentally change the way in which the assessment was undertaken.

To determine the quantity of respirable crystalline silica in both the existing background $PM_{10}$ burden and the emission of $PM_{10}$ from the project, the Proponent has taken a sample of the raw sand from the project site and sieved it to obtain a sample of sub-75 μm particles. This sample was further processed to extract a sub-10 μm size fraction using a cyclosizer. This sample was then analysed using X-ray diffraction to determine the percentage of the sub-10 μm particles that were crystalline silica. The fraction was found to be 4%. The concern raised by the community and the Panel is that this process does not replicate the process that creates the emission, in particular when sandstone is ripped by a dozer, or wheel generated dust is created.

The EA then assumes that 4% of the background $PM_{10}$ would be in the form of crystalline silica. This leads to an annual average crystalline silica concentration of 0.72 $\mu g/m^3$ in the sub-10 micron size range [0.04 x 18 $\mu g/m^3$]. The validity of the assumption, that 4% of the background $PM_{10}$ is in the form of crystalline silica, is open to question and the Panel requested that the Proponent collect further data to support this figure. Unfortunately the fieldwork commissioned by the Proponent turned out to be unsuccessful in answering this question.

### *5.3.4 Additional Work*

To deal with this the Panel has investigated other sources of data that could provide information on the background concentrations of crystalline silica in the area. Data collected by ANSTO (1995) at 24 sites in NSW as part of the ASP program has developed a useful database of $PM_{2.5}$ concentrations across NSW. Samples of 24-hour $PM_{2.5}$ concentrations were measured twice per week at the 24 sites and each sample was analysed to determine the elemental composition of the sample for a suite of the most common elements including silicon.

The closest ASP monitor to Somersby was at Doyalson 30 km to the northeast of Somersby. Twelve months of data from March 2002 to February 2003 were available to the Panel (in fact the data available ran through to June 2003 but to avoid introducing a seasonal bias the sample analysed was restricted to a complete year). The average concentration of silicon in the samples from Doyalson was 81 $ng/m^3$ (i.e. 0.081 $\mu g/m^3$). The average over all sites was 58 $ng/m^3$ so the Doyalson samples had a silicon content approximately 40% above the average over all 24 monitoring sites.

Silica has the chemical formula SiO2 and the atomic masses of Si and O are 28 and 16 respectively. Thus the mass of silica in the $PM_{2.5}$ particles is 0.17 $\mu g/m^3$ [i.e. 0.081 $\mu g/m^3$ x (28 + 2 x 16)/(28)]. The fraction of this which is in the form of crystalline silica is unknown, but it cannot be more than 100% and so a conservative estimate of the background crystalline silica concentration in the $PM_{2.5}$ size range is 0.17 $\mu g/m^3$.

The ratio of the concentrations of $PM_{2.5}$ and $PM_{10}$ particles in any airshed will depend on the sources of particles. Research referred to in the development of the Air-National Environment Protection Measures (Air-NEPMs) found the ratio to be in the range 26% to 80% with a mean of 49% for populated areas in Australia. Using a rounded figure of 50%

it may be seen that a $PM_{2.5}$ concentration of 0.17 $\mu g/m^3$ would likely be associated with $PM_{10}$ concentration of 0.34 $\mu g/m^3$. Thus the figure of 0.72 $\mu g/m^3$ assumed in the EA is likely to be conservative by a factor of almost 100%.

The Panel also examined the measured silicon concentrations at the other 24 NSW sites to determine the range that existed and whether or not the data at Doyalson could be considered typical or not. It was apparent that the annual average concentration across the highest and lowest sites was within a factor of two of one another and Doyalson was not an atypical site. Thus it would be reasonable to assume that the background levels at Somersby are likely to be similar to those at Doyalson and elsewhere in NSW.

Returning to the question as to how much of the $PM_{10}$ emissions from the project will be in the form of crystalline silica, it would appear that the estimate of 4% is a plausible estimate, but it is obviously also open to challenge. This is because the quarrying activities that are likely to result in the liberation of crystalline silica occur when the weathered rock is being ripped by dozers and when the material is mechanically disturbed, for example as vehicles travel over exposed ground either on the roads or the other exposed ground on the project site. These processes may or may not be replicated by the sampling process used by the proponent to determine the crystalline silica content of the sand.

To resolve the uncertainties left with the approach adopted by the EA, the Department of Planning (at the request of the Panel) commissioned additional tests. The tests focussed on measuring the percentage of respirable crystalline silica generated while a bulldozer is ripping weathered sandstone and when trucks are travelling on internal quarry roads. The dozer ripping activity was considered to be the process likely to generate the highest levels of crystalline silica that would be found anywhere on a sand quarry. The emission from trucks travelling on haul roads was considered likely to be representative of all other activities.

Getex Pty Ltd was commissioned to collect the samples. A total of six samples were collected, three for each of the two activities. The average percentage of crystalline silica for a dozer ripping sandstone was 89% (range 85% to 93%). These results apply to the dust in the air behind a dozer ripping sandstone (Getex, 2008). Thus the Proponent's assumption of 4% appears to be too low, but the dozer operations are a relatively small fraction of the total emission. The equivalent measurement for dust liberated by the movement of trucks was 6%.

The Proponent's estimated $PM_{10}$ emissions for Stage 2 operations have been reviewed and the above percentages have been applied to the estimated $PM_{10}$ emissions of crystalline silica. The assumption is that all emissions from dozer operations and from the excavator excavating sand are 90% crystalline silica and all other emissions are 6% crystalline silica. The overall effect is that up to 16% of the emissions could be crystalline silica. This compares with the EA estimate of 4%.

If the health risk assessment is redone using these figures it is estimated that the annual average $PM_{10}$ concentration of crystalline silica at the most-affected receptor in the worst-case year will be:

0.17 $\mu g/m^3$ due to existing background + 2.5 $\mu g/m^3$ x 0.16 due to emissions from the project = 0.57 $\mu g/m^3$.

This is below the Californian REL of 3 $\mu g/m^3$ (annual average) which applies to the $PM_4$ size fraction. The conclusion reached by the Panel is therefore the same as in the EA, namely there is no reason to expect any resident in the area will be exposed to sufficient concentrations of respirable crystalline silica as to cause silicosis.

### 5.4 Conclusions and Recommendations

The Panel is satisfied that it has sufficient information to assess the potential air quality impacts of the project. Overall, the Proponent's assessment has been conducted in accordance with accepted methodologies, and is consistent with current best practice in NSW.

The Panel is satisfied that the Proponent is implementing all reasonable and feasible mitigation measures to reduce dust emissions from the site, and in some circumstances these measures are over and above those that would normally be used in the quarrying industry.

With the implementation of these measures, the Panel is satisfied that emissions from the project are unlikely to exceed relevant DECC criteria for deposited dust, TSP, and $PM_{10}$ at the Somersby Public School or at any surrounding residences. However, under adverse weather conditions, dust from the project site may exceed DECC amenity criteria for short periods on land beyond the project boundary. The Panel is satisfied that this would be unlikely to result in any significant impacts on surrounding residences or land uses.

The Panel has also considered the impact of dust on horticultural industry. Given that the project is likely to comply with the DECC's amenity criteria in areas surrounding the site, and the distance to the nearest horticultural activities (i.e. approximately 1 km from any source of dust on the project site), the Panel believes that it is highly unlikely that there would be any noticeable accumulation of dust on cut flowers or other sensitive horticultural land uses.

The Panel has also carefully considered the potential for the project to result in elevated levels of air-borne crystalline silica and the associated health impacts. Based on its detailed assessment of this issue, the Panel is confident that the concentrations of air-borne crystalline silica would remain well below internationally accepted criteria in the areas surrounding the project, including at the Somersby Public School.

Consequently, the Panel does not believe that the project presents any appreciable health risk to students or teachers at the Somersby Public School or to surrounding residents. Furthermore, the Panel notes that the Proponent only proposed to proceed with Stage 2 of the project once it has satisfactorily demonstrated that it can meet relevant air quality criteria at the school and at surrounding residences. The Panel believes this provides an important safeguard for the community, and further security against any potential adverse air quality impacts associated with the project.

Notwithstanding, the Panel believes the Proponent should be required to:

- implement best practice dust mitigation as outlined in the Proponent's Statement of Commitments;

- demonstrate by monitoring that the project complies with relevant air quality criteria for off-site dust emissions, including the Californian standard for respirable crystalline silica;
- implement a comprehensive air quality monitoring program to ensure it complies with these criteria, including long term monitoring of crystalline silica, and real-time monitoring of $PM_{10}$, at the Somersby Public School. Crystalline silica should monitored following procedures adopted in Victoria as described in their "*Protocol for Environmental Management, Mining and Extractive Industries (PEM MEI)"*; and
- demonstrate compliance with relevant air quality criteria prior to being permitted to proceed from Stage 1 to Stage 2 of the project.

The Panel also believes that the Department of Planning should conduct regular independent audits of the quarry, and that any decision to allow the project to proceed to Stage 2 be based on a comprehensive independent review of air quality monitoring data.

# 6 NOISE

## 6.1 Overview

The key noise issues for the project relate to the potential for quarrying and processing equipment and for on-site and off-site transport activities to create excessive noise at the school and nearby residential properties. Similar questions arise for the noise generated in the construction period.

The Proponent's noise assessment was undertaken by Heggies Pty Ltd on behalf of R. W. Corkery & Co Pty Ltd.

The Noise Impact Assessment Study referred to the assessment procedures set out in the:

- Environmental Noise Control Manual (ECNM) published by the Environment Protection Authority (EPA) now known as the DECC (for construction).
- The NSW Government's Industrial Noise Policy (INP) published by the DECC (for on-site operational noise).
- The DEC's (now DECC) Environmental Criteria for Road Traffic Noise (ECRTN) for off-site road transport noise.
- The DECC's most recent policy regarding the assessment of sleep disturbance.

These are the standard references for assessing noise impacts for projects of this nature. They provide a state-wide uniform approach for assessing the environmental effects of noise from industry (including sand extraction) and road traffic noise.

The approach used in the assessment included the following:

- an analysis of the proposal to identify the noise sources associated with the proposal and the locations of the sources over the life of the proposal;
- a review of the surrounding land to identify land ownership and the locations of sensitive receivers;
- the conduct of attended and unattended surveys of background noise to determine the characteristics of the existing acoustic environment and to determine assessment criteria for sensitive receivers;
- a review of meteorological data to determine whether the effects of wind or the effects of nocturnal inversions on noise propagation need to be considered in the assessment;
- the use of the SoundPLAN V6.3 Industrial Model to simulate the propagation of noise from the site for a set of five scenarios representing different operational modes and stages for the project; and
- the comparison of the predicted noise levels at sensitive with receivers the derived assessment levels to assess the likely acoustic effects of the proposal.

The scenarios modelled included:

- site establishment/construction;
- operations in Stage 1 (east of the wash plant at the surface);
- operations in Stage 1 (west of the wash plant at the surface);
- operations in Stage 2 (at the surface); and

- operations in Stage 2 (at 10 m below the surface).

The assessment methodology used follows the DECC's guidelines as set out in the INP and other documents referred to above. The assumptions are clearly set out and are well-documented. The scenarios assessed cover an adequate range of future operating modes to capture likely impacts.

## 6.2 Submissions

General references to noise impacts were made in a number of submissions from the community and detailed technical submissions on noise were made by the DECC and Renzo Tonin and Associates (RTA) on behalf of the Parents and Citizens of the Somersby Primary School.

The submission by RTA criticised the Proponent's report, raising the following points:

- Noise monitoring was not undertaken at the nearest residence (Location N) (the Proponent's assessment assumed that the noise levels at the school (Location O) would be representative of background noise levels at Location N).
- That the assessment criteria for construction had not been correctly applied as the criteria only apply for periods of up to six months.
- Noise control bunds should be constructed before early construction works are undertaken.
- The noise from reversing alarms was not included in the assessment.
- Because the elevation of the receiver point used to assess noise levels at the school was not nominated in the Proponent's report, the noise levels at the upper level of the two storey building at the school might exceed the assessment criteria.
- The precise locations of the assessment points as shown on the plans in the assessment report are not clear and should be either at the most affected point on or within a residential property or within 30 m of the residence.
- Modifying factors were not applied to noise sources in the assessment process to account for the potential annoying properties of the noises; (e.g. the tonal or intermittent character of the noises).
- It was unclear if the adjustment to predicted noise levels to account for the variable nature of mobile noise had been applied to the stationary wash plant and mortar sand plant.
- Concern that the effects of noise from traffic on Peats Ridge Road at Location V had not been addressed sufficiently and that the assessment criteria and the acceptable level of traffic noise should be set at 60 dB(A).
- That the increase in truck noise between 9 p.m. and 10 p.m., while complying with the ECRTN noise objectives, may still cause a significant increase in truck noise which may be "significant and noticeable to residents".
- That the effect of noise from vehicles using the site between 5 a.m. and 7 a.m. has not been assessed with respect to the potential for sleep disturbance.

