EcOz Environmental Services

Western Desert Resources

Supplementary Environmental Impact Statement

Western Desert Resources Limited
Roper Bar Iron Ore Project



2012

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1 Introduction

1.1 Purpose of this Document

The purpose of this Document is to provide a response to submissions received during the public review period on the Draft Environmental Impact Statement (EIS) for the Roper Bar Iron Ore Project. Submissions were received from the general public, Non-Government Organisations, the Northern Territory Government, the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) and the Northern Land Council (NLC). The Draft EIS was submitted by Western Desert Resources Limited (WDRL) on Saturday 23 June 2012. The Draft EIS entered a four week statutory public review period from 23 June 2012 until Friday 20 July 2012. Submissions made on the Draft EIS during this review period are addressed in this Supplementary Document.

WDRL also takes this opportunity to present project-related changes and ongoing research results which have occurred since the submission of the Draft EIS.

1.2 Structure of this Document

The document comprises the following main sections and supporting information:

1. Project description and any changes;
2. Supplementary information including any results or new information;
3. Summary of responses received;
4. Responses to public submissions;
5. Table of all submissions;
6. Updated Commitments Table; and
7. Supporting Appendices.

1.3 Assessment Process

This document will be combined with the Draft EIS and together they will become the final EIS. The final EIS will be jointly assessed by the NT Government and Federal Government under the Northern Territory *Environmental Assessment Act 1982,* the Environmental Assessment Administrative Procedures 1984 and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

35 days is available for the minister to make a determination on the proposal, including any suggestions or recommendations concerning conditions that should apply to the proposal in order to minimise potential environmental impacts and to protect the environment. An Assessment Report is prepared containing the Minister's determination and advice and this is forwarded to the approving Minister for consideration and subsequent release of conditions.

1.4 Summary of Submissions

Appendix B provides a full list of submissions received for which responses have been provided in the text of this document. The table provides a cross-reference to the relevant sections both in the Draft EIS and in this Supplement Document. The vast majority of submissions were received from the Department of Natural Resources, Environment, the Arts and Sport (NRETAS) and the Department of Resources (DoR). As anticipated, the majority of submissions received were in reference to the Towns River re-alignment and management of PAF material.

2 Amended Project Description

2.1 Haul Road

The Haul Road will not be sealed until after the first wet season, this is to allow engineering design to be refined to ensure that the sealed road will operate to the appropriate level, that is, once sealed the road will not be adversely affected by flooding or long term use by heavy vehicles. Additional information is provided below to detail this change, including the predicted impact from noise.

2.1.1 Material

Earthworks fill material will be available from the table drains cut adjacent and on both sides of the road formation. The Haul Road has been designed to allow a balance of cut to fill utilising this process. It is anticipated that pavement material will be sourced from borrow pits along the haul road alignment.

WDR will utilise dump rock in most of the causeways and Bridges and floodways will be stabilised with cement.

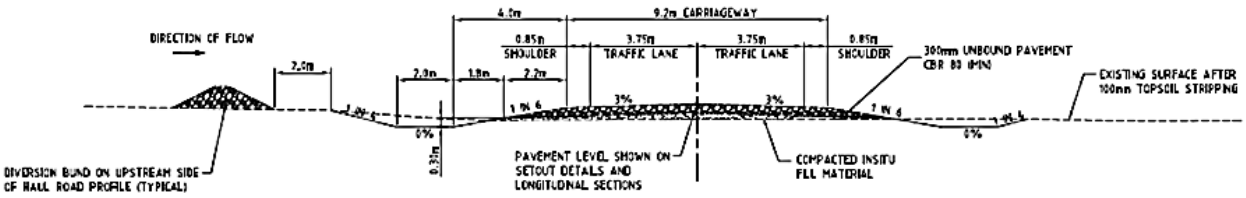
2.1.2 Spray Seal

The placement of spray seal on the road is anticipated after the first wet season. Dust Control and road maintenance will include a minimum of two graders and two water trucks until the road is sealed, with water sourced from the bore fields at the mine site and along the haul road. Water use during haul road construction is estimated to be approximately 33,600kL/a.

2.1.3 General

The road will be operational for 10.5 months. Between mid-February and the end of March operations will shut down and maintenance will be scheduled to fit in at this time (period when wet season is likely to make the road impassable in some locations).

