Plans for operational works including ancillary works and encroachments (AWE) where required will be developed with the transportation contractor and with the DMR prior to the development of any ancillary works or encroachments on the State-controlled road network required to enable construction and operation of the AN Plant and Construction Camp.

Main Roads advice about local government road conditions.

MR 4: - Construction Camp Access

1a. The construction camp access road has been designed to meet the specifications as recommended in the DMR correspondence for the access onto Goonyella Road.

1b. The DMR has recommended that within two months of commissioning the temporary access works from the road reserve be removed and the vegetation cover re-established. The construction camp for the project will be used for a period of 6 months following the commissioning of the AN Plant on the 1st of January 2009. From the 30th of August 2008 people involved in the commission of the plant will be the only people present at the construction camp and will be approximately 50 personnel. The construction camp will then be decommissioned on the 30th of July 2009 and vegetation will be re-established.

MR 5: - Ammonium Nitrate Plant Access

2a. Construction Access

The construction of the access road for the AN Plant has been undertaken in accordance with the recommendations as specified in the DMR correspondence dated 13 November 2006. A design drawing of the AN Plant access is provided in Appendix C. Detailed design information is being provided to Belyando Shire Council for their assessment.

MR 6: - Moranbah access road intersection with Mills Road

The DMR has recommended some significant changes to the intersection between Mills Road and the Goonyella Access Road. As provided above in Section 7.1 MR 1, DN as a new operation to the area is prepared to contribute to the upgrade of the intersection as part of the broader community encompassing the other operations, which utilise this intersection.

7.2 The Department Of Transport

DoT 1: - The construction process of the plant will involve a component of prefabrication and modularisation. Some items will require oversize transport, comprising an estimated 15 to 20 vehicles, during construction. Specific routes, times and escorts will be arranged with the appropriate agencies Consultation with appropriate agencies in relation to these oversize transport movements should include consultation with Queensland Transport and Main Roads.Consultation has been and will continue to be undertaken with the DMR and the Department of Transport (DoT) for traffic management during construction and operation and in regards to potential impacts on road infrastructure.

Consultation will be undertaken with the relevant state agencies on appointment of the transport contractor for the project in relation to traffic management for oversized loads.

DoT 2: - The last paragraph on Page 50 is poorly worded and confusing. The sentence, "A separate access track from Goonyella Road will be constructed to reduce traffic demand on the external transport network", seems to be misleading. The separate direct driveway access to the construction camp (by itself) would mainly reduce internal traffic pressure and congestion at the main project site entrance A better description may be as follows:

A separate and direct access track will be constructed between the construction camp and the AN plant, which will reduce traffic demand on the external road network.

As provided in the response from the Department of Transport a separate internal access road has been incorporated within the design for the project (refer Appendix B drawing no 600001-272-3y71-0003).

DoT 4: - 3.5.1 Transport Infrastructure Construction Phase (Page 63) Buses will be used to transport construction staff to and from the construction site, with an average vehicle occupancy of 15 persons per vehicle originating from the campsite. This will be by the proposed internal access road between the construction camp and the AN plant, without need to access Goonyella Road. This will generally improve road safety and minimise demand on the external road network, namely Goonyella Road. This is appropriate.

Comments have been noted.

DoT 5: - 3.5.1 Transport Infrastructure Method of Movement (Page 65) In the operations phase, the finished AN product is to be delivered by the road network to a variety of regional mine sites. The average number of heavy vehicle movements generated per day during operations is likely to be eighteen. This to include: 13 B-Triples (65t load) and 4 B-Doubles (50t load) to deliver AN product, and 1 B-Double to remove waste. During construction, it is estimated that 2 B-Doubles per day would deliver construction materials and plant to the site, while 3 B-Doubles would remove waste. These estimates are consistent with other information provided on the construction and operational phase transport requirements.

Comments have been noted.

DoT 6: - Proposed Routes (Page 65) The proposed roads to be used for transporting material from the plant to destination mines are to be limited to those that are designed to carry B-Triples and B-Doubles. The proposed routes have been discussed with Main Roads and are shown on Main Road Maps as per Figures 3-6 Pages 32-35 of the EIS. This is appropriate.

Comments have been noted.

DoT 7: - Maintenance and Upgrading of Key Transport Infrastructure Elements (Page 66) Traffic studies have been conducted to assess the construction and operational impacts on the existing transport infrastructure (per Section 4.11). A Pavement Impact Study has also been undertaken to determine the impact on the existing road infrastructure and provision of contributions for maintenance to DMR and local authorities. This is appropriate.

Comments have been noted.

DoT 8: - Rail Transportation (Page 66) The EIS states: "Rail infrastructure is located within 3km of the AN Plant on the Blair Athol Railway Line. In its current form however there are insufficient facilities to support transportation of AN product to the market. This may be a future opportunity for the AN Plant. At this stage however there is no intention to transport product by rail." The nearby rail network and rail services principally comprise a dedicated coal rail system. The end users of the AN product are multiple mining operations located relatively nearby in the Northern Bowen Basin and the North West Mineral Province. The movement of AN product in relatively small consignments, by rail would not be particularly cost effective or efficient. The use of road transport is understandable and appropriate.

Comments have been noted.

DoT 10: - 4.11.2 Potential Impacts and Mitigation Measures Pavement (Page 173) A Pavement Impact Study has been prepared a part of the supporting documentation for the Traffic Impact Assessment Report. The assessment showed that the AN Plant will generate significant heavy vehicle traffic increases (> 5% increase in existing heavy vehicle volumes per year) on a number of roads. The broad proposal that the project make financial contribution to MR Districts and local government shires for road maintenance is appropriate.

Comments have been noted.

DoT 11: - Traffic Assessment (Page 175) For the development of the AN Plant site and the construction campsite, two intersections will need to be developed. The EIS proposes a range of type-intersection forms. Consultation should be undertaken with DMR on the proposed intersection designs to determine their appropriateness and adequacy.

Consultation has been undertaken and will continue to be undertaken with the DMR in relation to the intersection designs for the project. (refer Section 7.1, 1 to 5 of this report).

DoT 13: - 5.8 Transport/Traffic Management Plan Control measures for implementation during the construction phase include, the preparation of a Traffic Management Plan, measures to assist the safe movement of heavy/over-dimensioned loads to the project site, measures to acquire all appropriate permits from transport and related authorities, and measures to ensure the safe and secure transport of hazardous and dangerous goods. These measures are appropriate.

Comments provided have been noted.

DoT 14: - 5.15.2 Draft Operations Environmental Management Plan Air and Noise (Page 253) Mitigation strategies in relation to greenhouse gas emissions include:

- ***Public reporting of greenhouse emissions and progress on greenhouse mitigation measures.***
- ***Obtain and maintain membership of the Commonwealth Government Greenhouse Challenge Program.***

These measures are appropriate.

Comments provided have been noted.

Dot 15: - Appendix 7.6 Pavement Impact Assessment In developing the EIS the proponents have prepared a Pavement Impact Assessment Report in accordance with the DMR publication "Guidelines for Assessment of Road Impacts of Development Proposals". Advice on the adequacy of this assessment and the proposed quanta of financial contributions to DMR and local authorities for road maintenance, should be sought from Main Roads and the relevant local authorities.

Dyno Nobel will work with the Department of Main Roads regarding the Pavement Impact assessment as part of the EIS (refer to Section 7.2, MR2 of this report).

7.3 Belyando Shire Council

BSC3, Transport: - The EIS does not provide any clear indication on the location of the product transport vehicles when not in use. The location of a transport depot wherever it may be needs to be fully detailed and assessed as part of the project. The amount of product to be moved from the site clearly involves significant amounts of transport movements and the location of these vehicles is fundamental to a rigorous assessment of the proposal. A failure to detail the location will lead to ad hoc management of the impacts after the event. This is a totally unacceptable outcome for the community. The impacts of transport movements beyond the site have not been clearly described and the EIS needs to be rigorous in this area to avoid cumulative impacts with other expansion programs in the region. The EIS clearly needs more detail and should be amended prior to further consideration by Council and the community.

A transportation company is yet to be appointed for the proposed facility. Transporters will be appointed by mining operations in the area (eg BMA and Anglo Coal). This will determine the transportation

company for the AN Plant. The transporter may have in operation existing infrastructure or may need to develop additional facilities. Dyno Nobel will assist in identifying a transport depot and in the management of vehicle movements from the AN Plant, until appointed DN cannot implement measures for the management of transportation infrastructure.

8. Additional Information Relating to Nature Conservation

Flora and Fauna

8.1.1 The Environmental Protection Agency

EP 1: - Include list of proponent commitments (app 7.15) needs to include the flora and fauna components from the specialist study.

Dyno Nobel will ensure that the recommendations from the fauna and flora report are implemented for the project as provided in appendix 7.15 of the EIS.

8.1.2 Belyando Shire Council

BSC 17: - The EIS contains no information on the ecological disturbance anticipated from the extensive lighting of the site during construction or operations. The effects of the lighting in the locality will dramatically affect local insect populations and act as an attractant for a vast area. This will redistribute the ecological balance of the locality. A clear assessment of this impact needs to be undertaken to ensure the proposed operations will not impact the resident insect, bat, bird or reptile populations and the influx of insects from lighting will not adversely affect the operations of the plant through either direct influences or altering the food chain causing higher order species populations to increase in response to food sources and inhabiting the plant confines.

The flora and fauna assessment at the site identified few nocturnal mammals except for the bat species, the Short Beaked Echidna and the Delicate Mouse. The insect species in the area and the potential impact from lighting this was not assessed as part of the EIS.

The area itself has a range of other significant light sources including those from the town of Moranbah and the surrounding mining operations. It should also be noted that the Enertrade compressor station is located 1.5 km from the site. The identification of habitat for roosting sites for bats within the EIS is representative of the surrounding remnant ecosystem types in the area of which there are significant areas of equivalent vegetation.

The lighting impacts will primarily affect the nocturnal fauna at the site. The fauna in the area will already be disturbed from the construction operations undertaken at the site. However, as the site has a significant vegetated buffer, where fauna are impacted by the lighting from the facility there is adequate cover and vegetation for the fauna to move away from the site if required.

Although the lighting of the AN Plant may result in a change in the immediate communities surrounding the facility it should be noted that grazing has extensively impacted the area. Lighting of facilities is a standard practice to provide for working outside of daylight hours, workplace health and safety and security. A detailed assessment of the potential impacts from lighting on the surrounding fauna communities is an aspect that has not been applied to the approval of other similar projects and was not a requirement for the ToR for this EIS.

In relation to the impacts from increased insect activity, it is not anticipated that the insect population will impact on the operation of the AN Plant, as equivalently lit facilities have not required any changes in relation to their operations.

BSC 18: - The EIS identifies the reptile Major Skink (Egernia frerei) as being present on the site during the assessment. The normal range of this species is considered to be more costal and linked to areas of higher rainfall in well watered forest country or seasonally dry woodlands where strong ground vegetation is present. It would appear that the identification of this species is an error.

Wilson & Knowles (2005), states the range of the Major Skink (*Egernia frerei*) as encompassing the Moranbah area and inhabiting open woodland habitats / rabbit burrows / low vegetation. These habitat features were present at the site of observation within the study site. The animal in question did not possess the large plate-like ear lobules of the Yakka Skink (*Egernia rugosa*) and no evidence of communal defecation sites characteristic of the Yakka Skink were present. The only other large Egernia that occurs in the study area is the Tree Skink (*Egernia striolata*), which is generally found inhabiting tree crevices and rock crevices (and is also a significantly smaller species), which did not fit the microhabitat of the specimen in question.

BSC 19: - The EIS also identifies the bird Rufus Fantail (Rhipidura rufifrons) as being observed on the site. The normal range of this species is more closely linked to dense foliage areas of rainforest gullies in coastal regions. It would appear that the identification of this species is in error.

The Rufous Fantail (*Rhipidura rufifrons*), though generally inhabiting moister, coastal regions, is known to migrate at various times of the year. During this period, the species has been observed within farmland, streets, buildings (Pizzey & Knight 2003) i.e. habitats not normally occupied during the remainder of the year. The specimen in question was observed by two ecologists in the open grazed area to the west of the study site and may have been passing through the area during a migratory dispersal event. The Grey Fantail and Rufous Fantail differ distinctly in morphology and it is highly unlikely that confusion has occurred between the species - the former was also observed within the study area.

BSC 20: - The EIS identifies the mammal Greater Broad Nosed Bat (Scoteanax Ruepellii) as being present on the site during the assessment. The normal range of this species is limited to the cool temperate to tropical wet sclerophyll forests and rain forests of northern NSW and Southern QLD. It would appear that the identification of this species is in error.

This species was identified as a probable by the sub-consultant who analysed the Anabat recordings. He stated in his report (included as Appendix C in the Fauna Report) that the call may be analogous with *Chalinolobus gouldii*. However, as the true distribution of bat species is still somewhat of an unknown quantity due to the previous difficulty of positively identifying them, current distribution records are unreliable.

8.1.3 Department of Natural Resources and Water

NRW4: - An application for the clearing of native vegetation was accepted as an ongoing purpose as per section 22A of the Vegetation Management Act 1999 (VMA), on the 16th October 2006. The Development Approval/Refusal will not be issued until after the following has been finalised:

- ***The EIS has been approved by the Coordinator General;***
- ***The deed has been issued by NRW to secure the tenure of the lots.***

If a Development Permit is issued as a result of this application, conditions may be set to ensure the purposes of the VMA are met. A Development Permit will not be required, as per Schedule 8 of the Integrated Planning Act 1997 (IPA), for the clearing of native vegetation in the mapped non-remnant areas on the EPA Version 5.0 Regional Ecosystem map once the freehold tenure has been finalised.

If a Development Permit is issued, any clearing of native vegetation outside of the Development Permit area will require an application to NRW, if not exempt under Schedule 8 of IPA.

Dyno Nobel currently have an application with the Department of Natural Resources and Water (NRW) in relation to the clearing of not of concern regional ecosystem in the northern highlands of the Bowen Basin. This application addresses the criteria specified by NRW and is a concurrent approval process to that covered under the EIS process. The CoG has also advised NRW that all issues that could impact on vegetation matters have been considered and resolved.

8.1.4 Resident Submission

R9: - Compliance and monitoring is only specified in the project for auditing at one month and then six monthly this is inadequate to enforce fauna spotting and other compliance activities.

Dyno Nobel will undertake internal auditing of environmental controls on site on a monthly basis for the first 6 months. Cultural heritage monitors will be on site during all of the initial earthworks and initial clearing of the site. All clearing undertaken is to be clearly delineated. A fauna spotter will be on site during the initial clearing of the AN Plants footprint. Other measures as provided in the Environmental Management Plan (section 5 of the EIS) will be implemented to minimise environmental impact from the construction activities on site.

9. Additional Information Relating to Waste and Waste Water

9.1 Belyando Shire Council

BSC 10, Waste Volumes 1: -There is confusion in the EIS as to the exact volume of solid waste to be produced during construction and operation of the facility. The EIS needs to clearly define the amount of wastes to be produced to allow the local facilities to prepare to accept additional wastes for disposal. The defining of long term waste disposal volumes is critical in allowing Council to sustainably manage the provision of waste disposal capacity for the community and industry in Moranbah.

Construction waste

The construction waste volumes generated are provided in section 4.5.2 of the EIS and equate to approximately three, 10^3m bins per week. The EIS identifies the waste generated being removed on a weekly basis. Taking this volume into account for the whole of the construction period (which is conservative) the waste generated during the construction period (22 months) is 2,640 m^3.

An additional volume of 2141.99 ^{3}m of sewage sludge will be generated over the 22 month construction period for the construction camp (with drying beds this is reduced to approximately 21.4 m^3 or approximately 21.408 tonnes).

Table 2 Waste Sludge Production Rates

Parameter	Units	Temporary	Permanent
Waste Sludge Production, (WAS) dry basis	kg/d	32	1.7
Waste Sludge Production, (WAS) wet basis	L/d	3197	169

The total waste generated during the construction period of 22 months equates to 2640m^3 and 21.4m^3 (or 2141.99m^3 of wet sludge).

Operational Waste

Volumes of waste generated during the operation of the AN Plant are provided in Table 33 of the EIS in relation to manufacturing wastes (which is reproduced below).

Table 3 Waste Type Estimated Quantity per annum

Waste Oil	19,200 L
Empty Drums	648 X 205 L
	225 X 20/40 L
Rags and adsorbents	36 x 240 L wheelie bins

- 19,200 litres of waste oil, which will be disposed of through a regulated, waste contractor and the empty drums as provided in Table 1.
- 1,655 kg/ month of maintenance waste generated per month (19.86 tonnes per year)
- 10 m^3 of waste sludge domestic AN Plant sewage sludge per year (from the AN Plant).

This equates to an operational waste generation for the life of the plant (35 years) of 695 tonnes and 350m^3 of sewage sludge (in addition to the empty drums detailed in Table 1). It should be noted that the sludge quantities generated are substantially lower during the operation phase of the project as the construction camp will no longer be in operation.

BSC 11, Waste volumes 2: - In addition the EIS does not identify the requirement of de-sludging the evaporation pond and the production of intractable waste from the process. If disposal is required longer term the provision and identification of suitable sites will need to be clearly spelt out and quantified in the EIS.

Ammonium Nitrate is primarily soluble and does not contribute significantly to the generation of waste sludge. Desludging volumes for the AN Plant and the operation of the evaporation ponds equates to the volume of particulates deposited over a specific period of time. The particulates from the process equates to 23 mg/l ((as provided by DN)(it should be noted that the nitrates will remain in solution within the evaporation pond)) at a rate of 15 m^3 per/hour this equates to:

- 15 m^3 equates to 15,000 litres at a concentration of 0.023g/l= 345g/hour
- 345 g/h * 24= 8280 grams (8.28 kg/day)
- 8.280 kg *365 days= 3022.2 kg (3.2 tonne /year).
- 10,000 m^2 * 25 hectares at 1 metre deep= 250,000 m^3
- 3.2 tonne/ 250,000 m^2=0.0000128 tonne/m^2 (or 0.0128 kg/m^2)

This equates to 0.0128 kg/m^2/year with an approximate volume of 0.0128 cm/m^2/year (1.28 mm/m^2/year) of material over the 25 hectares. To reduce the evaporation ponds depth to below 0.8 meters (as modelled in the EIS) would take longer than the plants operational life. Therefore the AN Plant would not require de-sludging until the decommissioning of the project.

9.2 Environmental Protection Agency

EP22: - large quantities of nitrogen will be contained in the storage dam. It is undesirable to store such large quantities, as there is long term monitoring and repair to capping and walls. Other options may need to be investigated to reduce the long term liability and cost to the proponent and regulatory burden.

A number of options are currently being considered in relation to management of the volume of nitrate rich wastewater generated from the operation of the AN Plant. One of the options encompasses the beneficial reuse of the nitrates as a constituent in fertiliser manufacturing. This has not as yet been finalised and is currently being looked at as a viable alternative. The other is the change of the operational process to recycle the wastewater back through the Nitric acid plant. This would concentrate the nitrates generated and reduce the volume of wastewater produced. This option is currently being investigated to determine its feasibility. Either of these options will significantly reduce the area of evaporation pond required and the potential costs associated with management of the evaporation pond and the issue of contamination.

EP23: - The total nitrogen load to the evap ponds appears to be 2.5 to 3 tonnes per day. Consideration needs to be given to potential options and their economic viability for the use of this material as a resource. It may be possible to use the waste as a fertiliser using fan evaporators to concentrate the material into a thicker sludge

As raised above (see EP 22) options for beneficial reuse are currently being considered and may be adopted for the plant's operation if the addition of a fertiliser plant to the facility proves viable.

9.2.1 Environmental Protection Agency

EP 11 Wastewater: The EMP needs to contain a contingency plan to prevent or further reduce the likelihood of overtopping. For example, when the dam reaches 80% capacity, actions such as work cessation or removal of water to other locations (such as mine pits) may need to be considered.

The compartmentalised evaporation pond has three separate bunds with gravity flow through the three ponds for maximisation of evaporation. The potential for overtopping to occur is very low. Prior to operation an assessment will be undertaken in regards to the development of a contingency management plan for an 80% or greater capacity event.

This contingency plan will be based on the operational knowledge of the AN Plant and may include:

- Cessation of work;
- Reduction in production rates; and
- Removal and disposal of nitrate rich water.

EP 12 Wastewater: - There is a discrepancy between the design and modelled depth of the dam. The depth of the evaporation pond in one place is 1 m and in another location is 0.8 of a meter. This discrepancy needs to be explained.

The modelling was undertaken on the basis that the dam starts empty and then is progressively filled at a rate of 15 m^3/ hr. The evaporation pond is modelled as empty and filled up over a 50-year period. As sludge will build up within the ponds at a very slow rate of deposition (approximately 1.5 mm/year) the sludge build up was not included in the modelling additionally the modelling assumed that all wastewater was discharged to the one pond. Both of the depths were modelled in relation to the assessment (1m and 0.8m) and no overtopping event was recorded for either of the sizes for the available years of recorded data. The proposed depth of the evaporation pond is 1 metre.

EP21 Wastewater: - The stormwater pond must be designed and operated with a fail safe mode that will prevent overtopping in all situations. In order to ensure that the overtopping in adverse circumstances does not occur (i.e. if rainfall and evaporation exceeds conditions of the past 50 years) or in the event of containment structure failure, an alternative containment and response plan that can be readily implemented must be prepared to prevent environmental harm.

There are a number of ponds on site one of these there is a stormwater surge pond (See Appendix B of this report). The comment provided in this response appears to relate to the evaporation pond for the site and this response is provided for the evaporation pond.

One third of the capacity of the dam will potentially be discharged in the event of dam wall failure (the dam is compartmentalised into three parts). If this were to occur DN would implement a management strategy using tractors and other equipment to build bunding to contain the liquid waste on site and

prevent the waste from moving offsite to sensitive receptors such as Grosvenor Creek located down slope of the AN Plant.