The DECC submission also raised a number of issues in relation to the conduct of the noise assessment and the effects of the proposal. In summary the DECC concerns covered the following:

- Noise at some monitoring sites may have been affected by noises from insects or frogs.
- That a single site at the school was used to determine background conditions at both Location O (the school) and N (the Daniels property).
- The DECC was not able to determine how the sleep disturbance criteria were derived, but concluded that the sleep disturbance criteria would be met.
- The impacts of constructing the eastern noise bund have not been addressed.
- That noise levels at Location N would exceed levels that the DECC would normally consider licensing to.
- That the assessment should consider mitigation measures to reduce traffic noise levels which are predicted during the early morning (5 a.m. to 6 a.m. and 6 a.m. to 7 a.m.) before taking advantage of the "existing background + 2 dB(A)" assessment criterion referred to in the ECRTN, which applies when existing levels exceed the target noise level.

DECC questioned the background noise levels used in the assessment. Their approach results in a more conservative assessment than the Proponent's, but for the key property affected (Location N) the project is predicted to exceed the project specific noise assessment levels regardless of which of the two approaches is used. Consequently it will be necessary for the Proponent to come to an arrangement with the occupiers of Location N.

In relation to the sleep disturbance criterion, the Proponent notes that the original figures in their report were incorrect and they have redone the assessment using the correct levels as identified by the DECC. They conclude that the project complies with the criteria based on the corrected analysis.

The Proponent has made a commitment not to use tonal reversing alarms on site.

The Proponent's assessment at the school only considered ground-based receivers and did not take into account the elevated position of the upper-floor location of some of the classrooms. According to calculations undertaken by the Proponent, taking account of the elevated position of some classrooms would increase noise levels by approximately 2 dB(A). This would take the predicted noise levels (under worst case conditions when Stage 2 was being operated and equipment was on the surface) close to the assessment criterion. The level would be expected to return to well below the criterion once equipment was operating below the local surface.

The Panel notes that the DECC's assessment stated that the assessment of construction noise impacts was appropriate.

### 6.3 Assessed Impacts

The Proponent has derived noise assessment levels for ten sensitive receivers in the neighbourhood of the proposal. Each receiver has a different set of assessment levels based on the measured existing background noise at the site. The assessment found that all receivers would comply with the derived assessment levels for intrusive noise and also would comply with the INP's amenity criterion, except Location N (the Daniels property).The DECC submission expressed concern about both the assumed background noise levels at Location N and about the predicted noise levels at this location.

At Location N the intrusiveness criterion is predicted to be exceeded by 9 dB(A) during the construction of the far western noise control bund and during extraction in Stage 2 when equipment is operating on the surface. Under daytime conditions with surface operations taking place the assessment level of 45 dB(A) is predicted to be exceeded by 5 dB(A). As noted previously the Panel is of the view that the Proponent must come to a mutually acceptable arrangement with the occupiers of this residence. This applies regardless of the background levels and whether the Proponent's or DECC's assessment criteria are used to assess impacts at this location. To a large extent the argument over the level of background noise is academic, since there is a predicted exceedance in either case.

The assessment also considered the effects of noise from traffic using Peats Ridge Road. Peats Ridge Road is classed as a collector road according to the ECRTN. For such roads, the ECRTN sets non-mandatory noise targets of 60 and 55 dB(A) for the $LA_{eq(1hr)}$ noise level due to traffic for day (7 a.m. to 10 p.m.) and night (10 p.m. to 7 a.m.) respectively. In addition the ECRTN states that for roads where the target level is already exceeded, new projects that introduce additional traffic should not allow the $LA_{eq(1hr)}$ to increase by more than 2 dB(A). For the project this is relevant for the early morning period (5 a.m. to 7 a.m.) and for the morning peak (8 a.m. to 9 a.m.) and afternoon peak (3 p.m. to 4 p.m.) and would allow the assessment criteria to be slightly higher than the 55 and 60 dB(A) targets for these periods.

The EA used methods developed by the United States Environmental Protection Agency to predict the $LA_{eq(1hr)}$ at the two closest existing residences to Peats Ridge Road (Locations V and Y respectively) and at the proposed residence at the DPI Field Station (referred to as Location B). If product haulage is permitted to commence at 5 a.m., the predictions indicate that the $LA_{eq(1hr)}$ at Residence V would be marginally (0.8 dB(A)) above the night time target of 55 dB(A). The predicted levels at the other residences would be lower than the 55 dB(A) target. The predicted $LA_{eq(1hr)}$ for the afternoon peak (3 pm to 4 pm) was also predicted to marginally (by 0.7 dB(A)) exceed the day time target of 60 dB(A) at Residence V.

For all daytime and evening periods the project traffic is predicted to comply with the target criteria requiring that the project does not cause traffic noise to rise more than 2 dB(A) above the existing $LA_{eq(1hr)}$ level and for most of the time the predicted level is less than the 60 dB(A) daytime target level. However, for the 5 a.m. to 7 a.m. period the 55 dB(A) target is predicted to be exceeded and the "existing $LA_{eq(1hr)}$ +2 dB(A)" level is predicted to be equalled at Location V.

A sleep disturbance assessment was included in the EA. However, DECC raised concerns about how the criteria were derived. In the response to submissions, the Proponent noted an error in its assessment. They included a revised sleep disturbance assessment that includes night-time traffic noise impacts (see page 2-33 of Response to Submissions). This assessment indicates no exceedances of DECC's sleep disturbance criteria.

### 6.4 Conclusions and Recommendations

The Panel is satisfied that the noise impact assessment has been conducted in accordance with the INP.

With the implementation of best practice noise mitigation, the Panel believes that noise generated from the project would generally comply with relevant DECC criteria, with the exception of one residence (Location N) where noise levels are expected to significantly exceed the DECC criteria during certain construction and excavation activities on the site, and one residence (Location V) on Peats Ridge Road where traffic noise is predicted to marginally exceed the DECC road traffic noise criteria.

The Panel has also considered the potential noise impacts on the Somersby Public School, and is satisfied that due to topographic and vegetative screening, noise from the project is unlikely to exceed the DECC noise criteria at the school. The Panel points out, however, that this does not mean that the project would be inaudible at the school, particularly in the playground which is closer to the proposed sand quarry. Nonetheless, the Panel is confident that the project is unlikely to result in any disruption to the student's learning due to the additional noise attenuation associated with being inside a classroom.

To address and manage the residual noise impacts of the project, the Panel believes that the Proponent be required to:

- acquire the property at Location N at the request of the landowner, unless a mutually acceptable negotiated noise agreement can be reached between the Proponent and the affected landowner;
- implement best practice noise mitigation as outlined in the Proponent's Statement of Commitments;
- comply with strict noise limits at all other residences in the area and at the Somersby Public School;
- implement a comprehensive noise monitoring program to ensure the Proponent complies with its noise limits, including real-time noise monitoring and monitoring at the second level of the classrooms at the Somersby Public School;
- restrict the construction of noise bunds to a defined period within school holidays; and
- demonstrate compliance with relevant noise criteria through an independent audit prior to being permitted to proceed from Stage 1 to Stage 2 of the project.

# 7 GROUNDWATER AND SURFACE WATER

## 7.1 Overview

The public water supply in the Gosford-Wyong area is reliant on streams that originate in elevated sandstone country. Some of this water originates on the Somersby Plateau. A component of the stream flow is groundwater from shallow aquifers that emerges at ground surface as seeps or springs. Apart from water supply, there is demand for groundwater for horticultural, agricultural and industrial purposes. As there is strong connectivity between surface water and groundwater, good groundwater management is critical to ensure that stream base flow is not jeopardised.

Groundwater levels on the Somersby Plateau are sustained by rainfall infiltration, but are controlled by ground surface topography and drainage lines. A local groundwater mound develops beneath the sandstone hills with ultimate discharge to incised creeks and wetlands, and loss by evapotranspiration through vegetation where the water table is within a few metres of ground surface.

The Somersby Fields project site lies at the junction of four surface water catchments: Ourimbah Creek (via Platypus Creek), Narara Creek, Robinson Creek, and Little Mooney Mooney Creek. The aquifers beneath the site host a portion of the Kulnura Mangrove Mountain Groundwater Source which is managed according to an issued Water Sharing Plan.

At the site, there is a perched water table in the near surface soils and a regional water table at greater depth. A number of springs occur on the site and in an approximate ring around the site. The proposed sand quarrying will intercept the perched water table and the regional water table and will affect the flow of a number of springs.

The Proponent's groundwater assessment was undertaken by Robert Carr & Associates Pty Ltd (RCA Australia) on behalf of R. W. Corkery & Co Pty Ltd. The approach used in the assessment included the following:

- background hydrogeology and hydrology;
- perched water and springs;
- district bore and spring census;
- conceptualisation of the hydrogeological model;
- computer modelling of the groundwater system;
- computer simulation of the sand quarrying sequence of operations;
- model sensitivity analysis;
- predicted impacts of the project and cumulative impacts taking Rindean quarry into account;
- mitigation measures; and
- groundwater monitoring and management.

Following the public hearings, the Panel requested additional groundwater assessment. This was undertaken by RCA Australia and documented in a report dated 18 April 2008. The tasks in the supplementary assessment included:

- provision of simulated water level contour maps for both model layers at Year 9, Year 15 and for the final landform;
- computer modelling of possible higher permeability lineaments across the site and regionally; and
- separate modelling of the perched groundwater system and its interaction with known springs.

The Proponent's surface water assessment was undertaken by Cardno Willing (NSW) Pty Ltd (Cardno) on behalf of R. W. Corkery & Co Pty Ltd. The approach used in the assessment included the following:

- background hydrology and meteorology;
- existing dams;
- computer modelling of rainfall/runoff to determine peak runoff;
- computer modelling of surface runoff volumes and water quality;
- estimation of project water demand;
- predicted impacts of the project; and
- water management plan.

Following the Supplementary Fauna Assessment by Kendall and Kendall Ecological Services Pty Ltd in March/April 2008, the Proponent announced in a report dated April 2008 that the planned extraction Stage 1/3 would now be retained in its natural form; in other words it is not to be excavated. This stage is adjacent to the Voluntary Conservation Area (VCA). This decision post-dates the groundwater and surface water assessments, and consequently has an effect on their findings.

### 7.2 Submissions

During the public hearings, many submissions raised water issues of concern. The foremost submission on groundwater issues was that of the Somersby Action Group, based on a report prepared for R. & S. Weller by Larry Cook & Associates Pty Ltd. The foremost submission on surface water was made by Brink & Associates on behalf of the NSW Department of Primary Industry.

The main issues of concern included:

- impacts on the Voluntary Conservation Area, wetlands, hanging swamps and other groundwater dependent ecosystems due to cessation of offsite spring flows with consequent effects on habitats;
- reduction in access to groundwater at offsite production bores due to regional lowering of the water table, and uncertainty of groundwater supplies at greater depth should bores have to be deepened or re-drilled;
- impacts resulting from diversion of water away from water supply catchments to the Narara Creek catchment; and
- lack of confidence in modelling per se, particularly the absence of lineaments from the conceptual hydrogeological model; the DWE questioned the accuracy of predicted quarry inflows and the distance to which regional water levels would be lowered.

## 7.3 Assessment

### *7.3.1 Spring Flows*

The Environmental Assessment dated May 2007 classified offsite springs as "perched" rainfall-dependent groundwater systems, or "true" groundwater systems sustained by regional water pressures. This conceptualisation was challenged during the public hearings, with the result that consensus was reached on the source of each spring. There appears to be a common elevation of 270-272m AHD for a number of springs that form a ring around the site, which suggests a fairly horizontal extensive layer of low permeability material that provides a base for a perched groundwater system. The springs are on the following properties: Cahill, Hawker, Weller, Woodlands, Ozbaglar; and Spring A on the project site. The change in agreed classification led to a change in predicted impact. The original groundwater model did not model the perched system explicitly, due to software limitations.