As part of the detail design process, the haul road formation and hydrology modelling has been modified. A typical Haul road cross section is provided below.



2.1.4 Noise

The Haul Road crosses the Limmen Bight River approximately two kilometres from the Savannah Way camp. To determine the noise profile VDM Consultants used SoundPLAN 7.1 modelling software. The model considered the terrain contours derived from DEM data, the alignment of the proposed haul road, the geographic location of the tourist camp, type of trucks and the frequency of truck movements on the haul road. The noise emissions were adjusted for the type of road surface (inherently noisy bituminous road surface). This modelling exercise concludes that the haul road noise levels for daytime, evening and night-time conditions are low (20.9 dB) and are unlikely to be perceived as audible by visitors at the tourist camp.

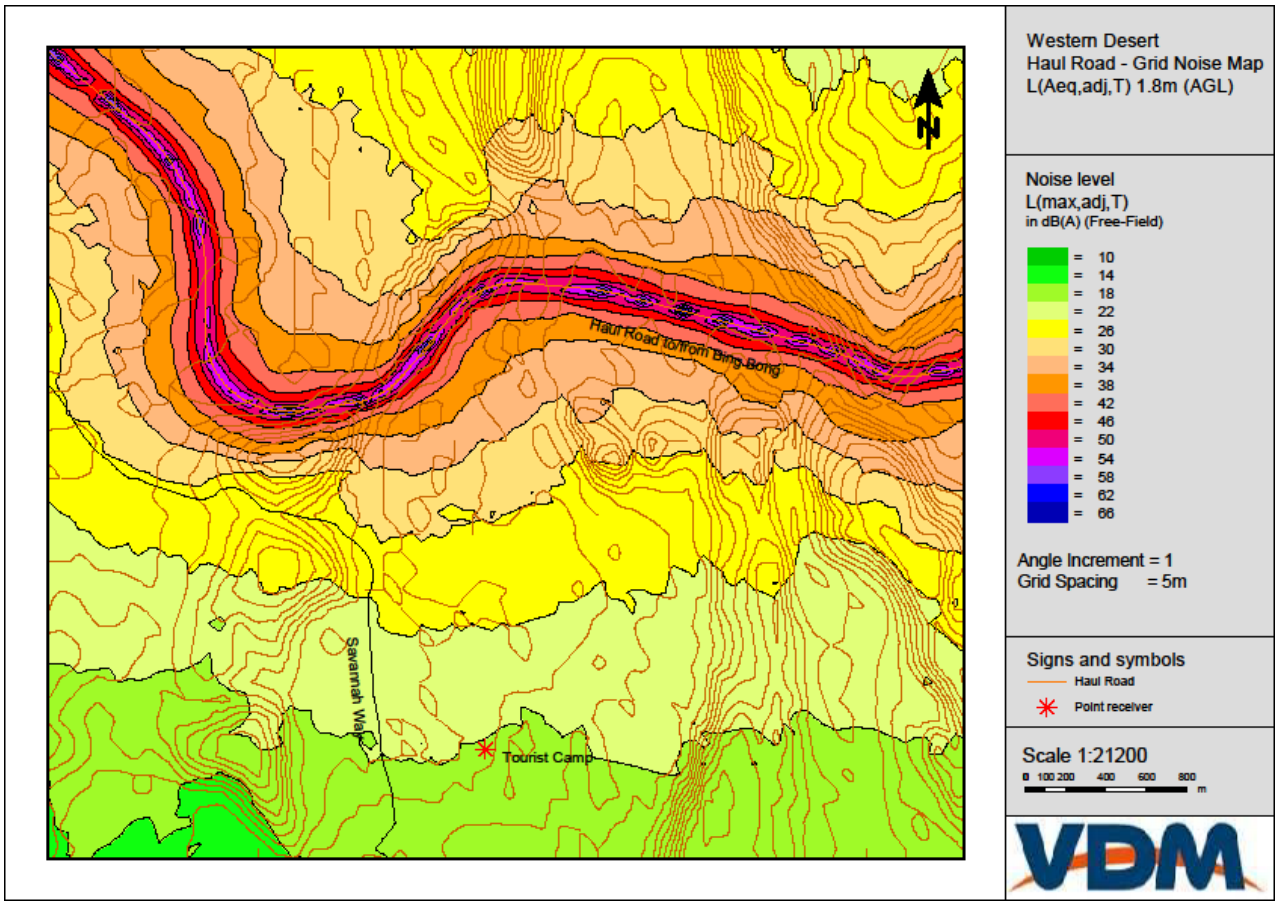


Figure 2-1: Output from modelling of noise impact on Tourist camp on Savannah Way.

