GLADSTONE NICKEL PROJECT ENVIRONMENTAL IMPACT STATEMENT SUPPLEMENT

# Socio-Economic Effects 13

URS

Gladstone Pacific Nickel LTD

# Section 13 Socio-Economic Effects

## 10.0 Socio-Economic Effects (4, 7, 16, 17)

***(4)*** *The Department of Local Government, Planning, Sport and Recreation (DLGPSR) has noted that the social mitigation actions as briefly outlined appear appropriate, however the EIS should provide more details on how these measures will be implemented to achieve such actions.*

Social impact mitigation actions are discussed below. They are based on the construction workforce numbers given in the EIS. These numbers will reduce substantially should PAMs be used as part of the construction process. However a conservative (worst case) approach has been taken by using the maximum numbers likely.

**Workforce Availability**

GPNL will engage a specialist employment firm to recruit its construction and operational workforce from both local sources (where possible) and from outside the region. Previous workforce analysis conducted during a similar scale project (the CAR project) noted a large percentage of 'imported workers' were from outside the Fitzroy Statistical District, including a significant component from interstate (PIFU, 2003). Previous analysis also suggests that large projects such as the GNP are likely to attract a higher proportion of older workers and married workers than would smaller and shorter construction projects.

GPNL will develop an employment policy which promotes the use of local workforces for the construction phase. An industry participation plan will be developed which will detail the level of local industry participation expected and the benefits that would flow to Queensland in industry development, technology transfer, job creation and skills development.

**Housing Availability and Affordability**

In recognition that some low-income households may be displaced as a result of demand pressures within the local rental housing market resulting from the GNP, GPNL has committed to providing financial support to Anglicare to assist low-income households utilising the Community Rent Scheme.

GPNL has proposed a coordinated and multi-faceted approach to achieving the accommodation required for its temporary and permanent workforces. Elements of the approach have been described in detail in Section 10 and Appendix Q of the EIS. These include:

- Stimulating construction of new dwellings including houses, townhouses, motels and hotels, units.
- Coordinated leasing of existing rental properties and newly developed housing.
- Utilising accommodation options and associated transport services in the greater regional area if necessary, e.g. Rockhampton.
- Development of a temporary construction workers' village or support of a permanent construction village.

Referral agencies have asked for more detail about how a coordinated housing strategy will be implemented. A summary of details are provided in Appendix E.

**Community Services**

Section 10.8.1 of the EIS notes more medical professionals are required however, if the shortage of medical professionals persists while the population increases, more health services could be referred to Rockhampton. Travelling doctors and medical specialists, and "telehealth" technology (surgical assistance provided by specialists outside the hospital via remote cameras) may also assist in dealing with medical professional shortages.

First-aid facilities will be provided at the refinery, a nurse or paramedic will be available, and sufficient personnel will receive accredited first-aid training. Non-serious injuries will be treated on-site and more serious injuries will be stabilised prior to transport to the region's medical facilities.

# Section 13 Socio-Economic Effects

The estimated peak in demand for school places from both direct and indirect imported workers with accompanying children due to the GNP will be for approximately 295 students in 2009 for Stage 1 and 250 in 2014 for Stage 2 (refer Section 10.8.2.1 of the EIS). Education Queensland representatives note that adequate resources would be provided to meet any increased demand (D.Eborn, 2.06.06 pers. comm.)

Central Queensland TAFE offers a number of courses for trades and skills training including engineering, building and construction, and science. There are presently almost 4,300 students at the Gladstone campus which has the capacity to handle additional students. During the operation of the refinery, an ongoing program of skills enhancement will be provided. This will be a combination of specific in-plant training plus more generalised skills instructions at off-site locations. In addition, an apprenticeship and/or traineeship program will be implemented by an internal program or in close consultation with existing local and regional technical training institutions.

The GPNL housing strategy also addresses the provision of housing support to low income households.

***(7)*** *The Department of Housing has indicated it is concerned with the methodology and analysis of existing housing market and the capacity of the local building sector to meet expected demand.*

The analysis of likely housing demand to be generated by the GNP, assessment of the existing housing supply / availability, and the capabilities of the residential construction industry in the Gladstone region were provided in detail in Appendix Q of the EIS. Information was drawn from a number of credible sources to establish an overview of the existing situation and important trends over time.

Estimates of the numbers of employees to be recruited locally and the numbers to be imported from other places were taken from modelling done by the Department of State Development and were accepted as authoritative.

Most of the information used in the housing study was current at the time (mid- 2006). However more up to date information has subsequently become available and is provided in Section D.

More details on the methodology and analysis of existing housing market are provided in Appendix E.

Since the GNP EIS was issued, Rio Tinto has announced the construction of Stage 2 of the Yarwun Refinery at Gladstone. This has had an immediate effect of increasing the development of a range of houses, units and other forms of accommodation in the Gladstone region. It is now likely the majority of the Yarwun Refinery Stage 2 Project will be completed prior to the commencement of activities associated with GPNL's project in Gladstone. This should assist in ensuring sufficient accommodation is available within Gladstone for GPNL's project.

***(16)*** *CSC/GCC have advised that the presence of the GSDA and corridors such as the infrastructure corridor from the Stanwell industrial estate to Gladstone provides an opportunity to remove major infrastructure from the Gladstone and Calliope residential areas and facilitates a coordinated approach to the development of infrastructure such as pipelines, powerlines and rail corridors. The councils wish to see that these regional planning initiatives are utilised by all large industrial projects.*

GPNL will utilise the GSDA and related infrastructure corridors where possible and where commercially viable. At this time the existing GSDA infrastructure corridor cannot provide the necessary area to enable the GNP's residue slurry pipelines to fit inside the corridor. An alternative route using the existing road reserves along Calliope River Road and Boyle's Road is being considered to minimise the impact on communities.

# Section 13 Socio-Economic Effects

***(16)*** *CSC/GCC have advised that the findings of the SIA have been constrained by the limited research undertaken. The data used in the EIS dates back to 2001, and is considered too outdated to accurately reflect the current situation in Gladstone region. It appears that a large percentage of the data collated and used for the analysis of the social impacts relates to the Calliope Shire exclusively and is therefore considered insufficient to reflect the current situation in Gladstone City. Council considers that there is no longer a boom or bust cycle, only boom as Gladstone is already classified as the 10th fastest growing city in the country. A standard for growth has been set and the accumulative effect thereof should be addressed in the EIS.*

The social impact assessment in the EIS was based on data which were available at the time the EIS was prepared. The 2001 Census data were the most recent available demographic data in many instances. Some results of the 2006 Census have recently been released and Appendix D of this EIS Supplement provides updated demographic information where available.

Data for SIA report was collated for both Calliope and Gladstone City local government areas (LGAs). Where impacts have been confined to an area, the SIA has limited reporting to this area.

***(16)*** *CSC/GCC have advised that the data sources used in the EIS preparation stage are outdated and is not a true reflection of the social and economic environment of Gladstone and region. It is also unclear where the data came from such as Tables 10.3.4; 10.4.2; 10.4.3; 10.5.3; and Figures 10.4.1; 10.5.1. Short-term accommodation availability (page 10-9 to 10-10), gives an inaccurate depiction of what is available, such as the occupancy rate in Gladstone.*

The data used for the EIS was the most recent available data at the time of preparation. Since release of the EIS, more recent data have become available including selected results of the 2006. This EIS Supplement provides updated demographic and housing data where they are available (refer Appendix D).

Sources of information for the tables and figures queried by CSC/GCC are as follows:

- Table 10.3.4 – “2001 Census Basic Community Profiles” (BCP) for each LGA and Queensland;
- Table 10.4.2 – “Total Residential Land Activity Fact Sheet” September quarter 2005 for Gladstone and Calliope LGAs (PIFU);
- Table 10.4.3 – “Total Residential Land Activity Fact Sheet” September quarter 2005 for Gladstone and Calliope LGAs (PIFU);
- Table 10.5.3 – “Gladstone Growth Management Initiative Population Model” (GGIM) 2006;
- Figure 10.4.1 – REIQ, RP Data, Qld. Department of Housing. Based on medians for all house sales; and
- Figure 10.5.1 – Data supplied by GPN.

CSC/GCC have noted that short-term accommodation is often booked up for 3 months in advance. GPNL acknowledges that short-term accommodation in Gladstone is often booked well in advance. GPNL will ensure the development of a single-person’s village in the Carrarra region to reduce the impact on short-term accommodation during the construction period. After construction, the overall demand for accommodation in the Gladstone region will be significantly less, and existing new accommodation developed during the construction phase should provide sufficient additional capacity to satisfy ongoing demand.

***(16)*** *CSC/GCC advised that the social infrastructure development has not been sufficiently explored, identified nor addressed. The following mitigation measures are suggested: » Contribution by the proponent to a fund that the local government authority is able to access to supplement the provision of social services and/or the State Government to support the social structure of the community. » Research indicates that when communities experience distress, there is an increase in crime, family breakdowns and financial distress. The State and Federal Government should be proactive in its support to the receiving community with ongoing funding, not just once off project related funding.*

GNP has initiated a memorandum of understanding (MOU) with Anglicare Central Queensland to provide additional financial support for low cost housing. Additionally, it is expected that additional opportunities to work with Anglicare on other initiatives to support the Gladstone community will be developed over time.

***(16)*** *CSC/GCC advised that the level and type of community and stakeholder consultation and the input of these consultations to the SIA is unknown. Information in the report were misquoted refer to Chapter 10 and should be addressed.*

Section 12 of the EIS provided a detailed summary of the stakeholder consultation undertaken which was used as input into the SIA. Section 12 addressed the approach; methodology; consultation methods; key issues and responses, and ongoing consultation.

***(16)*** *CSC/GCC advised that there is no identification of the social impacts or mitigation strategies related to the acquisition of land, this is a critical social impact due to the direct linkage with social health and wellbeing of individuals and communities.*

The refinery and RSF are contained within the GSDA. Land to be purchased relates to government-owned land zoned for industry. The pipeline route will use a corridor which predominantly does not require land acquisition although compensation will be paid for access and use of the land. Consultation has occurred with many stakeholders including landholders impacted by the pipelines and landholders near the proposed refinery and RSF sites. Section 12.4.2.1 of the EIS provides details of consultation with these stakeholders. This consultation has continued since the release of the EIS.