Dependent on the nature of the spill and its size, excavators may be employed to clean up the material spilled and remediate this material onsite or alternately dispose of this material to landfill. The contingency plan for the management of this type of significant spill event will be developed prior to commissioning of the AN Plant once the detailed design has been finalised for the project.

10. Additional Information Relating to Water Resources

10.1 Department of Natural Resources and Water

NRW3: - The EIS states the water requirements for the construction phase is 66.5ML but does not specify where this water will be sourced. If the proponents wish to access groundwater or surface water resources, an appropriate approval under the Water Act 2000 will be required. Please be advised that the Fitzroy Basin moratorium will affect any such applications.

Dyno Nobel is negotiating with BMA for the supply of water during construction as well as using the water from the development of the gas fields (water associated with the compressed methane gas) for the project as this water becomes available. The water from these sources will be used in road construction and for dust mitigation.

10.2 Environmental Protection Agency

EP11: - The EMP needs to contain a contingency plan to prevent or further reduce the likelihood of overtopping. For example, when the dam reaches 80% capacity, actions such as work cessation or removal of water to other locations (such as mine pits) may need to be considered.

The AN Plant has a compartmentalised evaporation pond with 3 separate internal bunds with gravity flow between these ponds for maximisation of evaporation (see Appendix B, drawing number 600001-272-3y71-0003). The potential for overtopping to occur is very low based on the existing water balance that has been undertaken that demonstrates that there is no overtopping of the evaporation ponds based on the available historical data for this par of Queensland. When the evaporation pond reaches 50% capacity DN will undertake an assessment on the management of the evaporation ponds based on actual operating data and identify measures required to manage the potential for overtopping once the evaporation ponds fill to 80% capacity. These measures may include:

- Shutting down operations;
- Reducing production capacity; and
- Removal of some of the nitrate rich waste from the waste stream.

EP12: - There is a discrepancy between the design and modelled depth of the dam. The depth of the evaporation pond in one place is 1 m and in another location is 0.8 of a meter. This discrepancy needs to be explained.

The modelling covered a number of different alternative sizes for the evaporation pond. These were modelled and included the two variations provided within the response. The size and shape of the evaporation pond in the design is 25 hectares, which will accommodate both of these variations of pond design as modelled within the EIS.

EP13: - Why would the majority of water remain within the dam? Elaborate or modify the statement.

In the unlikely event of dam wall failure there are two dam walls dividing the evaporation pond into three parts. If the dam wall fails water from the dam will be discharged into the environment. The remaining dam wall structures within the pond will contain the remaining wastewater preventing the release of this material from the dam. A copy of the current layout design is attached and provided in Appendix B.

EP14: - Studies of aquatic fauna should be carried out after rainfall events to look at aquatic communities in stream.

No assessment of aquatic biota was undertaken as part of the assessment for the EIS as Grosvenor Creek is an ephemeral stream and there are unlikely to be any aquatic biota in the watercourse during dry periods. Additionally the plant itself is located 2.5 km from this stream, it seems to be over and above what is reasonable for assessment of the impacts on this watercourse. There is in place a commitment to monitor water quality during flow events during the construction period.

EP15: - Water balance based on the last 50 years. Why is this the case and not longer? More detail needs to be provided on the likelihood of the dam overtopping.

The available data only goes back as far as 50 years. It could have been modelled on data for a longer period however the additional data would have only been extrapolated from the existing available data.

EP16: - It is recommended all cross-referencing for stormwater be checked and updated. Should show the stormwater collection points, diversionary earth wall bunding and the run-off pond (or equalisation basin) illustrated in the conceptual plan (Figure 17). Figure 31 should also be more widely cross-referenced.

The stormwater management plan for the site has not been finalised, as there are minor changes to the layout. A construction stormwater management plan has been developed for the AN plant which addresses the aspects raised in the EMP provided within the EIS (see Section 5 of the EIS). Drawings for the stormwater management plan are provided in Appendix E.

It should be noted however that the water from the hardstand area during operation would be discharged to the runoff pond prior to reuse. Figure 12 of volume 1 of the EIS shows a stormwater surge pond, which will initially capture the stormwater for reuse within the plant prior to discharge to the evaporation pond.

EP17: - Raw water reservoir evaporation. Raw water is shown as a tank in figure 17 and that is misleading.

This is noted, the raw water pond is discussed in the text of the report and provided in Figure 12 of volume 1 of the EIS.

EP18: - If it was the consultants intention to demonstrate reductions in total water usage through having the stated columns total less than 100% and not percentages (of the 180L/ep/day). L/ep/day should appear in glossary.

It is confirmed that this was the intention. Comments noted. L/ep/day, is litres per equivalent person per day as defined under AS/NZS 1547:2000, on site domestic wastewater management.

EP19: - It is recommended that the MBR option be opted (due to the system producing lower wastewater volume and nutrient loads in the effluent directed toward irrigation).

The sewage treatment plant has been chosen to meet Class A recycled water standards in accordance with the Queensland Water Recycling Guidelines (EPA, 2005). The proposed sewage treatment plant is a sequencing batch reactor.

10.3 Resident

R6 The project uses an incredible amount of water it is ironic that a project can be considered when housing developments are not allowed due to the water shortage.

The water used for the construction period will be sourced from a third party and outside the water supply provided to Moranbah.

Water supply during operation will be supplied via the Burdekin Water Pipeline, which is also outside of the water supply provided to Moranbah. Dyno Nobel will provide a supply of water for the operational workforce and their dependants over the life of the project.

R7: - The EIS does not adequately address how the existing channels will prevent runoff from leaving the site particularly during a major rainfall event.

The project has been designed as a zero discharge site with respect to water. Stormwater from all areas away from the AN Plant facility footprint will be diverted away from the site. Erosion and sediment controls will be used where appropriate to reduce the risk of turbid runoff water.

All other rainfall and runoff from hardstand areas will be discharged to equalisation basins where it will be treated for reuse within the facility.

Any reject water and some stormwater will be discharged to evaporation ponds. No contaminated water will be discharged from site.

R8: - The EIS does not address long term monitoring of the evaporation ponds on site.

Monitoring of the incoming waste stream will be undertaken on a monthly basis for the first 6 months then 6 monthly as required. An online monitor will be in place for real time monitoring of the waste stream.

Inspections of the evaporation pond will be undertaken on a 3 yearly basis during shutdown operations for pressure testing of the AN Plant and its operations. The evaporation ponds will be designed in accordance with the specifications provided within the EIS section 4.3.2.1.

10.4 Department of Primary Industries and Fisheries

DPI 1: - The DPI are concerned about any impacts the project may have on Grosvenor Creek and supports the implementation of the proposed measures specified in Section 7.5 under chapter 4.1.3.

Proposed measures such as implementation of erosion and sediment controls, site hardening and landscaping will minimise topsoil loss that may impact on water quality within Grosvenor Creek.

During operation, stormwater management will ensure that no contaminated runoff will leave the site. All process water and stormwater captured onsite is either reused or directed to the evaporation ponds. Stormwater from all areas away from the AN Plant facility will be diverted away from the site. Erosion and sediment controls will be used where appropriate to reduce the risk of turbid runoff water. The measures specified in section 7.5 under chapter 4.1.3 will be implemented.

DPI 2: - If the creek is flowing during construction the DPI would like to obtain copies of reports on any water quality monitoring undertaken.

Water quality monitoring will be reported to DPI once monitoring has been undertaken following a flow event in Grosvenor Creek.

10.5 Belyando Shire Council

BSC4 , Water Usage: - Water consumption through the plant operations is predisposed to evaporation loss. The EIS does not clearly describe the analysis of capturing the water vapour and recycling the material through the process. The evaporation ponds are proposed to evaporate a significant proportion of the total water consumption in the operations of the plant, as a result the EIS needs to explore in more detail the opportunities to have the high nitrate water processed and used in other spheres of industrial and agricultural applications. The EIS does not explore the opportunities of reprocessing the waste to alternative uses and in particular the maximization of the water allocation for the industrial process which is out of step with the expectations placed upon urban users.

Due to the importance and significant cost of water in Central Queensland the AN plant has been designed to maximise the water used in the plant's operation with reuse of the water for the operation up to ten times prior to release to the evaporation pond.

Dyno Nobel is also investigating options to recycle the water back into the Nitric Acid plant and also to value add to the operation of the AN Plant through beneficial reuse such as the incorporation of the nitrate rich waste stream into fertiliser production. If undertaken this will be a separate submission outside of the EIS process.

11. Additional Information Relating to Cultural Heritage

11.1 Belyando Shire Council

BSC 15 Native Title: - The EIS states Native title has been extinguished by the lease hold land title. Further clarification is sought on the context of this statement as the understanding of the wider community is that lease hold title does not extinguish the provisions of native title.

Grazing Homestead Perpetual Lease (GHPL) is a specific type of tenure that must be reverted back to Unallocated State Land and then to freehold once another interest purchases this land.

The Land Act and the *Native Title Act 1993* (Cwth) require that native title issues be addressed before the minister makes a decision on an application for conversion of tenure. NRW will carry out a native title assessment in relation to the leased land to judge whether and how native title may be addressed for the proposed conversion of tenure. During the period of conversion from Unallocated State Land to Freehold land application may be made for native title over the area of land. However as the conversion of tenure from GHPL to Freehold title is an administrative process the conversion across is effectively at the same time as the conversion from GHPL to Unallocated State Land. No native title claim over this area was lodged during this period and as such native title does not apply.

11.2 Environmental Protection Agency

EP20 : - The EIS fails to address the terms of reference in relation to the Queensland Heritage Act 1992 and identification of Non-Indigenous cultural heritage.

Searches have been undertaken of the Queensland Cultural Heritage Register. None of these searches identified any listed cultural heritage. Copies of these searches are provided in Appendix D of this report.

In addition a number of surveys were undertaken over the site for different aspects in relation to the project including Aboriginal cultural heritage surveys and flora and fauna surveys. No infrastructure is in place over the proposed AN Plant site or the proposed construction campsite except for the fence lines along the boundaries of the property.

12. Additional Information Coal Mining

12.1 Department of Mines and Energy

NRW 1: - Some figures showing the location of coal seams have been incorrectly drawn. The in-situ tonnage of raw coal in the Dysart Lower Seam located beneath the project area (plant site and buffer zone) will be considerably greater than the amount of coal estimated by the proponent in this seam. In terms of the potential impact on the future mineability of coal seams in the Moranbah area, the location of the proposed plant is not considered to be ideal as it will contribute to making a substantial quantity of coal inaccessible for mining for a very long and potentially indefinite period of time. The amount of coal in the Dysart Lower Seam located beneath the site is estimated at between 10 and 30 million tonnes (raw coal in-situ).

This has been noted and has been discussed directly with David Coffey of DME in relation to the temporary limitations on the access to the Goonyella lower seam. Due to contractual timeframes and constraints the location of the proposed AN Plant cannot be changed at this late stage for the project to proceed.

NRW2: - Minor typographical error in the last sentence on page 91. "…volume of coal affected provided in Table 4 should read …tonnage of coal affected provided in Table 22

Comment has been noted.

12.2 Anglo Coal Pty Ltd

A1: - A proposed buffer zone (page 90 of the EIS second paragraph) covers reserves within the Harrow Creek (Goonyella Middle) seam and will limit Anglo's ability to extract this resource. To access these resources by underground mining methods Anglo requires unimpeded access to not only the coal seam but to the surface overlying that resource to efficiently undertake the mining process.

The exclusion zone provided within the EIS relates to the storage of a magazine of explosives in relation to an ammonium nitrate precursor facility and does not prevent other activities being undertaken in this area. Additionally the buffer provided was from the boundary of the site however the storage itself is towards the centre of the site, which reduces the size of this buffer for magazine storage.

Another buffer is more relevant to the discussion raised by Anglo Pty Ltd, which relates to the *Australian Explosives Manufacturers Safety Committee (AEMSC), Precursors for Explosives – code of Good Practice.*

This code of good practice relates to the citing of a precursor facility and refers the assessment of citing back to the *Australian Standard AS 2187.1 Explosives: Storage, Transport and Use, Part 1, 1998*. The Australian Standard provides citing distances for a class 1 explosive. These distances are calculated to define separation distances to adjacent infrastructure. The updated Hazard and Risk Report provides the buffer distances as calculated under the AMESC code *Precursors for Explosives – code of Good Practice* in Section 5.2 (Table 16). Modelling was also undertaken to determine the blast overpressure from a containerised storage on site of 3,000 tonnes (the maximum on site storage stockpile).

This is provided in Table 15 of the updated Hazard and Risk Report. The blast contours calculated from the storage of AN are below the 21 KPA blast contour. The 14 kpa and the 7 kpa blast contours lie

offsite from the AN Plant with the separation distances 840 metres (14KPa) and 1525 metres (7KPa) respectively.

From discussions with the mines inspectorate there would be no restrictions on the type of buildings built up to the 7 KPa contour 1525 metres from the AN Plant. For works within this contour in to the 14 Kpa contour any structures built would need to take into account the blast overpressure (14kpa) into account in the design. Table 10 of the updated Hazard and Risk report details the expected impacts that could occur if the 3,000 tonne containerised storage were to explode.

The 14KPa Contour extends approximately 840 metres from the AN Plant or 171 metres past the site boundary (distance to the closest 3000 tonne stockpile is 669 metres from the site boundary).

A2: - The proposed infrastructure within the lease is east of the Dysart (Goonyella Lower) Seam subcrop line thus within the subsidence zone following extraction by underground mining methods. This will limit the ability of Anglo to cost effectively extract this coal at any point in the future unless the proposed infrastructure is capable of being subsided.

The proposed Moranbah AN plant will limit the extraction potential of the coal by long wall mining for the period of the AN Plants design life (30 years) dependent on which part of the operation is impacted.

In the case of underground mining operations the fixed plant will not be able to be subsided. Other components of the AN Plant site including the evaporation ponds may be able to be worked around to allow for subsidence of the evaporation pond in the future where alternative pond storage could be used while the material settles following subsidence and theses ponds reinstated following assessment of the integrity of the evaporation pond.

Bord and pillar operations may be a viable alternative to prevent subsidence of the plant infrastructure. The coal within the lower seam is of relatively unknown quality and economic viability based on the available information (The study by Wallin & Koppe 1978 discounted the viability of the Goonyella lower seam within their assessment).

13. Additional information in relation to Greenhouse gas

13.1 The Department of Transport

DoT 3: 3.3.7 Heat Recovery (Page 57) The last sentence in paragraph 1 states: "However, it is discharged as CO2 and not as methane, which has a thirty times the CO2 GHG effect." The reference to 30 times is inconsistent with the Global Warming Potential (GWP) of methane indicated by its usual quoted rating as 21 times CO2, and as referenced previously in paragraph 4 on Page 27.

This is noted, comparisons between the emissions of $C0_2$ methane is referenced differently dependent on the text used. The point made in the report is still valid as CO_2 contributes less to the Greenhouse Gas effect than methane gas.

DoT 9: - 3.5.2 Energy (Page 66) The energy requirements of the project will be provided through the development of an on-site gas-fired power generation facility. The generation facility will comprise nine (nominally 2MW) reciprocating gas engines (comprising total of 18MW capacity). Coal seam methane (CSM) will be used in electricity generation, as well as for manufacture of ammonia for emulsion and AN. This use of CSM in local power generation is a welcome development. It has the potential to also facilitate (longer-term) the expanded use of Coal Mine Methane (CMM) and CSM through pre-drainage of coal seams prior to underground and open-cut coal mining, in small-scale power generation. Methane is a potent greenhouse gas which is 21 times more effective as a contributor to global warming than an equivalent amount of CO2. Several Bowen Basin coal miners have already implemented similar CSM and power-generation facilities. Over time there is likely to be more coal miners and CSM operators seeking to supply methane to an expanding regional gas pipeline network for use in power generation or other industrial processes.

Comments have been noted in regards to the use of coal seam methane gas for local power generation.

DoT 12: - 4.14 Greenhouse Gas Emissions Energy Use (P201) Excluding natural gas emissions, the total CO2 emission is 431,000 tonnes pa, more than 15 million tonnes of CO2 over the 35 yr life of the project. This is a reasonably significant amount, given that CO2 has a 50-200 yr Atmospheric Lifetime. The 2nd last paragraph reports a maximum annual CO2 production of 469,000 tonnes, and states: "This is considered to be minor, approximately 0.08% of national emissions and approximately 0.27% of Queensland's annual emissions". The logic embedded in this conclusion is out-of-date. While these emissions are relatively small in comparison to total National and State emissions, the logic therein implies that individual projects don't contribute much to overall climate change and therefore shouldn't have to take significant measures now or in the future to reduce emissions. Acceptance of this logic means that most large Australian and Queensland stationary industrial emitters &medium-scale power stations would not be expected

to have to reduce their emissions. This is not sustainable. There is growing evidence that global warming is accelerating and its impacts are being amplified by a range of feed-back loops. The world's most authoritative body on climate change the Inter-governmental Panel on Climate Change (IPCC) has warned that we potentially face dangerous climate change within 50 years, and severe disruption to the earth's life-sustaining ecosystems. As a measure of the seriousness and magnitude of the challenge, the scientific consensus is that advanced countries like Australia will need to reduce their total greenhouse emissions by 60-80% below 1990 levels by 2050, to avoid dangerous climate change. The text should be amended to read: "On an annual basis this represents, approximately 0.08% of national emissions, and approximately 0.27% (maximum 0.3%) of Queensland's annual emissions. Over the 35 year life of the project however this represents in excess of 15 million tonnes of CO2, a reasonably significant amount."

Comments provided in relation to the quantity of CO_2 emitted have been noted however it should be taken into account that the coal seam gas emissions from the extraction of coal traditionally were either burnt off or released into the atmosphere on accessing the coal resource. Changes to mining methodologies and the recent accessing of coal seam methane gas in the Bowen Basin has meant that this resource is now being used rather than being released into the atmosphere as a much more significant contributor to Greenhouse Gas emissions (as methane gas).

DoT 16: - Appendix 7.9 Greenhouse Assessment Report 3.6 Summary of Emissions Estimates (Page 6) Consistent with our previous comments in relation to 4.14 Greenhouse Gas Emissions, outlined above: The last sentence in Paragraph 2 should be replaced, with the following text: "On an annual basis this represents, approximately 0.08% of national emissions, and approximately 0.27% (maximum 0.3%) of Queensland's annual emissions. Over the 35 year life of the project however this represents in excess of 15 million tonnes of CO2, a reasonably significant amount."

Refer to DoT 12 above.

14. References

AS/NZS 1547:2000 *Onsite Domestic Wastewater Management*, Australian Standards

Bruel and Kjaer, *Environmental* Noise. Bruel and Kjaer Sound and Vibration Measurement A/S, Bruel and Kjaer 2006.

Cahoon, Corrosion *Characteristics* of Mild Steel in Urea Ammonium Nitrate Fertilizer Solutions, NACE International 2002.

David Moore & Associates Pty Ltd, Environmental noise *level* study of proposed gas compressor plant at Moranbah and associated facilities at Woodstock, Mt Stuart and Yabulu, January 2003.

Declaration of SSAN as an Explosive 29 Oct 2004.

EPA, *Air Quality Sampling Manual.* Queensland Government EPA, November 1997.

EPA, Ambient Air Quality *Monitoring* in Queensland – 2004 Annual Summary and Trend Report – EPA QLD. 2005.

EPA, Queensland Water Recycling Guidelines 2005, EPA QLD 2005.

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Katestone, Air Quality *Impact* Assessment of the Proposal to Expand the Ammonium Nitrate Plant at Moura: Katestone Environmental, (October 2005)

NHMRC, National Water Quality *Management* Strategy, Australian Drinking Water Guidelines ,NHMRC, 2004.

NHMRC*, National Guidelines for Control of Emissions from new Stationary Sources.* National Health and Medical Research Council (NHMRC). 1985. Rescinded 29/02/2000

RLMS, QNP Moura *Ammonium* Nitrate Plant Expansion (QN2), October 2005.

Scannell, K. 2006. Environmental *Noise* A Good Practice Guide. Noise and Sound Services.