3 Supplementary Information

3.1 Dust Monitoring

Baseline dust monitoring has commenced at the Bing Bong Port and mine site camp using depositional dust monitors. Four dust monitors have been established at each location to monitor baseline dust levels.

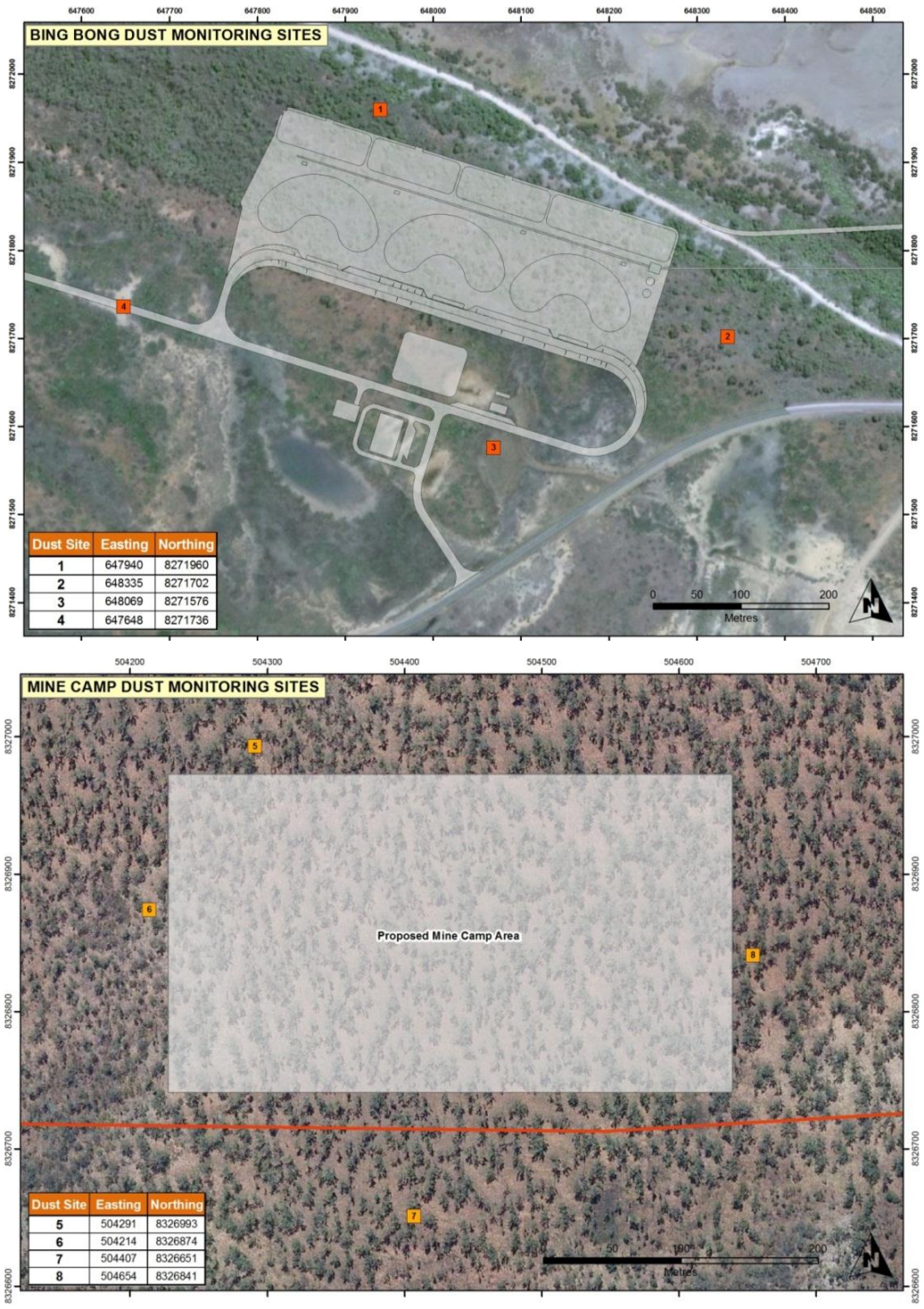


Figure 3-1: Dust monitoring sites have been established at Bing Bong and the proposed mine camp