***(16)*** *CSC/GCC has advised that undertaking these works outside the region will limit the opportunity for local engineering companies to assist construction of materials and this will limit revenue from the project being spent in the Gladstone region. This partly contradicts the statement that employment will be created in the area.*

It is understood that current local workforce capacity may be stretched due to several major projects being proposed for the Gladstone region. Construction or fabrication activities outside of the region will ensure that the economic benefits for the region have been maximised by utilising a balance of non-local and local resources. Over reliance on local resources where those resources are fully stretched to capacity will have implications for the ability of the project to be completed and will also place undue pressure on local engineering and community facilities.

Significant work will still be required to be completed within the Gladstone region and it is expected that local industries will benefit during both construction and post-construction periods.

***(17)*** *A respondent has raised concern regarding the social impacts with the construction work forces required and increased traffic flow that will be generated.*

Section 10 of the EIS has detailed social implications of the construction workforce in the area. The increased traffic flows were considered in Section 6 of the EIS.

### 10.4.8 Rental Property (16)

*CSC/GCC suggested that there were several areas in the EIS that took comments from the GCC Advisory Services out of context. For example, the first paragraph of section 10.4.8 states that LJ Hooker has estimated a vacancy of 2% for their portfolio and the Gladstone Advisory and Tenancy Group was quoted as the provider of that data which is incorrect.*

The first sentence of that paragraph discusses the data from LJ Hooker. The second sentence of the paragraph refers the informal survey of property managers in Gladstone and Calliope LGAs conducted in May 2006 by the Gladstone Tenant Advice and Advocacy Service which is the source reference referred to in the EIS.

Details of LJ Hooker's rental property list were gained from personal communications with LJ Hooker. Details of rental property availability from property managers in Gladstone and Calliope were gained from the Gladstone Tenant advisory Service.

### 10.4.11 Caravan Parks (16)

*CSC/GCC has stated that the information quoted in the EIS regarding caravan parks does not accurately describe available caravan sites, tent sites, cabins and on-site vans, based on more recent information obtained from the Advisory Services of GCC.*

GPNL is aware that the situation has changed since the data available at the time the EIS was prepared was reported.

GPNL is aware of the closure of the Clinton caravan park in Gladstone and the negative impacts on families and individuals who had used the caravan park as low cost housing. As a mitigation strategy GPNL is prepared to assist in the development of additional cabins at the Lake Awoonga caravan park to cater for seasonal tourist demand and for longer term accommodation needs of low income households. GPNL has also been in discussion with potential developers to assist in the development of a new caravan park in the region. The likelihood of a new caravan park is now considered low, unless the caravan park is located where the workers village is constructed, if the workers village is subsequently removed. Caravan park owners seek a longer financial commitment to invest than are available from a project like the GNP which only has two three-year periods of demand for temporary accommodation.

### 10.4.12 Workers Villages (16)

*CSC/GCC has noted that any proposed workers village and its facilities would need to be the subject of a separate approval process quite apart from the EIS.*

GPNL acknowledges that construction of a workers village would require separate development and building approvals to be sought and obtained prior to any works being undertaken. GPNL have been in consultation with CSC to ensure the workers village developed for GPNL aligns with CSC's vision of a workers village.

## 10.5 Project Workforce (10, 16)

***(10)*** *The Department of Communities (DC) respondent has recommended that the proponents partner with other major developers in the area, local and regional stakeholders such as the Department of Employment and Training, local Councils, the Gladstone Area Promotion and Development Limited (GAPDL), Get Real About Social Partnership (GRASP) and other community agencies and individuals:*

- *to develop and enact strategies to mitigate the burden accruing to fixed and/or low income households of increased labour costs arising from their projects and ·*
- *to develop a skills/employment working party that advances the availability of training and promotes the adoption of affirmative action policies and procedures for the training and employment of local employees from a variety of disadvantaged and diverse backgrounds from both within and outside the immediate region.*

*That the proponents ensure that the adoption of such policies and procedures, which might emanate from such collaboration, is a condition of engagement for any of the contractors and sub-contractors to the GNP.*

As discussed above, GPNL has entered into a MOU with Anglicare to provide direct financial support to low cost housing in the region. The GPNL housing strategy also includes the development of a single persons' village to further reduce the impact on local housing.

As discussed in Section 10.5.5 of the EIS, GPNL will develop an employment policy which promotes the use of local workforces for the construction phase. An industry participation plan will be developed which

will detail the level of local industry participation expected and the benefits that would flow to Queensland in industry development, technology transfer, job creation and skills development.

Within the industry participation plan, GPNL will commit to:

- Ensuring potential local suppliers are provided with information in an equitable and timely manner.
- Adopting design and procurement strategies to maximise local participation, wherever appropriate.
- Ensuring local suppliers are provided with opportunities to supply under the same terms, standards and conditions as interstate or overseas suppliers.
- Ensuring contracts are awarded on the basis of the most competitive proposal, which includes due consideration of non-cost factors such as reliability, maintainability, servicing etc.
- Incorporating performance measurements and feedback mechanisms.
- Promoting the adoption of affirmative action policies and procedures for the training and employment of local employees from a variety of disadvantaged and diverse background.

***(16)*** *CSC/GCC question whether the proportion of the workforce (42% or 1,258 people) can be sourced locally, as it would appear that to do so would mean the recruiting of workers from other existing jobs in the region. This means that those industries need to recruit to replace and hence more workers are imported. The impacts of a higher percentage of workers imported into the region – as opposed to strictly imported for the project – should be considered.*

The assumptions contained in the population estimates given in Section 10.5.3 of the EIS were based on the experience of previous major industrial developments in Gladstone. The model was developed by the Queensland Government and includes consideration of both direct and indirect workforce effects. The indirect effects include the effects of workers who are imported into the region in addition to those who are imported strictly for the project. Hence these impacts have been incorporated into the numbers presented in the EIS.

The timing of the GNP project now looks to be essentially after Rio Tinto's Yarwun Stage 2 Project is completed. Wherever possible the opportunity to employ personnel coming off Yarwun Stage 2 will reduce the impact on Gladstone's permanent workforce.

## 10.7 Effects on Housing and Accommodation Facilities (10)

*DC has indicated that it supports the enactment of the initiative to assist Councils to fund services that support low income households. The Department also supports the proponent's intention to negotiate with local councils on the development of a workforce camp and the establishment of a relocatable home park, both with permanent infrastructure that can be handed over to local authorities at the end of the project.*

GPNL has proposed a coordinated and multifaceted approach to achieving the accommodation required for its temporary and permanent workforces. Elements of the approach have been described in detail in Section 10 of the EIS and the Housing Study Report in Appendix Q.

### 10.7.1.4 Summary of GNP Housing Demand (16)

*CSC/GCC contend that it will be difficult to achieve the housing production rates suggested in the EIS (how does the Queensland Master Builders Association (Rockhampton) suggest that 600 units of housing could be produced each year?) without a significant increase in tradesmen and professionals involved in the land development/housing approval/housing construction industry in the region.*

The EIS stated that the ability to achieve a rate of 600 housing units per year would be dependent on attracting builders and trade staff from Rockhampton and surrounding areas, and on the availability of skilled labour in an environment of skilled labour shortage. Because of the current limits on such resources, the EIS stated that it may be unrealistic to assume that the rate of 600 units of housing per

year could be maintained over a five year period. Consequently the analysis undertaken in the EIS took a more conservative approach and as there is an historical rate of 500 units of housing per year that has been achieved in recent times it is that rate that has been used in estimates of future performance.

The commitment to use a single persons' village will further reduce the impact or demand on housing units within the region.

*CSC/GCC have stated that there will be a need to find more resources to process the necessary land use approval applications and building approval applications to cater with the doubling and trebling of the workload during this time. It may therefore be appropriate in terms of addressing the impacts of the project, the proponent be required to negotiate with the councils a funding arrangement for additional technical staff for the three year time period.*

GPNL will enter into an infrastructure agreement with government which will incorporate consideration of government resourcing issues created by the project.

### 10.7.2 Housing Strategy (15, 16)

***(15)*** *CQPA advised that the EIS should outline in detail how the accommodation situation will be handled. The Strategies may well be the basis for addressing the situation, however more detail is required.*

Housing strategies were detailed in Appendix Q of the EIS. This strategy identified a multi-layered approach would be taken which included a single-person's village, new developments of houses, flats, motels and hotels, and co-ordinated leasing of existing rental properties

Since the completion of the EIS, GPNL has undertaken further development of its housing strategy and has investigated a number of options and activities associated with low-cost housing. There are a number of opportunities which are being considered including:

- Support to the Community Rent Scheme through Anglicare.
- Development of the Lake Awoonga Caravan Park with the development of additional cabins suitable for low cost housing.
- Development of a new relocatable home sub-division near the Carrara Homestead which could eventually be available for low cost housing.

**Support to the Community Rent Scheme (CRS)**

Anglicare's December 2006 report identified that during the construction of CAR1, average rentals for low-cost housing increased by $20/week, and the number of houses retained in the CRS program dropped from 68 to 37. Both the rent increase and the reduction in housing supply had a significant impact on the ability to provide low-cost housing to the community. As at December 2006, the number of accommodation units within CRS in the region has returned to 68. There were 92 households on the waiting list as at December 2006.

Agreement has been reached with Anglicare to provide an additional $20/week for 68 units of accommodation for the two peak years of construction associated with the GNP. This direct financial support should provide significant assistance to Anglicare to enable low cost housing to continue to be adequately supported.

**Development of Lake Awoonga Caravan Park**

GPNL has had a number of discussions with the Dimidium Group which owns the caravan park rights for the Lake Awoonga Caravan Park. In addition the Dimidium Group recently purchased the Marlborough Caravan Park in July 2007.

One of the options being considered is for Dimidium to build a number of additional cabins at Lake Awoonga, subject to relevant DA approvals, that GPNL would underwrite during the GNP construction period. It is planned these cabins would be used by personnel associated with the construction project.

At the end of the construction phase, the cabins would become available to Dimidium to be used to support housing needs in the region.