At the request of the Panel, the Proponent's consultant created a separate single-layer model of the perched system, subject to simulated quarry progression. It was found to be necessary to adopt a higher permeability of 0.5 metres/day in concert with higher rainfall recharge of 15-20 percent, which is more in keeping with the community's expectations.

Only qualitative assessments of impact on spring flows could be offered in the original Environmental Assessment. Now, the quantitative assessment shows that the impact of quarrying on the springs will be negligible prior to Stage 2. At the end of Stage 2, the predicted impact is less than 5 percent at the Cahill, Hawker and Weller springs; about 10 percent at Woodlands and site Spring A; and about 20 percent at the Ozbaglar spring.

As the wetlands and hanging swamps are dependent on sustained spring flow, the revised modelling demonstrates that the impact will be minor and well within the natural fluctuations to which the systems are accustomed.

Spring A on the site will suffer minor impact because it will be replenished by water from the adjoining Woodlands property.

### *7.3.2 Groundwater Dependant Ecosystems*

There is no doubt that much of the vegetation on the site and adjoining the site is sustained by spring water, which has its origin as groundwater. That vegetation can be said to be groundwater dependent, although it is not in fact dependent on water held in an aquifer. Apart from vegetation on site in areas which will be excavated, the likely impact on other spring-fed vegetation is likely to be minor.

The term "groundwater dependent ecosystems" is usually reserved for vegetation whose roots access the water table. An issue of particular concern to the community is the ongoing health of the Prostanthera junonis (Somersby Mintbush) on the site. The Panel accepts the Proponent's assertion that this species is not groundwater dependent, and hence reductions in perched or regional water tables will not affect its health.

The issue with the Voluntary Conservation Area (VCA) is whether it will dry out by seepage of perched water to the adjacent open pit in the course of quarrying. Prior to extraction, it is likely that the western end of the VCA receives lateral groundwater flow

moving from west to east. That flow will be interrupted during quarrying and could be reversed at the western end of the VCA. After land forming and rehabilitation take place, the perched water system will be restored and lateral flow to the VCA will resume.

This issue appears not to have been addressed quantitatively by the Proponent. Given the late decision by the proponent to exclude Stage 1/3 from excavation, the seepage risk is now limited to a small area at the western end of the VCA. The Panel's assessment is that there is a very low risk of the VCA drying out during or after extraction.

### *7.3.3 Groundwater Levels*

Interception of the water table during quarrying will cause a reduction in offsite groundwater levels, due to the formation of a drawdown cone of depression. The Proponent has assessed the degree of impact in terms of the reduction in saturated thickness at each affected bore. The Panel accepts this as a reasonable approach.

During the hearings, concern was raised that the predicted impacts could be worse if inferred structural lineaments pass beneath the site. The lineaments could act as permeable conduits that might distort the shape of the drawdown cone and extend the effects to greater distances. At the request of the Panel, the Proponent's consultant modified the two-layer regional model with agreed parameters to accommodate permeable lineaments in both layers. As groundwater could more easily drain away, the rainfall recharge rates had to be increased to 13-18 percent, which is more in keeping with community expectations. The predicted drawdown onsite is greater, but the offsite 1 metre drawdown contour does not extend as far. In only one case (Bore GW044721) did the predicted saturated thickness decrease compared with the original model results. The impact at this bore has now increased from 2.2 percent to 3.6 percent of saturated thickness. The largest effect (at the school bore) has improved from 13 percent to 8 percent of saturated thickness.

The Proponent has committed to deepening bores, or drilling new bores, in case of adverse interference with groundwater levels in affected bores. It is highly unlikely that drilling contractors would agree to deepen a bore, due to the risk of permanent damage to the bore. Therefore, it is appropriate that new bores be drilled if required.

Concerns were raised that there is little chance of getting water at greater depths. Independent regional modelling confirms that there is a substantial groundwater resource to great depths beneath the Somersby Plateau. It is true that there will be zones at depth that are more productive than others, due to the alternation of massive and sheet sandstone units, and that the water yield of a bore depends on interception of fractures in which the water resides. Nevertheless, the Panel is of the view that the risk of a dry bore, or a lower yielding bore, is slight.

### *7.3.4 Surface Water*

In considering the significance of the diversion of surface water that will occur due to quarrying, it is essential to consider the magnitude of the change in each catchment, relative to total catchment area. For three of the catchments, the change is less than 0.3 percent. The largest change will occur in the Ourimbah catchment, where there is expected to be a reduction of about 28 ML/year in the average annual flow (about 3,500 ML/year) in Ourimbah Creek, which supplies about 11 percent of the water for the Gosford-Wyong

water supply. Based on modelling by the Proponent's consultant, the Panel's assessment is that the project will cause about 0.1 percent reduction in the water supply.

The Narara Creek catchment will increase in size by about 0.2 percent. The Panel agrees with the Proponent that there is no cause for concern with respect to the potential for increased flooding risk in the Narara Creek valley. The predicted increase in peak flow at Narara is about 1.5 percent of the current estimate for 1:100 year flow.
Submissions raised a number of concerns over the Proponent's surface water and groundwater assessments with particular relevance to the DPI Somersby Field Station, which lies about 500 metres to the east of the project site's eastern boundary; namely:

- no explicit consideration of impacts at the location of the DPI dam;
- no explicit statement of anticipated groundwater drawdown at the dam (other than an inference of less than 1.0 metre from contours);
- questioning of the Proponent's estimate of existing runoff of 187 ML/year from Dam A to the DPI dam (gaugings averaged 300 ML/year from August 2007 to February 2008, a wet period);
- water balance contingent on a rough estimate (1 L/second) of spring flow;
- risk of sustaining 0.2 ML/day through the planned diversion pipe around Dam A; and
- lack of consideration of the effects on the DPI dam of reductions in spring flow between the DPI site and the project site.

At present, the dam is the only source of water for the DPI site. Its security of supply is an important issue, especially with an increase in demand when the Station expands in the near future. Given the diversion of surface water away from other catchments to the catchment which hosts the DPI site, the likelihood is that the security of supply will be strengthened in the long term. However, there could be a reduction in security while quarrying is in progress. The late decision by the Proponent to exclude Stage 1/3 from excavation should reduce the impacts foreshadowed in the original surface water assessment.

Groundwater and surface water conditions close to the DPI dam are not well known due to a lack of monitoring on the DPI site, despite being the location for a number of DWE-constructed monitoring bores. It is understood that DPI has commenced the gauging of stream flow near the western boundary up-gradient of the dam. This will provide valuable benchmark data for subsequent assessment of any impacts that quarrying might cause.

As the Panel was not given definitive information on the relative levels of dam water and groundwater, it cannot determine whether the dam is gaining water from the aquifer or is losing water by leakage. If the groundwater level is already below the base of the dam, then quarrying-induced drawdown will not affect the current leakage rates. However, if groundwater levels are above dam levels, then a reduction in groundwater level could change the status of the dam (from "gaining" to "losing"), or increase the rate of leakage losses. The DWE monitoring bores should be reinstated to provide current benchmark levels for subsequent impact assessment. However, they are some distance from the dam, and a new bore closer to the dam is warranted whether or not the project is approved.

As the farthest 1.0 metre drawdown contour does not extend as far as the dam, there is no explicit statement in the environmental assessment on the drawdown expected at the dam.

However, as a worst case, the cumulative drawdown from the Somersby Fields project and the nearby Rindean quarry is predicted to be 1.0 metre.

DPI has questioned the reliability of the Proponent's estimate of existing runoff of 187 ML/year from Dam A to the DPI dam. This figure is dependent on the estimate for spring flow (1 L/second). It is not clear whether this was estimated or measured by the Proponent. The Panel recognises that an imprecise estimate for spring flow will have flow-on effects on all aspects of the water budget. This will affect the assessment of impacts, and will affect onsite water management operations. This matter should be resolved by measurement or sensitivity analysis, and accommodated in a Water Management Plan.

Several submissions envisaged the erosion of emplaced "fines" (silt/clay) and increased turbidity of drainage waters. The Proponent holds that water quality will be improved rather than degraded due to sediment trapping in a series of dams. The DECC submission agreed with the Proponent's assertion.

It is imperative that benchmark data be collected between Dam A and the DPI dam prior to extraction, with ongoing monitoring as part of a Water Management Plan. As Dam A is to be relied on for sediment control, the proposed piped water diversion (around Dam A in times of low flow) will require separate sampling.

## 7.4 Credibility of Modelling

Some submissions were critical of aspects of the groundwater modelling, namely:

- no sensitivity analysis for rainfall recharge variation;
- no sensitivity analysis for permeability variation; and
- no modelling of extreme weather conditions (low and high rainfall periods).

The criticisms of lack of sensitivity analysis are justified. Minimal sensitivity analysis was conducted in the original groundwater assessment. However, the supplementary modelling requested by the Panel showed that the original modelling was conservative. This satisfactorily deals with the question of sensitivity analysis for rainfall recharge and permeability.

Although modelling of extreme weather conditions was not undertaken seasonal fluctuations in groundwater levels and spring flows will continue to occur irrespective of whether the project is approved or not. The Panel is therefore satisfied that the groundwater modelling undertaken by the Proponent is satisfactory for impact assessment.

There were also similar criticisms of some aspects of the surface water modelling. However, the Panel is satisfied that the surface water modelling undertaken by the Proponent is satisfactory for impact assessment, and notes that whilst the simulation of climate dynamics has not been done, the Proponent has estimated average annual runoff under existing conditions for dry and wet years.

## 7.5 Conclusions and Recommendations

The Panel is satisfied that it has sufficient information to assess the potential groundwater and surface water impacts of the project. Overall, subject to reservations on the extent of

model sensitivity analyses, the Proponent's assessment has been conducted in accordance with accepted methodologies, and is consistent with current best practice in NSW.

The Panel acknowledges that there is difficulty in discriminating between alternative causes in a cause-and-effect relationship between hydraulic processes and observed effects on water levels, water quality and vegetation health. This will be an issue post-extraction if quarrying is approved, in interpreting the cause of possible reductions in groundwater levels, spring flows, and vegetation health. The Panel is satisfied that the Proponent is committed to resolving the potential ambiguities by detailed onsite and offsite continuous monitoring of water levels and flows. The extra monitoring bores proposed by the Proponent, coupled with the private production bores, together with an additional bore on the DPI site close to the dam, should be sufficient to resolve this issue.

The Panel is satisfied further that the Proponent is committed to implementing all reasonable and feasible mitigation measures, should definitive impacts occur to spring flows or permanent reduction in saturated thickness at offsite production bores.

The Panel's assessment is that there is a very low risk of the Voluntary Conservation Area drying out during extraction by seepage of perched water to the adjacent open pit. Due to the decision by the Proponent to exclude Stage 1/3 from excavation, the seepage risk is limited to a small area at the western end of the VCA. After land forming and rehabilitation take place, the perched water system can be expected to be restored and lateral groundwater flow to the VCA (from west to east) will resume.

With respect to surface water, the Panel concludes that the project will have a negligible impact on the Gosford-Wyong water supply through reduction in catchment area. The Panel agrees with the Proponent that there is no cause for concern with respect to the potential for increased flooding risk in the Narara Creek valley. At the adjoining down-gradient DPI site, there could be a reduction in security of water supply to the DPI dam while quarrying is in progress. However, the likelihood is that the security of supply will be strengthened in the long term.

Notwithstanding, the Panel believes the Proponent should be required to:

- develop a comprehensive Water Management Plan that incorporates the actions listed in the Proponent's Statement of Commitments;
- undertake surface water model sensitivity analysis for the estimate of spring flow, to assess the risk to DPI dam security of supply, the uncertainty in site water balance, and the flexibility in water management planning;
- arrange to drill a deep bore on school grounds to ensure the school has an ongoing supply of groundwater; the bore should be sufficiently deep to demonstrate that there is a satisfactory groundwater source at deeper levels, should it become necessary for other district bores to be deepened;
- undertake continuous monitoring of its existing and proposed bores and the private production bores within 1 km radius;
- negotiate with DPI for the drilling of an additional bore close to the DPI dam, with both the bore and the dam surveyed to Australian Height Datum, with continuous monitoring of bore and dam water levels;
- collect benchmark water quality data between Dam A and the DPI dam prior to extraction, with ongoing monitoring as part of a Water Management Plan; and

- conduct regular water quality sampling in the proposed piped water diversion around Dam A.