3.2 Mosquito Surveys

A 12 month baseline adult mosquito monitoring program was initiated in February 2012 by EcOz Environmental Services, in collaboration with NT Medical Entomology, background information and management is outlined in the Draft Environmental Impact Statement (DEIS) Appendix O – Biting Insect Management Plan. Further mosquito surveys were undertaken in July 2012.

Information gathered from the baseline survey will provide detail on mosquito species present, their relevant numbers, and the temporal and spatial distribution of mosquito species in the area. This information will be utilised to further refine management methods and inform personnel of peak abundance periods

A final report will be produced in January 2013 once the baseline studies are completed.

3.3 Community Consultation

Further community consultation has been conducted since submission of the Draft EIS. Detail can be found in Appendix F and Appendix G.

3.4 Vegetation Surveys

3.4.1 Re-alignment Channel Vegetation Description

Riparian vegetation supported within the section of the Towns River that will be re-aligned is generally sparse and restricted to the immediate river bank. There is no substantial riparian vegetation patches within the vicinity of the mine site, with the closest patches being located at the junction of the Savannah Way and Towns River Crossing approximately 25 km downstream.

The vegetation type of the Towns River section within the mine site has been described as *Eucalyptus camaldulensis* low open woodland, which was a result of 1:10,000 vegetation mapping of the mining lease (see Figure 3-2 for vegetation map). Refer to the plates in Table 3-1 for a selection of representative photos of the creek line. Appendix D of the DEIS contains a detailed account of this vegetation type, and others associated with the re-alignment channel.