Wallin & Koppe 1978 “Record 1978/49 An Evaluation of Coal Resources in the Moranbah Area, Central Queensland” Queensland Department of Mines G.S.Q. Record 1978/49

Appendix A

EIS Submission Register

Sub. No.	Date	Submitter	Contact	Issue No.	Ref Section Supplementary Report	Major Issues - General	Major issues - details	Address in Supplementary Report?	Relevant Section of EIS	Comments to GHD / Dyno Nobel
1	1/11/06	Department of Mines and Energy	Judith Allen	1		No comments		N/A		
2		Department of Natural Resources and Water and Department of Mines and Energy	Jacki Wirth	NRW1	Section 12	Coal resources	Some figures showing the location of coal seams have been incorrectly drawn. The in-situ tonnage of raw coal in the Dysart Lower Seam located beneath the project area (plant site and buffer zone) will be considerably greater than the amount of coal estimated by the proponent in this seam. In terms of the potential impact on the future mineability of coal seams in the Moranbah area, the location of the proposed plant is not considered to be ideal as it will contribute to making a substant quantity of coal inaccessible for mining for a very long and potentially indefinite period of time. The amount of coal in the Dysart Lower Seam located beneath the site is estimated at between 10 and 30 million tonnes (raw coal in-situ).	Yes		During the course of the project's development Dyno Nobel need to communicate directly with DME officers based in Brisbane. For this purpose, the appropriate contact officer is Mr David Coffey who can be contacted on telephone (07) 3237 1476.
				NRW2	Section 12	Typing Error	Minor typographical error in the last sentence on page 91. "…volume of coal affected provided in Table 4 should read …**tonnage** of coal affected provided in Table **22**.	Yes	4.1.1	Correct relevant errors in the EIS
				NRW3	Section 8.13	Water	The EIS states the water requirements for the construction phase is 66.5ML but does not specify where this water will be sourced from. If the proponents wish to access groundwater or surface wate resources, an appropriate approval under the *Water Act 2000* will be required. Please be advised that the Fitzroy Basin moratorium will affect any such applications.	Yes	3.5.3	GHD to provide clarification of water source for construction phase.
3	3/11/06	Department of Local Government, Planning, Sport and Recreation	Nichola Parish	1		No comments		N/A		
4	6/11/06	Local resident	Natasha Mallise	R1, R2, R3 & R4	Section 4.5	Air Quality	Insufficient baseline data on existing pollutants. The potential human health risk is not adequately addressed. Worst case and upset conditions did not include air quality monitoring. No information c continuous air quality monitoring when plant is operational.	Yes		
				R5	Section 3.1	Housing	No accommodation strategy.	No		This is adequately addressed in the EIS
				R6, R7 & R8	Section 10.3	Water	Does not address how storm run off will be contained. Does not address long term monitoring of the evaporation pond.	No		This is adequately addressed in the EIS
				R9	Section 8.1.4	EMP	Compliance after 1 or 6 months is not adequate.	Yes		GHD to clarify compliance monitoring.
				R10	Section 3.1	Consultation	Responses to community questions and concerns are not adequate.	Yes		This should be addressed. Responses should be more specific.
5	9/11/06	Department of State Development, Trade and Innovation	Jenny Descovich	1		No comments				
6	10/11/06	Department of Primary Industries and Fisheries	Paul Walmsley	DPI 1		Grosvenor Creek	There is a potential for increased turbidity in the creek. If the creek is flowing during the construction phase of the project DPI&F would like to receive a copy of any reports for the proposed monitoring.	Yes	7.5	EIS details mitigation methods and monitoring methods. This will be a condition in the CG report.
7	10/11/06	Environmental Protection Agency	Dean Ellwood	EP1	Section 8.1.1	Flora and Fauna	This section includes reference to section 5 work (fauna and flora), however section 5 contains only recommendations prepared by the consulting ecology group and does not include any firm commitments by the proponent. It is recommended that the EPA request an addendum to the EIS which outlines the proponents commitments to adopting recommendations provided in section 7.5; Potential Impact and Mitigation.	Yes	Flora and Fauna 7.15	GHD to provide clarification.
				EP2	Section 4.2	Air Quality	Figure numbering in text does not match numbers on specific figures. It is recommended that the report is checked and figure numbering in the text is corrected.	Yes	Air Quality	GHD to check figure numbering.
				EP3	Section 4.2	Air Quality	The report refers to total mass emission rates for NOx and AN vent and reformer stack, however these rates were not included in the report. It is recommended that the EIS report includes the total mass emission rates of NOx for the AN vent and reformer stack that were provided by Dyno Nobel.	Yes	Air Quality 2.2.2	GHD to add this data.
				EP4	Section 4.2	Air Quality	In Table 2 of the report emission rates for PM10 are estimated. However no detail is provided on how the estimated figures were derived. It is recommended that the EIS report provides an explanation for the estimated PM10 emission rates in Table 2.	Yes	Air Quality 2.2.2	GHD to provid explanation for emission rates.
				EP5	Section 4.2	Air Quality	It is recommended that the EIS report provides an explanation on how the NO2 emission rate for the NA vent in Table 2 was calculated.	Yes	Air Quality 2.2.2	GHD to provide explanation for calculations.

Sub. No.	Date	Submitter	Contact	Issue No.	Ref Section Supplementary Report	Major Issues - General	Major issues - details	Address in Supplementary Report?	Relevant Section of EIS	Comments to GHD / Dyno Nobel
				EP6	Section 4.2	Air Quality	In Table 3, it is not strictly correct to interpret the Environmental Protection (Air) Policy 1997 1-hour goal for NO2 as allowing 9 exceedences per year. The Environmental Protection (Air) Policy 1997 goals were not defined as modelling criteria or given any statistical basis. However for impact assessment purposes, EPA accepts the predidicted 99.9th percentile one-hour concentrations from air dispersion modelling can be compared to one-hour Environmental Protection (Air) Policy 1997 goals. It is recommended that the Environmental Protection (Air) Policy 1997 goal is quoted without qualifying it with allows 9 exceedences per year. Use the predicted 99.9 percentile 1-h concentrations to compare the goal.	Yes	Air Quality 3	GHD to update section.
				EP7	Section 4.2	Air Quality	It is recommended that the report is corrected to include Figure 10.	Yes	Air Quality 6.4.1	GHD to add Figure 10.
				EP8	Section 4.2	Air Quality	The section doesn't offer any description of model inputs and model configurations used to perform the predictions of deposited nitrogen. It is recommended that the EIS report is adjusted to include a outline of the modelling methods.	Yes	Air Quality 7.2.3	GHD to provide outline of modelling methods.
				EP9	Section 4.2	Air Quality	This section incorrectly abbreviates the unit grams as 'gm'. It is recommended that the references to grams, when abbreviated, within the report be changed to 'g'.	Yes	Air Quality 7.2.3	GHD to update abbreviations for grams.
				EP10	Section 4.2	Air Quality	In Table 7, first row, 49.3+45=89.3 doesn't add up. The table also includes the 9 exceedences per year interpretation on the goal. It is recommended that Table 7 is adjusted to reflect changes.	Yes	Air Quality 7.2.8	GHD to check and update calculations.
				EP11	Section 10.2	Water Quality	Overtopping of the evaporation dam could have serious impacts on Grosvenor Creek. The water in the dam is likely to contain very high levels of ammonia and nitrate (over 2000 times the Australian and New Zealand Guidelines for Fresh and Marine Water Quality). Even when diluted or dissipated these compounds are likely to cause significant mortality of aquatic flora and fauna. Levels of copper and zinc will exceed the national guidelines, though it is likely dilution the level of copper may not be of concern. Other compounds could be present that are not found inthe Moura dam. While the dam is unlikely to overtop if the weather is similar to or drier the that of the past fifty years, the high levels of toxic compounds likely to be present in the dam water mean that any possibilty of overtopping should be minimised to the greatest extent possible. The environmental management plan needs to contain a contingency plan to prevent or furthur reduce the likelihood of overtopping. For example, when the dam reaches 80% capacity, actions such as work cessation or removal of water to other locations (such as mine pits) may need to be considered.	Yes	Water Quality 4.3.2.1	GHD to clarify likelihood of overtopping by clarifying the '1 in 50 year' data used. GHD to add contingency plans.
				EP12	Section 10.2	Water Quality	Page 119, there is discrepancy between the design and modelling depth of the dam in paragraphs 3 and 9 (1m vs. 0.8m). It is recommended that the discrepancy in depth be explained.	Yes	Water Quality 4.3.2.1	GHD to explain discrepancy.
				EP13	Section 10.2	Water Quality	Paragraph 6 p 123, "*…a significant volume of this material would remain within the pond…*". There is no evidence to support why this would be the case. What design features or what mechanisms are in place to ensure this? What volume or proportion of capacity does a *"significant volume"* equate to? Please elaborate upon, or modify the statement.	Yes	Water Quality 4.3.2.1	GHD to provide details of the dam design.
				EP14	Section 10.2	Water Quality	Furthur investigation of aquatic flora & fauna is needed. Section7.1 of theTOR: *the EIS should describe existing environmental values for nature conservation that may be affected by the proposal" & "should describe the occurence and significance of any rare or threatened flora or fauna species & habitat for these species within the area affected by the construction and operatn of the facility"*. While ephemeral waterbodies within the site were not flowing at the time of the study, Grosvenor Ck contained standing water & this should've been sampled for aquatic flora and fauna. The creek is likely tobe impacted by constructn and operation (p122-4) & overtopping of the evap. dam could have large impacts (issue11).	Yes	Water Quality 4.7	GHD to conduct testing as described when the opportunity arises.
							Standing waterbodies can act as important refuge for rare or endangered species. Sampling of the waterbody could also give an indication of the species that may be present whenthe waterway isflowing. Studies of aquatic flora and fauna should be carried out in Grosvenor Ck at the earliest opportunity (I.e. the first significant flow event). This should not be carried out during the period of fi flush. This may need to be repeated if flows in the creek do not allow developmt of aquatic communities (eg hatching & growth of macroinvertebrates & migration of fish).			
				EP15	Section 10.2	Water Quality	Paragraph 8 (p 138), It is not clear why the last 50 years were used. Was this all the data that was available or is this the life expectancy of the plant? Was a safety factor built into the sizing modelling and if so, what was it? It is recommended that the mass balance conceptual design figure be named as such and listed in the table of figures, and that consistency be maintained in the terms used between overflow and overtop. It is also recommended that more detail be provided on the likelihood of the dam overflowing (re: "would not be expected to overtop").	Yes	Water Quality 4.5.2	GHD to clarify data and explain model.

Sub. No.	Date	Submitter	Contact	Issue No.	Ref Section Supplementary Report	Major Issues - General	Major issues - details	Address in Supplementary Report?	Relevant Section of EIS	Comments to GHD / Dyno Nobel
				EP16	Section 10.2	Water Quality	A stormwater management strategy (SMS) is mentioned in Paragraph 1 (p. 105) and Paragraph 6 (p. 122), directing the reader to Section 5, but there is no SMS there. The terms *"stormwater management"* is only mentioned once in all of Section 5 (p. 250). There only seems to be a SMS outline presented in 3.5.3 *Water Supply and Management*, *Stormwater management (operational phase)* (p. 69), and *Stormwater management (construction phase)* (p. 70). It is recommended all cross-referencing for stormwater be checked and updated. Figure 31 should show the stormwater collection points, diversionary earth wall bunding and the run-off pond (or equalisation basin) illustrated in the conceptual plan (Figure 17). Figure 31 should also be more widely cross-referenced.	Yes	Water Quality 3.5	GHD to fix references to SMS.
				EP17	Section 10.2	Water Quality	Paragraph 1 (p. 71). *"Raw water reservoir evaporation..."* Is raw water storage in roofed tank's) not feasible? Raw water storage is shown as a tank in Figure 17 and that is misleading. It is recommended that the feasibility of roofed-tank raw water storage be considered and the advantages and disadvantages be presented along with the outcome. Figure 17 should be modified to show a raw water storage dam (and not a tank) unless the storage facility is changed.	Yes	Water Quality p71	DN to consider the feasibility of a roofed tank raw water storage.
				EP18	Section 10.2	Water Quality	The percentage breakdown of water usage in the *"Permanent Facilities"* and *"Temporary Facilities (with Composting Toilets)"* columns do not total 100%. If it was the consultant's intention to demonstrate reductions in total water usage through having the stated columns total less that 100%, then volumes (L/EP/day) and not percentages (of the 180 L/EP/day) should have been presented. Alternatively, explain why these columns don't total 100%. "L/EP/day" should appear in the glossary.	Yes	Water Quality 7.12	GHD to update data.
				EP19	Section 10.2	Water Quality	It is unusual that the most likely wastewater treatment system as presented in the EIS (paragraph 2, p. 72) is not mentioned here (i.e. preference for the Biolytix system). It is recommended that the MBR option be adopted (due to the system producing both lower wastewater volume and nutrient loads in the effluent directed toward irrigation.	Yes	Water Quality 7.12	GHD to clarify .
				EP20	Section 11.2	Cultural Heritage	The EIS fails to address the Terms of Reference in relation to the *Queensland Heritage Act 1992* and identification of Non-Indigenous cultural heritage. It is recommended that the EIS report is adjusted in order to address the Terms of Reference in relation to the *Queensland Heritage Act 1992* and identification of Non-Indigenous cultural heritage.	Yes	Cultural Heritage	GHD to clarify.
				EP21	Section 9.2.1	Contaminated Land	The stormwater pond must be designed and operated with a fail safe mode that will prevent overtopping in all situations. In order to ensure that the overtopping in adverse circumstances does not occur (ie if rainfall and evaporation exceeds conditions of the past 50 years) or in the event of containment structure failure, an alternative containment and response plan that can be readily implemented must be prepared to prevent environmental harm.	Yes	Contaminated Land	See issue 13.
				EP22	Section 9.2	Contaminated Land	The pond area will accumulate large quantities of available nitrogen over time and result in a contaminated area of 20-25 ha requiring secure containment and monitoring. It is not an environmentally desirable approach to permanently store large quantities of a highly mobile contaminant of this type. Exhaustion of the pond's storage capacity will require its effective closure with low permeability capping and long term environmental and structural monitoring and repair to capping and walls as required under the conditions of a Site Management Plan. Other options may need to be considered to reduce the long term liability and cost to the proponent and regulatory burden.	Yes	Contaminated Land	GHD to clarify.
				EP23	Section 9.2	Contaminated Land	The total nitrogen load on the evaporation ponds appears to be of the order of 2.5-3 T/day. The wastewater also carries a number of other contaiminants from parts of the plant that could contaminate any fertiliser product. Consideration needs to be given to potential options and their economic viability for the use of this material as a resource. It may be feasible to use the waste in a concentrated form as fertilizer directly or by addition to other soil conditioning materials. Considering the comparitively large volumes of liquid waste, this may involve options such as downsizing the evaporation area and using fan evaporators to reduce water volumes followed by trasportating thickened wastewater/sludge nearer to agricultural areas for further processing and final use. If the other contaminantns in the wastewater are a concern, these contaminants may be able to be segregated and managed separated from the main nitrogen bearing waste streams as part of the plant operation to control fertilizer product quality. Economic analysis of any resource use options should consider the long term cost of managing the evaporation ponds during plant life and followin	Yes	Contaminated Land	GHD to comment on viability.
8	10/11/06	Anglo Coal	Rob Reeson	1		Sterilisation of Coal Resource	Anglo objects to the proposed development because the location of the project and the previously undisclosed buffer zone will impede the efficient and cost effective extraction of coal reserves held b Anglo.			Explain results of meeting with Anglo Coal.

Sub. No.	Date	Submitter	Contact	Issue No.	Ref Section Supplementary Report	Major Issues - General	Major issues - details	Address in Supplementary Report?	Relevant Section of EIS	Comments to GHD / Dyno Nobel
9	10/11/06	Office of Aboriginal And Torres Straight Islander Policy	Tracey Dawson			No comments				
10	10/11/06	Belyando Shire Counci	John Torpy	BSC1	Section 5.1	Chemical Discharges	The EIS provides some comment on the possibility of chemical and gas discharges; however the EI does not clearly annunciate the strategies proposed to maintain the safety and well being of the residents of Moranbah and inform the community of events which pose a danger to health and safety. The EIS does not propose a method of informing the community as a whole and this is clear an opportunity missed. It would be most beneficial if the proponent would commit to a regular forum of communication with the community to allow the fostering of mutual understanding and cooperatio in the community.	Yes		GHD to address in supplementary report.
				BSC2	Section 6.1	Noise & Vibration	The EIS does not provide a clear time line assessment of the noise impacts of the proposal for the expansion of the existing compressor station. The EIS should clearly specify the background noise levels prior to the development commencing on the site and examine the cumulative effects of subsequent expansions of the compressor station to the first base line data. Without the rigorous assessment of the noise levels to the base line data the noise levels are affected by bracket creep and will result in unsatisfactory environmental impacts in the locality. The EIS should be amended and have supplementary details to provide updated information on these outstanding points.	Yes		GHD to address in supplementary report.
				BSC3	Section 7.3	Transport	The EIS does not provide any clear indication on the location of the product transport vehicles when not in use. The location of a transport depot wherever it may be needs to be fully detailed and assessed as part of the project. The amount of product to be moved from the site clearly involves significant amounts of transport movements and the location of these vehicles is fundamental to a rigorous assessment of the proposal. A failure to detail the location will lead to adhoc management of the impacts after the event. This is a totally unacceptable outcome for the community. The impacts of transport movements beyond the site have not been clearly described and the EIS needs to be rigorous in this area to avoid cumulative impacts with other expansion programs in the region. The EIS clearly needs more detail and should be amended prior to further consideration by Council and the community.	Yes		If DN do not explain this in the EIS supplementary report a Development Approval will be required.
				BSC4	Section 10.5	Water Usage	Water consumption through the plant operations is predisposed to evaporation loss. The EIS does not clearly describe the analysis of capturing the water vapour and recycling the material through the process. The evaporation ponds are proposed to evaporate a significant proportion of the total water consumption in the operations of the plant, as a result the EIS needs to explore in more detail the opportunities to have the high nitrate water processed and used in other spheres of industrial and agricultural applications. The EIS does not explore the opportunities of reprocessing the waste to alternative uses and in particular the maximization of the water allocation for the industrial process which is out of step with the expectations placed upon urban users.	Yes		GHD to comment on in the supplementary report.
				BSC5	Section 3.4	Water Allocation for Moranbah	The EIS fails to acknowledge the multiplier effect of the economic stimulant of the proposal on generating additional water demand in the community. A sincere and unbiased appraisal of the tota water demand needs to be undertaken. The process of allocating water directly to urban use in the residential corner ignores the broader economic stimulant that will eventuate as a result of the proposal. Subordinate industries and residential functions will follow and will place greater pressure on the existing allocation of water to the community. By focusing solely upon the direct link between employers and their families and water consumption, the proposed allocation is deficient and will not meet the community needs and will result in greater pressure on existing users in an environment of constrained supply.	Yes		DN to consider.

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				BSC6	Section 3.4	Social Impact	The EIS does not detail a multiplier effect in terms of the additional demand for housing and accommodation. While consideration is given to direct links of the proposal which is commendable, broader impacts are not detailed. In the constrained housing market, additional demand will result in pressure to provide temporary accommodation. This outcome is not a sustainable position for the community which has in excess of 21% of the popn in Single Persons Quarters. The EIS needs to detail a commitment to delivering affordable housing for all the impacts of the project and not avoid the dire social consequences of a fractured community. The EIS needs to reflect the full impacts of the project within the local constraints of Moranbah. It is clearly unacceptable for additional pressure to continue to be applied to the local market. The social fabric of the community is under considerable duress and it is unsustainable for weekly rental costs for housing to exceed the gross incomes of general service industry workers within the community, or as in some cases more than the two combined gross incomes of young workers.	Yes		DN to consider.
				BSC7	Section 3.4	Construction Camps	A construction camp is proposed to be located on adjacent site to the project construction site. The EIS position is supported by Council and represents a more defined and logical needs based approach to meeting accommodation demand other than the stimulation of further works camp outcomes within the residential township of Moranbah that go beyond the life of the project.	No		n/a
				BSC8	Section 5.1	Emergency Services Response	A detailed response to the issue of impacts on emergency services is missing from the EIS and needs to be addressed as the potential for a combination of emergency responses needs to be quantified and a response formulated. The EIS does not acknowledge the incomplete service provision to Moranbah of Police and the Fire and Rescue services. A clear needs analysis of the proposal should be included in the EIS and the implications worked through at a local level to ensure that the service provision to Moranbah is not compromised or reduced from the current standard.	Yes		DN to consider..
				BSC9	Section 3.4	Max Design Capacity of Plant	The EIS does not clearly detail the maximum production capacity of the plant and the future growth and expansion of the facility to this level. The EIS should clearly detail the maximum capacity of the plant and the potential production capacities and how these volumes will affect waste discharges ar all the impacts associated with the operation. It is clearly unacceptable to have an EIS not providing this vital information as the compounding of production growth impacts will be far reaching and need to be quantifiably described to allow a fair assessment of the project and the defined site for the development. It would be grossly deficient to have a plant installed and production capacity increase over time compounding impacts on the locality and community.	Yes		GHD to explain in supplementary report.
				BSC10 & BSC11	Section 9.1	Waste Volumes	There is confusion in the EIS as to the exact volume of solid waste to be produced during construction and operation of the facility. The EIS needs to clearly define the amount of wastes to be produced to allow the local facilities to prepare to accept additional wastes for disposal. The defining of long term waste disposal volumes is critical in allowing Council to sustainably manage the provision of waste disposal capacity for the community and industry in Moranbah. In addition the EIS does not identify the requirement of de-sludging the evaporation pond and the production of intractable waste from the process. If disposal is required longer term the provision and identification of suitable sites will need to be clearly spelt out and quantified in the EIS.	Yes		GHD to clarify in supplementary report.
				BSC12, BSC13 & BSC14	Section 4.4	Cumulative effects of emissions and local atmospheric conditions	The EIS does not detail any potential of the Plant emissions (Nitrogen Oxide and Nitrogen Dioxide) reacting with local atmospheric compounds including dust which may produce a precipitate, cumulative impacts or photochemical wastes. There are significant amounts of Nitrogen compounds being discharged from the facility and the EIS needs to background the chemical reactions anticipated from the site wastes. The EIS provides information on the discharges of Nitrogen oxide and Nitrogen dioxide from the plant, however provides no details on cumulative effects of the safe exposure levels for the materials and the concentrations anticipated at ground level inside the site and at the boundary. With Nitrogen Oxide being a relatively reactive compound additional detail needs to be spelt out on the concentrations and exposure levels anticipated. A full detailed description of the Ausplume modeling for the project needs to be provided for referencing. The EIS needs to clearly detail all the modeling data to allow a full disclosure of the inherent risks to plant workers and the community.	Yes		GHD to comment on this in the supplementary report.
				BSC15	Section 11.1	Native Title	The EIS states Native title has been extinguished by the lease hold land title. Further clarification is sought on the context of this statement as the understanding of the wider community is that lease hold title does not extinguish the provisions of native title.	Yes		GHD to clarify in supplementary report.