***(16)*** *CSC/GCC have stated that the EIS does not reflect how the housing shortfall will be overcome….The strategies should reflect timelines and specific outcomes.*

Some of the housing options outlined in the strategy have been developed further and negotiations are underway with a number of potential housing providers to implement the housing strategy. Once these negotiations have been completed it will be possible to provide information on timelines and specific outcomes. Further details are provided above.

### 10.7.2.2 New Dwellings (6)

*The Department of State Development (DSD) advised that it encourages further consideration into the construction of a permanent village providing short-term accommodation for industry and construction employees.*

A number of agencies have expressed support for the development of a workers village or camp to accommodate part of the construction workforce. It was also suggested that the camp or village be a permanent facility.

A number of potential sites have been investigated but attention is now focussed on land near Carrara in the Calliope Shire. There are three site options:

- The 'Carrara' property near Calliope (Lot 5 RP616418) or this site in combination with adjacent Calliope Shire land fronting the Bruce Highway (Lot 17 CTN1285).
- An alternative location on the 'Carrara' property (parts of Lot 6 RP616418 and Lot 260 SP183065).

Water and sewerage services will need to be provided by GPNL for all these sites and appropriate arrangements made with the Department of Main Roads (DMR) and CSC for a sealed access road from the Bruce Highway. Separate local government planning approvals would also need to be obtained for the camp development to proceed. GPNL has had preliminary discussions with a representative of the owners of the 'Carrara' property and CSC.

The camp to be constructed on the site would use a modular design.

It is proposed that the camp be developed and managed by a third party specialising in this type of accommodation. This approach to ownership and management will mean that the camp can be used to accommodate workers from other projects (where project construction timeframes allow) and has the potential for an ongoing life after the GPNL construction phase has been completed.

### 10.7.2.5 Workers Village (11)

*DMR has asked that the proponent confirms the location of the temporary construction village and review and amend the traffic assessment to more accurately reflect the expected traffic movements associated with the project.*

The proposed construction camp is intended to be located on Calliope River Road on the northern side of the Bruce Highway. This will ensure that traffic between the camp and the refinery site will not need to cross the Bruce Highway. If this is not the case, a further traffic assessment will be completed to ensure the proposed traffic movements are in line in the impact on the regional road network detailed in Appendix F.

### 10.7.3.3 Modularisation (15)

*CQPA has advised that if the PAMs concept is of such criticality to the overall project, then that concept should be addressed in detail so that the actual impact of construction workforce numbers and associated accommodation impacts can be evaluated.*

The PAM construction method is a means of reducing site labour as compared to the stick build method. GPNL's approach to PAM construction is based on the desire to control the schedule and delivery of a project which will bring ongoing and long term benefit to Australia.

The facilities required for PAM delivery to site have been discussed with CQPA and studies undertaken to verify appropriate routes.

The proposed facilities are suitable for a range of projects above and beyond GPNL's requirements and a process separate to GPNL's environmental process is proposed.

Should the PAM concept proceed, the GNP's construction workforce will reduce to approximately1,500.

*CQPA requested that the comment that 'adverse impacts from more than one project being constructed simultaneously would be mitigated if all projects utilised the modular approach' needs to be verified.*

Should a common-user PAM facility be available for other major projects in Gladstone, the construction workforce numbers would be reduced for each project hence reducing the impacts of these project on existing housing and infrastructure services.

### 10.8 Community Services, Facilities (10)

*DC has advised that the proponents commit to collaborating with Government, the community and other project developers in the region to not only investigate but also resource the strategies required to mitigate the increased demand for community services in the region.*

GPNL will engage with government and the community to promote enhanced community infrastructure. This includes a commitment to fund roads, undertake development of ports, assist with training and development of occupational health and safety skills, and provide support for community programs both in sporting, recreation and social development.

### 10.10 Land Tenure (16)

*CSC/GCC noted that the EIS identifies several properties to be utilised by the project, but which are not currently included in the GSDA. Council wishes to advise that this could be an issue in relation to formal land use approval.*

Since the release of the EIS, the GSDA has been expanded to encompass all property utilised by the project other than Lot 52 near the RSF which has been purchased by GPNL. As such land use approval will go through the GSDA development scheme. GPNL recognises that should the project require land that is not within the GSDA, the appropriate development applications will be submitted to council. The pipeline route for the residue is still being finalised but requires access to land outside of the existing GSDA. Negotiations with the CSC or Property Service Group (MIDQ) respectively will be required depending on the final route location.

### 10.11.2 Residue Storage Facility (8)

*QR notes that the proponent has a residue storage dam within the GSDA near where QR's proposed Moura Link Line will run. Given the scale of the map it is hard to tell how far the dam would be away from QR's potential alignment. QR could not find any link to the Coordinator General's Corridor Studies for the GSDA and whether they will be consistent with that planning. GPNL should provide details of the proposed location to QR showing the extent of the proposed works and the likely impacts.*

GPNL has shown detailed information in the EIS associated with the RSF proposed works to QR and also discussed likely impacts. Changes to the property boundaries have been agreed with state government to incorporate the proposed Moura rail line route.

### 10.12.2 Calliope Shire Council (4)

*DLGPSR advised that the EIS would benefit from minor updating in line with more recent developments in the Calliope Shire planning scheme. The new IPA-compliant planning scheme commenced on 27 April 2007. Comparisons made in the EIS with an earlier draft of the planning scheme should be revised, particularly in relation to land zoning and development made assessable by the scheme for the project area. This will have implications for determining the assessment manager for some project approvals.*

Details of the updated Calliope Shire planning scheme in relation to the proposed development are discussed in Section 1.9 of this EIS Supplement.

### 10.13 Visual Amenity (16, 17)

***(16)*** *CSC/GCC advised that they support the mitigation measures for visual amenity provided in Section 10.13.10 of the EIS and will require these measures to be included as elements of conditions of development approval for the Material Change of Use and Building Applications.*

Comment noted.

***(17)*** *A respondent has raised concern regarding the visual effects of the operational plant that will be viewed entering and exiting the Gladstone City via Hanson Rd.*

There will be a visual effect associated with the operational plant. This has been discussed in the EIS in detail in addition to mitigation measures.

GLADSTONE NICKEL PROJECT ENVIRONMENTAL IMPACT STATEMENT SUPPLEMENT

# Cultural Heritage 14

URS

Gladstone Pacific Nickel LTD

# Section 14 Cultural Heritage

## 11 Cultural Heritage (1)

*EPA advised that the EIS should acknowledge the requirements for non-indigenous cultural heritage surveys in the Queensland Heritage Act 1992 should be included into EIS.*

GPNL acknowledges that surveys with the intent of identifying non-indigenous cultural heritage require an approval from the EPA Chief Executive under Part 7, section 55, of the Cultural Heritage Act 1992.

## 11.3 Potential Impacts and Mitigation (1)

*EPA advised that the Queensland Heritage Act 1992, section 56, requires that a person who discovers an object that may be of cultural heritage significance must report the object to the responsible Minister as soon as practicable after the discovery is made. The EIS should be re-written to acknowledge the above legislation and the need to advise the Environmental Protection Agency of any such discoveries.*

The requirement to report to the Minister in the event that an object is found that may be of cultural heritage significance will be included in cultural heritage management plan.

GLADSTONE NICKEL PROJECT ENVIRONMENTAL IMPACT STATEMENT SUPPLEMENT

# Community Consultation 15

URS

Gladstone Pacific Nickel LTD

# Section 15 Community Consultation

## 12.3 Community Consultation Methodology (17)

*A respondent has advised that there has been a lack of consultation with local community groups in the EIS and review period.*

A significant amount of consultation has been undertaken in the period leading up to the EIS and ongoing review period. Ongoing consultation has occurred with many stakeholders on an ongoing basis including:

- Landholders impacted by the pipelines.
- Traditional owners.
- Local community groups including the Mount Larcom Economic Working Group and the Yarwun Progress Association.
- Local and state government agencies.

A full list of the stakeholders consulted is given in Table 12.3.1 of the EIS.

Stakeholders were invited to attend and participate in stakeholder meetings and briefings at the following key stages during the EIS process.

- Round One was held during the first half of 2006 to coincide with the release of the ToR and IAS, to introduce the project, to explain the approvals process, and to discuss any issues raised. A number of stakeholders were consulted regularly during this round of consultation.
- Round Two was held from mid-2006 to provide an update of the project, an outline of the environmental studies and the preliminary findings prior to the public release of the EIS, and to discuss any issues raised. A number of stakeholders were consulted regularly during this round of consultation.
- Round Three took place with the release of the EIS for public review and comment in May 2007. A number of community meetings were held and the contents of the EIS were explained.

Since comments were received from the public review of the EIS, GPNL has made contact with most respondents and will continue to listen to concerns raised with a view to avoiding or at least minimising impacts to the community and the environment. Since July 2007, GPNL has focused on gathering additional information to provide to respondents and addressing the potential impacts of subsequent modifications to the project. GPNL has not been successful in contacting all stakeholders related to the RSF site although this has been address in part with a meeting with the Yarwun community on 17 November 2007.

### 12.3.3 Consultation Methods (10)

*DC requested the proponent develop a Community Consultation Management Plan that incorporates: ·*

- *the establishment of a social monitoring group that incorporates representation from key community stakeholders who can identify broad issues of concern, ·*
- *provision of information that is easily accessible to the community and specific interest groups; and*
- *provision for focused and detailed consultation to consider issues, resolve conflicts, and to develop mitigation or monitoring strategies with the relevant parties.*

GPNL recognises that the project is located within and near communities and is conscious that mutual trust and support needs to be developed between all parties to ensure that the community is aware of the benefits of the project and initiatives undertaken by GPNL are relevant and meet their specific needs. Consultation will continue during both the construction and operational phases of the project. Regular reporting and involvement and interaction with regulators and stakeholders will be undertaken.

GPNL will develop a community consultation management plan that:

# Section 15 Community Consultation

- Continues to inform and notify affected and interested stakeholders about the project,
- Identifies any concerns of stakeholders.
- Establishes a social monitoring group that incorporates representation from key community stakeholders who can identify broad issues of concern.

GLADSTONE NICKEL PROJECT ENVIRONMENTAL IMPACT STATEMENT SUPPLEMENT

# Risk and Safety 16

URS

Gladstone Pacific Nickel LTD

# Section 16 Risk and Safety

## 13 Risk and Safety – Slurry & Seawater (1)

*EPA has requested that the hazards and risks associated with the pipeline should be reassessed and mitigation measures proposed for those risks identified.*

See Sections 7.3.2 and 7.8.2.1 and Appendix C.