The Panel is supportive of the actions outlined in the Proponent's Statement of Commitments. The Water Management Plan shall include, but not be limited to:

- a groundwater management plan;
- a surface water management plan;
- an inventory of bores and springs to be assessed for benchmark levels and flows;
- an inventory of bores and springs for ongoing monitoring;
- a list of analytes to be measured in groundwater and surface water samples to the satisfaction of DWE;
- a commitment to maintain computerised databases for water levels, water quality, onsite water usage, and rainfall;
- a protocol for delivery of raw data to DWE for addition to NSW water databases;
- a protocol for regular dissemination of summary information to the community;
- unambiguous definitions of impact assessment criteria to the satisfaction of the community and DWE;
- unambiguous agreed actions in the event of exceedances of impact assessment criteria to the satisfaction of the community and DWE; and
- inclusion of monitoring results and professional analysis in an annual environmental management report (AEMR).

# 8 OTHER ISSUES

## 8.1 Flora and Fauna

### *8.1.1 Flora*

The Proponent's flora assessment was undertaken by Robert Payne – Ecological Surveys & Management on behalf of R. W. Corkery & Co Pty Ltd.

The EA indicates the flora assessment involved a search of all relevant flora databases, a literature review, field studies, and a series of analyses using recognised programs and models.

The main native vegetation communities identified within the Project Site are Somersby Plateau Forest and Hawkesbury Banksia Scrub-Woodland. The project predicates the removal of 12.8ha of native vegetation, the retention and protection of 14.7ha of native vegetation and the progressive regeneration of 17.5ha of native vegetation.

Three threatened plant species were identified on the Project Site, (refer Figure 3) namely:

- Prostanthera junonis;
- Hibbertia procumbens;
- Tetratheca glandulosa.

The Proponent proposes to compensate habitat and vegetation loss with the establishment of a Voluntary Conservation Area (VCA) covering the bulk of the P. junonis plants. The proposed project will result in the removal and translocation of approximately thirty to forty plants which is said to resemble 11-16% of the total number of P. junonis plants onsite. The Flora Assessment concludes that the project is unlikely to have any significant impact on P. junonus. This assumption is made under the premise that the mitigation method of translocating species of Prostanthera junonis and Hibbertia procumbens to the conservation area can be undertaken successfully. It is the opinion of Gosford City Council's Environmental Assessment Officer, that the Section 5a assessment of the Threatened Species Conservation Act 1995 undertaken for Prostanthera junonis is inadequate.

The project will result in the removal of approximately 10 H. procumbens plants, which is said to resemble 25% of the total number of H. procumbens plants onsite.

Tetratheca glandulosa is listed as a vulnerable species. The project proposes to retain the two T. glandulosa plants onsite within the proposed VCA.

The Department of Environment & Climate Change (DECC) indicated there were major deficiencies in the survey methodology and assessment process for Threatened Species and Offsets and the proposed offset/compensatory habitat measures are based on an inadequate assessment and advised that the Proponent revise the compensatory habitat measures for the area to be disturbed in accordance with DECC's "Offset Principles Draft Guidelines for Biodiversity Certification and Environmental Planning Instruments."

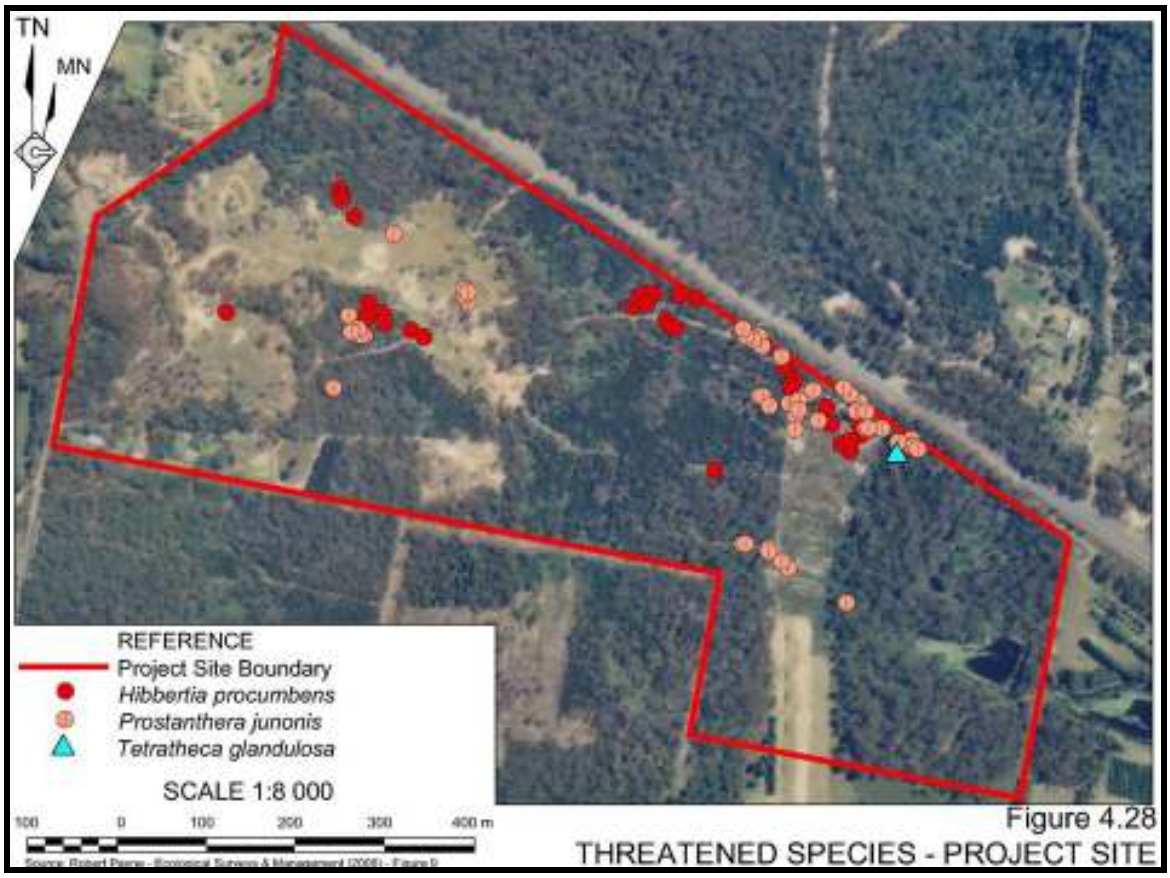


*Figure 3: Threatened Species*
*(Source: Somersby Fields Project, Environmental Assessment May 2007)*

The Proponent's biodiversity offset strategy focuses upon providing long term security for all mature native vegetation areas outside the area of proposed disturbance and the progressive revegetation of areas either to be disturbed or that lie outside the planned area of disturbance and are currently cleared or support exotic vegetation.

In addition to the VCA the Proponent proposes that 21ha of the Project site be set aside for nature conservation through the use of a Section 88B addendum on the land titles. The area covered by the instrument would include the areas referred to as the eastern and western fauna / flora corridors and northern and southern boundary corridors. (See Figure 4.)

The area designated as "without protection" is the area for the extension of the adjoining airstrip and is proposed to incorporate an area of scattered revegetation designed to stabilise slopes as well as complement the surrounding denser areas of native vegetation.

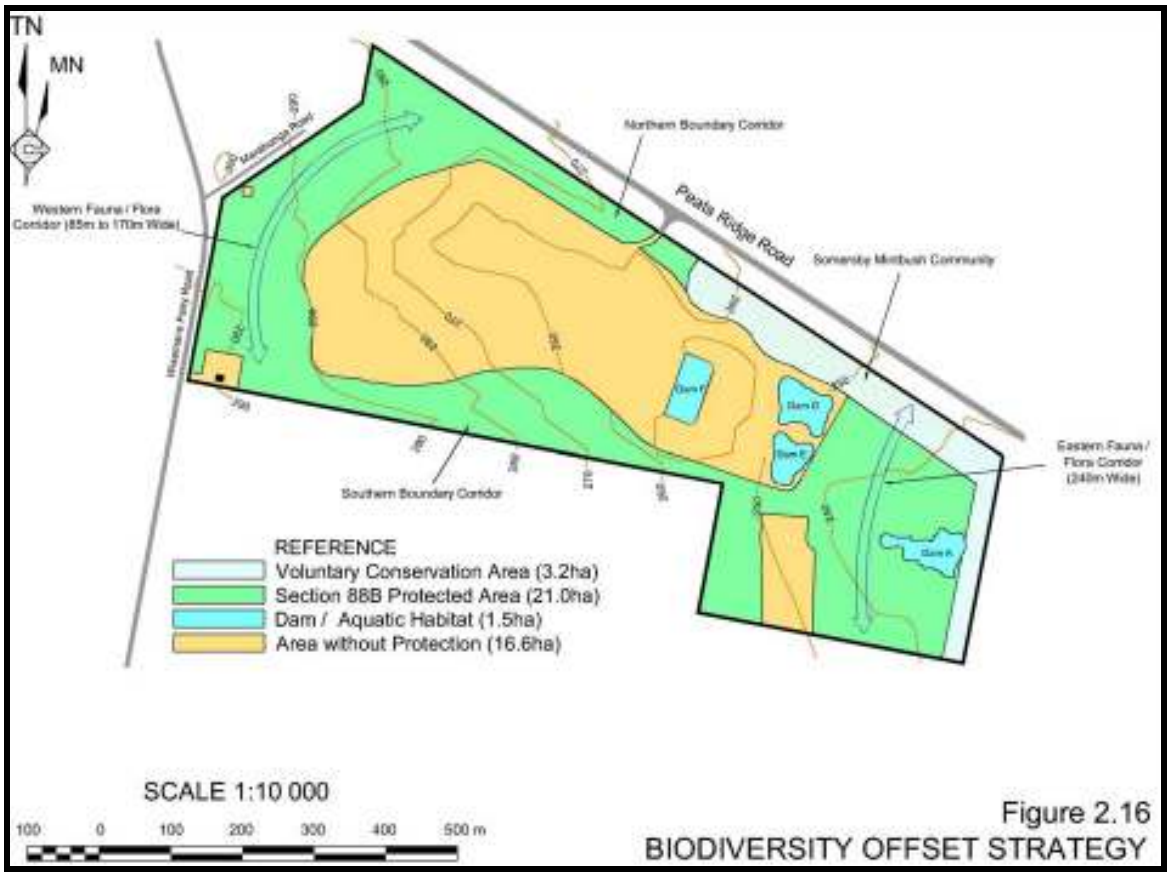


*Figure 4: Biodiversity Offset Strategy*
*(Source: Somersby Fields Project, Environmental Assessment May 2007)*

The Proponent in its "Response to Government Agency Submissions and Non-Confidential Public Submissions Regarding Ecological Issues and Biodiversity Offsets" (April 2008) has indicated that the extraction stage nominated as Stage 1/3 is now proposed to be retained in its natural form, albeit with a minor realignment with the adjoining Stage1/4 (see Figure 2). As a result of the retention of this area (covering approximately 2ha), the area of existing native vegetation proposed to be retained in perpetuity will increase from 12.7ha to 14.7ha.

The retention of this area will provide a vegetated corridor between the VCA encompassing the main P. junonis population and the native vegetation approaching and beyond the southern boundary of the Project Site.

### *8.1.2 Fauna*

The Proponent's fauna assessment was undertaken by Countrywide Ecological Service on behalf of R. W. Corkery & Co Pty Ltd. Following the public hearings, a supplementary fauna assessment was undertaken by Kendall and Kendall Ecological Services Pty Ltd.

The project site has previously been disturbed by topsoil and ridge gravel removal activities and use by the then Department of Main Roads. Based on the existing vegetation communities and areas regenerating from previous disturbance, five structural habitat types were identified as woodland on the ridgeline and slopes; cleared lands with exotic pine; banksia heath; watercourse community with thick fern understorey and wetlands (dams). Amphibians, birds, mammals and reptiles were identified during the fauna survey.