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				BSC16	Section 5.1	Site Security	The EIS document does not provide any clear links to maintaining a secure boundary to the plant on the property / allotment boundary. It is acknowledged that the need for vegetation management will see grazing of the site as a preferred option. However the security of the plant will be compromised by the close proximity of the security fence at the rear of the site. A closer management regime needs to be put in place to guarantee safety and deliver an uncompromised outcome for both functions on the site.	Yes		DN to clarify.
				BSC17	Section 8.1.2	Ecological Disturbance	The EIS contains no information on the ecological disturbance anticipated from the extensive lighting of the site during construction or operations. The effects of the lighting in the locality will dramatically affect local insect populations and act as an attractant for a vast area. This will redistribute the ecological balance of the locality. A clear assessment of this impact needs to be undertaken to ensure the proposed operations will not impact the resident insect, bat, bird or reptile populations ar the influx of insects from lighting will not adversely affect the operations of the plant through either direct influences or altering the food chain causing higher order species populations to increase in response to food sources and inhabiting the plant confines.	Yes		GHD to address in supplementary report.
				BSC18, BSC19 & BSC20	Section 8.1.2	Flora & Fauna	The EIS identifies the reptile Major Skink (Egernia frerei) as being present on the site during the assessment. The normal range of this species is considered to be more costal and linked to areas of higher rainfall in well watered forest country or seasonally dry woodlands where strong ground vegetation is present. It would appear that the identification of this species is an error. The EIS also identifies the bird Rufus Fantail (Rhipidura rufifrons) as being observed on the site. The normal range of this species is more closely linked to dense foliage areas of rainforest gullies in coastal regions. It would appear that the identification of this species is in error. The EIS identifies the mammal Greater Broad Nosed Bat (Scoteanax Ruepellii) as being present on the site during the assessment. The normal range of this species is limited to the cool temperate to tropical wet sclerophyll forests and rain forests of northern NSW and Southern QLD. It would appear that the identification of this species is in error.	Yes		GHD to comment on this submission.
11	10/11/06	CHEM Services	Harry Pirvics	1		Risk & Safety	The impact on the adjacent mine workings from an explosion event at the facility should be explored. This study should consider the potential for collapse of underground workings from ground vibration. Additionally, potential impacts from the mining operations including extraction caving practices on the AN plant, particularly as the mine develops toward the AN plant site, should be identified and considered in the design of the plant.	Yes		Meeting with Anglo Coal
				2		Risk & Safety	Measures to reduce the potential for knock-on events (through both missile impact and overpressur between Ammonium Nitrate (including Ammonium Nitrate Emulsion) explosion events and the Ammonia storage tank, should be considered and implemented where practicable.	Yes		GHD to address in supplementary report.
				3		Risk & Safety	Measures to protect the control room and administration building, where the majority of site personnel will be located, from overpressure effects should be implemented to ensure the risk is as low as reasonably practicable.	Yes		DN to consider.
				4		Risk & Safety	CHEM Services support the Explosives Inspectorate's view on the siting of the construction camp. CHEM Services recommend that the construction camp is located outside of the 1x10^-6 per year LSIR contour.	Yes		GHD to provide updated location and layout of camp in supplementary report.
				5		Risk & Safety	Consideration should be given to locating administration staff and other non-operational staff off-site. The risk to non-operational staff from the hazards the plant presents may be effectively eliminated b locating them off-site. A number of Major Hazard Facilities in Queensland are planning to, or are currently relocating non-operational staff to offices off-site.	Yes		DN to consider.
				6		Risk & Safety	The ERPG values as published in The American Industrial Hygiene Association (AIHA), Emergency Response Planning Guideline values and Workplace Environmental Exposure Level Guides Handbook, Fairfax , VA , 2005 for ammonia are; ERPG-1: 25 ppm, ERPG-2: 150 ppm and ERPG-3: 750ppm. These levels should be adopted in place of the values documented in the Hazard and Risk Assessment report.	Yes		GHD to update in supplementary report.
12	10/11/06	Enertrade	Michael Fewster	E1 to E2		Hazard and Risk Assessment	The *Hazard and Risk Assessment* included in the EIS does not recognise the manned Enertrade's Moranbah Compressor Station and fails to acknowledge the Moranbah to Townsville High Pressure Gas Pipeline	Yes		GHD and Chem services to comment on safety.
				E3 to E9		Air Quality Assessment	The *Air Quality Assessment* included in the EIS fails to describe impacts on the Enertrade facilities and staff at Enertrade's Moranbah Compressor Station	Yes		GHD to comment on air safety for staff at Enertrade's compressor station.
13	14/11/06	Queensland Health	Sophie Dwyer	H1		Local Health Service Impact	The impact of an additional 500 workers (and their families) during the construction period on the local health service will be significant and has been acknowledged in the EIS. With the already stretched health services in rural areas it will be important to liaise with the Moranbah Health Service District early to assist in the planning of general and emergency health services.	Yes		DN to liaise with the Health Service District.

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				H2	Section 4.3	Air Quality	There appears to be discrepancy in the air quality report. In Section 7.1 of Appendix 7.8 the report indicates that the 24 hour average offsite PM10 level during construction is expected to be a maximum of 75 µg/m3 above the estimated background of 45.3 µg/m3, however the contours on Figure 11 indicate that the 24 hour average offsite PM10 level will be a maximum of 50 µg/m3 abov background. The former value could result in the ambient 24 hour average offsite PM10 level being approximately 120 µg/m3 which exceeds the National Environment Protection Measures health based standard of 50 µg/m3. Clarification is requested on why the information differs and if there will be any impacts on sensitive receptors.	Yes	Section 7.1 of Appendix 7.8	GHD to clarify.
14	10/11/06	Explosives Inspectorate of the Department of Mines and Energy	Geoff Downs	1		Siting of the plant	Issues of communication (explosive) between ammonium nitrate and ammonium nitrate emulsions for both storage and manufacture (in all those combinations between products and activities) was discussed and needs to be understood. This applies to donors and receptors from the initiating event. I believe that the influence of ANE as donor was discussed/highlighted with respect to AN as the receptor during the meeting of 27 October 2006 for the knock on effects.	Yes		GHD to address.
				2		Future Mining	The risk and impacts to underground miners from an explosion should also be considered in the context of the hazard and risk assessment for existing and future underground mining activities.	Yes		GHD to address.
				3		Security Threat	Security Sensitive Ammonium Nitrate (SSAN) has been declared an explosive and is regulated und national guidelines for SSAN. The terrorist threat (i.e. other than industrial accident) should also be included in the scenarios for the risk analysis. This will include consequence and impact based upon the scenarios and also the frequency which should be influenced by the control measures in place. As explained at the meeting, this scenario is now a credible scenario and should be put into the risk analysis and assessment of risk.	Yes		GHD to address.
				4		PRA and SRA	The issue of conducting the SRA at the concluding phase of the project was discussed during the meeting. It is essential to get the issues of separation distances for items of plant resolved as soon as possible rather than identifying the issues when it difficult to resolve the matter	Yes		GHD to address.
				5		Technical Information for ammonium nitrate	In order to effectively set the separation distances and storage quantities, more information on industrial (explosive) grade ammonium nitrate was needed for the hazard and risk assessment It was noted that agricultural grade AN rather than industrial (explosive) grade AN has been quoted a referenced and used in the basis and discussion in the report. The behaviour of the agricultural (higher density) can be different and this needed to be understood in the findings and conclusions of the report. The likely differences and impacts need to be understood. We understand that Ian Smit undertook at the meeting on 27 October 2006 to approach TNO with respect to these matters. I understood that these findings would be added to the report	Yes		GHD to address.
				6		Off site Critical Infrastructure	Have the impacts of an explosion on other critical infrastructure, both on site and off site, been evaluated. The off site impacts referred to include the proposed power stations and other adjacent proposed developments.	Yes		GHD to address.
				7		Construction Camp	While the construction camp may fall outside the 1 x 10^{-6} risk contour, this risk contour is not believed to be reflecting the risk during commissioning of the plant but rather for a fully operational plant. It appears that the siting may not be optimal from a risk perspective and needs to be reviewed to see if there is acceptable risk during commissioning to fully understand the exposure to risk during commissioning which is a higher risk activity. To this end, a construction safety study as per one of the HIPAPs from the NSW Department of Urban Affairs and Planning would be useful for the projec particularly in the commissioning phase.	Yes		GHD to address.
				8		Transport	Transport of ammonium nitrate and ammonium nitrate emulsions through built up/ populated areas Moranbah. If it did occur, whether route selection of alternative routes of lower risk had been addressed.	Yes		GHD to address.
				9		Storage	During the meeting of 27 October 2006, Mr Ian Smith undertook to consider alternative storage arrangements. These alternative storage requirements for ammonium nitrate could include storage shipping containers in lieu of the two 6000 tonne bulk stores.	Yes		DN to consider.
				10		General	There has been a lack of consistency of recognition of the role and application of the Explosives Act 1999 for ammonium nitrate and ammonium nitrate emulsions within the EIS and hazard and risk assessment. For example, on page 4 of the hazard and risk assessment, prilled ammonium nitrate is quoted as being under the Queensland Workplace Health and Safety Act 1995.	Yes		GHD to address.

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				11		General	Chemical Spill Management Guidelines in Section 4.12 of the EIS. Dyno Nobel already has processes in place for these issues eg ammonium nitrate and ammonium nitrate emulsions, yet reference is made to developing these from the MSDS. The problem is that there is no information in the MSDS to effectively develop emergency response and spill clean up plans.	Yes		GHD to address.
				12		General	There is conflict between the information in the MSDS and that quoted in the EIS and HARA. Eg melting point of ammonium nitrate	Yes		GHD to address.
				13		General	Hazards identified in the body of the EIS and hazard and risk assessment are not consistent with those in the MSDS.	Yes		GHD to address.
				14		General	The report states that "the sensitivity of ammonium nitrate to detonation is largely dependent on thre variables present namely high temperature, confinement and contamination. Without any of these three being present, ammonium nitrate requires a strong initiation charge (an example being high explosives) to detonate.". This is inaccurate and overly simplistic. The 3 variables are not essentia for ammonium nitrate to detonate.	Yes		GHD to address.
15	15/11/06	Robert Hutchison	Robert Huchison	1			The assessment makes no distinction between Fertilizer Grade AN (FGAN) and Technical Grade A (TGAN). The plant will produce TGAN, which is more sensitive to explosion than is FGAN. TGAN ha a lower density, which makes it more susceptible to explosion. This is a necessary property of AN that is designed to be used as an explosive precursor but is not a requirement of FGAN. The main implication of the report not making the distinction is that the report applies FGAN explosion history and FGAN recommended methodologies to a plant making the more sensitive TGAN.	Yes		GHD to address.
				2			The assessment is not clear on what were the modelled explosion scenarios. The assessment identifies the storage scenarios as being based on 2 x 6000 te stockpiles. It is not clear whether these stockpiles are of bulk prill or of FIBC (bulka bags). The report identifies various involvement fractions (10% of stockpile, 100% of stockpile) and TNT equivalence factors (32%, 55%) but is not explicit what is being modelled. This lack of clarity makes a review more difficult to undertake but ca be easily overcome through the regulator asking questions of the applicant.	Yes		GHD to address.
				3			The report considers the potential for the entire stockpile to be contaminated and rightly states that this is an extremely unlikely scenario. However, the following more likely scenario is not identified or assessed. The scenario is developed from the Cherokee accident which is discussed in the report. A vehicle accident near the stockpile (say involving a front end loader) could cause a small portion of the stockpile (say 2 tonnes) to be contaminated by fuel from the vehicle. If the accident also causes fire, as occurred during the Cherokee accident, it is credible that the contaminated small portion of the stockpile could explode. This also happened at Cherokee. However, the report does not identify the scenario where the explosion of 2 tonnes of contaminated ammonium nitrate could propagate to involve the rest of the stockpile. Recent work by Kersten, et al. [RJA Kersten, EIV van den Hengel and AC van der Steen 2006, Safety testing of ammonium nitrate products, International fertiliser society, Proceedings 580, 6 April, 2006, London.] has shown that uncontaminated, non-confined and non-heated AN can be exploded by a large nearby booster charge. I suggest that the explosion of 2	Yes		GHD to address.
				4			The report states that "The UK HSE specifies 25% efficiency and 55% TNT equivalency (NEQ 13.75%) for the determination of an overall TNT equivalence however these are primarily based on small scale stockpiling facilities with potentially less robust quality control mechanisms to prevent contamination." (p25). The reference was not given in the reference list, so I could not check exactly where the information came from. However, I suspect that it came from HSE 2002, Explosions in warehouses, Extract from HSE document SRAG – Chemical Warehouses Version 6, 26 June 2002, which states: "The consensus of opinion on ammonium nitrate hazards is that, in the event of a larg fire at an fertiliser store, a pool of liquid ammonium nitrate will be formed at the side of the stack that is nearest to the fire. If this pool is struck by a high speed missile (e.g. something falling or part of a drum that has exploded) then a local explosion will occur sending a shock wave into the main fertilis stack that has not melted.	Yes		GHD to address.

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							If this stack contains just less than 300 tonnes it will not support a detonation but will deflagrate and in doing so, will release an amount of energy equivalent to 41 tonnes of TNT. This figure is calculate on the basis of a TNT equivalence of AN of 55% and an efficiency of 25%." The quotation given above suggests that a stockpile containing greater than 300 tonnes may support a detonation, which may cause the efficiency of the reaction to be greater than 25%. This implication of the HSE is not reflected in the risk assessment report. In addition, there are no reasons given for the 25% efficiency figure. Furthermore, other HSE documents suggest other equivalence values. The 2002 HID Safety Report Assessment Guide – Chemical Warehouses Criteria recommended the TNT equivalence of ammonium nitrate to be 14% but gave no other details. The 1990 Port Risks in Great Britain from Marine Transport of Dangerous Goods in Bulk: A Risk Assessment, for The UK Health and Safety Executive, advised that for bulk piles above 2 m high, 80% would contribute to the explosion.	Yes		GHD to address
							The report gives undue authority to the values given in a single UK HSE document. In addition, the quotation suggests that a large scale stockpile would have a lower explosion potential due to the more robust mechanisms to prevent contamination. This incorrectly suggests that contamination of the stockpile is a dominant factor affecting the efficiency of explosion.	Yes		GHD to address
				5			The report uses an overpressure correlation that produces lesser effect distances for an explosion. suggest that this correlation is not conservative but is optimistic. Other correlations give significantly greater effect distances.	Yes		GHD to address.
				6			The report does not consider recent publications by Kersten et al, TNO and the French government which are less optimistic than earlier publications and reports. As these recent publications report on significant changes in thinking on the potential for explosion of ammonium nitrate, it is important that they be considered.	Yes		GHD to address.
				7			The estimation of the number of fragments produced by an explosion is stated to be conservatively assumed to be three (p.41). This number of fragments is consistent with the number of fragments produced by typical BLEVE incidents but not from explosions involving ammonium nitrate. The Port Neal explosions produced 569 identified pieces of shrapnel of various sizes. The Texas City explosions of the ships High Flyer and Grand Camp produced a large number of pieces of shrapnel and a number of these were large and travelled great distances. It is not accurate to use a shrapnel model developed for BLEVEs for ammonium nitrate explosions.	Yes		GHD to address.
				8			The report states "A worst-case scenario for the AN facilities has been identified as the detonation of 10% of an entire 6,000 tonne stockpile." (p 87) This is not correct as in point 3 above a credible scenario is developed that could result in the detonation of virtually the entire stockpile.	Yes		GHD to address.
				9			I have restricted the comments above to the explosion modelling but note that the ERPG 3 value used for ammonia is 1000 ppm, whereas I think that the current value is 750 ppm.	Yes		GHD to address.
16	15/11/06	Department of Communities	Mallani Mcarthur	1		No comments		N/A		
17	16/11/06	Department of Main Roads	Tom Orr	1	Section 7.1	Intersection	Main Roads believes that the findings of traffic analysis understate the impact of project traffic on the Moranbah Access Road intersection with the Peak Downs Highway. Main Roads is concerned safet impacts of 200 000 to 250 000 tonnes of ammonium nitrate transported through the intersection hav not been fully accounted for. Main Roads notes that the assessment of the project's operational traffic impacts on the Moranbah Access Road intersection with the Peak Downs Highway recommends a existing Type AUR treatment would be sufficient (refer page 180 of the EIS). However, Main Roads advises that, while recommending an AUR intersection is consistent with the traffic analysis, it no longer provides an adequate level of safety for the intersection, as the Type AUR treatment has recently been removed from Main Roads' Road Planning and Design Manual due to its inadequate road safety performance. A more appropriate treatment for the intersection is required on safety grounds as follows.	Yes		Dyno Nobel to state its position.

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							To maintain the road safety and efficiency of the Moranbah Access Road intersection with the Peak Downs Highway, the proponent will provide a Type CHR raised channelised right turn seagull treatment and a Type CHL raised channelised left turn treatment in accordance with Chapter 13 of the Main Roads – Road Planning and Design Manual (RP&DM) October 2006. The design shall include the following requirements: • a minimum 5.0m wide raised median to separate right turning traffic from the opposing eastbound traffic stream. • a minimum 3.5m wide auxiliary right turn lane in the through road.• a 3.5m wide through lane and a 1.5m wide shoulder for the westbound traffic on the Peak Downs Highway.• a raised concrete median in the side road generally in accordance with figure 13.84 of the RP&DM. The raised median shall extend north around the horizontal curve to the northern tangent point of the curve to provide adequate approach visibility to the nose. • full intersection lighting in accordance with chapter 17 of the RP&DM.	Yes		Dyno Nobel to state its position.
				2	Section 7.1	Road Impact	A draft Road Impact Assessment Report is provided in Appendix 7.6 of the EIS. The report has nominated a number of road links which need to be assessed on a case by case basis. The proponent is committed to further communication regarding pavement impacts on these road links. Prior to the commencement of use of the Ammonium Nitrate Plant, the proponent shall: 1. Complete the assessment of the pavement impacts on all nominated project haul routes and amend the tables and associated figures to reflect the negotiated impact assessment; 2. Identify traffic management mitigation measures and any proponent contributions for road impacts once all road links have been considered under the RIA; and 3. Complete agreed works and pay MR the agreed contributions identified in the RIA to ensure safety and efficiency of the State-controlled network impacted upon b the project.	Yes	Pavement report 7.6	DN should accept these conditions.
							The proponent may enter into an Infrastructure Agreement with Department of Main Roads to formalise mitigation measures including annual payments to Main Roads for the amelioration of pavement impacts of the development traffic for a five year period. This agreement should be then completed prior to the commissioning of the Ammonium Nitrate Plant. At the 5 year anniversary of the commissioning of the Ammonium Nitrate Plant, the proponent should: • Review the haul routes, tonnages and the pavement impact assessment report for the next 5 year period. • An updated pavement impact assessment report shall be submitted to the Central Highlands District. • If necessary, submit a new schedule of mitigation measures including any contributions required, to the Emerald office of the Department of Main Roads for agreement by other affected Main Roads Districts.	Yes	Pavement report 7.7	DN should accept these conditions.
							During the operation of the Project, the proponent shall: • Inform the Emerald office of the Department of Main Roads of any proposed changes to the existing haulage routes, haulage volumes, vehicle impacts etc which may require significant variation of the road impact assessment report and any contribution to mitigating road impacts. • The Proponent shall revise the Road Impact Assessment and re-negotiate any contributions towards addressing road impacts with the Emerald office of the Department of Main Roads. • Pay any agreed increase in contribution to the Emerald office of the Department of Main Roads prior to amending any existing haulage route/s or haulage volumes.		Pavement report 7.8	
				3	Section 7.1	Road Use Management	The draft Road-use Management Plan (RMP) (referred to as a Transport/Traffic Management Plan) does not adequately cover the key issues identified by the proponent in the report. In particular, it needs to address mitigation measures such as monitoring, notification measures advising road users of traffic restrictions, roadside clean up measures for accidents involving AN accidents, and so on for both the construction and operational phases of the project. These impacts are to be monitored and managed by strategies defined in the RMP. To assist the development of this plan, a proforma outline of the report is available from the Emerald district office. The proponent shall complete the RMP in consultation with officers from Central Highlands office of Main Roads, and undertake any required actions. The proponent should also finalise plans for any operational works (eg any ancillary works and encroachments) to be undertaken on State-controlled roads affected by the project and submit them to the Emerald office in accordance with requirements of the Transport Infrastructure (SCR) Regulation 2006.	Yes	Transport Traffic Management Plan S 5.8	GHD to address in the supplementary report.
				4	Section 7.1	Construction camp access	The type BA intersection is inconsistent with the high speed and other intersections along the 100km/hr section of Goonyella Rd. A higher standard of treatment for the left turn is recommende due to the proximity of the adjacent horizontal curve. Recommended access is a type BAR righ turn and type AUL(S) short left turn. Refer chap 13 Main Roads - Road Planning and Design Manual (RPDM). Design shall include minimum 3.5m wide auxiliary turn in through road and temporary intersection lighting (refer chap 17 RPDM). Within 2 months of commissioning of the plant, temporary access works will be removed and vegetation cover reestablished.			DN to state its position