## 13.2.3 Dangerous Goods (MHF) (12)

*The Department of Emergency Services (DES) respondent has advised that should the proponents establish that the facility does exceed the threshold for a MHF they will need to submit a notification to the Chief Executive six months before the facility is commissioned.*

*DES advised that the proponents have not declared whether the aggregate storage of ammonia, hydrogen sulphide, LPG, hydrogen peroxide and hydrogen exceed the threshold for a possible Major Hazard Facility. If they do the proponents will need to submit a notification to the Chief Executive six months before the facility is commissioned.*

GPNL will submit a notification should the refinery exceed the threshold for a MHF. Currently the proposed quantities of the materials planned for the refinery do not exceed the threshold for a MHF.

Appendix T of the EIS contains the risk assessment undertaken for the project. The main objectives of the risk assessment were to assess the major hazards associated with the project in accordance with Australian Standard 4360:2004 and to also identify hazards that have the potential to extend offsite and determine if a quantitative risk assessment is necessary.

Major issues identified included a solvent phase fire in the solvent extraction area of the plant and an ammonia release from the main storage area where about 80 t of ammonia are stored. The actual volume is identified in Table 2.3 of Appendix C of Appendix T of the EIS.

Hydrogen sulphide storage is limited due to the production of demand system. LPG and hydrogen peroxide are also held at site in storage tanks however details of these are yet to be determined and will be developed during the detailed design phase.

Hydrogen storage is limited also however further work is required in the detailed design phase to confirm hydrogen storage requirements. If these do exceed prescribed limits notification to the Chief Executive will be made as required.

*DES advised that the EIS does not make it clear whether Hydrogen Sulphide will be stored in any appreciable quantity. Management of hydrogen sulphide containment and fugitive emission sources will be of significance in assessing possible offsite impacts and nuisance caused by the facility.*

Hydrogen sulphide storage is restricted to immediate requirements within the pipeline leading from the $H_2S$ plant to adjacent internal consumers. Storage is not required as it is produced on-demand to eliminate as far as possible risk associated with the storage of hydrogen sulphide explosion risks. As noted in Appendix B of Appendix T of the EIS, the total inventory of $H_2S$ on site will be 10 t.

# Section 16 Risk and Safety

## 13.3 Risk Approach Results (8)

*QR advised that this section states 'fatalities' as being a major risk requiring assessment. Yet the EIS has only focused on the occupational refinery matters and failed to look at such downstream effect of either the construction traffic with the pipeline and refinery and/or increased freight rail services associated with the project having on interface points with the rail network (i.e. level crossings). Particularly with the possible transport of probably very long pipes via rail from Kemble Grange (Section 2.3.6.9) and likely rail transport of 130 containers of refined nickel & cobalt briquettes per week from Gladstone to Port of Brisbane. To resolve this matter the proponent should discuss during the detailed design phase with QR the safety implication of the above scenarios and agree on the proposed measures to be adopted to mitigate the safety risks. These agreements are to be signed off at least 3 months prior to commencing construction of the proposed refinery and pipeline.*

GPNL will undertake detailed studies with QR with regard to pipeline design and pipe transport via rail from Kembla Grange in addition to rail transport of containers from the Mt Miller to Port of Brisbane.

*QR advised that if the ore's transport mode is changed from being pipeline to rail, a similar liaison with QR about the safety implications of increased rail services associated with the proposed project using any rail/road level crossings and agreements signed off at least three (3) months prior to commencement of any such proposed rail services.*

GPNL will undertake detailed studies with QR with regard to ore transport from Marlborough.

## Table 13.5.1 Risk Assessment Results (1)

*The EPA advised that the assessment that Area 9 (RSF at Aldoga) is not a major hazard facility is questionable. Similarly, the assessment of Area 8 (Pipelines to/from the RSF at Aldoga), while identified as a major hazard (Table 13.5.2), does not appear to take into account that these pipelines will be at high pressure and that leakages or failures of seals or pipe wall could result in a large loss of material. The hazard and risk assessment for the RSF and pipelines from the RSF to the Refinery should be reviewed and reassessed taking into account the nature of the material involved and the long term consequences of failure.*

**Area 8 - Pipelines to/from the RSF**

The risk assessment of Area 8 resulted in the following:

| | |
|---|---|
| Major hazard: | Release to the environment |
| Possible causes: | Pipe/flange failure<br>Vehicle impact |
| Potential Consequences: | Pipeline to RSF: release of slurry<br>Pipeline from RSF: release of saline water with high magnesium content. |
| Controls: | Rubber lining, regular inspection, condition monitoring, control of vehicle entry to pipeline corridor, differential pressure sensors/shut down. |

On the basis of the above assessment, a consequence of 4 (offsite release with short term impact) was adopted. The reason a consequence of 5 (offsite release with long term impact) was not adopted was because of the differential pressure sensor controls which will shut down the pumps as soon as the leak occurs thus limiting the amount of material that could be spilt. In addition, the route though the pipeline is likely to pass would not be considered as highly sensitive

**Area 9 – RSF**

As discussed in Section 13.5 of the EIS, there were 27 major hazards identified in the risk assessment; Area 9 was one of them and was assessed as a major hazard.

### 13.9 Workplace Hazards (8, 12, 16)

***(8)*** *QR advised that in regard to safety of workers and plant operation in the vicinity of rail lines, GPNL is to determine risks and undertake necessary actions in consultation with QR*

Prior to construction occurring in the vicinity of rail lines, GPNL will consult with QR with respect to health and safety issues and will apply for any permits necessary for construction works to proceed.

***(8)*** *QR advised that prior to commencing any rail services associated with this proposed project, GPNL shall arrange with QR for assessment of the noise and air quality implications of the proposed addition services in accordance with QR's Access Undertaking 2005, Code of Practice for Railway Noise Management and relevant legislation. This will be done in consultation with QR. Note this has to occur anyway to comply with the EIRMR requirements of the Access Undertaking.*

GPNL will provide QR with any relevant information to enable QR to prepare an environmental investigation and risk management report. It is understood that this report will include aspects such as noise and dust as well as other relevant environmental issues.

GPNL is currently in discussions with QR which has completed a formal study of the feasibility of transporting ore from Marlborough to the refinery by rail. This will progress to a final commercial agreement which will meet the requirements of QR and GPNL subject to commercial viability.

***(12)*** *The Department of Emergency Services (DES) has noted that the GNP appears to come within the 0.5 x $10^{-6}$ risk contour of the Orica Yarwun facility. DES recommends that Orica should now perform a formal revision to their QRA to confirm the risk contours for the site in the light of that expansion.*

GPNL considers that the requirement for Orica to undertake a formal revision of their quantitative risk assessment (QRA) is premature. This activity would best be undertaken when GPNL has finalised its refinery layout during the detailed design process. This is expected to occur approximately in the third quarter of 2008 at which point GPNL and Orica will seek to undertake appropriate studies.

### 13.9.6 Fires (12)

*DES recommends that a bushfire hazard assessment is undertaken as the refinery is located within a medium bushfire hazard management area. The proponent should identify what the residual bushfire hazard will be after development has occurred as well as outlining a mitigation plan to address residual hazard.*

The vegetation with the potential to generate fires at the refinery site will be removed as part of the site's development and the site will no longer present a bushfire hazard with the exception of vegetation planted for screening purposes. The refinery site will be buffered on all sides from bushfires by the Calliope River to the east, Hanson Road to the north, Reid Road to the west, and the North Coast Railway to the south.

GPNL will liaise with local fires services during detailed design stage so that measures can be incorporated into the construction to minimise the potential risk of bushfire.

GLADSTONE NICKEL PROJECT ENVIRONMENTAL IMPACT STATEMENT SUPPLEMENT

# Environmental Management Plan 17

URS

Gladstone Pacific Nickel LTD

## 14.3 Legislation (1)

*The EPA noted that the statement in Section 14.3 - Legislation that the EM plan would be amended to incorporate conditions following the issue of the environmental authority for the pipeline mining lease is not correct. Rather it is the draft EM plan that should propose environmental protection commitments that may be incorporated as conditions in the EA. The draft EM plan must meet the content requirements of s203 of the EP Act. The EM plan is used by the EPA to develop the draft EA, and an amended EM plan is therefore a necessary precursor to the draft EA. An amended EM plan for the relevant mining activities associated with the proposed ore slurry pipeline should be provided in accordance with the requirements of s203 of the Environmental Protection Act 1994 and the appropriate EPA guideline.*

The EPA's comment that the EM plan is used by the EPA to develop the draft EA, and an amended EM plan is therefore a necessary precursor to the draft EA, is noted.

As the slurry pipeline will be buried for its entire length, with no above ground facilities, the potential impacts of operating the pipeline will be associated with:

- Restoration of the areas disturbed during construction (initial operational phase),
- Inspections and patrols of the pipeline,
- Potential emergency situations.

GPNL has prepared a revised EM Plan in accordance with the requirements of Section 203 of the *Environmental Protection Act* to support the Environmental Authority Application (refer to Appendix C). The EM Plan applies to relevant mining activities associated with the proposed pipelines (construction and operations) and is additional to the draft Pipeline Construction EMP included in the EIS for the project.

### 14.8.3.7 Hydrotesting Management Plan (2)

*DPIF advised that the Hydrotesting Management Plan should be reviewed to detail the management that will ensure translocation of fauna (including fish larvae) and flora between water bodies will not occur as a result of hydrotesting.*

Hydrotest water will be disposed of via land application, thus eliminating the risk of translocation of fauna and flora between water bodies. This will involve the irrigation or discharge of the hydrotest water onto a portion of land agreed with the relevant landholder. Discharge will occur in such a way as to prevent runoff into any watercourse or drainage line, flooding or erosion. Post construction, the discharge location will be monitored and any mitigation (e.g. weed control, additional erosion control) will be implemented.

A revised Pipeline Environmental Management Plan is provided in Appendix C.