The bulk of the fauna surveys were carried out on the project site in December 2000. It is the opinion of Gosford City Council's Environmental Assessment Officer, that "the main surveys were conducted during an extremely dry period that preceded a number of years of very low rainfall". Fauna densities were said to be unusually low due to poor breeding conditions that year as well as several preceding years. Due to the prevailing drought during the main fauna surveys, frog species would be especially affected. The Council maintained that further surveys were required to adequately assess the current Threatened Species value of the site.

As referred above the Proponent in its "Response to Government Agency Submissions and Non-Confidential Public Submissions Regarding Ecological Issues and Biodiversity Offsets" (April 2008) has indicated that the extraction stage nominated as Stage 1/3 is now proposed to be retained in its natural form, albeit with a minor realignment with the adjoining Stage 1/4. The report advises the realignment was undertaken to achieve a distance of 100m from the western side of Stage 1/1 and 1/2 and the eastern side of Stage 1/4. The distance of 100m was determined based on two factors:

- the typical distance moved by Red-crowned Toadlets, which have been identified on the site, is understood to be in the order 50m; and
- the home range for an Eastern Pygmy-possum is in the order of 0.8ha which would equate to a circle of approximately 100m diameter.

### *8.1.3 Conclusions and Recommendations*

The Proponent's supplementary flora and fauna report appears to address the various issues raised in the DECC submission to the EA. The Panel understands that DECC is now satisfied with this report. The Somersby Action Group comments to the additional report have however been noted by the Panel.

The Panel recommends the Department of Planning resolve with the DECC the necessary offset/compensatory habitat measures that are required by the Proponent for the area to be disturbed in accordance with DECC's "Offset Principles Draft Guidelines for Biodiversity Certification and Environmental Planning Instruments."

The Panel recommends that if the project is approved, the project approval should make provision that:

- The relevant Statements of Commitment by the Proponent are incorporated into the project approval; and
- A range of "offsets" be included to compensate for the loss of habitat as a result of the land clearing proposed for the Project Site and that the project be assessed to compensate for the impact on threatened species.

## 8.2 Justification for Resource

### *8.2.1 Overview*

With regard to the need for the resource, the Panel considers there is an ongoing need to develop sand extraction operations within and around Greater Sydney Metropolitan Region to meet the needs of the construction industry.

The Greater Sydney Region is estimated to use about 6.5 to 7 million tonnes of construction sands a year, about 55% of which is fine-grained sand. The Central Coast sand market accounts for about 10% of the Sydney market and is growing. The major uses of fine-grained sand are for concrete manufacture, mortar for bricklaying, roof tile and fibre cement manufacture, plastering and concrete product production.

The supply of fine to medium grained construction sand is an issue that is constantly under review. Two of the largest sources of this type of sand currently supplying the Sydney market are at Kurnell Peninsula and Penrith Lakes. Industry and departmental advice to the Panel is that production from Penrith Lakes is expected to cease by 2012 at the outside and the long term security of supply from Kurnell Peninsula is uncertain due to increasing environmental issues associated with sand dune extraction. Similarly there is a government imposed moratorium on quarrying marine aggregates which, even if changed, it would be a long time before any resource for this source would be available to the market.

The Somersby Action Group in their submission to the Panel believed the shortfall can be met from the recently approved Newnes Junction sand extraction operation with a proposed production of up to 1.28 mtpa of sand. The Newnes Junction project has not commenced production as yet and is relying on the transportation of crushed material by rail to an industrial site in the Greater Sydney Metropolitan Area for processing and recovery of products including building sand, speciality sands, gravels and kaolin. This site is independently owned and operated and therefore has to develop its markets. The Panel is satisfied that this resource alone will not meet the market demand likely to be left by the closure of Penrith Lakes and the uncertainty of other sources.

The Panel has additionally assessed other sand quarries currently operating and it would appear many have environmental constraints that would limit an expansion of production. There are some that have expansion proposals in the pipeline but much has to be done before such expansions are submitted and approved. Other resources identified are constrained by various factors including transportation and environmental issues.

The Somersby Action Group advised the Panel that “Sand from weathered rock sources such as that proposed from this quarry, has to be ripped and crushed. This process cracks many of the grains and results in sand that makes poor concrete. For example, such concrete will not pump as readily as one made from dune sand as it does not flow as well and tends to clump more.” The Panel has not been able to be satisfied this statement is correct as a deal of sand used in the Sydney construction industry already comes from sand extracted and processed in a similar manner as proposed by the project.

### *8.2.2 Conclusion*

The Panel recognises that there is an ongoing need to develop both reliable and good quality sand to satisfy the needs of the construction industry within and around the Greater Sydney Metropolitan Area. It is additionally recognised that production from such operations needs to be brought on stream at various stages to guarantee supplies in the short, medium and longer terms.

The Somersby Plateau has been identified by government agencies as a potential future major source of sand for the Sydney and Central Regions.

Overall, the Panel is satisfied that the Proponent has sufficiently justified the need for the project.

## 8.3 Traffic

### *8.3.1 Overview*

The Proponent undertook a traffic and transport assessment as part of the EA. The Proponent's consultation process identified the following concerns and issues:

- safety of Somersby Public School children and staff entering and leaving school.
- truck movements to and from the project site.
- site access and its location.
- impact on the surrounding road network and proposed access point on Peats Ridge Road.
- road safety issues.
- environmental performance and ongoing monitoring.

These concerns and issues were again raised by the community during the public hearings and via their submissions.

The Proponent has given a commitment that all product trucks leaving and returning to the Project site will use Peats Ridge Road and travel directly to and from the F3 Freeway. In addition the entrance to the Project Site is proposed to be constructed in such a manner that will physically prevent a left turn by exiting heavy vehicles leaving the site.

Potentially, a proportion of the on-site workforce in private cars would use Wisemans Ferry Road to gain access to the Project site. Most of the workforce would be travelling to and from the project site outside the periods when school children and staff arrive and depart from school.

Timing for completion of the site entrance intersection was raised by Gosford City Council and the community. The Proponent in its response to submissions seeks to allow "limited works" to be carried out on site, prior to the construction of the site entrance intersection.

The Panel considers the "limited works" referred to by the Proponent will by necessity involve the movement of heavy vehicles to and from the project site and therefore considers that for the enhancement of road safety and the prohibition of heavy vehicle

movements in the vicinity of the Somersby Public School the entrance intersection should be completed prior to the commencement of clearing and excavation of material.

The noise impact of truck movements on Peats Ridge Road is considered in section 6 of this report.

### *8.3.2 Conclusions and Recommendations*

After reviewing the EA, the comments by the RTA, Gosford City Council and the community, the Panel is satisfied that traffic impacts can be ameliorated by appropriate conditions of consent if the project is approved. A summary of the recommended conditions is as follows:

Construct the entrance to the Project site in accordance with the RTA approved design that will prevent trucks from turning left when exiting the project site.
Construct the site entrance intersection in Peats Ridge Road at the start of the construction phase.
Require all trucks without exception to travel to and from the site entrance to the F3 directly on Peats Ridge Road.

## 8.4 Social Impact

### *8.4.1 Overview*

The Proponent in recognising the perceived social impacts of the project by members of the Somersby and district community, commissioned Key Insights Pty Ltd to identify what potential social impacts may occur as a consequence of the project and how such impacts would best be ameliorated.

The Somersby Public School P&C engaged Ms Kylie Frazer, a Principal Consultant, Frazer Howard & Partners, Social Planning and Community Development Consultants to critique the Social Impact Assessment undertaken by Key Insights Pty Ltd and provide information on additional social impacts as part of their submission in response to the EA.

Surveys have been conducted by these professional groups as well as other stakeholder groups, each claiming to create a clearer picture of the community's concerns.

The Panel understands the perceived social impact of an activity such as a sand quarry is largely a result of individual objection/acceptance of such a proposal. The negative perception was evident through the submissions to the EA and the Public Hearings.

The Panel identified that the following issues are the primary social impacts of the proposed Project:

- Potential impact on Somersby Public School, including noise, road safety, air quality and reduced school numbers.
- Potential impact on the community, including noise, water, road safety, air quality, visual impacts, traffic, hours of operation land uses and land values.

### *8.4.2 Potential Impact on Somersby Public School*

The issues of noise and air quality are dealt with in other sections of this report.

The Panel noted that several mitigation suggestions were advanced by the P&C such as the double glazing of school windows, air conditioning of classrooms and other amenities that may be deemed necessary in the future. The Panel acknowledges that if the project is approved and should amenities be deemed to be necessary at the school or generally as a result of further monitoring these should be able to be negotiated through the Community Consultative Committee that would be formalised as a condition of approval.

The potential impact on road safety is mitigated by the Proponent's undertaking that all highway trucks to deliver sand products would only approach and depart the site along Peats Ridge Road towards the F3 Freeway. No trucks from this proposed project site would exit westwards along Peats Ridge Road or pass Somersby Public School.

Any reduction in student numbers that may occur at the Somersby Public School is only possible to assess after the commencement of any sand quarrying activities and the decision of individual parents to place children at alternative schools. The Proponent undertook a case study of the impact of sand extraction near the Maroota Public School. The Somersby Public School P&C also conducted interviews of parents associated with the Maroota School.

The Panel received submissions on this case study contradicting the findings of the Proponent's study. In particular it is claimed dust is endemic and the school learning environment is threatened by encroaching quarry workings. There are similarities between the two projects in relation to the proximity of quarrying to the schools; however a significant difference is that at Maroota there are product trucks travelling past the school whereas this is not proposed at Somersby. The Panel received submissions indicating some parents propose to remove their children from the school if the project is approved. If this were to occur on any significant scale it would impact on the teaching resources at the school.

### *8.4.3 Potential Impact on the Community*

The issues of noise, air quality, water and road safety and traffic are dealt with other sections of this report.

The visual impact of the operation is expected to be minimal and can be further mitigated through a number of design and management procedures. The presence of wide belts of vegetation around the eastern, northern and western side of the Project site currently limits virtually all visibility onto the property. The retention / enhancement of the vegetation screen around the boundary of the project site is an essential management procedure. In addition the Proponent proposes to align the site access road in a curved manner to prevent visual access from Peats Ridge Road onto the operations on the Project Site.

The impact of a sand quarry on surrounding land uses and the subsequent impact on land values was raised during the Public Hearings as unacceptable. A number of sand quarries already operate on the Somersby Plateau and the Panel has not assessed there to be unacceptable impacts or impacts that can not be ameliorated in regard to other land uses.

The Panel is not aware of any recent sales that would identify a negative impact on land values.

The local community in its submissions did not express confidence in the establishment of a Community Consultative Committee (CCC). There is an apparent lack of trust that the Proponent would want any genuine community oversight of their operations. The Panel is aware that CCC's are now a normal condition of approval for quarries and believes such committees provide a genuine opportunity for community monitoring of consent conditions. The membership of CCC's involves a range of local stakeholders, together with company representatives and with an Independent Chairperson. The local community representatives and the independent chairperson require the endorsement of the Director-General of the Department of Planning.

Many submissions to the Panel raised community concern that where similar projects have been approved in the past both State and Local Government have neglected the enforcement of conditions imposed on developments. The Panel acknowledges this concern. However, if the proposed project is approved the Panel understands that a detailed environmental monitoring regime will be required and the monitoring results would be made publicly available. The Panel also understands that quarries are subject to regular independent audits and the Panel endorses a similar approach for this project.

### *8.4.4 Conclusions and Recommendations*

The Panel believes the possible major impacts of the proposed project can be satisfactorily mitigated through adaptive management informed by ongoing monitoring particularly of air quality and noise impacts for both the school and the community. It is impossible to predict whether parents will remove their children from the school as indicated in the various submissions; however it is incumbent upon the Proponent to develop a program of communication that will enable concerned parents to make informed decisions.