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				5	Section 7.1	AN plant accces	Type AUR treatment for the plant access is not appropriate for the loads. It is recommended access to the plant be by a channelised, painted type CHR right turn with an AUL left turn (refer chap 13 RPDM). Also provide - min 1m wide painted median to separate right turning traffic from northboun traffic; min 3.5 m auxiliary right lane turn in the through road; 3.5m through lane and 1.5m shoulder for southbound traffic on Goonyella Rd; min 1.2m wide by 30m long raised concrete median in the side access road (refer fig 13.84 in RPDM) and full intersection lighting (refer chap 17 RPDM)			DN to state its position
				6	Section 7.1	Moranbah Access road / Mills Road intersection	EIS states that the existing AUR treatment at Mills Rd intersection should be retained, however, it is recommended that the interesection be upgraded to a type CHR painted, channelised right turn (chap 13 RPDM). Also provide - min 1m wide painted median to separate right turning traffic from southbound traffic; min 3.5 m auxiliary right lane turn in the through road; 3.5m through lane and 1.5m shoulder for northbound traffic on Moranbah Access Rd and provide/upgrade and full intersection lighting (refer chap 17 RPDM).			DN to state its position
18	16/11/06	Department of Education, Training and the Arts	Trevor Torrens	1	Section 3.2		It is recommended that further analysis on the training opportunities that the Project may deliver be included in the environmental impact statement, including a detailed profile of skills requirements.	Yes		DN to talk with Trevor about options. Outcomes may be included in the CG report.
19	16/11/06	Queensland Transport	Greg Hollands				3.2.5 Traffic and Access (Page 49) Access to the plant project site is to be provided by the adjacen Goonyella Road. The development of the access road onto the site will be undertaken early in the site works to ensure there is adequate infrastructure for the vehicle volume and size of vehicles accessing the site and to ensure that sufficient measures are adopted to mitigate impacts on the pipeline infrastructure that moves across the front of the site.**THIS IS APPROPRIATE**	No		
				DoT 1	Section 7.2		The construction process of the plant will involve a component of prefabrication and modularisation. Some items will require oversize transport, comprising an estimated 15 to 20 vehicles, during construction. Specific routes, times and escorts will be arranged with the appropriate agencies **Consultation with appropriate agencies in relation to these oversize transport movements should include consultation with Queensland Transport and Main Roads.**	Yes		DN to agree - likely to be included in the CG report
				DoT 2	Section 7.2		The last paragraph on Page 50 is poorly worded and confusing. The sentence, "A separate access track from Goonyella Road will be constructed to reduce traffic demand on the external transport network", seems to be misleading. The separate direct driveway access to the construction camp (b itself) would mainly reduce internal traffic pressure and congestion at the main project site entrance **A better description may be as follows:** **A separate and direct access track will be constructed between the construction camp and the AN plant, which will reduce traffic demand on the external road network.**	Yes		DN to clarify in supplementary report
				DoT 3	Section 13.1		3.3.7 Heat Recovery (Page 57) The last sentence in paragraph 1 states: "However, it is discharge as CO2 and not as methane, which has a thirty times the CO2 GHG effect." **The reference to 30 times is inconsistent with the Global Warming Potential (GWP) of methane indicated by its usual quoted rating as 21 times CO2, and as referenced previously in paragraph 4 on Page 27.**	Yes		DN to clarify in supplementary report
				DoT 4	Section 7.2		3.5.1 Transport Infrastructure Construction Phase (Page 63) Buses will be used to transport construction staff to and from the construction site, with an average vehicle occupancy of 15 persons per vehicle originating from the campsite. This will be by the proposed internal access road between the construction camp and the AN plant, without need to access Goonyella Road. This will generally improve road safety and minimise demand on the external road network, namely Goonyella Road. **This is appropriate.**	No		
				DoT 5	Section 7.2		3.5.1 Transport Infrastructure Method of Movement (Page 65) In the operations phase, the finished AN product is to be delivered by the road network to a variety of regional mine sites. The average number of heavy vehicle movements generated per day during operations is likely to be eighteen. This to include: 13 B-Triples (65t load) and 4 B-Doubles (50t load) to deliver AN product, and 1 B-Double to remove waste. During construction, it is estimated that 2 B-Doubles per day would deliver construction materials ar plant to the site, while 3 B-Doubles would remove waste. **These estimates are consistent with other information provided on the construction and operational phase transport requirements.**	No		

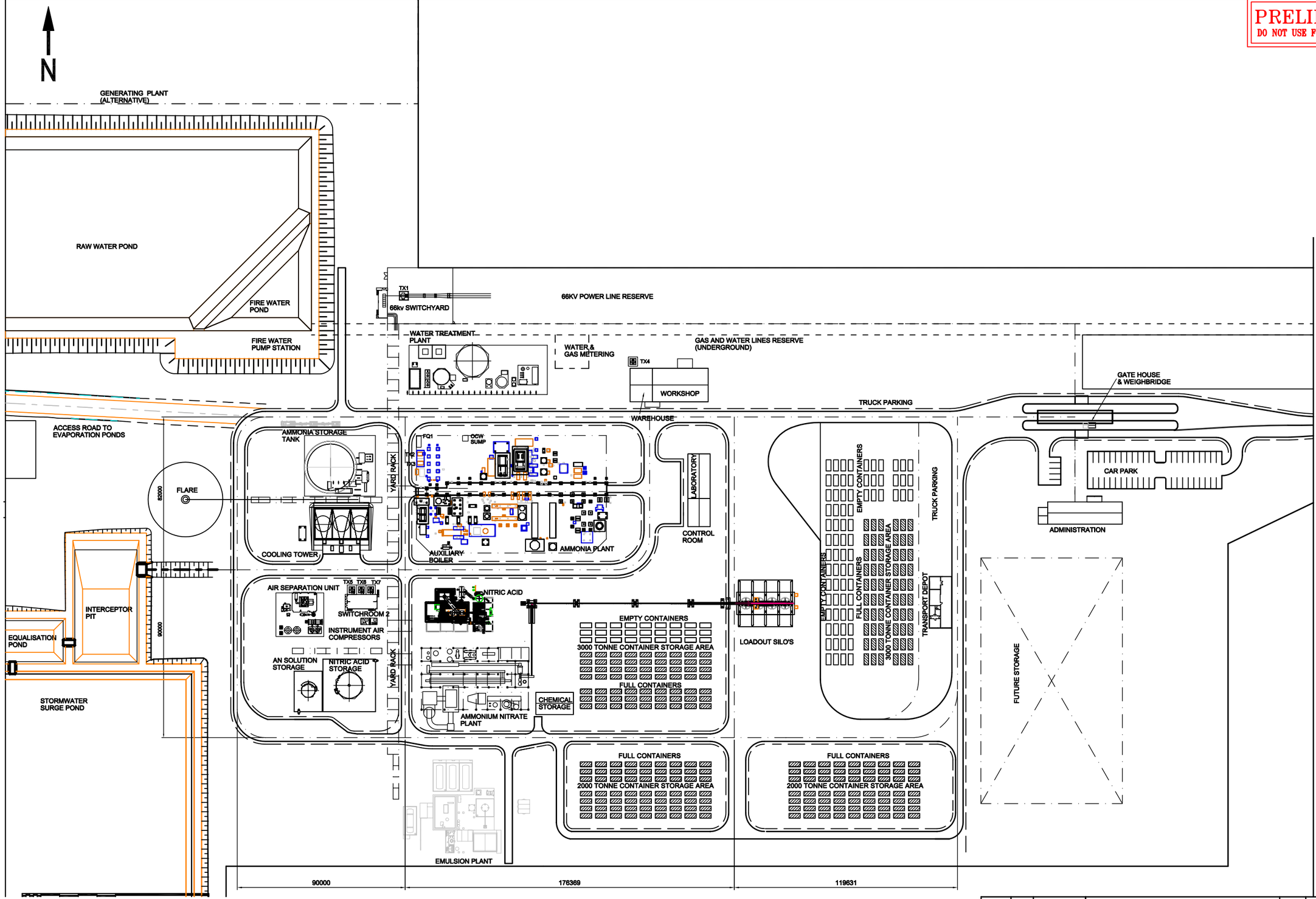
Sub. No.	Date	Submitter	Contact	Issue No.	Ref Section Supplementary Report	Major Issues - General	Major issues - details	Address in Supplementary Report?	Relevant Section of EIS	Comments to GHD / Dyno Nobel
				DoT 6	Section 7.2		Proposed Routes (Page 65) The proposed roads to be used for transporting material from the plant to destination mines are to be limited to those that are designed to carry B-Triples and B-Doubles. The proposed routes have been discussed with Main Roads and are shown on Main Road Maps as per Figures 3-6 Pages 32-35 of the EIS. **This is appropriate.**	No		
				DoT 7	Section 7.2		Maintenance and Upgrading of Key Transport Infrastructure Elements (Page 66) Traffic studies have been conducted to assess the construction and operational impacts on the existing transport infrastructure (per Section 4.11). A Pavement Impact Study has also been undertaken to determine the impact on the existing road infrastructure and provision of contributions for maintenance to DMR and local authorities. **This is appropriate.**	No		
				DoT 8	Section 7.2		Rail Transportation (Page 66) The EIS states: "Rail infrastructure is located within 3km of the AN Plant on the Blair Athol Railway Line. In its current form however there are insufficient facilities to support transportation of AN product to the market. This may be a future opportunity for the AN Plant. At this stage however there is no intention to transport product by rail." **The nearby rail network and rail services principally comprise a dedicated coal rail system. The end users of the AN product are multiple mining operations located relatively nearby in the Northern Bowen Basin and the North West Mineral Province. The movement of AN product in relatively small consignments, by rail would not be particularly cost effective or efficient. The use of road transport is understandable and appropriate**	No		DN to note.
				DoT 9	Section 13.1		3.5.2 Energy (Page 66) The energy requirements of the project will be provided through the development of an on-site gas-fired power generation facility. The generation facility will comprise nine (nominally 2MW) reciprocating gas engines (comprising total of 18MW capacity). Coal seam methane (CSM) will be used in electricity generation, as well as for manufacture of ammonia for emulsion and AN. **This use of CSM in local power generation is a welcome development. It has the potential to also facilitate (longer-term) the expanded use of Coal Mine Methane (CMM) and CSM through pre-drainage of coal seams prior to underground and open-cut coal mining, in small-scale power generation Methane is a potent greenhouse gas which is 21 times more effective as a contributor to global warming than an equivalent amount of CO2. Several Bowen Basin coa miners have already implemented similar CSM and power-generation facilities. Over time there is likely to be more coal miners and CSM operators seeking to supply methane to an expanding regional gas pipeline network for use in power generation or other industrial proc**	No		
				DoT 10	Section 7.2		4.11.2 Potential Impacts and Mitigation Measures Pavement (Page 173) A Pavement Impact Study has been prepared a part of the supporting documentation for the Traffic Impact Assessment Report. The assessment showed that the AN Plant will generate significant heavy vehicle traffic increases (> 5% increase in existing heavy vehicle volumes per year) on a number of roads. **The broad proposal that the project make financial contribution to MR Districts and local government shires for road maintenance is appropriate.**	No		
				DoT 11	Section 7.2		Traffic Assessment (Page 175) For the development of the AN Plant site and the construction campsite, two intersections will need to be developed. The EIS proposes a range of type-intersection forms **Consultation should be undertaken with DMR on the proposed intersection designs to determine their appropriateness and adequacy.**	Yes		DN to make this undertaking
							Facility Description (Page 190) AN Dispatch AN Product is to be dispatched to customers in bulk. Prill is to be transported either (mainly) in truck tanks or 1.2t Bulka bags, both loaded from a conveyor and hopper. Bulka bags are loaded onto truc trays using a forklift. AN Product is not classified as an explosive. The chance of explosion is very lo as the material requires the combination of contamination, heat and pressure. AN Prill and emulsion will be transported in accordance with the requirements of the National Code for Transport of Dangerous Goods. **This is appropriate.**	No		

Sub. No.	Date	Submitter	Contact	Issue No.	Ref Section Supplementary Report	Major Issues - General	Major issues - details	Address in Supplementary Report?	Relevant Section of EIS	Comments to GHD / Dyno Nobel
				DoT 12	Section 13.1		4.14 Greenhouse Gas Emissions Energy Use (P201) Excluding natural gas emissions, the total CO emission is 431,000 tonnes pa, more than 15 million tonnes of CO2 over the 35 yr life of the project. This is a reasonably significant amount, given that CO2 has a 50-200 yr Atmospheric Lifetime. The 2nd last paragraph reports a maximum annual CO2 production of 469,000 tonnes, and states: "This is considered to be minor, approximately 0.08% of national emissions and approximately 0.27 of Queensland's annual emissions". The logic embedded in this conclusion is out-of-date. While these emissions are relatively small in comparison to total National and State emissions, the logic therein implies that individual projects don't contribute much to overall climate change and therefore shouldn't have to take significant measures now or in the future to reduce emissions. Acceptance of this logic means that most large Australian and Queensland stationary industrial emitters &medium-scale power stations would not be expected to have to reduce their emissions.	Yes		DN to clarify
							This is not sustainable. There is growing evidence that global warming is accelerating and its impacts are being amplified by a range of feed-back loops. The world's most authoritative body on climate change the Inter-governmental Panel on Climate Change (IPCC) has warned that we potentially face dangerous climate change within 50 years, and severe disruption to the earth's life-sustaining ecosystems. As a measure of the seriousness and magnitude of the challenge, the scientific consensus is that advanced countries like Australia will need to reduce their total greenhouse emissions by 60-80% below 1990 levels by 2050, to avoid dangerous climate change. **The text should be amended to read: "On an annual basis this represents, approximately 0.08% of national emissions, and approximately 0.27% (maximum 0.3%) of Queensland's annual emissions. Over the 35 year life of the project however this represents in excess of 1 million tonnes of CO2, a reasonably significant amount."**			
				DoT 13	Section 7.2		5.8 Transport/Traffic Management Plan Control measures for implementation during the construction phase include, the preparation of a Traffic Management Plan, measures to assist the safe movement of heavy/over-dimensioned loads to the project site, measures to acquire all appropriate permits from transport and related authorities, and measures to ensure the safe and secure transport of hazardous and dangerous goods. **These measures are appropriate**	No		
				DoT 14	Section 7.2		5.15.2 Draft Operations Environmental Management Plan Air and Noise (Page 253) Mitigation strategies in relation to greenhouse gas emissions include: • Public reporting of greenhouse emissions and progress on greenhouse mitigation measures. • Obtain and maintain membership of the Commonwealth Government Greenhouse Challenge Program. **These measures are appropriate.**	No		
				DoT 15	Section 7.2		Appendix 7.6 Pavement Impact Assessment In developing the EIS the proponents have prepared a Pavement Impact Assessment Report in accordance with the DMR publication "Guidelines for Assessment of Road Impacts of Development Proposals". **Advice on the adequacy of this assessment and the proposed quanta of financial contributions to DMR and local authorities for road maintenance, should be sought from Mai Roads and the relevant local authorities.**	Yes		DN to confirm
				DoT 16	Section 13.1		Appendix 7.9 Greenhouse Assessment Report 3.6 Summary of Emissions Estimates (Page 6) Consistent with our previous comments in relation to 4.14 Greenhouse Gas Emissions, outlined above: **The last sentence in Paragraph 2 should be replaced, with the following text:** **"On an annual basis this represents, approximately 0.08% of national emissions, and approximately 0.27% (maximum 0.3%) of Queensland's annual emissions. Over the 35 year life of the project however this represents in excess of 15 million tonnes of CO2, a reasonabl significant amount."**			GHD to clarify
20	15/11/06	Department of Housing	Natalie MacDonald	DoH 1	Section 3.3		The Department expects the Supplementary Environmental Impact Statement to clarify and provide firm commitments to the proponent's accommodation strategy that will ensure no further pressure is placed on the housing markets in Moranbah.	Yes		GHD to clarify in supplementary report.

Appendix B

AN Plant Layout

PRELIMINARY
DO NOT USE FOR CONSTRUCTION



REFERENCES	DRG No	TITLE
	60001-272-3G71-0002_D-A	GENERAL ARRANGEMENT PLAN

REFERENCES	DRG No	TITLE

REVISIONS	REV	DRN	DATE	DESCRIPTION	CHK	APP

REVISIONS	REV	DRN	DATE	DESCRIPTION	CHK	APP
	A	MG	07/11/2006	ORIGINAL ISSUE.	-	-
	B	MG	08/11/2006	Container Layout Revised	-	-
	C	MG	09/11/2006	Storage and Transport Depot Added	-	-
	D	MG	29/11/2006	Storage Area Updated (Tonne)	-	-
	E	MG	04/12/2006	Emulsion Tank Added	-	-

DYNO
Dyno Nobel

MARK No.	QTY.	MATERIAL	DESCRIPTION	MASS kg.	REMARKS

SCALE 1 = 1000 (N.T.S = NOT TO SCALE)

	SIGNATURE	DATE
DRAWN	Marina S	07/11/2006
CHECKED		
APPROVED		
DESIGN ENG		

CONTRACT No. 147

CLIENT QNB Moranbah

DRAWING No. 147-3-009

TITLE
QUEENSLAND AMMONIUM NITRATE PLANT
MORANBAH PLANT SITE
PROPOSED PLANT LAYOUT
SITE LAYOUT

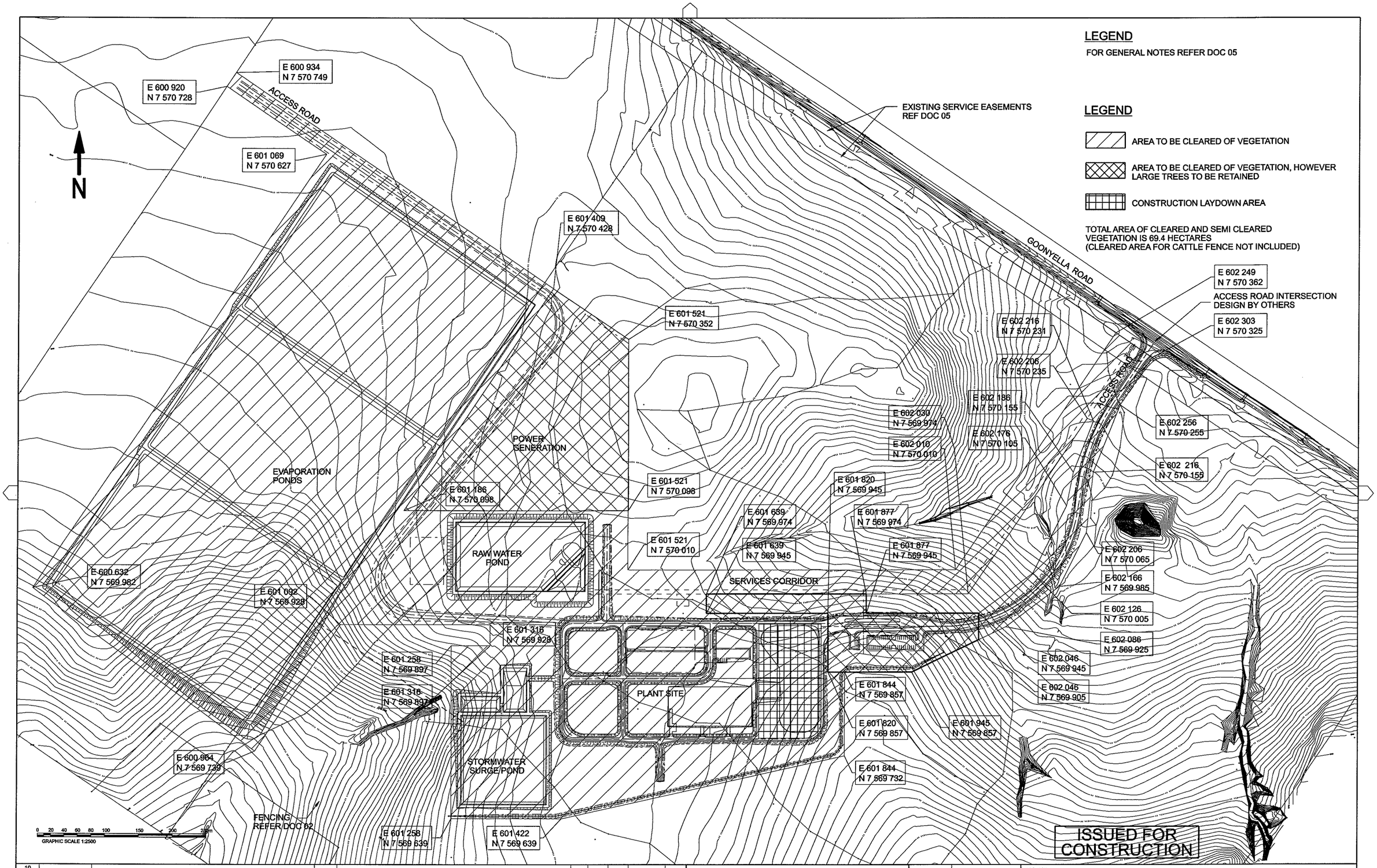
DYNO
Dyno Nobel

REVISION E

A1

Appendix C

AN Plant Access Intersection



REF	DOCUMENT No	TITLE
10		
09		
08		
07		
06	272-3Y71-1002	DRAWING INDEX PLAN - CIVIL
05	272-3Y71-1001	OVERALL PLANT LAYOUT - CIVIL
04	272-3Y71-0006	CULTURAL INTEREST PLAN
03	272-3G71-0001	OVERALL PLANT LAYOUT
02	272-3Y71-0005	FENCING PLAN
01	272-3G71-0002	PLANT ARRANGEMENT PLAN

REFERENCE DOCUMENTS

No	DESCRIPTION	DRN	CHK'D	APP'D	DATE	CLIENT
0	ISSUED FOR CONSTRUCTION	NRG	RP	PR	27/11/06	

REVISIONS

United Group Resources

DESIGNED	R KIRKE
DRAWN	K TINSLEY
CHECKED	R PEARCE
DISCIP. ENGR.	P RUSHTON
DESIGN MGR.	P RUSHTON
ENG. MGR.	R KIRKE
SCALE	1:2500

PROJECT: DYNO NOBEL AMMONIUM NITRATE COMPLEX

TITLE: MORANBAH PLANT SITE
GENERAL PLANT
PLANT SITE
VEGETATION CLEARING PLAN

DWG No. 600001-272-3Y71-0003

REV. 0

...\600001-272-3Y71-0003_0.mrg 27/11/2006 8:16:03 AM USER:neville.grigsby

Appendix D

Cultural Heritage Searches

Queensland Heritage Act 1992

Part 3 - The Heritage Register

Extracts from the Heritage Register

32.(1) The Council must, on application by a member of the public and payment of the prescribed fee -

(a) provide a certified copy of any entry in the heritage register; or

(b) provide a certificate as to whether a property is affected by an entry in the heritage register or is otherwise affected by the provisions of this Act.