### 14.8.4.4 Soil Management Plan (13)

*DNRW advised that while the disturbance of Acid Sulfate Soils (ASS) is generally not expected on the pipeline routes, verification testing of disturbed material post liming and prior to re-burial should be included in the plan.*

The acid sulfate soils (ASS) section of the Soils Management Plan of the EMP has been revised to include verification testing of disturbed material post liming and prior to reburial as follows:

If ASS material is identified, mitigation measures will be developed such as:

- Minimising the time the trench spoil is stockpiled.
- Neutralising trench spoil with lime.

- Containing runoff from stockpile areas in holding ponds or bunded areas.
- Disposing of trench water only after analysis.
- Verification testing of potential or actual acid sulfate soils post liming and prior to reburial.
- Burying of soil below the water table.
- Compacting the backfill to prevent acid leach migration.

A revised Pipeline Environmental Management Plan is provided in Appendix C.

### 14.8.4.10 Traffic Management Plan (11)

*DMR advised that the proponent should provide specific details in the draft Road-use Management Plan (RUMP) for each construction component of the project. At a minimum it should contain the following:*

- *A brief description of the project including maps showing location of facilities, access points and transport routes.*
- *A description of the scope of the transport task.*
- *Information on management of haulage tasks – by whom, what sort of vehicle, etc.*
- *A detailed statement of general and specific objectives of the plan rather than simply a one-line statement of "policy" to manage impacts.*
- *A detailed statement of the specific performance criteria including specific targets and measures.*
- *A strategy that provides specific responses to manage foreseen issues relating to heavy vehicles, buses and cars, service vehicles, dangerous goods movement, over-dimensional loads, and so on.*
- *Key aspects to be covered should include: traffic mgt, vehicle mgt, compliance, safety mgt, personnel mgt, environmental mgt, accident and incident mgt, monitoring and reporting and review and amendment.*

GPNL will provide a road use management plan according to DMR's requirements. The road use management plan will be developed and agreed with DMR after project approval following detailed design. It is likely to contain the following:

- A brief description of the project including maps showing the locations of facilities, access points and transport routes.
- A description of the scope of the transport task.
- Information on the management of haulage tasks.
- General and specific objectives of the plan.
- Specific performance criteria including targets and measures.
- Strategy that provides specific responses to manage foreseen issues relating to heavy loads, buses and cars, service vehicles, dangerous goods movement, over-dimensional loads and so on.
- Key aspects to be covered will include:
  - Traffic management
  - Vehicle management
  - Compliance
  - Safety management
  - Personnel management
  - Environmental management
  - Accident and safety management
  - Monitoring and reporting
  - Review and amendment

*DMR advised that the pavement depths are not considered adequate for construction traffic concentrated over a short period of time and especially if periods of wet weather are encountered. The proponent should include in the draft RUMP for the pipeline construction works, provisions to address:*

- *operational and road safety concerns in relation to the operation of construction traffic during school bus operating times and higher traffic volume journeys to and from work peaks;*
- *road impacts from operation of construction traffic when wet weather is encountered.*

*Wet weather provisions should include the following:*

- *immediately discontinue or moderate the use of the Ridgelands Rd by heavy vehicles if, during or immediately after wet weather, any section of the road used by the construction traffic shows signs of distress, until assessment of requirement/ undertaking of repairs at no cost to MR.*

GPNL will include in the RUMP conditions as agreed with DMR with respect to wet weather and during school bus operating times and higher traffic volume journeys to and from work peaks .

### 14.9 Pipeline Operations Environmental Management Plan (1)

*EPA advised that the EIS should provide an ore pipeline and parallel sea water pipeline monitoring program in sufficient detail to demonstrate best practice management as required by the ToR. The monitoring program should include consideration of appropriate environmental indicators, monitoring technology, location, and timing sufficient to detect and respond to operational upsets and material failures.*

The revised Pipeline Environmental Management Plan (Appendix C) contains a monitoring program for pipeline operations.

### 14.10.2 Air Quality Management Plan (16)

*CSC/GCC advised that the Councils support the management and monitoring proposals included in the EMP (as stated in Section 14.10.2 for construction and 14.11.2 for operation) and will require these elements to form conditions of approval for the proposal.*

Comment noted.

### 14.10.3 Noise Management Plan (16)

*CSC/GCC support the scheduling of high noise events to minimise impacts on the local community and the provision of briefings of the local community of the timing of noise events during construction. Requirements for construction to occur during the hours of 6am-6pm should be included as a condition of approval as should the need to notify the local community of atypical noise events.*

The proposed hours of construction will exceed the range proposed from 6am to 6pm. It is therefore proposed to negotiate with the local community and local residents regarding work hours. This will provide the project some flexibility whilst enabling residents to be informed and aware of out-of-hours construction which may be required as part of the project. The limitations to construction times has the potential to increase the duration of project and increase the duration of construction noise for the period of delay.

### 14.10.10 Mosquito Management Plan (16)

*CSC/GCC advised that a management plan should be prepared and submitted to Councils detailing the design, construction and operational measures that will be put in place to prevent ponding of water that could form a breeding ground for mosquitos and other biting insects.*

A mosquito management plan for the project is presented in Section 14.10.10 of the EIS. This plan will be discussed with CSC during the detailed design phase and updated to incorporate Council's requirements. It will include design, construction and operational measures to be put in place for the ponded areas for stormwater treatment to prevent mosquito breeding.

Building development plans are an element of the input to CSC for final approval. The project will be available for detailed discussions with Council as part of the approval process.

### 14.10.13 Traffic Management Plan (11)

*DMR advised that details of the construction of the materials conveyor/s and seawater pipes from Wiggins Island Wharf to the refinery site do not appear to be included in any traffic management plan. The proponent should include within the draft RUMP for the Refinery and RSF construction works, provisions for managing any road/safety impacts of construction of the materials conveyor/s and seawater pipes construction from Wiggins Island Wharf to the refinery site.*

The ore and sulphur conveyors will pass under Hanson Road in the same manner proposed for the conveyors for the WICT. The refinery discharge pipelines will also pass under Hanson Road.

The planned crossing of Hanson Road will allow for the road's duplication and will be undertaken in such a way so as to minimise detrimental affects on traffic flow. This will be achieved by undertaking construction of the widened road corridor for a predetermined length and to a higher road level. During the construction of this widened portion of the road, a series of culverts and slabs will be constructed within the embankment to provide the necessary clearance for the sub-road structures which will contain the conveyors and pipelines as well as maintenance access and other related services.

When complete, traffic on Hanson road will be diverted onto the newly constructed alignment. This will permit work to proceed on the original alignment. Local services will be protected, the height of the embankment of the original road will be increased to match the diverted section of road, and matching sub-road structures installed for the continuation of the conveyors and pipelines under the existing road. Finally, traffic will return to the original alignment and the widened portion will remain in place ready for eventual upgrade of the entire road.

During the detailed design phase, GPNL will prepare a RUMP in conjunction with DMR which will include measures to manage all relevant road safety aspects of the construction works.

### 14.11.2 Air Quality Management Plan (16)

*CSC/GCC advised that Council's support management and monitoring proposals included in the EMP (as stated in Section 14.10.2 for construction and 14.11.2 for operation) and will require these elements to form conditions of approval for the proposal.*

Comments noted.

### 14.11.7 Water Discharge Management Plan (1)

*EPA advised that the water discharge management plan should state that any exceedence of the water quality limits will be reported to the EPA as soon as practicable whether or not there are any apparent detrimental effects.*

The water discharge management plan will be modified to include a requirement that any exceedence of the water quality limits will be reported to the EPA as soon as practicable whether or not there are any apparent detrimental effects.

*EPA advised that the water discharge management plan should state what corrective actions will be taken in response to any exceedence of the water quality limits, (e.g. temperature exceedence, metal exceedence, suspended solids or other variations).*

As stated in Section 14.11.7 of the EIS, in the event of a non-compliance the following corrective actions will be implemented as appropriate:

- Notify relevant environmental authorities.
- Investigate the cause of the non-compliance.
- Review work practices.
- Review operating practices and procedures.
- Undertake maintenance of water treatment devices, if appropriate.
- Implement additional water quality control measures to minimise discharge of non-compliant water into Port Curtis.

*EPA advised that the project needs to further develop the strategy involving the possibility of mixing nickel refinery residues with bauxite refinery residues. Preliminary scoping of the following components should be provided including:*

- *geochemistry of the combined residues;*
- *how the strategy would deal with much higher volume of nickel related residues compared to the volume of bauxite residues; and*
- *infrastructure required to transport, mix and store the combined residues.*

GPNL is working with bauxite refiners to explore opportunities for co-disposal. This work is ongoing and will include consideration of the above points raised by the EPA.

### 14.11.13 Traffic Management Plan (11)

*DMR advised that details of the operation of the materials conveyor/s and seawater pipes from Wiggins Island Wharf to the refinery site do not appear to be included in any traffic management plan. The proponent should include within the draft RMP for the Refinery and RSF operation, provisions for the managing any road/safety impacts of operation of the materials conveyor/s and seawater pipes from Wiggins Island Wharf to the refinery site.*

The operational control of the Wiggins Island Wharf and associated facilities rests with CQPA and accordingly will be dealt with in the CQPA approval processes. GPNL involvement in the operation or maintenance of facilities will be subject to CQPA site standards in this regard. As the conveyors and pipeline will pass underneath Hanson Road, it is not envisaged that their operations will have any significant effect on Hanson Road traffic.

### Appendix A - Terms of Reference (1, 16)

***(1)*** *EPA respondent has advised that the EIS should contain an accurate copy of the terms of reference as issued by the Coordinator-General March 2006 to fulfil requirements of ToR section 6.1.*

*The EIS should provide a separate table to reconcile ToR section numbers and EIS sections to fulfil requirements of ToR section 6.6.*

The EIS contains a complete copy of the terms of reference which was also annotated to reconcile it with the relevant section numbers of the EIS. This fulfils the requirement of the terms of reference.