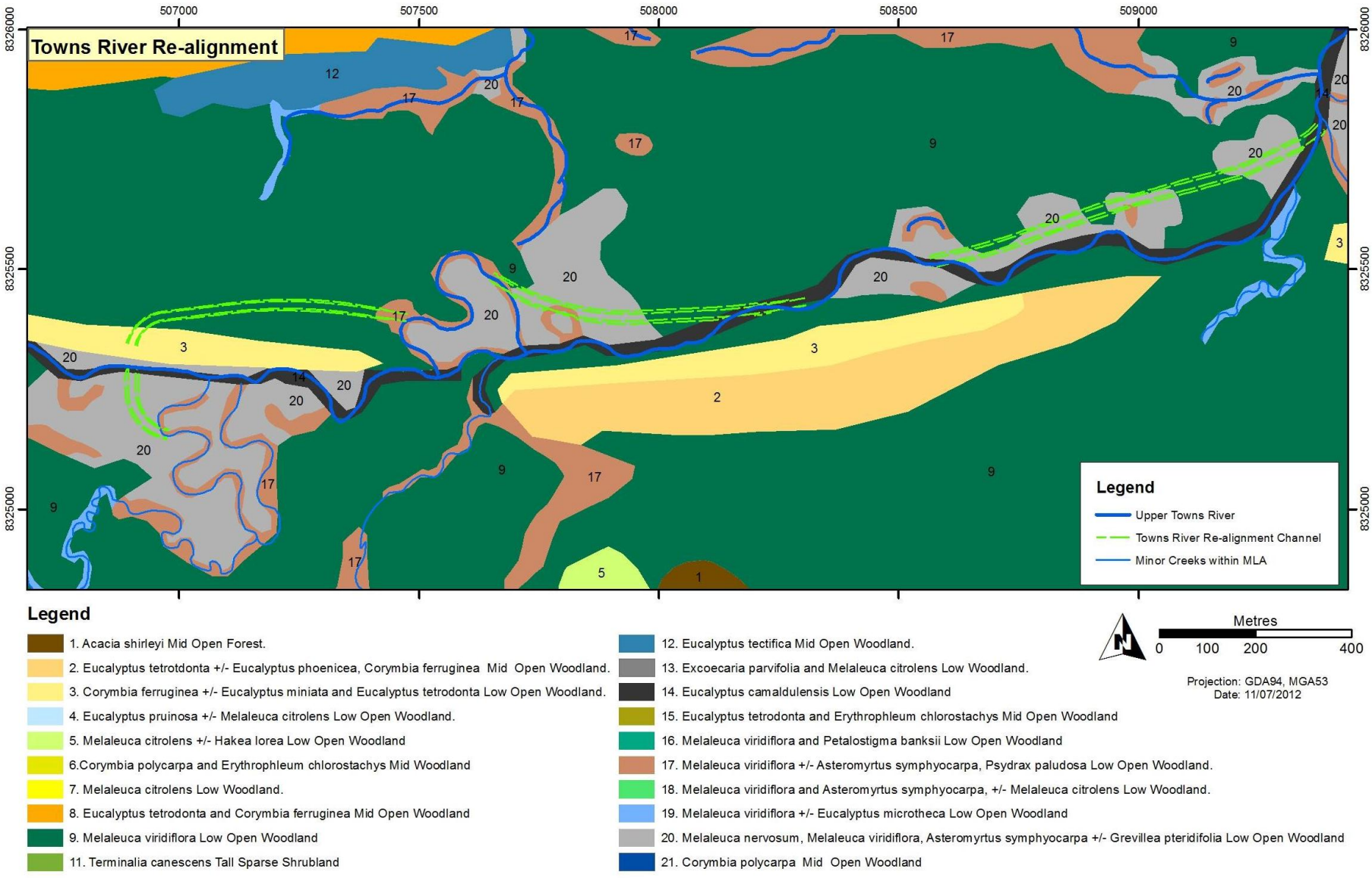


Figure 3-2: Vegetation map of proposed re-alignment channel

Table 3-1: Photographs of the Towns River section proposed for re-alignment








3.4.2 Re-alignment Channel Ecological Connectivity

We are confident that ecological connectivity of the upper stretches of the Towns River will not be fragmented due to the presence of an existing creek line (see Figure 3-3) that provides an alternate natural linkage (explained below) and the planned restoration of riparian vegetation along the banks of the re-alignment channel (which will be monitored, constructed, and managed until the landform is proved to be stabilised and suitably re-vegetated).

To the north of the re-alignment there is an existing creek (part of the Towns River) that reconnects to the Towns River downstream of the proposed open cut pits (see Figure 3-3). This creek system will not be disturbed and provides connectivity of riparian vegetation in the section where the re-alignment is proposed. This existing creek system, along with restoration of riparian vegetation of the re-alignment channel, will maintain ecological connectivity of the Towns River upper reaches – refer to Table 3-2 for representative photos of the creek line.

Aquatic fauna that are supported within the existing waterway will be able to follow the flow path of the re-alignment channel, which will maintain connection between the upper and lower reaches of the Towns River. The aquatic environment was surveyed during the DEIS and did not record any sawfish species but did identify suitable sawfish habitat approximately 20km downstream of the mine in the perennial sections of Towns River (reported in Appendix D of the DEIS). The main threats for sawfish are related to surface water contamination and erosion/sedimentation, of which these will be mitigated and monitored under a water management plan.

Terrestrial fauna studies of the Towns River section within the MLA included 3 sites surveyed during the wet and dry season suing standard NT methodology. Results indicate that the section of creek line generally supports Least Concern bushland species and amphibians. Species data is presented in Appendix 4 of the DEIS.

Magaranyi Creek to the east of the mining area is a more significant waterway than the section of Towns River located within the mineral lease. Magaranyi Creek feeds the downstream (perennial) sections of the Towns River, contains large permanent pools along its length and more sustained flow into the dry season. It is likely to provide higher biodiversity value and ecological connectivity than the upper reaches of Towns River. Magaranyi Creek will not be disturbed as part of the mining proposal (aside from the haul road crossing) and is part of the surface water monitoring program and macro-invertebrate studies. Opportunistic observations indicate this waterway provides better riparian connection habitat than the Towns River section within the MLA. Refer to Table 3-3 for representative photos of Magaranyi Creek.

Western Desert Resources will commit to conducting environmental monitoring programs to ensure that the re-alignment channel is properly stabilised prior to each Wet season, and to ensure that appropriate flora species become established on the banks of the channel. Proposed monitoring programs include:

- Photo point monitoring
- Revegetation monitoring
- Surface water monitoring
- Macro-invertebrate monitoring

These monitoring programs will determine if targets set in the rehabilitation plans for the mine are being achieved. This will be audited as part of the MMP process.