32.(2) A certified copy of an entry in the heritage register is admissible as evidence in legal proceedings and, in the absence of proof to the contrary, is to be taken as proof of the entry and of its contents.

Part 4 - Registration of Places

Criteria for entry in the Register

34.(1) A place may be entered in the heritage register if it is of cultural heritage significance and satisfies 1 or more of the following criteria-

(a) the place is important in demonstrating the evolution or pattern of Queensland's history;

(b) the place demonstrates rare, uncommon or endangered aspects of Queensland's cultural heritage;

(c) the place has potential to yield information that will contribute to an understanding of Queensland's history;

(d) the place is important in demonstrating the principal characteristics of a particular class of cultural places;

(e) the place is important because of its aesthetic significance;

(f) the place is important in demonstrating a high degree of creative or technical achievement at a particular period;

(g) the place has a strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;

(h) the place has a special association with the life or work of a particular person, group or organisation of importance in Queensland's history;

(2) A place is not to be excluded from the heritage register on the ground that places with similar characteristics have already been entered in the register.

(3) A place does not satisfy the criteria for entry in the heritage register if there is no prospect of the cultural heritage significance of the place being conserved.

(4) A place may be entered in the heritage register even if the part of the place does not fully satisfy a criterion in subsection (1) but only if it forms part of a streetscape that satisfies a criterion in subsection (1) or is adjacent to a registered place and exhibits the characteristics of the registered place and failure to enter the place would reduce the overall cultural heritage significance of the streetscape or the registered place.

Queensland Heritage Act 1992

Certificate of affect pursuant to Section 32 (1) (b).

(see reverse side of form)

Reference: *CA31307*

File Number: *0*

Certificate issued under Section 32(1)(b) of the *Queensland Heritage Act 1992* (the "Act") as to whether a place is affected by an entry in the Heritage Register or is otherwise affected by the provisions of the Act.

This is to certify that the place described as,

[name of place]	*Property*
and located at [address of place]	*Adjacent to Goonyella Road, Moranbah*
[real property description]	*13/SP191679 Parish of BROADMEADOW, County of GROSVENOR*
in the local government area of [name of local government authority]	*BELYANDO SHIRE COUNCIL*

is not affected by the provisions of the Act;

For Chairperson, Heritage Council

Date: 27 November 2006

Note: This certificate is valid at the date of issue only.

Fee received: $28.50

Your reference:

Client Details:

Queensland Government
Environmental Protection Agency

GHD
GPO Box 668
BRISBANE QLD 4001

Queensland Heritage Act 1992

Part 3 - The Heritage Register

Extracts from the Heritage Register

32.(1) The Council must, on application by a member of the public and payment of the prescribed fee -

(a) provide a certified copy of any entry in the heritage register; or

(b) provide a certificate as to whether a property is affected by an entry in the heritage register or is otherwise affected by the provisions of this Act.

32.(2) A certified copy of an entry in the heritage register is admissible as evidence in legal proceedings and, in the absence of proof to the contrary, is to be taken as proof of the entry and of its contents.

Part 4 - Registration of Places

Criteria for entry in the Register

34.(1) A place may be entered in the heritage register if it is of cultural heritage significance and satisfies 1 or more of the following criteria-

(a) the place is important in demonstrating the evolution or pattern of Queensland's history;

(b) the place demonstrates rare, uncommon or endangered aspects of Queensland's cultural heritage;

(c) the place has potential to yield information that will contribute to an understanding of Queensland's history;

(d) the place is important in demonstrating the principal characteristics of a particular class of cultural places;

(e) the place is important because of its aesthetic significance;

(f) the place is important in demonstrating a high degree of creative or technical achievement at a particular period;

(g) the place has a strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;

(h) the place has a special association with the life or work of a particular person, group or organisation of importance in Queensland's history;

(2) A place is not to be excluded from the heritage register on the ground that places with similar characteristics have already been entered in the register.

(3) A place does not satisfy the criteria for entry in the heritage register if there is no prospect of the cultural heritage significance of the place being conserved.

(4) A place may be entered in the heritage register even if the part of the place does not fully satisfy a criterion in subsection (1) but only if it forms part of a streetscape that satisfies a criterion in subsection (1) or is adjacent to a registered place and exhibits the characteristics of the registered place and failure to enter the place would reduce the overall cultural heritage significance of the streetscape or the registered place.

Queensland Heritage Act 1992

Certificate of affect pursuant to Section 32 (1) (b).

(see reverse side of form)

Reference: *CA31306*

File Number: *0*

Certificate issued under Section 32(1)(b) of the *Queensland Heritage Act 1992* (the "Act") as to whether a place is affected by an entry in the Heritage Register or is otherwise affected by the provisions of the Act.

This is to certify that the place described as,

[name of place] — *Property*

and located at [address of place] — *Adjacent to Goonyella Road, Moranbah*

[real property description] — *14/SP191699 Parish of BROADMEADOW, County of GROSVENOR*

in the local government area of [name of local government authority] — *BELYANDO SHIRE COUNCIL*

is not affected by the provisions of the Act;

For Chairperson, Heritage Council

Date: 27 November 2006

Note: This certificate is valid at the date of issue only.

Fee received: $28.50

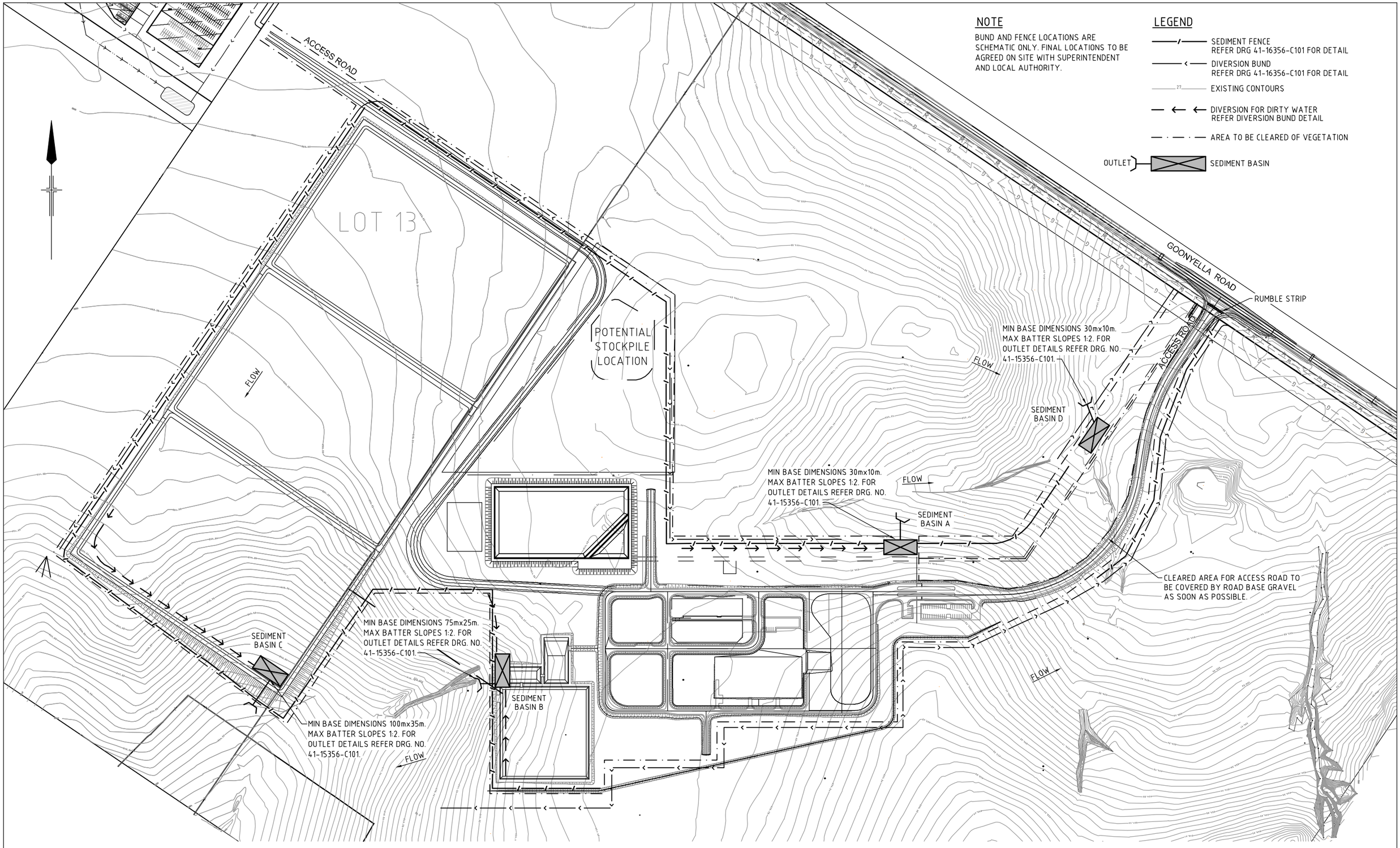
Your reference:

Client Details:
GHD
GPO Box 668
BRISBANE QLD 4001

Queensland Government
Environmental Protection Agency

Appendix E

Stormwater Management Plan Drawings (Construction)



PRELIMINARY

No	Revision	Drawn	Checked	Approved	Date
B	AMENDED PRELIMINARY ISSUE	CI			11/12/06
A	PRELIMINARY ISSUE	AWG			

Note: * indicates signatures on original issue of drawing or last revision of drawing.

GHD CLIENTS | PEOPLE | PERFORMANCE
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GPO Box 668 Brisbane QLD 4001
T 61 7 3316 3000 F 61 7 3316 3333
E bnemail@ghd.com.au W www.ghd.com.au

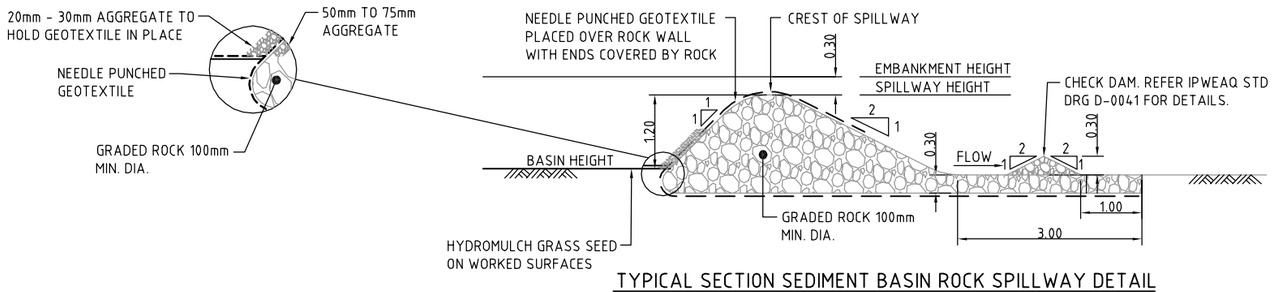
DO NOT SCALE

Drawn	A.GIBSON	Designed	F.GISHKORI
Drafting Check		Design Check	
Approved			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client: DYNO NOBEL
Project: MORANBAH A.N. PLANT CONSTRUCTION CAMP
Title: SEDIMENT AND EROSION PLAN

Original Size: A1
Drawing No: 41-16356-C100
Rev: B

Plot Date: 15 December 2006 - 12:07 PM
Cad File No: G:\41\16356\CADD\Drawings\Civil\41-16356-C100.dwg



TYPICAL SECTION SEDIMENT BASIN ROCK SPILLWAY DETAIL

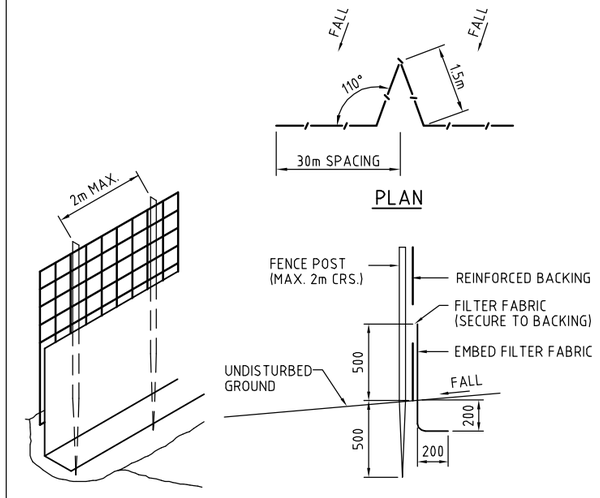
N.T.S.

GENERAL NOTES

1. THE SEQUENCE OF OPERATIONS SHALL BE AS FOLLOWS:
   - (i) DELINEATION OF BUFFER AREAS AND DRAINAGE RESERVES, ERECTION OF BARRIER FENCING.
   - (ii) LOCATION OF TOPSOIL STOCKPILES AND ERECTION OF DOWNHILL SEDIMENT FENCE.
   - (iii) CONSTRUCTION OF DIVERSION WORKS NECESSARY TO MINIMISE RUNOFF FROM ENTERING THE SITE.
   - (iv) THE CONSTRUCTION OF TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES (E.G. SILT FENCES).
   - (v) LAND CLEARING AND TOPSOIL STRIPPING.
   - (vi) CONSTRUCTION OF STORMWATER DRAINAGE FACILITIES.
   - (vii) LAND SHAPING.
   - (viii) CONSTRUCTION OF ROADS AND ACCESS WAYS, INSTALLATION OF SERVICES.
   - (ix) FINAL REHABILITATION AND LANDSCAPING.
   - (x) MAINTENANCE.
2. ALL SEDIMENT FENCES ARE TO BE INSTALLED PARALLEL TO CONTOURS.
3. SEDIMENT FENCES ARE TO BE INSTALLED DOWNHILL AND DIVERSION BANKS UPHILL OF TOPSOIL STOCKPILES.
4. TOPSOIL STOCKPILES ARE TO BE MULCHED OR TEMPORARILY VEGETATED IF THEY ARE TO REMAIN FOR MORE THAN 30 DAYS.
5. MOVEMENT OF CONSTRUCTION EQUIPMENT SHALL BE LIMITED TO THE AREA OF WORK AND EXISTING ROADS. CONTRACTOR TO CONSTRUCT ENTRY/EXIT SEDIMENT TRAP ALTERNATIVE 2, REFER IPWEAQ DWG D-0040. LOCATION TO BE CONFIRMED BY CONTRACTOR.
6. DISTURBED AREAS ARE TO BE GRASSED FOLLOWING FINAL TRIMMING, AREAS ARE TO BE DISTURBED AND RESTORED PROGRESSIVELY.
7. ALL EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE INSPECTED AND MAINTAINED AFTER EACH STORM EVENT AND AT REGULAR INTERVALS.
8. KERB AND/OR SURFACE INLET SEDIMENT TRAPS ARE TO BE PROVIDED AT EACH DRAINAGE PIT UNTIL ADJACENT DISTURBED AREAS ARE FULLY RESTORED.
9. FILTER ROLLS TO BE PROVIDED AT ALL STORMWATER INLET PITS.
10. ALL SEDIMENT CONTROL DETAILS SHOWN ARE INDICATIVE ONLY. REFER TO THE SPECIFICATION FOR DETAILS OF THE CONTRACTORS RESPONSIBILITIES IN RELATION TO EROSION AND SEDIMENT CONTROL ON THE SITE.
11. MAINTAIN SEDIMENT CONTROL DEVICES UNTIL NEW GROUND IS ESTABLISHED.
12. THE CONTRACTOR SHALL INSTALL ADDITIONAL EROSION CONTROL DEVICES AS DESCRIBED IN QUDM 9.03.5 WHERE DIRECTED. TO MINIMISE EROSION AND DOWNSTREAM SEDIMENT TRANSPORT.
13. DUST CONTROL SCREENS TO BE CONSTRUCTED AROUND PERIMETER OF WORKS AS DIRECTED.
14. STOCKPILES, BORROW PITS, STORAGE AREAS TO BE CONSTRUCTED IN ACCORDANCE WITH PRINCIPLES DETAILED IN SECTION A.6.3 SOIL EROSION AND SEDIMENT CONTROL GUIDELINES FOR QUEENSLAND CONSTRUCTION SITES, JUNE 1996, IPWEAQ.
15. SEDIMENT FENCES AND/OR CHECK DAMS TO BE INSTALLED AT THE ENDS OF DIVERSION BUNDS.

EROSION AND SEDIMENT CONTROL NOTES

1. CONSTRUCTION OF ALL SEDIMENT MANAGEMENT DEVICES SHALL BE COMPLETED AND EFFECTIVE PRIOR TO:
   - STRIPPING OF TOPSOIL AND GRASS
   - BULK EARTHWORKS TO THE SITE
   - SERVICE INSTALLATION
2. ALL SEDIMENT MANAGEMENT DEVICES ARE TO REMAIN IN PLACE UNTIL WRITTEN NOTICE FROM LICENSING AND COMPLIANCE.
3. BOTH TEMPORARY AND PERMANENT SEDIMENT MANAGEMENT DEVICES SHALL BE MAINTAINED AT A SUITABLE LEVEL/CONDITION THROUGHOUT CONSTRUCTION. SEDIMENT FENCES ARE TO BE CLEANED OUT WHEN CAPACITY IS REDUCED BY 25%.
4. PRIOR TO COMMENCEMENT OF CONSTRUCTION APPROVAL IS TO BE OBTAINED FROM LICENSING AND COMPLIANCE FOR THE LOCATION OF THE SITE ACCESS POINT WASH DOWN AREA WHICH ARE TO BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD.
5. IF EROSION AND SEDIMENT CONTROL DEVICES HAVE BEEN FOUND TO BE DEFICIENT OR FAILED IN SERVICE, DUE TO UNFORESEEN CIRCUMSTANCES, CORRECTIVE ACTION IS TO BE UNDERTAKEN IMMEDIATELY WHICH MAY INCLUDE AMENDMENTS/ ADDITIONS TO THE ORIGINAL APPROVED EROSION PLANS. SUCH ADDITIONS ARE TO BE APPROVED BY THE LOCAL AUTHORITY
6. THE INSTALLATION, REMOVAL, RELOCATION OR MODIFICATION TO EROSION AND SEDIMENT CONTROL DEVICES MAY BE MADE BY THE LOCAL AUTHORITY IF DEEMED NECESSARY AND RELEVANT.



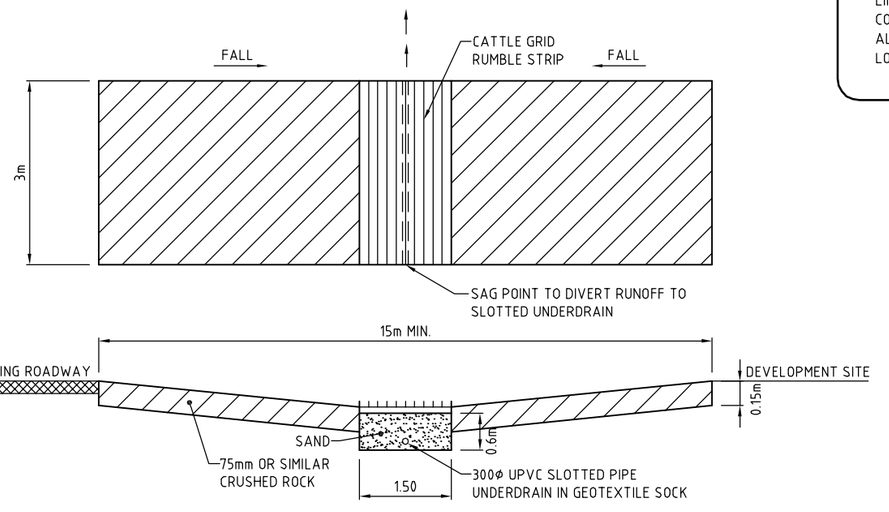
PLAN

ISOMETRIC

SECTION

SEDIMENT FENCES
NTS

SEDIMENT CONTROL DETAILS



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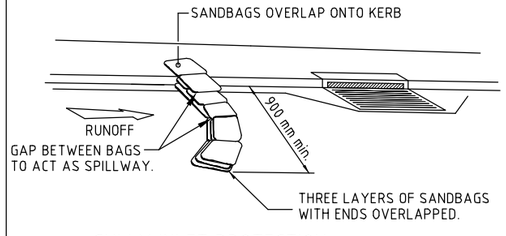

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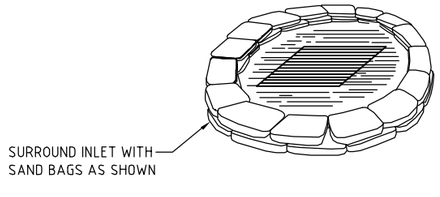

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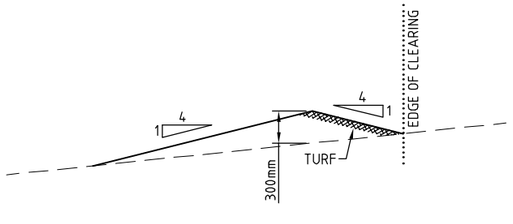

DIVERSION BUND DETAIL
NTS

MAINTENANCE OF SEDIMENT CONTROL DEVICES.
ALL DEVICES SHOWN ARE TO BE IN PLACE PRIOR TO CONSTRUCTION. THEY ARE TO BE MAINTAINED IN GOOD CONDITION THROUGHOUT THE CONTRACT AND MAINTENANCE PERIOD. SEDIMENT BUILD UP IS TO BE REMOVED FROM THESE DEVICES AT REGULAR INTERVALS, ESPECIALLY IN WET WEATHER TO MAINTAIN THEIR EFFECTIVENESS

ALL SEDIMENT AND EROSION CONTROL MEASURES ARE TO BE IN ACCORDANCE WITH THE SOIL EROSION AND SEDIMENT CONTROL - ENGINEERING GUIDELINES FOR QUEENSLAND SITES PUBLISHED BY THE INSTITUTION OF ENGINEERS, AUSTRALIA, QUEENSLAND DIVISION, 1996.