***(16)*** *CSC/GCC indicated that the following outlines the sections of the ToR that have not been properly addressed in the SIA: » ToR s4 – it is strongly advised in the ToR to consult with Advisory Agencies (AA) and other appropriate stakeholders throughout the EIS process. The proponent is furthermore advised to consult with AA to identify legislation, policies and methodologies relevant to the EIS process and to determine the appropriate parts of the community that should be involved during the EIS preparation stage. This was not done. » ToR s3.10 - we propose that more recent data be used to accurately depict the housing market in Gladstone and region. No accurate impacts and mitigation measures can be developed if the data is not a true reflection of the current reality. » ToR s3.10.2 – we propose that the impacts of both the construction and operational workforce and associated contractors on housing demand will be reflected in a thoroughly researched Housing Model for the workers camp and then also addressing support services and community cohesion.*

A comprehensive consultation program was undertaken with advisory agencies and the general community throughout the preparation of the EIS. The results of this program are given in Section 12 of the EIS with further details provided in Appendix S. This consultation included discussions about legislation, policies and methodologies relevant to the EIS process. A number of issues were raised and have been dealt with as part of the development process.

At the time of preparation of the EIS updated census data were not available. However they are now available and have been provided in the relevant sections of this EIS Supplement.

The housing impacts for both the construction and operational workforce were assessed in the EIS. Further information is given in this EIS Supplement. It is noted that the response from the Department of Housing to the EIS included the following comment "*The department is impressed by the comprehensive evaluation of housing issues undertaken by URS Australia Pty Ltd and, in particular, the potential impacts on the Gladstone City and Calliope Local Government Areas*."

### Appendix B - Traffic Impact Assessment (11)

*DMR advised that the proponent should amend the " Pipeline Heavy Vehicle Impacts Scoping" tables for 2008 and 2009 by combining them into one construction year (in instances where the construction generated traffic is impacting for less than 12 months).The construction generated ESAs should be compared with corresponding background ESAs for one year to determine if the road impacts are significant. The assessment should re-calculate road impacts and any contributions required, based on the total construction impacts to defray the costs of damage caused by the construction generated traffic.*

A revised traffic impact assessment has been undertaken and is included in Appendix F. It should be noted that the pipeline construction traffic will now be half of that reported in the EIS because the saltwater pipeline between Gladstone and Marlborough will no longer be built.

### Appendix H - Marine Environments (1)

*EPA advised that the peer review of the studies into manganese oxidation (by Professors Barry Chiswell and Michael Moore) should be included in this Appendix for completeness.*

The studies comprise a review rather than new information. On this basis they have not been included in the EIS. Following the review, additional work was undertaken by CSIRO and reported. During the preparation of the EIS Supplement CSIRO undertook yet more work and this has been reported in Appendix I.

### Appendix I - Marine Modelling (14)

*QH expressed concerns that the discharge of liquid wastes into the marine environment may result in the contamination of seafood caught in the Gladstone area.*

Where relevant, the water quality objectives adopted have been based on ANZECC criteria for the protection of marine species. The 95$^{th}$ percentile was adopted for metals that do not bioaccumulate and

the 99th percentile was adopted for those that do bioaccumulate. For the case of cadmium, while ANZECC recommend 0.7 µg/L for 99% protection of species, it also recommends that in an area where shellfish are likely to be used for human consumption then a value of 0.2 µg/L should be used. Due to the consumption of shellfish in the Gladstone area an objective of 0.2 µg/L has been adopted for cadmium. The use of ANZECC guidelines is accepted practice by the Queensland regulatory agencies and they have been assumed to address issues of seafood contamination.

*QH would like clarification on the following aspects of the modelling: 1. The name of the tracer and its specific gravity. 2. The limitations of the tracer in determining the dispersion of various chemicals including heavy metals.*

The selected tracer (which is the same used for all subsequent simulations reported here) is simply a numerical tracer that acts as a tag to the released inflow water. It is not a real-world substance, and as such has no name or specific gravity: it is purely a numerical tool that allows the advection and dispersion of all pollutants (equally, including heavy metals) to be concurrently assessed. A numerical decay rate is also applied to this tracer in separate simulations, and this accounts for the decay of manganese.

*QH notes that the EIS states that Near Field Model are correct to ± 50% and all results should be interpreted accordingly. However, the EIS does not appear to take this limitation into consideration in the discussion on (s 9), Environmental Effects of refinery.*

The exact numbers predicted by the near-field model are subject to the uncertainty and errors associated with CORMIX (at least +/- 50%) and RMA modelling, but they do indicate that generally good initial mixing can be expected if the outfall is designed and installed as simulated.

To assess the significance of the error margin a sensitivity test has been undertaken for the predicted near-field concentrations at 1000 m downstream for Stage 1. The predicted concentrations (see Appendix E), were increased by 50% to allow for the uncertainty in CORMIX simulations. This would represent a worst-case scenario for the CORMIX predictions, as related to WQOs. The results are shown in the following table.

**Adjusted Near Field Concentrations (µg/L) (1000m Downstream of Diffuser) – Stage 1**

| Constituent | Discharge Concentration | Adjusted (x1.5) Concentration at 1000m | Residual Far Field Concentration | Total Adjusted Maximum Near Field Concentration | Water Quality Objective[1] |
|---|---|---|---|---|---|
| Nickel | 5000 | 1.86 | 1.80 | 3.66 | 7 |
| Cobalt | 700 | 0.255 | 0.58 | 0.835 | 1 |
| Iron | 3000 | 1.11 | 90.78 | 91.89 | [2] |
| Magnesium | 17900000 | 6663 | 1294654 | 1301317 | NA |
| Aluminium | 2000 | 0.75 | 73.52 | 74.27 | [3] |
| Manganese | 100000 | 37.5 | 28.6 | 66.1 | 340/140 |
| Zinc | 40 | 0.015 | 0.51 | 0.525 | 15 |
| Cadmium | 50 | 0.018 | 0.113 | 0.131 | 0.2 |
| Calcium | 670000 | 249 | 411174 | 411423 | NA |
| Chlorine | 12080000 | 4497 | 19403141 | 19407638 | NA |
| Sulfate | 66400000 | 24714 | 2705264 | 2729978 | NA |

[1] See Table 8.3.3
[2] Variation from baseline (Table 8.3.6) – 2.1% increase of ambient mean
[3] Variation from baseline (Table 8.3.6) – 1.6% increase of ambient mean

It can be seen from the above table that even in the worst case situation of all concentrations being 50% greater than predicted, all water quality objectives are still met.

*QH advised that cadmium is one of the pollutants in the discharge liquid. However, the likely concentration of cadmium in the discharge liquid is not mentioned in the EIS and also cadmium is not included in the modelling. We would like to know the reasons for not including cadmium in the modelling.*

Cadmium has now been included in the modelling. See Section 8.3.12.

### Appendix M - Air Quality (1, 14, 21)

***(1)** EPA advised that the EIS includes an assessment of the ground level concentrations at the receptor sites identified in Appendix M, Table 1.19 and within the area that the model shows would be subject to exceedences of air quality goals that would result from locating the refinery in the alternative sites identified in section 5.3.1 of the EIS. Impacts of the preferred location of the refinery on the State Development Area and non-residential areas should be discussed.*

Alternative locations for the refinery were evaluated in the EIS. These alternatives were rejected for reasons other than air quality impacts. Therefore no comparison of air quality impacts as a result of alternative plant locations was included in the EIS. There would be no benefit in modelling the air quality effects of the refinery situated at locations where it would not be constructed.

***(1)** EPA requested that the EIS identify what type of chemical suppressant will be used and use a 50% control factor to re-evaluate the use of water sprays and chemical dust suppressant unless the use of a larger factor can be justified. The EIS should provide details of the number and type of water sprays to be installed and details of type of water (salt, treated or fresh) and estimated consumption.*

Control factors were applied to materials handling emissions to represent the nature of the material being handled. As explained in the EIS, sulphur is delivered to the site as a low dust-generating pastille material, with the pastille size typically between 2 and 4 mm in diameter. During the pastille formation process, the sulphur is coated in a dust suppressant medium to further reduce the possibility of dust generation. The pastille is also robust and resistant to breakage, thus minimising the formation of fine particles during handling.

GPNL has committed to the use of dust suppressant sprays on the sulphur handling facility. This will comprise a combination of water sprays, and the use of proprietary dust suppression chemicals that have demonstrated effectiveness for sulphur handling. Dust suppression sprays will be installed at each conveyor transfer point, and during stockpiling of the sulphur. Portable water sprays will be used in the Front End Loader operating areas to control dust during handling. The binding medium that coats the pastille and use of dust suppression sprays with chemical dust suppression for handling points are effective at controlling dust emissions from sulphur. These control measures are consistent with the use of the control factor of 90% that has been applied to sulphur handling emissions in the EIS.

Controls on the imported ore were adopted as a 90% control factor to represent the handling of wet ore, with added water sprays for dust suppression. The ore is anticipated to be received with a high moisture content of 35% as detailed in the EIS (Appendix M, Section 1.5.2). The high amount of moisture in the ore will significantly reduce the potential for dust generation from materials handling of the imported ore, and has been accounted for in the emission estimation and modelling.

***(1)** EPA advised that the EIS should provide estimates of dust generation and the efficacy of any dust mitigation measures for sulphur stockpiles based on experience with stockpiles of similar material at comparable sites.*

Sulphur is delivered to the site as a low dust-generating pastille material, which is coated in a binding medium to further reduce the possibility of dust generation. The dust control measures that will be used on site are described above. The chemical control medium is used as a dust suppressant at other sulphur handling terminals internationally.

# Section 17 Environmental Management Plan

***(1)** EPA advised that the EIS provide estimates of dust generation and the efficacy of any dust mitigation measures ammonium sulphate handling based on experience with a similar material at comparable sites.*

Dust emissions due to handling of ammonium sulphate (amsul) have been incorporate into the EIS. Due to the soluble nature of the material, water sprays are not used for dust suppression with this product. Instead, engineering controls have been designed into the amsul handling system. These include the use of an enclosed storage building for loading amsul onto trucks; the use of enclosed storage buildings with dust control for storage at Barney Point; covered conveyors for the transport of amsul from the shed to the ship; and the use of telescopic chutes to load the amsul into the ship. These dust mitigation measures have been shown by the dispersion modelling results to provide effective control of dust emissions from the site.

***(1)** EPA advised that the EIS should identify where any crushing or milling of local or imported ore is likely to be undertaken. If it is likely that such activities will be undertaken on the refinery site, this should be included in the estimation of dust emissions.*

All ore to be used at the refinery will be crushed at the mine site. Hence crushing will not be a source of dust at the refinery.