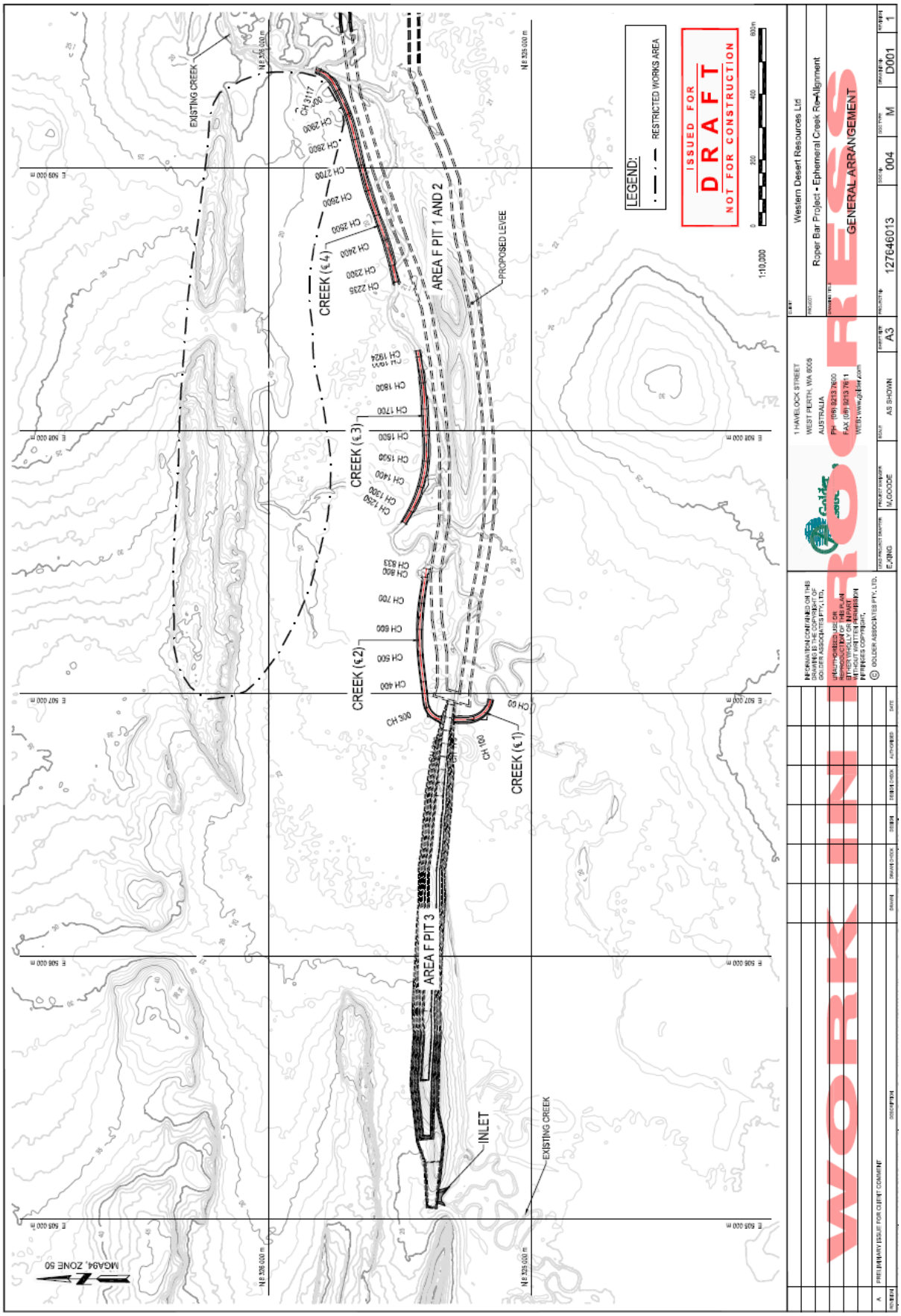


Figure 3-3: Broadscale view of proposed re-alignment channel

Table 3-2: Photos of the existing creek line to the north of the re-alignment (December 2010)