PRELIMINARY

No	Revision	Drawn	Checked	Approved	Date
B	AMENDED PRELIMINARY ISSUE	CI			11/12/06
A	PRELIMINARY ISSUE	AWG			

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Title: SEDIMENT AND EROSION DETAILS

Original Size: A1
Drawing No: 41-16356-C101
Rev: B

Plot Date: 15 December 2006 - 12:06 PM
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Appendix F

Hazard and Risk

Dyno Nobel Asia Pacific Limited

Proposed Ammonium Nitrate Plant, Moranbah, Queensland

Hazard and Risk Assessment

December 2006

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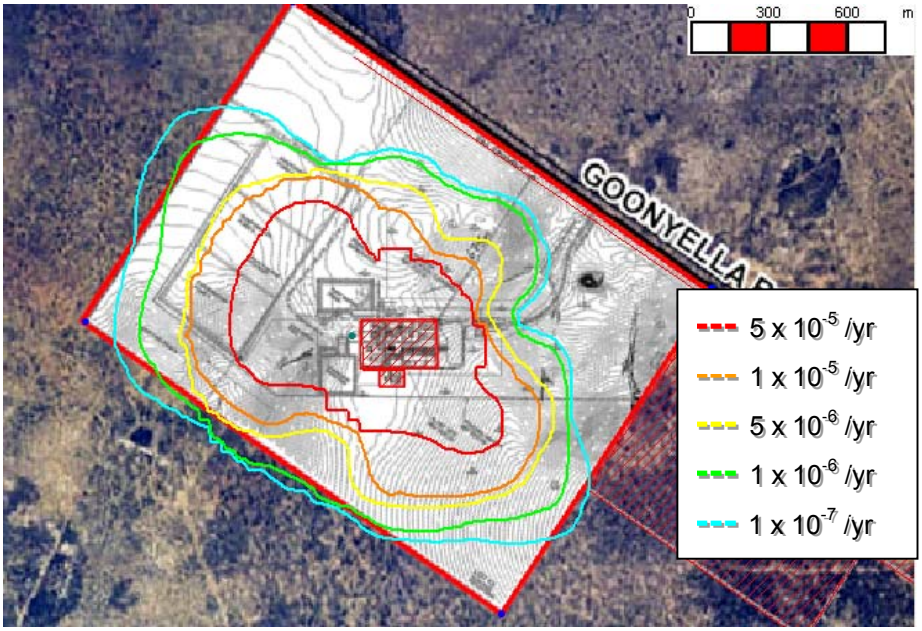
Executive Summary

GHD Pty Ltd have been commissioned by Dyno Nobel Asia Pacific Limited (DN) to conduct a Hazard and Risk Assessment (H&RA) in response to issues raised within the EIS.

This H&RA will form part of the Environmental Impact Statement (EIS) being developed by GHD to address the offsite risk to surrounding populations hence demonstrating the adequacy of location with respect to Land-Use Safety Planning (LUSP) requirements.

The H&RA following remodelling of changes as raised, proposed Ammonium Nitrate production facilities remain compliant with the relevant Queensland CHEM Services Land-Use Safety Planning (LUSP) criteria for offsite individual risk presents the Location Specific Individual Risk (LSIR) contours developed in this study. The land to the north and west of Moranbah is privately owned and access to the area is via the industrial service road (Goonyella Rd). Transfield and Enertrade have adjacent sites, which are currently undeveloped and are expected to be unmanned[1]. A gas-fired power station is located onsite to the north of the facility.

Figure 1 Dyno Nobel Proposed Ammonium Nitrate Plant LSIR Profile



The major risk contributors are releases from the Ammonia Tank Storage situated at the AN Facility. The tank inventory (5000 tonnes) means that the risk profile will always remain high, as Ammonia is a highly toxic chemical.

[1] This is based on discussions with staff from each company.

Recommendations

The following recommendations have been considered by DN for incorporation into the design:

1. Dyno Nobel Asia Pacific Limited to introduce a minimisation program to reduce, where possible, (by engineering design) the number of small-bore fittings, valves, and flanged joints on equipment operating with toxic chemicals. These equipment items were assessed to constitute the greatest proportion of leaks affecting offsite areas. This reduces the volume stored and potential leaks. This matter should also be addressed in the development of the piping material specification. Screwed joints should not be used.
2. Update the Quantitative Risk Analysis once the facility design is finalised and modify the Safety Management System (SMS) via the Major Hazard Facility Safety Case. The update will incorporate onsite risks and any potential changes to the population in the area since the H&RA was completed.
3. An integrated communication system encompassing mines/council (emergency services)

Glossary

ALARP	As Low As Reasonably Practicable
AN	Ammonia Nitrate
AS	Australian Standard
BOM	Bureau of Meteorology
DCS	Distribution Control System
DME	Department of Mines and Energy
DN	Dyno Nobel Asia Pacific Limited
EIS	Environmental Impact Statement
ERPG	Emergency Response Planning Group
GHD	GHD Pty Ltd
H&RA	Hazard and Risk Assessment
HIPAP	Hazardous Industry Planning Advisory Paper
LSIR	Location Specific Individual Risk
LUSP	Land-Use Safety Planning
MHF	Major Hazard Facility
NDT	Non-destructive Testing
NEQ	Net Equivalent Quantity
NOHSC	National Occupational Health and Safety Commission
PFD	Process Flow Diagram
PHAST	Process Hazard Analysis Software Tool
PLL	Potential Loss of Life
PPE	Personal Protective Equipment
PSA	Pressure Swing Adsorption
QLD	Queensland
QRA	Quantitative Risk Assessment
SMS	Safety Management System
SSAN	Security Sensitive Ammonium Nitrate

1. Introduction

1.1 Background

GHD Pty Ltd (GHD) were commissioned by Dyno Nobel Asia Pacific Limited (DN) to conduct a Hazard and Risk Assessment (H&RA) of the proposed Ammonium Nitrate and Ammonium Nitrate Emulsion Facilities (the project) to be built on the site along Goonyella Rd near Moranbah, Queensland. This H&RA update will form part of the Environmental Impact Statement (EIS) being developed by GHD Environmental Department (Brisbane), by addressing the offsite risk to surrounding populations hence demonstrating the adequacy of location with respect to Land-Use Safety Planning (LUSP) requirements after comment by relevant stakeholders.

The project will now produce approximately 330,000 tonnes per year of Ammonium Nitrate (AN) Prill with storage of up to 12000 tonnes (this includes AN moving through the manufacturing process) of AN product distributed between storage containers of AN prill, and emulsion tanks. The project will use coal seam methane gas from the nearby coal deposits as a feedstock to the Ammonia plant.

Technical grade AN prill and emulsion are the major raw materials for the most widely used explosives in open cut mining operations. Prilled AN is produced as small, solid, round non-volatile granules and is classified as a Class 5.1 oxidising agent under the Queensland Workplace Health and Safety Act 1995 and associated codes and regulations. This product is stable and non-volatile. AN emulsion is a precursor for in-situ explosives manufacturing and AN is used in the emulsion manufacturing process. Ammonium Nitrate is classified as an Explosive under the Explosives Regulation 2003, which is regulated by the Explosives Inspectorate of the Department of Mines and Energy.

DN is looking to increase its production capabilities within Australia to meet growing demands in the region. Demand for AN is high in Queensland and the timing of new supply will be consistent with the development of new mines within the area. DN therefore proposes to construct and operate an AN Prill and Emulsion plant in the Moranbah area, Queensland, if the timing can meet customer expectations. However, like any other processing or storage facility, if not designed, sited, and operated correctly, it has the potential to cause harm to workers/public, damage to property and the environment, and/or disruption to adjacent/dependent businesses.

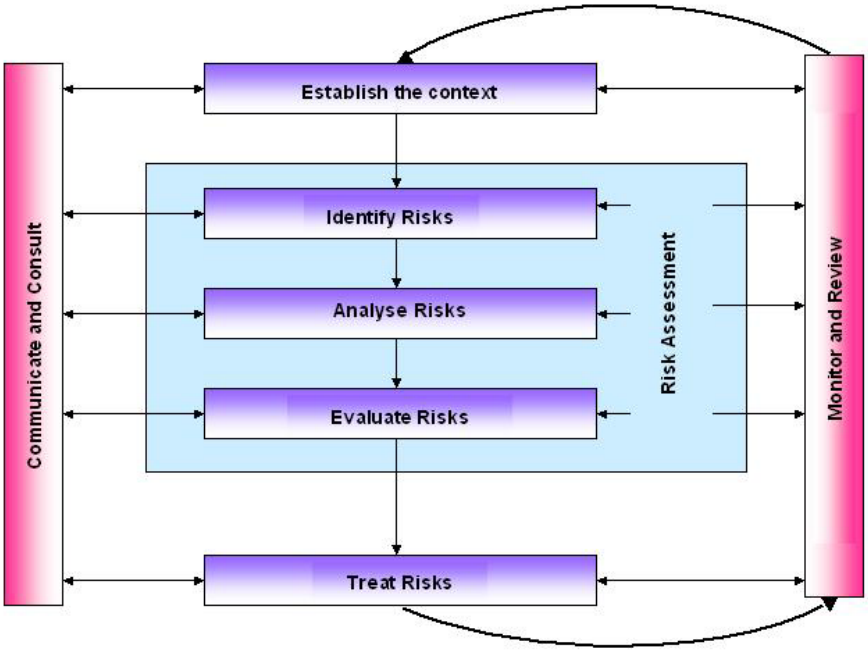
The Queensland *Dangerous Goods Safety Management Act 2001* regulates facilities storing significant quantities of Hazardous Materials as Major Hazard Facilities (MHF) in accordance with the requirements of the NOHSC. Accordingly, the proposed Ammonium Nitrate Plant will be classified as a Major Hazard Facility due to the large quantities of Schedule 1 materials produced and stored there (namely Ammonia and Ammonium Nitrate), to which the aforementioned standard applies. It is a requirement of the Safety Assessment associated with the National Standard that all potential Major Accidents[2] are identified. [Note that the Control of

[2] Under the NOHSC standard, a Major Accident is defined as a sudden occurrence (*including a particular major emission, loss of containment, fire, explosion or release of energy*) leading to serious danger or harm to people, property or the built environment, whether immediate or delayed.

Major Hazard Facilities - National Standard (NOHSC: 1014) and Code of Practice (NOHSC: 2016) give minimum threshold quantities in Schedule 1 as 200 T for Ammonia and 2,500 T of AN][3]. Since this study identifies events with the potential to cause injury or death to people *offsite*, it may be used as a starting-point for the required MHF Safety Assessment. However, this risk assessment does not address onsite risk nor commissioning and/or operational issues, as these issues will need to be subsequently addressed within the Facility's Safety Case.

The Australian Standard for Risk Management AS/NZS 4360:2004 [Ref 2] details a classical risk assessment methodology, which is consistent with the approach taken in this study. The methodology is shown below.

Figure 2 Risk Assessment Procedure AS NZS 4360:2004



1.2 Objectives

The primary objectives of this study are to:

- Establish a preliminary quantitative offsite individual fatality risk profile [4] of the project, and assess this against the relevant criteria;

[3] It is noted that all storage/manufacturing facilities storing in excess of 2500 tonnes for UN 1942 and 5000 tonnes for Ammonium Nitrate Fertilizer of UN Classification No.s 2067, 2068, 2069, 2070, 2071 or 2072 are classified as a Major Hazard Facility (MHF), which requires a site specific risk assessment to be conducted for the purpose of land use planning to determine the minimum separation distances to the various types of developments and to minimise all risks to as low as reasonably practicable.

[4] Hazard and Risk Assessments (H&RAs) are typically conducted to demonstrate the adequacy of a proposed project concept / location for Land Use Safety Planning purposes (i.e. Show that the relevant risk criteria will be met by the proposed facility as part of the development approval). H&RA's are typically conducted before the full engineering details are available and in order to ensure that the final as-built design of the activity does not exceed the risk profile of the H&RA, a conservative approach is taken throughout the study. As the design develops, and full engineering details are finalised (including all Safety related systems, etc), a more precise analysis can be conducted that should not exceed the previous results.

- Review the risk associated with the project and assess the level of impact the facility will have on neighbouring locations of interest;
- Identify recommendations for ensuring the risks of offsite impacts are reduced to a level that is As Low As Reasonably Practicable (ALARP) at the proposed sites.

1.3 Scope of Work

The scope of this expanded study is limited to the assessment of acute safety risk to offsite populations resulting from onsite operations associated with the project. Most of the modelled events would be classified as Major Accidents according to the National Standard[5]. As such, the findings of this report may be used as a starting-point for a more exhaustive analysis once detailed design/operational information becomes available.

The physical scope of this H&RA covers all normal processes and utility operations associated with the project from the point at which the coal seam gas supply crosses the site boundary from the off-site pipeline, to the point where the products are taken offsite by trucks.

The scope does not cover risk to onsite populations in detail nor to offsite populations during abnormal circumstances, such as neighbouring construction activities, maintenance campaigns and/or temporary shutdowns.

1.4 Relevant Queensland and Australian Legislative Documents

The following regulations, codes of practice and information documents are applicable for the project:

- Australian Explosives Manufacturers Safety Committee (AEMSC) – Code of Good Practice – Precursors for Explosives, Edition 1, 1999 [Ref 13].
- Council of Australian Government (COAG) Document “Principles for the Regulation of Ammonium Nitrate” [Ref 16]
- Explosive Act 1999 and Explosive Regulation 2003 [Ref 17]
- Dangerous Goods Safety Management (DGSM) Act 2001 and Regulation [Ref 18]
- Declaration of SSAN as an Explosive 29 Oct 2004 [Ref 19]
- Explosives Information Bulletin No 41 – Persons Appropriateness to Access [Ref 20]
- Explosives Information Bulletin No 53 – Storage Requirements for SSAN 2006 [Ref 21]
- Australian Standard AS 4326 – The Storage and Handling of Oxidising Agents [Ref 22]
- Australian Code for the Transport of Dangerous Goods by Road and Rail (6th Edition) 1 Jan 1998 (ADG Code) [Ref 23]

[5] Control of Major Hazard Facilities National Standard [NOHSC: 1014 (2002)]

- Australian Code for the Transport of Explosives by Road and Rail (2nd Edition) Mar 2000 [Ref 24]
- AS 2187.1 Explosives: Storage, Transport and Use, Part 1 [Ref 25]

1.5 Risk Assessment Methodology

1.5.1 Definitions

Anything with the potential to cause harm is defined as a hazard. Accidents are the realisation of the hazards that result in harm. Accidents may range from small leaks of gas that disrupt the plant operation but cause no other damage, up to major failures of pipes or vessels or explosions causing extensive damage to property and the death of one or more people in the area.

The concept of risk describes how likely such accidents are to occur. Risk may be defined as the likelihood of a specific type of harm being caused over a given time period. Risk therefore is the combination of two key components:

- The likelihood or frequency of accidents occurring.
- The consequences, or harm cause if the accident does occur.

Safety may be loosely defined as the inverse of risk. The higher the standard of safety at the facility, the lower the risk profile. With any facility dealing with dangerous goods, it is never possible to achieve absolute safety in the sense of "zero risk", as no matter how many precautions are taken the chance of an accident will always remain. This is frequently referred to as the residual risk and comprises of an inherent risk component and a component that incurs cost in gross disproportion to the benefit to reduce risk. The only way to achieve zero risk is to remove the facility altogether. In practice, most people consider an installation to be "tolerably safe" once the risks have been made As Low As Reasonably Practicable (ALARP).

1.5.2 QRA Methodology

A Quantified Risk Assessment (QRA) was conducted for the plants H&RA as this form of assessment is appropriate for demonstrating the adequacy of location with respect to Land Use Safety Planning requirements. The following section illustrates the QRA process utilized. The emphasis of this study, in line with the Queensland CHEM Services risk criteria [Ref 12], was to assess the risk of a potential fatality beyond the site boundary. The classical QRA process is shown in and described in the following text.

1. **Define System**. Defines the intent of the study and identifies system operations, environment, and boundaries. Criteria relevant to the study are identified at this point.
2. **Hazard Identification**. During this step, the identification and preliminary screening of hazardous events is conducted.

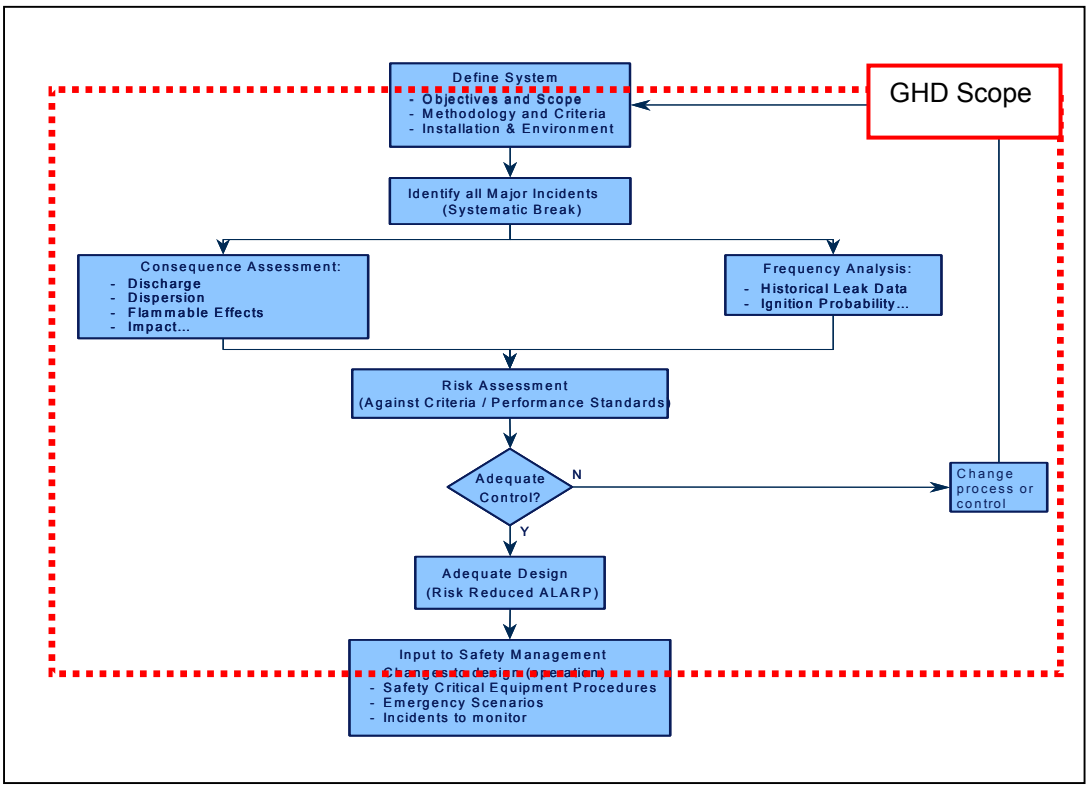
3. **Consequence Analysis**. The consequences of each event are determined using either empirical means or by consequence modelling software. In this study, the consequence package PHAST was used for process releases.

4. **Frequency Analysis**. The frequency for each event (identified in Step 2) is determined by assessing and comparing the scenario against either a relevant historical record or by determining the likelihood of its contributing events.

5. **Risk Assessment**. Risk is determined by the combination of frequency and consequence for each event. The overall risk profile may then be assessed against the study criteria defined in Step 1. Where the overall level of risk is determined not to be tolerable, action can be taken to reduce the risk to ALARP levels through the identification and management of risk driving events. **S**oftware for the **A**ssessment of **F**ire, **E**xplosion, and **T**oxic **I**mpact (SAFETI) is a software program used for the consequence and frequency analysis. SAFETI provides the ability to produce a full spectrum of individual risk at given locations, societal risk curves, and various other risk result presentations.

6. **Input into Safety Management System (SMS)**[6]. The QRA may be used as a tool to support the subsequent design activities used in the proposed facility SMS, by providing insight into risk-based activities (control, maintenance, etc) or as a starting point for compliance to MHF requirements.

Figure 3 The QRA Process



[6] The findings from all risk assessments should be included in the SMS Report, as per the MHF requirements.

1.6 Facility Description

Although the design of the plant has not been fully completed, it will be similar to other DN Ammonium Nitrate and AN Emulsion plants (i.e. Moura Joint Venture [Ref 1]). The description presented in the following sections details the key processes and utilities handling toxic and / or explosive materials relevant to the offsite risk assessment. (overleaf) presents a Process Flow Diagram (PFD), which shows the overall process from the coal seam gas inlet pipe, to the storage of AN Prill and Emulsion.

1.7 Power Station

A 18 MW gas-fired facility will be situated to the north of the proposed Ammonia Nitrate Plant in Moranbah. The facility will be three times the power of 2 MW x 60 Hz and four times 3 MW x 50 Hz plus some spare power generation capacity.

The size of the footprint of the facility will be approximately 150m x 200m (3 Ha) for the layout of the engines. The additional facilities, including the control room, workshop, switch room, switchgear transformers and let-down station, etc, will occupy additional space.

The Natural Gas pipeline to the power generation facility will be a branch off the existing gas pipeline running to the Ammonia plant. The power station will be ancillary to the operation of the Ammonia Nitrate Plant and will be incorporated into the site. The facility is anticipated to be unmanned.

1.8 Ammonia Manufacture

Coal Seam methane entering the plant is compressed and transferred to a reforming plant. After the reforming stage the reformed gas is cooled before entering a shift reactor. Hydrogen is then separated from other undesired products in a Pressure Swing Adsorption (PSA) unit.