The Panel recommends that if the project is approved, the project approval should make provision that:

- Construction of the far-western earth mound and acoustic barrier shall be undertaken during proclaimed school holidays and between the hours of 7am to 6pm Monday to Saturday.
- Construct the entrance to the Project Site in accordance with an RTA approved design that will prevent trucks exiting westwards along Peats Ridge Road.
- Require all heavy trucks without exception (even when the F3 Freeway is closed for whatever reason) to travel to and from the site entrance to the F3 directly on Peats Ridge Road.
- Retain and where necessary enhance the vegetation buffer zone on all boundaries.
- Design and construct the entrance road with a curve so it is not possible to see the operation from the site entrance.
- Prepare and implement a Transport Code of Conduct to outline minimum requirements for the movement of heavy vehicles to and from the site. The code shall address the requirements of the Council and the RTA. The code shall include but not necessarily be limited to restriction to routes; restrictions to the approved hours of operation; minimum requirements for vehicle maintenance to address noise and

exhaust emissions; behavioural requirements for drivers; and load coverage requirements.

- A Community Consultative Committee is established to oversee the environmental performance of the development. The CCC shall be comprised of representatives from the Proponent, including the person responsible for environmental management at the quarry; a local government representative; local community representatives; a representative from the Somersby Public School; and independent chairperson, whose appointment has been endorsed by the Director-General. The CCC will meet at least twice a year and review and provide comment on the environmental performance of the development, including any construction or environmental management plans, monitoring results, audit report, or complaints. The DoP shall provide additional conditions in the consent detailing the Proponent's obligations in regard to the operation of the CCC.

## 8.5 Aboriginal Cultural Heritage

### *8.5.1 Overview*

An Aboriginal heritage assessment was conducted by the Proponent's consultants who were assisted by a representative of the local Darkinjung Local Aboriginal Land Council (LALC).

A search of the Aboriginal Sites Register (Aboriginal Heritage Information Management System – AHIMS) did not reveal any sites of significance on or near the project site.

In July 1995, Rex Silcox, archaeological consultant, surveyed a large portion of the project site and recommended that a sub-surface investigation should be undertaken close to the eastern boundary. In 1996, Silcox conducted a test excavation programme which involved 75 pits. Silcox hand-sieved all excavated material and recovered 10 artefacts, seven of which came from three pits. Only four items could be positively identified as being artefacts.

In 2005, a detailed survey was conducted and no sites of Indigenous origin were observed. The Darkinjung LALC in 2004 had recommended that a buffer zone 30m wide should be retained along the eastern boundary in the area identified as being of cultural sensitivity and that there would be no archaeological (or cultural) constraints on the removal of sand on the balance of the Project site.

The Proponent has undertaken to provide a 30m wide buffer zone along the eastern boundary which would remain undisturbed during the period of the sand removal operation.

During the Public Hearings the Panel heard a submission from a local Aboriginal who indicated that it was important that such buffer zones don't become an island in the 'sea of development'.

DECC advised the Panel the project is unlikely to have a significant impact on Aboriginal Heritage.

### *8.5.2 Conclusions and Recommendations*

In conclusion, the Panel is satisfied that the proposed project is unlikely to have a significant impact on Aboriginal Heritage.

The Proponent should initiate discussions with the Darkinjung LALC to facilitate appropriate access needs.

The Panel recommends that if the project is approved, the project approval should make provision that:

- A 30m wide buffer zone be provided along the eastern boundary of the Project site in conjunction with the Voluntary Conservation Area and the site remain undisturbed during the period of the sand removal operation.
- All employees of the Proponent (including all contractors) to be informed of the location of the buffer zone and the legal requirement to avoid direct or indirect disturbance of the buffer zone.
- All employees and contractors to be made aware of their responsibility under the National Parks and Wildlife Act 1974 to notify the operations manager should any additional Aboriginal heritage sites be identified and that work should cease immediately in the area of the find. In the event that any Aboriginal heritage sites are discovered, the Darkinjung LALC and staff of the DECC would be informed of the discovery and work would not recommence in that area until permission to proceed has been given.

## 8.6 Rehabilitation and Final Land Use

### *8.6.1 Overview*

The Proponent proposes a high standard of rehabilitation and proposes procedures that would be best practice in the extractive industry.

Rehabilitation has to be considered during the site establishment period particularly to stabilise all disturbed areas to limit erosion and dust issues and to manage the visual aspects of the site. Rehabilitation of the operational areas is essential for the provision of a geotechnically stable and safe landform that would support the intended long term land use.

The Proponent proposes the progressive rehabilitation of those areas no longer required for project-related activities. The Panel received submissions questioning the Proponent's undertaking and the process.

The Proponent has determined that rather than operating with a series of settling dams for precipitating the clay fines in the process water, it would be environmentally and operationally better for the clay fines to be dewatered to produce a material with a consistency able to be transported and placed for use in the rehabilitation of the Project Site. The clay fines would be collected, thickened and dewatered through a belt filter press yielding a material with a moisture content of approximately 30%. This material would be dewatered sufficiently for it to be removed from the processing area by off-road truck.

The Proponent claims the use of belt filter press technology is now well proven in both Australia and US sand manufacturing industries. The adoption of this technology eliminates the need for extensive settling dams, which often remain at the completion of operations presenting long term environmental problems and limiting the final landform and land use.

Submissions to the Department of Planning and to the Panel during the Public Hearings raised concerns regarding the suitability of the clay fines from the belt press facility being used in rehabilitation.

The Proponent has acknowledged that clay fines need to be considered as an engineering material used to achieve an engineered stable landform.

Other submissions to the Panel at the Public Hearings called for the Proponent to lodge a Bond to cover the potential cost of rehabilitating the Project Site in the event it does not meet the requirements of its conditions. The community generally were concerned that extractive industries did not have a good record on rehabilitation. The Proponent acknowledges that if the project is approved progress with all rehabilitation activities will be set out in each annual report provided to the DoP and the local community.

The Proponent advocates in the EA that an important component in rehabilitating areas disturbed by extractive industries is the reconstruction of a landform that can support the proposed vegetation and subsequent land uses. Figure 5 presents the final landform (prior to the decision to not disturb Stage 1/3) after all site activities in Stages 1 and 2 are concluded and all equipment removed. The final landform within the sand removal area would appear as an amphitheatre with perimeter slopes on three sides and free draining via a series of water quality dams to the east. The central comparatively flat area would be created within the final landform, which is on the sections within the Project Site where the sandstone forms the base of sand removal and is not covered by any clay fines.

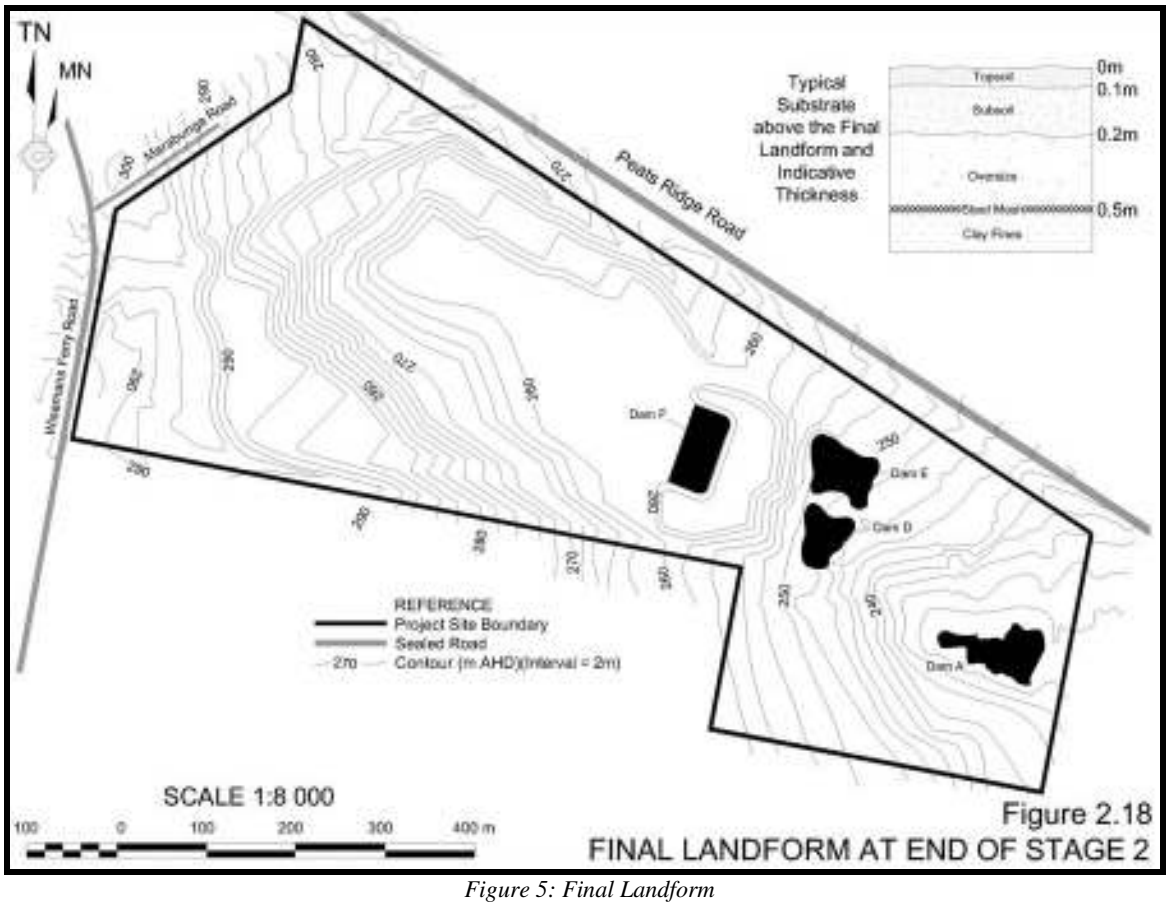


*Figure 5: Final Landform*
*(Source: Somersby Fields Project, Environmental Assessment May 2007)*

The final land use has been the subject of considerable discussion and debate between the Proponent, Gosford City Council and the local community.

The Proponent originally proposed granting some of the site to the community for use either as a regional sporting facility or a small Somersby "village green". Hence the name "Somersby Fields" was created. The Proponent acknowledges that it has been unable to obtain the necessary support for these concepts and now proposes that if the project proceeds the land would be used for rural residential activities consistent with Gosford City Council requirements. The Panel received submissions that confirmed the majority of the community at this stage supports the rural residential concept rather than a sporting field, if project approval is given.

### *8.6.2 Conclusions and Recommendations*

The Panel recognises that the Proponent is proposing a rehabilitation process that is not common practice for the extractive industry in NSW and in particular on the Central Coast Plateau. Whilst the local community remains sceptical, the Panel understands the Proponent would be required to submit engineering plans and a Rehabilitation and Landscape Management Plan for the development in consultation with Council and DECC and to the satisfaction of the Department of Planning, if the Minister approves the project.

If such plans are approved and implemented it will create a new standard for rehabilitation of extractive industry sites and ultimately provide local communities with a higher level of confidence.

It should be noted that progressive rehabilitation in quarries is not new and has been incorporated into other projects.

The Panel recommends that if the project is approved, the project approval should make provision that:

- The Proponent shall progressively rehabilitate the site in the manner proposed and agreed by the DoP and in a manner that is generally consistent with the concept landform and land uses as approved by the DoP.
- The Proponent shall prepare and implement engineering plans and a Rehabilitation and Landscape Management Plan for the development in consultation with Gosford City Council and DECC and to the satisfaction of the DoP.
- The Proponent shall regularly review and update these plans to the satisfaction of the DoP.
- The Proponent shall lodge a rehabilitation bond for the development with the DoP within the terms and conditions prescribed by the Director-General.
- The Proponent shall lodge application with Gosford City Council for the proposed rural residential development of the project site within 5 years of completion of the proposed activity and rehabilitation.

## 9 OVERALL CONCLUSIONS

The Panel is of the opinion that:

- Noise impacts can be effectively managed via appropriate controls of approval supported by monitoring and testing of performance.

- Air quality impacts can be effectively managed via appropriate controls of approval supported by monitoring and testing of performance.

- Groundwater and surface water impacts can be effectively managed via appropriate controls of approval supported by monitoring and testing of performance.

- The general amenity of the surrounding land uses and activities would not be adversely affected by the proposal following the implementation of appropriate controls

- The impacts on the Somersby Public School have been assessed as not being adverse to its continuing operation. However, appropriate noise and dust monitoring programmes will need to be implemented.

- Independent audits be commissioned of the environmental performance of Stage 1 operations to demonstrate compliance before Stage 2 of the project is permitted to proceed.