Table 3-3: Photos of Magaranyi Creek. This creek not impacted by mining (December 2010)




3.4.3 Bing Bong

As the iron ore stockyard location has changed since the DEIS on-ground flora surveys were undertaken to determine if survey work conducted for the DEIS is still representative. These surveys were conducted in July 2012 by EcOz and included:

- Description of the mangrove community adjacent to the barge loading facility. This focused on determining floristic diversity, structure, and general species dominance at the site. No surveys in mangroves were conducted as part of the DEIS.
- Checking existing vegetation mapping and descriptions for the new iron ore stockyard location. This was conducted by doing flora check sites (dominant species only) within the new boundary and comparing them against existing mapping from the DEIS.

Mangrove Community

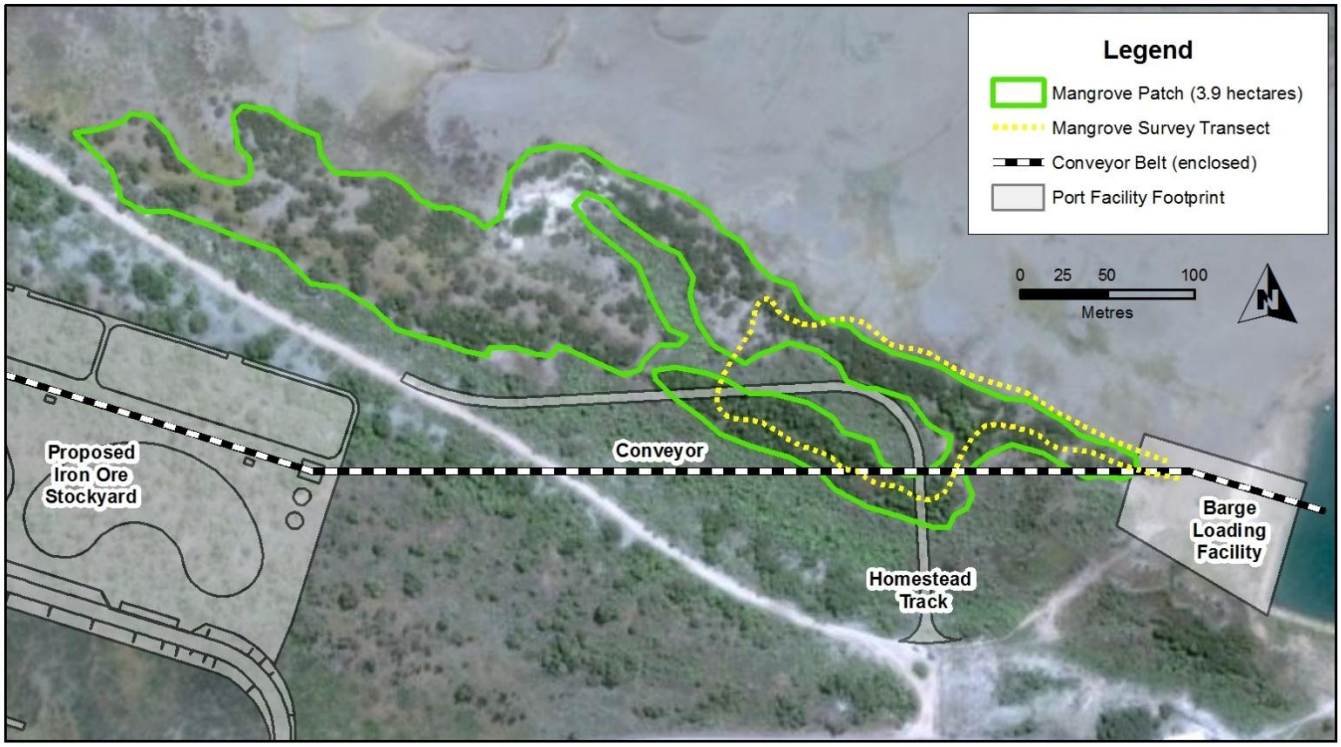
The community was surveyed by walking two 200m transect and noting down species present and its general abundance. The patch was dominated by four main species - *Lumnitzera racemosa, Excoecaria ovalis, Pemphis acidula,* and *Excoecaria spp.* (likely *agallocha*) with an upper story average height of 6m. Other mangrove species recorded in lower abundances were *Aegialitis annulata, Avicennia marina, Cynanchum carnosum*, and potentially *Ceriops*, however many species were difficult to identify due to lack of reproductive materials present at the time of sampling. Other non-mangroves species within the community were *Sesuvium portulacastrum*, *Acacia hemsleyi*, *Halosarcia indica, Thespesia populneoides, Sporobolus virginicus*, and *Amyema mackayensis*.