Some milling of local and imported ore will be undertaken on site adjacent to the sulphur stockpile, between the sulphur stockpile and the process plant. Milling occurs as a wet process and hence dust generation will be insignificant.

***(1)** EPA advised that the EIS should include details of the calculations and assumptions that have been made to estimate dust deposition rates.*

The emissions estimation for dust from the project was made using the methodology outlined in Appendix M of the EIS. Different dispersion model options were used to calculate either dust concentration or dust deposition impacts using the dust emission rates that are presented in Section 1.5.2, Appendix M. Model parameters are calculated within the model to determine the amount of dust deposited, using the model option to predict dry deposition of particulate matter.

***(1)** EPA advised that the EIS should detail how the calculations were made to estimate dust emissions from the RSF.*

Dust emission rates for the RSF (Table 1.14) were estimated from the exposed dry area of the RSF (360 ha) and the default emission rates of 0.4 kg/ha/hr for TSP and 0.2 kg/ha/hr for $PM_{10}$ from the NPI handbook for mining. No emission controls were applied to these estimated emission rates.

No dust controls have been assumed for the RSF surface. In practice, Amphiroll farming techniques will be used which will maintain a wet surface for considerably longer periods and create a contoured surface structure which is less susceptible to wind erosion. In addition subsequent changes to the RSF design with the introduction of small cells will reduce the surface area available to wind erosion.

***(1)** EPA advised that the EIS should include an assessment of the likely maximum particulate emissions over a range of potential climatic events and the impact of such events on ground level particulate concentrations in surrounding areas.*

The NPI emission estimation technique manual for mining recommends that dust emissions from surfaces such as the residue storage facility are estimated using the default emission factors that do not depend on the ambient wind speed. Likewise, in the absence of specific data on the silt content of the ore and sulphur, the handbook recommends using the default emission factors. These factors have been adopted in the air quality assessment for the EIS.

The range of climatic conditions encountered at both the Refinery and RSF sites that affect dispersion of dust from the source have been included in the dispersion modelling using the methodology and meteorological data from GAMS.

# Section 17 Environmental Management Plan

***(1)*** *EPA advised that the EIS should assess the emissions from the full range of possible upset conditions, particularly those situations where pollution control equipment is out of operation. This assessment should also consider other potential pollutants in addition to $SO_2$. Where the design of the GPNL plant does not have sufficient detail to provide the required information, reference should be made to an existing plant with similar characteristics.*

The most likely worst case upset condition might occur when the $H_2S$ scrubber is not operational and vent gas is bypassed to the regenerative thermal oxidiser. The regenerative thermal oxidiser converts all $H_2S$ to $SO_2$ through high-temperature combustion. It is anticipated that this could occur for a period of days depending on the reason for bypassing the scrubber and scheduled maintenance time for repair. Emission rates of $SO_2$ during this upset condition are shown in Appendix M and have been checked against recent data, which show that the assumptions for flow rate and $SO_2$ emissions are conservative.

***(1)*** *EPA advised that the EIS should review the suitability of GAMS for assessing impacts at near-by sites and reassess the predictions using a suitable model where necessary. The EIS should include a discussion of the cumulative impacts of the proposed refinery with existing emission sources.*

EPP (Air) guidelines are not used to evaluate air quality impact at near-by locations where workplace health and safety legislation is applicable. Occupational health and safety impacts have been evaluated only at neighbouring industrial sites for comparison to occupational health and safety guidelines. The distance of these off-site locations from the stack sources is considered to be sufficient such that the model results are valid at these off-site locations. Thus, the use of GAMS at these locations is considered to be an appropriate use of the model.

The predicted impacts on workplace health and safety have been compared to the relevant legislation from the National Occupational Health and Safety Commission. These are less than 0.2% of the guideline value for pollutants evaluated in isolation, indicating that potential impacts due to GPNL are negligible at these locations. Thus on any near-by industrial site, compliance with workplace health and safety legislation will be dominated by potential releases from that industry itself, not emissions from GPN. A comprehensive assessment of cumulative impacts is therefore not required for nearby industrial locations.

***(14)*** *QH indicated that mitigation strategies for adverse events have not been outlined in the Environmental Impact Statement. Such strategies need to be detailed.*

Evaluation of air quality impacts due to upset conditions has been undertaken in the EIS. The case considered was the failure of the $H_2S$ scrubber, and subsequent increase in $SO_2$ emissions from the regenerative thermal oxidiser. The regenerative thermal oxidiser is the mitigation measure to prevent the release of large quantities of $H_2S$ to the environment. The assessment presented in the EIS concluded that the increased $SO_2$ emissions would not adversely affect ambient air quality.

***(14)*** *QH noted that the EPP(Air) standards were developed about 10 years ago and are not consistent with recent health based guidelines set by WHO. As the WHO guidelines are based on recent research regarding air quality and health effects, it is considered that the assessment of air quality impacts of the project should be based on the WHO guidelines.*

*QH notes that the EIS refers to both EPP and WHO guidelines as bench marks for contaminants like cadmium, nickel, mercury and hydrogen sulphide but ignores WHO guidelines for other important contaminants like sulphur dioxide, nitrogen dioxide, particulate matter and ozone.*

*QH indicated that it agrees with the authors' view that WHO has interim targets for $SO_2$ and $PM_{10}$. However, they do not agree with the view of the authors that interim targets be used as references for air quality in the Gladstone region. Interim targets are proposed by WHO as incremental steps in a progressive reduction of air pollution and are intended for use in areas where pollution is high. The interim targets are intended for countries which do not have the resources and technical capabilities to tackle high pollution and are intended only as a short term measure. WHO also states that mortality levels are definitely higher in those communities that attempt to comply only with WHO interim targets. Australia, endowed with its economic wealth and technical means, should comply with WHO guidelines rather than attempt to comply with the interim targets to minimise morbidity and mortality from pollutants in air.*

The EIS has applied the air quality guidelines that are enacted by legislation in Queensland, namely the Environmental Protection (Air) Policy and National Environmental Protection Measure. The use of these guidelines was discussed and agreed in consultation with the EPA prior to commencement of the air quality assessment. EPP (Air) guidelines were applied to the evaluation of impacts from nitrogen dioxide, sulphur dioxide, particulate matter, hydrogen sulphide and cadmium.

Additional guidelines from other jurisdictions have been used in the assessment of impacts for other pollutants, namely sulphuric acid (Victorian SEPP), nickel, cadmium and mercury (World Health Organisation, WHO). These guidelines were adopted as no Queensland guidelines exist for these pollutants. The use of the Victorian and WHO guidelines was intended to give a context to the magnitude of predicted impacts from the proposed plant.

It is not appropriate for this EIS to evaluate the merit of using WHO guidelines for $SO_2$, $NO_2$ and $PM_{10}$ for evaluation of air quality impacts when state-based guidelines are available for use and are part of Queensland legislation. This matter should be addressed at an agency level in discussions between the EPA and QH. Any change in air quality guidelines that are enforceable in Queensland requires consideration not only of the scientific and health-based literature, as QH has illustrated, but is also a decision that is made on regulatory grounds that are suited to each jurisdiction.

The latter issue is supported by the WHO Air Quality Guidelines Global Update 2005 which notes the following:

> *"The WHO air quality guidelines aim to provide a uniform scientific basis for understanding the effects of air pollution on human health. Using these guidelines as a basis, local or national air quality standards can be developed for the management of air quality."*

***(14)** QH indicated that the Gladstone Airshed Modelling System (GAMS) was used to predict background ground-level concentration. The EIS states that the predicted model has shown higher concentrations than actual monitoring data collected by EPA and as such the EIS has disregarded some data from the modelling. They do not agree with the view that data provided by GAMS should not be relied upon for predictions. Very limited information was provided in the EIS about the verification of data from GAMS to conclude that modelling predicted higher levels of contamination. The EIS should have addressed this important aspect of the study as many assumptions in the EIS are based on GAMS and included a statement from EPA about the validity of data provided by GAMS. If the authors believed that the data provided by GAMS is not valid, then they should have explored the possibility of using other models for prediction. QH would like more information on the limitations of GAMS and any specific situations where the predicted levels were rejected or modified and the reasons for these decisions.*

The EIS has discussed the features of GAMS, the industrial sources included in the modelling system, and a comparison of predictions to measured ambient concentrations to demonstrate that the background air quality of the region, as modelled in GAMS, is a reasonable predictor of the actual measured results. It was acknowledged that the model tends to over-predict the ground-level concentrations of pollutants. The bias of any dispersion model towards over-prediction of impacts is preferable to under-prediction, as it ensures that the predicted results are conservative and will further protect human health when the model predictions are compared against ambient air quality monitoring results.

Comprehensive validation of GAMS is outside the scope of this EIS, as the modelling system was commissioned and is maintained by the EPA, and is currently being updated by the Department of

Tourism, Regional Development and Industry. GAMS is provided to industry to assist in evaluating cumulative air quality impacts in the Gladstone airshed. The EPA did not provide a statement on the validity of data provided by GAMS, however unpublished EPA studies, as cited in the EIS, demonstrate that peak concentrations can be over-predicted by the model.

The EIS has not disregarded or rejected data from the modelling contained within GAMS. The pre-generated model results for existing industrial sources, which are contained within GAMS, were used to represent the background contribution to the Gladstone airshed. The only modification to this, as documented in the EIS, was to increase the emissions from the Boyne Smelters Limited by an additional 35% to account for the higher $SO_2$ and $NO_x$ emissions from the proposed expansion which were not captured in the modelled results.

Modelling of the new air quality sources for the EIS used the default GAMS configuration and industrial sources. Alterations to the model setup included the removal of the model option known as the probability density function algorithm for tall, buoyant plumes as it was unsuited to modelling of the short, wake-affected stacks for the project. Modelling of dust concentration and deposition also required a modification of the model setup to allow these parameters to be calculated using the meteorological database from GAMS.