Garry West

Chair

Independent Hearing and Assessment Panel

Somersby Fields Project

July 2008

## APPENDIX A: SUMMARY OF PRESENTATIONS MADE AT THE PUBLIC HEARING 4-7 MARCH 2008

***Marie Andrews MP***

Ms Andrews is the Member of Parliament for Gosford. Ms Andrews objected to the proposal, and highlighted that the proximity of the project to the Somersby Public School raises concerns with regard to the health and wellbeing of students. The project poses serious threats to groundwater resources on which local horticultural businesses rely. Trucks from the project may impact upon the community through increased noise and increased traffic numbers on local roads. Threatened species such as the Somersby Mintbush (SMB) would be severely impacted by quarrying at the project site. Rehabilitation of the site will be difficult and history has shown this to be the case for similar operations.

***Somersby Action Group (SAG)***

SAG is a local community group formed from the Somersby Public School P&C Association in order to oppose the project. SAG's presentation was led by Mr Richard Weller. Mr Weller was supported by Mr Peter Donnelly (impacts on local businesses), Mr Larry Cook (water resources) and Ms Robin Meldrum (flora and fauna). SAG's concerns were highlighted in its presentations and backed by its extensive submission to the Department of Planning. Its concerns and key issues raised before the Panel included:

*General:*

- SFP have not adequately addressed the Director-General's requirements for the project. The principles of ESD have not been satisfied due to the removal of vegetation and impacts to water resources.
- Somersby is a vibrant business area and such enterprises include farms, orchards and horse studs.
- SREP 9 has zoned large areas of the region for sand extraction and this can impact upon areas zoned for tourist activities.
- Two surveys have been carried out by SAG (residents) and the School P&C (school families). Results show the majority of residents oppose the project and that the community's issues of concern include health impacts, water loss and noise impacts.
- Somersby Public School is the focus of the community with many sporting activities occurring there. The project may impact the school by reducing water levels in its groundwater bore as well as by affecting the health and learning of students through increased dust and noise levels. The School may suffer from reduced enrolments or removal of children should the project be approved.
- All quarries create dust, leading to the potential for community health impacts as well as causing a nuisance through dust deposition at properties. The Proponent's modelling in the EA uses average values for the duration of dust impacts, however dust events may be intermittent.
- SAG visited sand quarrying operations in Maroota and its opinion was that dust is a major problem given the proximity of quarrying operations to residences and the Maroota Public School.
- The community is concerned with the loss of amenity the project might contribute to.
- The project would increase heavy vehicle movements on local roads with associated road safety impacts.
- The project's proposed hours of operation are too long.

- Other sand quarrying operations (eg Newnes) can satisfy the Sydney market and these operations are not in the vicinity of schools.
- Filter cake tailings emplacement at the site may cause erosion and soil instability.

*Noise:*
SAG commissioned Renzo Tonin to undertake a review of the EA's noise impact assessment. SAG tabled the review at the Panel hearing. Main findings in the review included:

- The noise environment during construction of the project, during operations and the impact of traffic from the project.
- Background noise levels, project specific noise levels and impact predictions in the EA.
- The results of the review showed that SFP had collected and used long term noise monitoring data in its assessment. However, SFP did not monitor the Daniel property (closest to the project boundary) to determine the background noise level rather, it used the school to determine this level.
- The modelling of construction noise was inaccurate and did not take into consideration use of a bulldozer on site and did not model the noise from construction of the north-east bund.
- Reverse alarms on machinery were not included in the modelling. SAG asked if SFP were legally responsible to use reversing alarms.
- The review questioned the assessment of operational noise levels. The noise monitor on the Donnelly property was placed in the wrong location. The sound power level of the washery operation was not included. SAG asked whether noise levels would be higher at the 2nd level of the school building.
- Exceedences of ECTRN criterion would occur at the Douglas property on Peats Ridge Road. The number of truck movements from the project should be revised to comply with this criterion. Sleep disturbance was not discussed in the EA and is relevant due to the proposed 5am operational start time.
- Additional noise comments included that the local environment is quiet due to its rural setting and that INP criteria are not suitable for application in such a setting, that low frequency noise from machinery cannot be taken into consideration and that the lack of sleep disturbance assessment is of concern to SAG.

*Flora and fauna:*

- The project will impact upon EECs and hanging swamps that cannot be replaced easily through offset measures. The project may impact upon endangered species such as the eastern pigmy possum and the red-crowned toadlet.
- SMB is a threatened species occurring on the project site that will face impacts from the project. No targeted surveys for SMB since 2002. SMB difficult to reproduce and doesn't recover well from drought. Steve Bell's survey found little and the population has been overestimated by DECC. The EA also overestimates the population of SMB and gives it the wrong classification. There is no evidence to suggest SMB would thrive at a highly disturbed site such as the SFP site. Rehabilitation cannot easily reproduce the habitat necessary for SMB. Translocation is unlikely to be successful also.
- The VCA is insufficient to offset the loss of fauna habitat.

*Water resources:*

- The local community has no town water supply and relies on groundwater bores, springs and tank water. Agriculture in the region also relies on these water supply systems. The Somersby Plateau forms the majority of the water catchment for Gosford. The Somersby region acts as a sponge and is the headwaters to 4 catchments.
- The area in the immediate region of the project site contains a perched water system above 270m AHD and extraction at the project site would lead to this water draining to the project site and Narara Creek and not the 4 catchments. Many in the local community rely on the water from the perched system and the EA has not recognised this impact.
- Local groundwater bores need regular monitoring on a long term basis. There is a difference between the standing water level and yield.
- Conditions of approval should ensure local groundwater resources are not impacted. Security bonds are necessary to ensure this.
- Surface water run-off will increase in the area and the potential exists for the flooding of Narara Creek.

*Revegetation, rehabilitation and final landform:*

- Progressive rehabilitation is impractical as the voids would be needed to store plant and equipment.
- Emplaced fines would be unstable and may erode in rainfall events. Erodability factors are given in the EA for topsoil and sand but not for fines. Revegetation can only occur when the landform is stable and would be unlikely to be successful given the level of soil disturbance.

***Somersby Public School Parents and Citizens Association (P&C)***

The P&C represents the interests of the Somersby Public School community. Its presentation highlighted its major concerns which included noise, dust, land-use conflicts, social impacts and impacts to water resources. Noise and dust impacts would affect the amenity of the school and its students. Social impacts include the potential for reduced student numbers at the school and the resultant increased stress on local families. The playground at the school will be 200m from quarrying areas and this will create land-use conflicts.

The P&C stated that the Department of Education and Training would not purchase a school site next to a sand quarry. Conflicts in local land zonings exist, with areas zoned for extractive industry in the same region as tourism and agriculture. P&C expressed its concern with the company's social impact assessment and its failure to attend community meetings. The project would impact upon local groundwater users, including the school. In conclusion, the P&C reiterated its concern at the proximity of the project to the school and the potential impacts to its students from the operation of the project.

Lyn Hawker, Melissa Cahill and Lynne Daniel are all local residents who live in close proximity to the project site. The Daniel property is the closest property to the project. They tabled letters of support from various organisations and their presentation included the following key concerns:

***Lyn Hawker***
Mrs Hawker stated that the EA contained technical information which was difficult for community members to fully interpret. Major concerns for the Hawkers include loss of water supply and dust impacts. The Hawker property has 3 rainwater tanks as well as a groundwater bore that supplies water for domestic purposes. A dam supplies water for stock purposes and although the company has offered to restore water losses in the dam, this exercise is seen to be infeasible by the Hawkers. Hanging swamps on their property would be damaged through water loss and their groundwater bore will face drawdown impacts. Alternative mitigation measures are needed to compensate for the loss.

Other concerns highlighted included that increased dust will impact upon the health and amenity of the local community and a real time monitoring program should be implemented for the project. Community consultation has been inadequate to date and the project offers no benefit to the community. Overall, the project cannot be justified in light of other sand extraction projects in the Sydney region that can satisfy the market.

***Melissa Cahill***
The Cahill property is within 250m of the project and Melissa Cahill is the 3rd generation of her family to live there. Her children are the 4th generation of her family to attend the Somersby Public school. Mrs Cahill shares similar concerns with regard to security of water supply and stated that water loss to her spring fed dam cannot be remediated. Mrs Cahill also highlighted concerns with regard to predicted air quality impacts and impacts to local flora and fauna.

***Lynne Daniel***
The Daniel property is the closest property to the project. Mrs Daniel stated that noise exceedences would occur at her residence during stage 2 of the project and also during the construction of the noise attenuation bund. These exceedences would be unacceptable in light of her husband's work as an interstate truck driver. Mrs Daniel stated that the company was yet to offer her any form of compensation to offset the impacts of the project. Their riding school would also be affected through their horses being scared by noise from the project. Dust, water loss and the proposed operating hours of the project are also of concern to the Daniels.

Mrs Daniel visited residents in the vicinity of local quarry operations and found that dust impacts are a common concern. The Daniels' groundwater bore would be impacted by 10% and although the company has offered to supply a new pump to compensate this, evidence shows that deepening this bore has little effect on its yield. The proposed operating hours of the project should be reduced.

Mrs Daniel also tabled a submission from a resident of Dog Trap Road. This submission highlighted concerns regarding noise impacts on Peats Ridge Road, health impacts, impacts to water resources as well as concerns about road safety and proposed hours of operation.

***Susan Weller***
Susan Weller, her husband Richard and their two children live on Wisemans Ferry Road, in close proximity to the project. Mrs Weller outlined to the Panel the sense of community in Somersby and expressed disappointment with the content of the company's response to submissions. Ms Weller highlighted concerns with regard to impacts to local flora and

fauna, in particular impacts to an area of hanging swamp on the Weller property. Concerns were also raised with regard to community health impacts, particularly her child's medical condition and the risk of increased instances of silicosis in the area. Traffic impacts and sleep disturbance through the project's extended hours of operation were also highlighted by Ms Weller.

***Richard Weller***

Mr Weller is the co-ordinator of the Somersby Action Group. His personal submission to the Panel highlighted concerns similar to Mrs Weller's including noise, dust and water impacts. Mr Weller explained that the local groundwater system includes a perched aquifer system above 270m AHD. Mr Weller highlighted concerns that the project would alter the perched aquifer and lower the water table. Mr Weller also highlighted concerns including reduced potential to create tourism opportunities at the property, loss of night sky through night lighting and impacts to threatened species.

***Peter Donnelly***

Mr Donnelly is the co-owner of Coachwood Nurseries along with his wife Ruth. Mr Donnelly outlined to the Panel that in excess of 200 people are employed locally in the horticulture industry. Mr Donnelly highlighted that the DPI was relocating its research station to Narara and would investigate the propagation of green tea for export. Mr Donnelly also stated that green tea plants can be affected by dust deposition.

Mr Donnelly spoke on behalf of his own business and 2 other local horticultural enterprises (Boydita Roses and Golden Vale Flowers). Major concerns are increased dust in the area and impacts to water resources. Mr Donnelly stated that dust deposition may affect the growth cycle of plants and that the project would affect groundwater resources necessary for horticultural enterprises.

***Kim Wilson***

Ms Wilson is a local resident whose property neighbours the Rindean quarry at Somersby. Ms Wilson highlighted concerns with the project, including noise, dust, water, learning difficulties in young people, given the impacts to her property from Rindean.

***Margaret Pontifex***

Ms Pontifex is a member of the Rocla Calga Sands Quarry Community Consultative Committee. Key concerns included insufficient impact mitigation measures and that sand should be sought from other areas than the Somersby Plateau.

***Carmel Underwood***

Ms Underwood's property is situated behind the Hawker and Cahill properties. Ms Underwood commented that the company's EA and response to submissions contained a number of errors. Ms Underwood stated that a new groundwater bore on her property may be necessary but that it would need to be proved that the project had impacted her groundwater access prior to this occurring. Ms Underwood also stated her concern with enforcement of consent conditions and that monitoring programs would not solve issues.

***Bev Ferrier***

Ms Ferrier has lived in the Somersby area for 16 years. Concerns highlighted in her presentation included community health impacts through increased dust levels and the impact on flora and fauna.

***Dayan Noonan***
Ms Noonan highlighted issues relative to resource conservation as well as sustainability and alerted the Panel to the Ourimbah Protocol, a reference document outlining procedures for community consultation relative to local forestry.