Nitrogen is also separated from air in an air separation unit. A mixture of purified hydrogen and nitrogen is then sent to a converter where Ammonia is formed. The Ammonia gas is cooled and condensed before being stored in a refrigerated storage tank. This Ammonia is then used in the nitric acid plant and the Ammonium Nitrate plant

1.9 Nitric Acid Manufacture

The Nitric Acid Plant uses Ammonia and air as raw materials. Anhydrous liquefied Ammonia will be supplied at high pressure from the Ammonia tank. The Ammonia will be vaporised in the Ammonia Evaporator and Superheater to a pressure of approximately 1300 kPag and 100 °C. Ammonia will then be fed at a lower pressure into a mixer where it is combined with filtered clean air. The Ammonia/air mixture will then be fed into a Burner where the mixture is reacted over catalytic platinum gauze. The reaction produces a mixture of nitrogen oxides and steam.

After the Burner, the hot reaction products are passed through a series of heat recovery processes including a Tail Gas Heater, an Economiser, and a Gas Cooler-

Condenser. The gas mixture will be cooled to less than 60 °C resulting in production of weak nitric acid solution, which is then separated out and fed as weak nitric acid into the Absorption Tower. The non-dissolved nitrogen oxide gases (NO_X) are subsequently absorbed into the weak acid in the Tower to form nitric acid at a concentration of approximately 60% w/w. The acid flows from the bottom of the Tower to storage tanks.

1.10 Ammonium Nitrate Manufacture

Anhydrous liquid Ammonia at approximately 1600 kPag is fed to the Ammonium Nitrate Plant where it is vaporised in the Ammonia Evaporator and Superheater to a pressure of approximately 530 kPag and 70 °C before being fed to the pipe reactor.

The plant uses liquid nitric acid and gaseous Ammonia as raw materials in the process to produce Ammonium Nitrate solution in a reactor. The exothermic reaction provides sufficient energy to maintain non-saturated water in a vapour phase, which is separated as process steam in the Reactor Separator. Approximately 40% of the process steam flow passes to a number of heat exchangers, all of which return the condensate to the Concentrated Process Condensate Tank. The Ammonium Nitrate solution flows under gravity to a flash tank where the solution is concentrated. The solution is then pumped to an evaporator and collects in a tank before being fed to the prilling processes.

1.11 Prill Manufacture

Prilling is the process of forming solid particles from a solution maintained at a higher temperature than its saturation and the crystallization temperatures. Liquid Ammonium Nitrate is passed through spray nozzles with suitable size holes through which the solution flows. The counter-current flow of air cools and solidifies the prill during their fall. The prill is then dried, cooled, screened, coated, weighed and sized for product quality. Prill, which is out of specification, is returned to the system. On-spec prill is conveyed to silos transferred to shipping container and/or dispatch.

1.12 Emulsion Manufacture

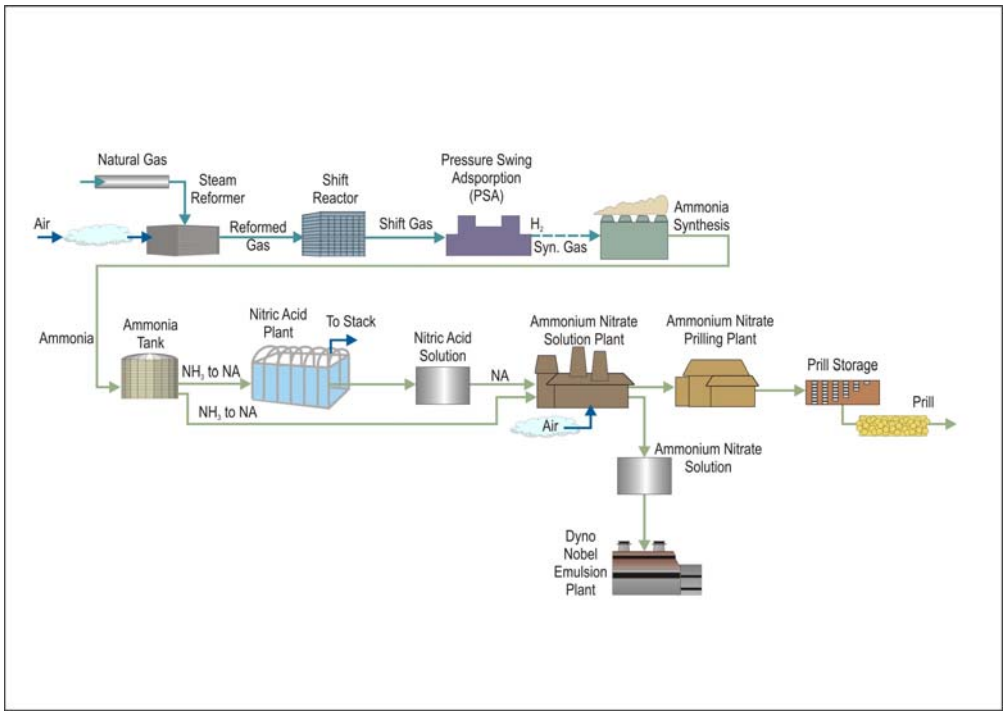
Ammonium Nitrate solution is blended with process oils (emulsifiers, mineral oils, and diesels), then cooled and stored as an emulsion. The emulsion plant produces continuously with storage of 3 x 140 tonnes of Ammonium Nitrate emulsion. Storages are protected against missile impact by mounding, and are suitable for sensitisation (density lowering, gassing) in the bulk vehicles used in the surrounding mining operations.

1.13 AN Dispatch

The product is dispatched to customers in bulk. The prill is transported either (mainly) in bulk tippers or 20 tonne shipping containers, both loaded from a conveyor and hopper (gravity fed). Shipping containers are loaded onto trucks using a forklift or alternatively using a side lifter truck. AN prill and emulsion will be

transported in accordance with the requirements of the National Code for Transport of Dangerous Goods.

Figure 4 Facility Process



1.14 Safety Systems

Whilst the risk of significant fire or explosion is low onsite, fire-fighting facilities such as hydrants with hoses will be provided consistent with normal practice. Fire fighting equipment will be fitted out in such a manner that the plant operators are able to fight fires and rapidly provide cooling water to at risk equipment.

Safety equipment including firewater monitors with fogging nozzles, hydrants, mobile and portable fire extinguishers, protective clothing and self-contained breathing apparatus will be provided. Fixed water spray systems will be installed for key facility components.

1.15 Vent System

The vent system will collect and discharge relief gases and liquids as well as waste gases such as Ammonia and steam to a remote location where they will be safely vented. Combustion products will consist almost entirely of carbon dioxide, water vapour, and elemental nitrogen, with trace quantities of NO_X from Ammonia streams. The flare system is an emergency device and under normal operation will only burn pilot gas.

1.16 Process Interlocking and Alarm Systems

An interlocking system is the safest method of controlling a complex chemical plant. One control system interlocks with another to ensure the plant (and processes) are

controlled as an integrated system and not independently. The interlocks of the plant are divided into safety relevant trip functions and process related interlocks. Safety related trips are realized in a separate emergency shutdown system (Safe Instrument Systems (SIS)) that consists of a certified, failsafe Programmable Logic Controller (PLC).

The process related trips are connected to a Distributed Control System (DCS). The SIS will be connected to the DCS via a signal link (data bus). Alarm management (display and data logging) will be executed at the DCS operator stations. The station will allow operators to recognise the alarms in the order in which they appear. Shutdown actions will be announced by an audible signal from the DCS together with a flashing display of the pertaining tag number.

1.17 Gas Detectors and Personal Protection Equipment (PPE)

Gas detectors will monitor the atmosphere surrounding potential leak points of combustible or toxic gases (pumps, compressors, pressure relieving devices, valve stations) to prevent injury to personnel. Gas detectors will be installed if necessary at strategic locations such as classified indoor locations; air intakes and outlets for buildings; permanent ignition sources such as furnaces in the gas let-down station, coal seam gas, Ammonia plant, Ammonia storage and possibly the reformer (CO). PPE includes canister-type gas masks and Self Contained Breathing Apparatus (SCBA) and will be provided at appropriate points throughout the plant. Safety goggles, rubber gloves, boots, and aprons will be worn for dangerous work as indicated by procedures established for plant operators. Additionally DN has discussed with current underground mines that they should have ammonia detection monitors.

1.18 Operations

1.18.1 Transportation

DN sells to its customers who are responsible for transportation of products. DN understands at the date of the EIS that Ammonium Nitrate Prill and AN Emulsion will be transported in accordance with ***Explosives Act 1999*** [Ref 17]. GHD have conducted a pavement impact assessment as part of the technical requirements under the EIS submission, (Section 4.11).

This report presents the proposed haulage routes of AN prill and AN Emulsion through the QLD state controlled road network. It is predicted that the largest supply of AN Prill and AN Emulsion will be transported to the Central Highlands and Mackay (Eastern Basin) Regions of QLD from the proposed AN Prill and AN Emulsion facility. It is estimated that up to 43% (120, 742 te) and 39% (109,668 te) of AN Prill that will be produced from the Dyno Nobel AN prill facility, in the Bowen Basin (Moranbah), will be transported to the Central Highlands and Mackay (Eastern Basin) Regions of QLD. In the case of AN Emulsion, it is estimated that up to 48% (33, 582 te) and 37% (25,572 te) of AN Emulsion that will be produced from the DNAP AN prill facility will be transported to the Central Highlands and Mackay (Eastern Basin) Regions of QLD.

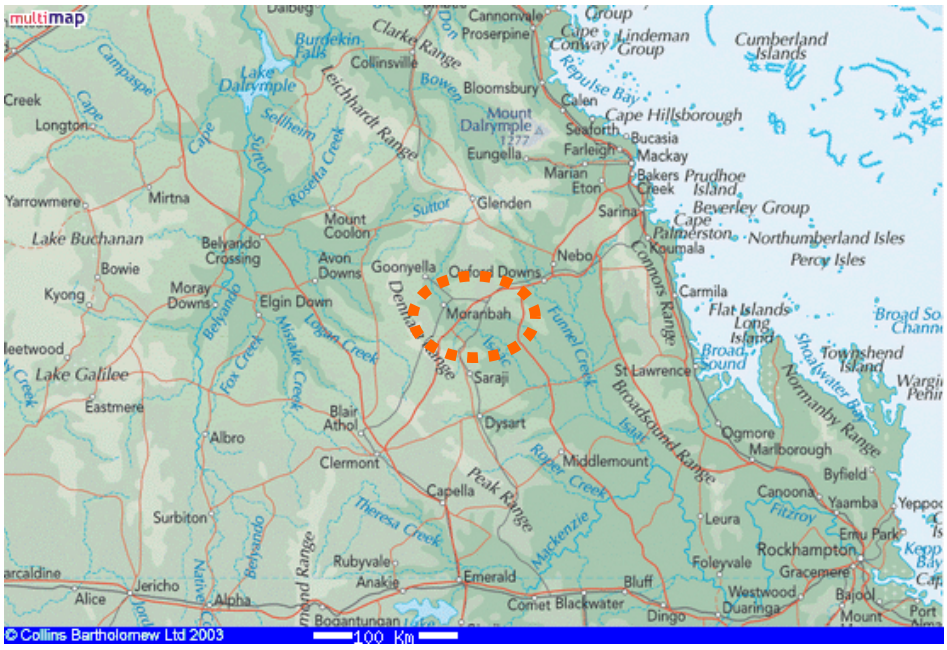
It is estimated that the impact from the proposed expansion of the AN Plant will increase the existing traffic movements, which currently consists of AB triple and B triple combinations plus two trailer road trains and B doubles. The haulage from the proposed plant will be a 7 day 24 hour operation along routes approved for Type 1 Road Trains.

2. Local Neighbourhood and Environment

2.1 Site Location and Surrounding Populations

The Ammonium Nitrate and Emulsion Facilities will be located approximately 4.5 km north of the town of Moranbah on the western side of the Goonyella road and north of the railway line. The preferred area is in the vicinity of the existing Ergon Power Station. Figure 5 shows the general location of Moranbah, Queensland, whilst Figure 6 shows the site location of the AN Facility within the Moranbah area.

Figure 5 Moranbah, Queensland



Local population groups influence the societal risk measures developed for the proposed plant and ultimately the acceptability of the development by the regulator. Approximate population numbers for facilities nearby the proposed plant are presented in Table 1. The AN Plant is approximately 4.5km to the North-west of Moranbah. It faces Goonyella Rd, which is used predominantly by non-commercial population. Figure 6 provides a layout of the Moranbah area.

Table 1 Local Population Groups

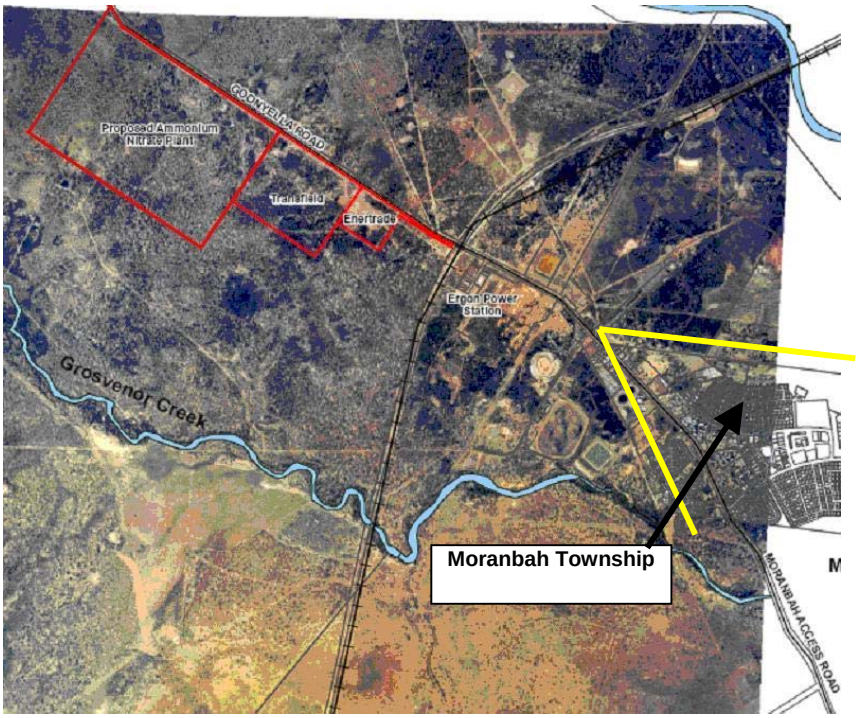
Population Group	Distance	Population	Ref. Source
Site Office (to Ammonia Plant)	0.12km	40 personnel on day shift with 10 operators on the	QNP Moura Ammonium Nitrate Plant Expansion

		plant at any time	(QN2), Oct 2005.
Emulsion Plant (to AN Plant)	~0.1km	3 personnel (5hrs a day)	Meeting with DN[7]
Goonyella Road	~0.9km	3670 vehicles per day	QLD Main Roads
Transfield Power Station (proposed)	1.2km (from one centre of property to the other)	1 (occasional maintenance)	Phone conversation with Transfield
Enertrade Facility (proposed)	2.0km (from one centre of property to the other)	1 (occasional maintenance)	Phone conversation with Enetrade
Ergon Power Station	3.7km (from one centre of property to the other)	1 (occasional maintenance)	Email from Ergon[8]
Moranbah (Residential town area)	4.3km	6673 people	Planning Information and Forecasting Unit QLD Dept of Local Government Planning, Sport and Recreation,

[7] Meeting at GHD Office Perth with Alistair Burch (15/5/06)

[8] Email from Brodie Chester from Ergon (5/5/06)

Figure 6 Moranbah, Area



2.2 Environment

The plant site is located in the Belyando Shire, which has several industrial developments in the surrounding regions. Moranbah is the service centre for the BHP Billiton Coal Mines of Peak Downs and Goonyella/Riverside, the gasfields, Moranbah North Coal Mine and a number of coal mines to the south.

2.3 Topography

The plant is situated at 260m above sea level and the levels of significant locations from the plant are shown in Table 3. The distance between each of the significant locations are shown in Table 5. The topographical surroundings in Moranbah are shown in Figure 7. The difference between relative levels will have negligible affect on the consequence models and therefore has not been specifically used in this analysis.

Table 3 Sea Level of Surrounding Locations

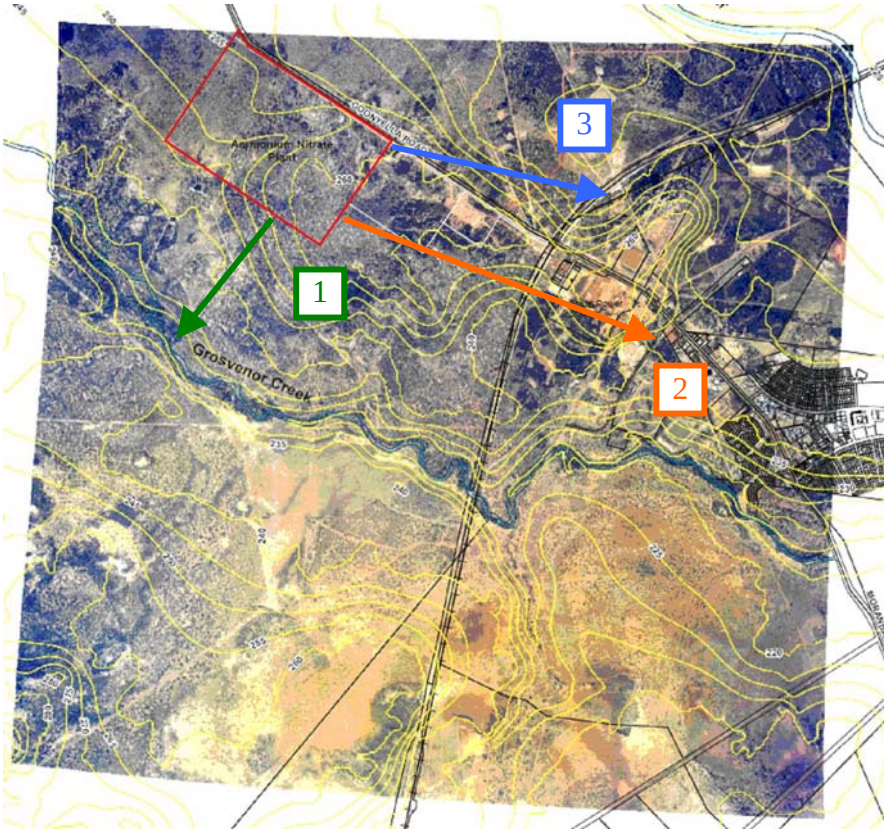
Location	Sea Level
Grosvenor Creek	235m
Moranbah Township	235m
Railway Line	240m

Table 5 Distance from the Plant to Significant Offsite Locations

Location	Distance from Plant
1. Grosvenor Creek	~2.0km
2. Moranbah Township	4.3km*
3. Railway Line	2.6km

* This is the distance to the nearest residence from the edge of the Facility.

Figure 7 Topographical Map of Moranbah



2.4 Meteorology

Wind speed and atmospheric stability affect the dispersion of vapour clouds, while the wind direction determines the bearing of the cloud. Wind speed also influences the rate of evaporation of liquid pools.

Meteorological data was obtained from the Bureau of Meteorology's (BoM) Moranbah station. The wind data consists of over 1000 samples taken over the year 2004 and covers direction, speed, and stability groupings. In addition temperature, humidity, and solar flux values were obtained from annual summaries.

Wind data was obtained for 16 cardinal compass points, which make up the representative wind model for the dispersion modelling, as presented in Figure 8,

and indicates that the prevalent wind occurs from the South-East. Pasquil stability categories are used to define dispersion coefficients used by the consequence modelling packages involved in this assessment. The coefficients dictate the degree of vertical dispersion of a vapour cloud hence the concentrations received at distances from the release point. Pasquil stability categories are shown in Table 7. The BoM data was group into three broad weather categories considered representative for the site as shown in Table 7. In addition of the wind stability and direction data previously mentioned, Table 11 presents the temperature and humidity averages obtained from the Moranbah BoM weather station. This information is used as the input to the SAFETI model.

Figure 8 Moranbah Weather Station Wind Rose

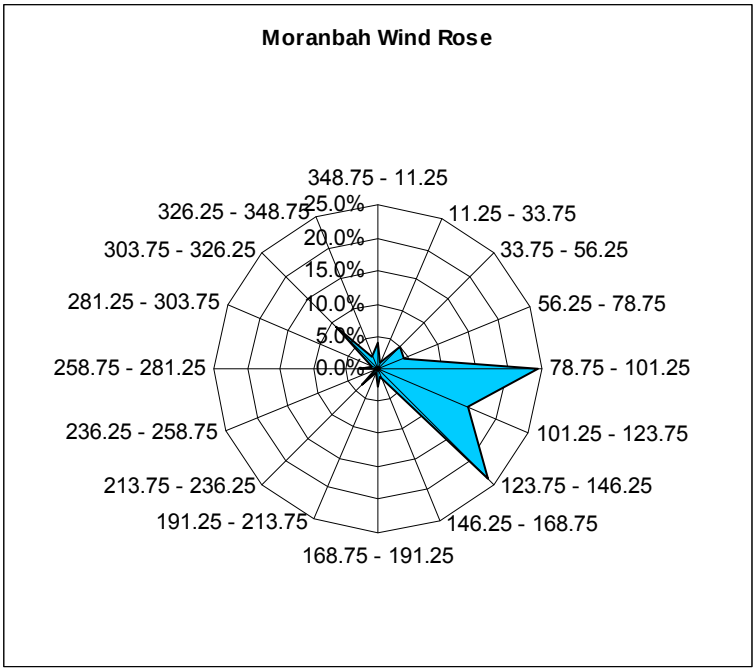


Table 7 Pasquil Stability Class Definitions

Class	Type	Description
A	Very Unstable	Daytime – sunny, light winds (strong insolation)
B	Unstable	Daytime – moderately sunny, light to moderate winds
C	Unstable / Neutral	Daytime – moderate winds, overcast or windy and suny
D	Neutral	Daytime – windy, overcast or Night-time – windy
E	Stable	Night-time – moderate winds with little cloud or light winds with more clouds
F	Very Stable	Night-time – light wind, little cloud (strong temperature inversion)