***(14)*** *QH noted that in the EIS, only 1-hour mean data from four different sites in the Gladstone region was discussed. For a better appreciation of the current air quality, annual-mean and 24-hour mean data should have been provided. The maximum l-hour $NO_2$ levels measured at the EPA monitoring locations at Gladstone are less than the WHO guidelines. The predicted background concentrations data indicate that the highest 1-hour mean concentration is expected to be about 111% of the WHO guideline at Clinton. Is there any intention to revise GAMS to improve its predictive ability?*

The EIS shows predicted cumulative 1-hour and annual average results for $NO_2$ (Table 8.7.10) for comparison with human health-based guidelines. Table 8.7.14 of the EIS contains the predicted cumulative 4-hour and annual concentrations of $NO_2$, which are compared with the EPP (Air) guidelines for biological integrity. Predicted concentrations of $NO_2$ due to background industrial sources only are provided in Appendix M Table 1.7 for 1 hour, 4 hour and annual average concentrations.

It is understood that the Department of Tourism, Regional Development and Industry is currently undertaking a revision of GAMS with an updated industrial emissions database. The updated version of GAMS has not yet been released.

***(14)*** *QH asked for clarification about the statements made in the second paragraph of section 1.9.6. 'The refinery project will not contribute .....Gladstone region' We would like to know why the highest predicted incremental increase of $NO_2$ for a 1- hour average is compared with EPP guideline values. It is incorrect to compare incremental increases with EPP guidelines values. The data presented in the EIS indicates that $NO_2$ and NO concentrations are higher than WHO guidelines. We are of the opinion that any new industrial activity will deteriorate the air quality in the region.*

Table 1.19 of Appendix M of the EIS contains a footnote that explains that the incremental concentrations of $SO_2$ and $NO_2$ from the refinery in isolation cannot be compared to guidelines. The guideline values have been included to provide a context of the magnitude of impacts for the data presented in the table. The comment in Section 1.9.6 that compared the incremental concentrations of $NO_2$ to the air quality guideline was intended to demonstrate that predicted cumulative impacts, as noted in Section 1.9.1 of the Appendix, were predominantly due to other industrial sources as the impacts due to the refinery in isolation are low.

***(14)*** *QH noted that studies conducted overseas indicate that an increase in mortality of around 0.5% for each 10ug increment in the daily concentration (WHO). Therefore a $PM_{10}$ concentration of 98 ug/m³ (table 1.21, EPA monitoring sites) could be associated with approximately a 2.5% increase in mortality which is not acceptable in a developed country like Australia. The review of data indicates that the concentrations of the particulate matter in Gladstone region is significantly higher than the international guidelines and the risks of mortality and morbidity are much higher if no mitigation measures are put in place. Any new industrial activity may have a significant negative impact on the health of the communities.*

The issue of the applicability of the WHO guidelines in Queensland has been discussed above. The EIS used Queensland guidelines to evaluate all impacts, as agreed with the EPA prior to the assessment.

***(14)*** *QH noted that there is no WHO guideline value for the one hour mean concentration of $SO_2$. In the absence of WHO guideline values for 1 -hour mean, a guideline value of 350 ug/m³ has been used as a bench mark as it is used by New Zealand and other developed countries. The concentrations of $SO_2$ in many areas are significantly higher than international standards. The incremental increases (table 1.9) based on modelled ground level concentrations of $SO_2$ due to the refinery (stage 2) in isolation indicate significant increments. The significance of these increases is not discussed in the EIS. We would like more information on the significance of the above data.*

The issue of the applicability of the WHO guidelines in Queensland has been discussed above. The EIS used Queensland guidelines to evaluate all impacts, as agreed with the EPA prior to the assessment.

The incremental concentrations of $SO_2$ have been documented in the EIS to demonstrate the contribution of the project to the overall ambient air quality within the region. The incremental $SO_2$ concentrations are well below the relevant EPP (Air) guidelines. Additional data presented in the EIS confirms that the cumulative impacts, due to the GNP and other industrial sources in Gladstone, are likewise below the EPP (Air) concentrations.

***(14)*** *QH noted that ozone, an important pollutant, is not discussed in any detail in the EIS. As $NO_2$ is an important pollutant of the refinery, they requested more data on the predicted 1-hour mean and 8-hour mean to make any further comments*.

Ozone is formed in the atmosphere as a result of complex photochemical interactions between $NO_x$ (primarily $NO_2$ and NO), sunlight, volatile organic compounds and existing levels of ozone. Ozone is not directly emitted from industrial facilities but rather is a secondary pollutant that can be formed in industrial areas and cities.

As discussed in Section 1.9.6 of Appendix M of the EIS, photochemical smog is not considered to be a problem for the Gladstone region based on the monitoring results for $NO_2$ and $O_3$. The refinery will emit very low amounts of nitrogen oxides, as shown by both the refinery's emissions rates and the predicted ground-level concentrations of $NO_2$.

Dispersion modelling of pollutant emissions from the refinery addressed the dispersion of $NO_x$ without explicit consideration of the photochemical reactions that involve $NO_x$. Instead, a simple scaling method is used in GAMS to evaluate $NO_2$ concentrations as a function of $NO_x$ concentrations.

Similar evaluation of the ground-level concentrations of ozone using non-reactive pollutant dispersion are not possible since ozone is a secondary pollutant, and is not emitted from the refinery. Ozone concentrations can only be modelled with detailed photochemistry models, which would require comprehensive databases of the emissions of $NO_x$ and volatile organic compounds from industry, residential, vehicle and biogenic sources. Recent enquiries to the EPA found that there currently is no sufficiently detailed airshed emissions inventory to provide all the required data for this level of in-depth study.

***(14)*** *QH sought clarification about the statements made in 1.9.1 Air Quality Impact from Project page 34 last paragraph "To assist in the assessment… EPA monitoring data". The statement appears to be in contradiction to other statements made in s 1.9.1 which states that the 10 minute, 1 hour, 24-hour $SO_2$ and 1 -hour $NO_2$ concentrations are predicted to exceed the EPP (Air) guidelines in some non-residential locations due to current industrial sources.*

The paragraph quoted above from Appendix M of the EIS referred to ground-level concentrations of pollutants from the refinery in isolation. The EIS acknowledged that these concentrations cannot be meaningfully compared to EPP (Air) guidelines, as the cumulative impact from all sources must be evaluated.

This does not contradict the other statements referred to as they relate to concentrations of the combined refinery plus existing industrial sources. Appendix M notes that some regions of high predicted concentration of $SO_2$ and $NO_x$ are shown in the contour plots. These are non-residential areas, and the higher impacts are due to other industrial sources in the region. The results presented in Tables 1.17 and 1.18 of the EIS are for impacts at known residential locations.

**(21)** *A respondent has raised concerns that not enough open space and protecting trees, provision of sufficient green spaces or regional tracts of open space acting as carbon sinks to absorb and offset the concentrations of pollutants including those from the proposed in the Gladstone State Development Area as a matter addressed in the State's CQ2010 project.*

Refer to comments in Section 8.7.

### Appendix N - Noise Impact Assessment Table 4.3 (1)

*EPA advised that Table 4.3 shows monitoring periods not consistent with the requirements of AS1055 – 1997 which recommends a minimum of 10 minutes to a maximum of one hour for assessing background noise. In one case (at L4) the monitoring period is as short as 91 seconds. Also, the monitoring period should be at the time when noise levels are expected to be at their lowest. Further attended monitoring should be undertaken at these (Table 4.3) sites in accordance with AS1055 – 1997.*

The results in Table 4.3 of the EIS were not directly used for determining background noise and hence the measurement does not have to be 10 minutes. Shorter measurement periods are used in instances where the field engineer decides that the sample period is sufficient for understanding the noise source of interest. For example, a train passby measurement would not need to occur for 10 minutes.

### Appendix O - Residue Characterisation (14)

*QH noted that Table 1.3.3 in Appendix O of the EIS indicates that the detection limits for cadmium and mercury in the residue liquor are 0.05 mg/L and 0.005 mg/L respectively. These are higher than the ANZECC/NEPC guideline values for cadmium and mercury of 0.01 mg/L and 0.002 mg/L respectively and so it is not possible to determine if the cadmium and mercury concentrations are less than the guideline values.*

Refer to comment in Section 8.3.12.

### Appendix Q - Housing Impacts Study (6, 16)

**(6)** *DSD advised that it encourages further consideration into the construction of a permanent village providing short-term accommodation for industry and construction employees.*

Refer comment in Section 10.7.2.2.

**(16)** *CSC/GCC have stated that the EIS does not reflect how the housing shortfall will be overcome….The strategies should reflect timelines and specific outcomes.*

# Section 17 Environmental Management Plan

Refer comment in Section10.7.2.

GLADSTONE NICKEL PROJECT ENVIRONMENTAL IMPACT STATEMENT SUPPLEMENT

# References 18

URS

Gladstone Pacific Nickel LTD

# Section 18 References

**References**

Cogger, H.G (2000). *Reptiles and Amphibians of Australia.* Reed Books Australia.

Connell Hatch, 2006, *Wiggins Island Coal Terminal EIS Volume 1 & 2*, prepared for Central Queensland Ports Authority, Connell Hatch, Brisbane.

Department of Primary Industries and Fisheries (2007). Exotic Plant Pests – Giant African Snail. [http://www2.dpi.qld.gov.au/health/5613.html]

Florence, T, M., Stauber, J, L., & Ahsanullah, M. 1994. *Toxicity of Nickel Ores to Marine Organism - The Science of the Total Environment*, vol. 148, pages 139-155.

Lassing Dibben Consulting Engineers Ltd, Draft Technical Report on Proposed Ship Lightering Arrangement, Halifax Bay Project, March, 1991.

Kunst, Noleen (2007). Personal Communication, Principal Conservation Officer, Queensland Environmental Protection Agency.

McFarland, David (2007). Personal Communication, Biodiversity Unit, Queensland Environmental Protection Agency.

Queensland Environmental Protection Agency (2007) Essential Habitat mapping database, [http://www.epa.qld.gov.au/nature_conservation/biodiversity/regional_ecosystems/introduction_and_status/Regional_Ecosystem_Maps/]

Robinson, M (1993). *A Field Guide to Frogs of Australia*. Reed New Holland, Sydney

URS (2007a). *Preliminary Design for a Residue Storage Facility (RSF)* for Gladstone Pacific Nickel Ltd, 16 December 2007. Unpublished report

URS (2007b) *Rio Tinto Aluminium – Yarwun Water Monitoring Services Annual Report 2006*. Unpublished report prepared for Rio Tinto Aluminium Yarwun.