***Reid Finney***
Reid is a school captain at Somersby Public School and lives in the area with his family. Reid's presentation highlighted dust and noise impacts and stated these impacts would affect the amenity of students at the school. Reid also highlighted concerns with regard to the project's impacts on threatened species including the Red Crowned Toadlet and the Somersby Mintbush as well as impacts to his school's water supply.

***Charlotte Zorro***
Charlotte is also a school captain at Somersby Public School. Charlotte raised concerns with proposed rehabilitative actions at the site and questioned how rehabilitation conditions would be able to be enforced. Charlotte stated that her school is environmentally friendly and is a good learning environment. Charlotte also raised concerns with air quality impacts and noise impacts and that air conditioning would be necessary in school classrooms to mitigate impacts from the project.

***Bruce Davies***
Bruce Davies is a parent whose children attend the Somersby Public School. Mr Davis spoke about a community survey conducted on attitudes to the project. The survey found that only a small amount of local people had been contacted by the company. A further survey of families at the school found major concerns to be the potential for reduced student numbers and consequent loss of teaching staff and the loss of community focus. Mr Davis highlighted concerns with statements made by the company that local property values would not be impacted by the project and concluded his presentation by showing video footage of the operations at a local quarry.

***Kevin Duncan***
Mr Duncan highlighted concerns with respect to the level of protection afforded to Aboriginal heritage sites in the Somersby area. Mr Duncan highlighted that over 50 sites of significance exist at the project site and that Aboriginal people would require access to these sites in the future.

***Ruth Donnelly***
Ruth Donnelly co-owns the Coachwood nursery with her husband Peter. Mrs Donnelly's concerns mainly relate to potential community health impacts from the ingestion of dust from the project. A number of documents were tabled throughout her presentation to aid discussion of her concerns. Mrs Donnelly stated that 4 sand extraction operations were currently in operation within a 5km radius of the project and that the project would assist in lowering the air quality of the area and result in respirable health impacts. Mrs Donnelly compared this to the situation at Maroota where a number of sand extraction operations exist in the vicinity of a village.

Mrs Donnelly contended that the predicted air quality impacts have been understated and that soil from the project site needed to be tested further to ascertain its silica level. An explanation was provided to the Panel that when ripping operations occur a fine silica dust

can be released and this silica dust when ingested can cause respiratory diseases, including silicosis. The community needs further information with regard to the design of the buildings that would house the processing machinery and stated that dust emissions can still occur even with such structures in operation. 30% of dust emissions escape the operating area of sand extraction operations. Dust can also contaminate drinking water supplies.

Cumulative impacts from all sand quarrying operations in the area should be given further consideration as these impacts are unacceptable to the community. Mrs Donnelly highlighted to the Panel the research she has undertaken with regard to the impacts of dust from sand extraction operations. Her research included interviews with Dr Bryan Burmeister, who is conducting similar research in the Redlands area of Brisbane and the laboratory analysis of soil samples representative of the project (ie dust from a sand quarry) and at a control site to assess silica levels. Mrs Donnelly stated that the results from the analysis of the dust show that it contains between 50-80% silica.

In conclusion, Mrs Donnelly stated her objection to the project, that the area should be rezoned to prohibit sand extraction, that sand can be extracted through off-shore methods to satisfy the Sydney market and that no new sand extraction operations should be allowed at the Somersby Plateau.

***Dr Bryan Burmeister***
Dr Burmeister gave an oral presentation via a telephone link from Brisbane. Dr Burmeister lives 4km from a sand quarry at Redlands and began researching the effects of wind blown dust following a number of reported cases of cancer in that area. Dr Burmeister stated the results of his research show a 10% increase in cancer cases in the Redlands area and that levels of respirable diseases are 3 times higher near to the quarry than that of exposure to bushfire. Dr Burmeister stated that $PM_{2.5}$ sized particles are of concern to his research.

***Phil Cantrall***
Mr Cantrall has a background in industrial hygiene and toxicology. Mr Cantrall explained how the human respiratory system works and discussed how exposure to crystalline silica has the potential to cause lung disease.

***Tassin & Gerald Bernard***
Mr & Mrs Bernard are the owners of Walkabout Park (approximately 1.5km from the Rocla Calga Sands Quarry). They stated that whilst their relationship with Rocla is good, they have concerns with regard to proposed modification to its operations that will bring the quarry closer to their property and the impact it will have on the Park. They state that current dust levels from the operation are unacceptable and have concerns with regard to dust monitoring at their property.

***David Ross***
Mr Ross is the owner of Golden Vale Flowers, situated to the south of the project site. He stated that the business had been in operation for over 30 years and concerns relate to the impact of dust deposition on flowers and the effect this may have on their rate of growth. Mr Ross also raised concerns with impacts to water supply and enquired whether his business would be compensated for any economic loss attributable to the project.

***Councillor Chris Holstein***
Councillor Holstein is a member of Gosford City Council and sits on its Flood Management Committee. Councillor Holstein raised concerns that the project may impact upon the flood regime of the Narara Valley. He stated that between 1985-1992 there were 4 floods in this area that could be categorised as 1 in 100 year floods. Narara Creek has silted up and has not been dredged, exacerbating flood conditions at the creek. If the project goes ahead it will change the floodplain and residential areas and schools will be under threat from flood and Councillor Holstein suggested that houses may need to be acquired.

***Gosford City Council (Council)***
Council was represented by its Senior Planner, Robert Eyre, and its Manager Gary Lofts. Council stated its concerns relative to water supply issues and these issues are highlighted in the Draft Central Coast Regional Strategy. This strategy predicts an increase in population in the region of 100,000 by 2031. Council contends that this figure should be reduced to 64,000 given the constraints on its water supply system. Both Council and its neighbour Wyong jointly manage water supply systems for the 2 LGAs and this Joint Water Authority objects to the proposal. Council outlined its planned contingencies in the event of water shortages. These include groundwater harvesting, recycling, educating ratepayers and providing financial incentives.
Council highlighted the predicted impacts from the project and requested that acquisition clauses be inserted into the project approval if the project exceeds its noise and air quality criteria. Council also raised concerns with regard to impacts to local flora and fauna.

***Department of Education and Training (DET)***
DET was represented by Mr Frank Potter. Mr Potter highlighted DET's concerns that children are sensitive receivers and that a rigorous air quality and noise monitoring program would need to be undertaken at Somersby Public School. Mr Potter stated if school enrolments dropped by 14 then 1 teacher would be lost. DET also has concerns with regard to increase in the heavy vehicle movements in the area and the risk of unauthorised access to the site by school children.

***NSW Health***
NSW Health was represented by Dr Peter Lewis. Dr Lewis highlighted concerns with regard to air quality impacts and effects on community health from increased dust levels. Dr Lewis stated concerns with air quality criteria and that compliance with criteria doesn't always mean there will be no impact. Dr Lewis stated the silica content of dust from the project would need to be analysed and that cumulative impacts should be given further consideration. The hours of operation for the project should be the industry standard and not those proposed for the project.

***Department of Primary Industries (DPI)***
DPI was represented by Mr Chris Weale, Mr Paul Anderson and Mr Ralph Erni (Brink & Associates – Surface Water consultants). DPI stated that it will relocate its Narara research facility in 2009 and it will border the southern end of the project. DPI highlighted its concerns relating to predicted changes to surface water regimes. Mr Erni then gave a presentation relative to the findings of a groundwater / seepage water assessment conducted by Brink & Associates which highlighted the potential for the dams at the project site not be able to control the flow of surface water and impacts of this to the DPI research site. The groundwater / seepage water assessment as presented made several

conclusions; no assessment of the effects of groundwater drawdown, seepage flow losses or reduction of runoff on the DPI dam has been undertaken to date. Mitigation measures should be included for the DPI dam; recharge conditions have not been adequately addressed; effects of ground and surface water variations on the DPI dam have not been addressed; impact of groundwater drawdown on the DPI dam has not been assessed; and the cumulative impact of groundwater drawdown from the Rindean quarry and the SFP on the DPI site has not been assessed.

***Department of Environment and Climate Change (DECC)***
DECC was represented by Mr Grahame Clarke and Mr Hamish Rutherford. Mr Clarke outlined DECC's role in the assessment process and stated its role was advisory. DECC offered its opinion that the project was unlikely to have significant impacts on Aboriginal heritage sites and that the project's water pollution mitigation measures were acceptable. DECC stated its concern with the air quality modelling methodology but stated its satisfaction with the EA's findings. It recommended a real time air quality monitoring program be implemented for the life of the project.

With regard to noise impacts, DECC requested the company to explain why variations in background levels were reported in the EA and expressed dissatisfaction with project specific noise levels. DECC also raised concerns that construction noise exceedences would occur during construction of noise attenuation bunds and that operational noise exceedences would occur at the Daniel residence. DECC stated that whilst the assessment was conservative its opinion was that the project would still be noisy. Road traffic noise criteria would be exceeded at the property to the south of the project site.

DECC stated its concerns with the company's on-site threatened species assessment, stating that DECC guidelines had not been followed. The assessment's survey methodology was deficient and proposed offsets were based on inadequate assessment. DECC requested the company develop a more comprehensive offset package. Proposed offsets can be located on-site or off-site and should concentrate on stopping habitat loss.

***Department of Water and Energy (DWE)***
DWE was represented by Mr Andrew Philippa. Mr Philippa outlined the water management framework in NSW, the Water Management Act, the role of water sharing plans and other water policy before making specific comments on the proposal. DWE stated that two dams at the project site would need to be licensed and currently there is no water sharing plan for surface water management purposes in the area.

DWE also stated concerns with SFP's groundwater modelling stating that it did not adequately assess inflows, the extent of decompression or risk of loss of water supply down gradient of the project. SFP's current water access licence entitlement may not adequately deal with a drought situation. Impacts may be greater than predicted and a precautionary approach should be undertaken. DWE concluded its presentation by stating SFP should outline adequate groundwater loss mitigation measures and that the project should meet statutory water requirements

***Somersby Fields Project (SFP)***
The presentation from SFP was led by Mr John Lockett of the Somersby Fields Project. Mr Lockett stated that the company had acknowledged the community's concerns and accepts that the project is different to other similar proposals, given its proximity to the Somersby

Public School. SFP would commit to best industry practice and set new standards. Mr Lockett outlined the consultation process to date and outlined the changes to the project that had been made through consultation with the community. These changes have included a 2 stage approach to extraction, an expanded voluntary conservation area at the site, expanded acoustic bunds and more rigorous monitoring programs.

Mr Lockett stated that the assessment SFP has undertaken shows that the project would meet its environmental requirements. SFP want to become members of the community and build trust in the local area.

Ms Fiona Robinson then made a presentation on groundwater aspects of the project. Ms Robinson stated that the groundwater assessment provided by the Somersby Action Group shows that the springs on the Hawker and Cahill properties are contact springs and not groundwater dependent springs. Therefore the impacts from extraction are difficult to evaluate. The Panel requested that the company undertake modelling of these springs in light of this information.

Ms Robinson confirmed the monitoring SFP would undertake would include baseline monitoring of all bores and springs within 800m of the project and quarterly water level and water quality monitoring. Ms Robinson also commented on impacts to the dam to the east of the project site as well as outlining the water access licences SFP holds.

Mr Damon Roddis gave a presentation with regard to air quality. Mr Roddis stated that the project would have a negligible impact on local air quality and that a comprehensive best practice monitoring program would be undertaken.

Mr Roddis explained that US standards for safe levels of respirable silica are higher than the total particulate matter levels that would be experienced at the project site and that SFP would analyse silica levels in background $PM_{10}$ concentrations at the site.

Rob Corkery gave a presentation on traffic, flooding, noise and rehabilitation. Mr Corkery reiterated that no heavy vehicles from the project would pass Somersby Public School. Information was also given as to traffic counts performed on Peats Ridge Road and Wisemans Ferry Road. SFP would construct a dam on the site to ensure existing flood flows are maintained. Mr Corkery then explained the approach SFP took when assessing the project's noise impacts. He also explained that the emplaced material would be blended to ensure its stability, bunds would be constructed from clay and capped with topsoil and that SFP is committed to the total rehabilitation of Stage 1 prior to Stage 2 commencing.

Mr Lockett concluded SFP's presentation by outlining the benefits of the project and strengthening commitments already made by SFP with regard to impact monitoring and community consultation.