There are two distinct patches of mangroves separated by a strip of coastal shrub approximately 50m wide (dominated by *Acacia hemsleyi* and highly impacted by *Hyptis suaveolens*). The mangrove community is approximately 3.8 hectares (width of 90 m and 600 m long). Mangroves photos from recent surveys are provided in Table 3-4.

The eastern edge of the mangrove patch has been cleared in the past as part of the construction of the port facility, and as a result there is recruitment occurring (mainly by *Lumnitzera racemosa* and *Excoecaria ovalis)* and also a high weed impact due to exposed soils and human traffic along a designated path. The mangrove community itself has very little weed impact, however the fringing coastal shrub community that occurs on slight sandy rise contains several weed species, notably *Hyptis suaveolens* with other less common weeds being *Azadirachta indica, Parkinsonia aculeata, Passiflora foetida*. Feral pigs were observed.

Although the mangroves patches were small, they are still providing habitat for a range of species and were regarded as worthy of conservation. Therefore, direct clearing of mangroves will be kept to a minimum (estimated at 0.5 ha) and conveyor/roads will be either formed on the sandy rise landform adjacent to the community or on areas that have been previously cleared as part of the original port construction.

Table 3-4: Mangrove Community Map and Photos



West view of coastal fringe

View within mangrove patch

South western view down existing access track

Acacia shrub in between mangrove patch

Vegetation of the Iron-ore Stockyard Facility

Assessment of the new iron ore stockyard location determined that existing vegetation descriptions are suitable and that no more baseline flora or fauna assessment is required.

The vegetation types observed within the proposed stockyard area included:

- **2b:** Mixed monsoon coastal vine-thicket +/- *Corymbia bella, Diospyros* sp., *Flueggea virosa, Premna acuminata, Exocarpos latifolia, Barringtonia acutangula, Ficus virens virens* Low Closed Forest
- **3a:** +/- *Halosarcia indica, Tecticornia australasica, Suaeda arbusculoides* Low Open Chenopod Shrubland
- **4:** *Melaleuca viridiflora* +/- *Melaleuca acacioides* Low Woodland over *Pseudoraphis spinescens* Low Tussock Grassland
- **6c:** *Melaleuca viridiflora* +/- *Corymbia bella* Low Woodland over *Chrysopogon elongatus* Tall Tussock Grassland.
- **6d:** *Corymbia bella* Mid Open Forest over +/- *Acacia* spp., *Pandanus spiralis*, *Hyptis suaveolens*, Sparse Mid Shrubland.

Refer to Table 3-5 for a selection of images of key vegetation types within the stockyard facility and a revised vegetation map is provided in Figure 3-4. Full vegetation types description are provided in Appendix D of the DEIS.

The main vegetation community that will be cleared as a result of the construction of the facility will be Vegetation Types 6c and 6d.

All areas seem to be highly impacted by weed with most vegetation types having infestations of Passion Vine (*Passiflora foetida*) and Hyptis (*Hyptis suaveolens*). Other environmental weed species identified included Sida *(Sida acuta),* Kapok Bush (*Aerva javanica*), Cobbler's Peg (*Bidens bipinnata*) and Buffel Grass (*Cenchrus ciliaris*). Parkinsonia (*Parkinsonia aculeata*) is also known to occur in swamps close-by.

No threatened species or habitats are expected to be impacted by the construction and operation of the iron ore stockyard.

Table 3-5: Representative selection of photographs from the iron-ore stockyard facility

Veg Type 3a – Low Open Chenopod Shrubland

Veg Type 3a – Low Open Chenopod Shrubland

Veg Type 4 – Ephemeral Swamp

Man-made dam within stockyard area

Veg Type 6c – Coastal Woodland

Veg Type 4 – *Melaleuca acacioides*

Veg Type 6d – Coastal Woodland

Veg Type 6d – Coastal Woodland

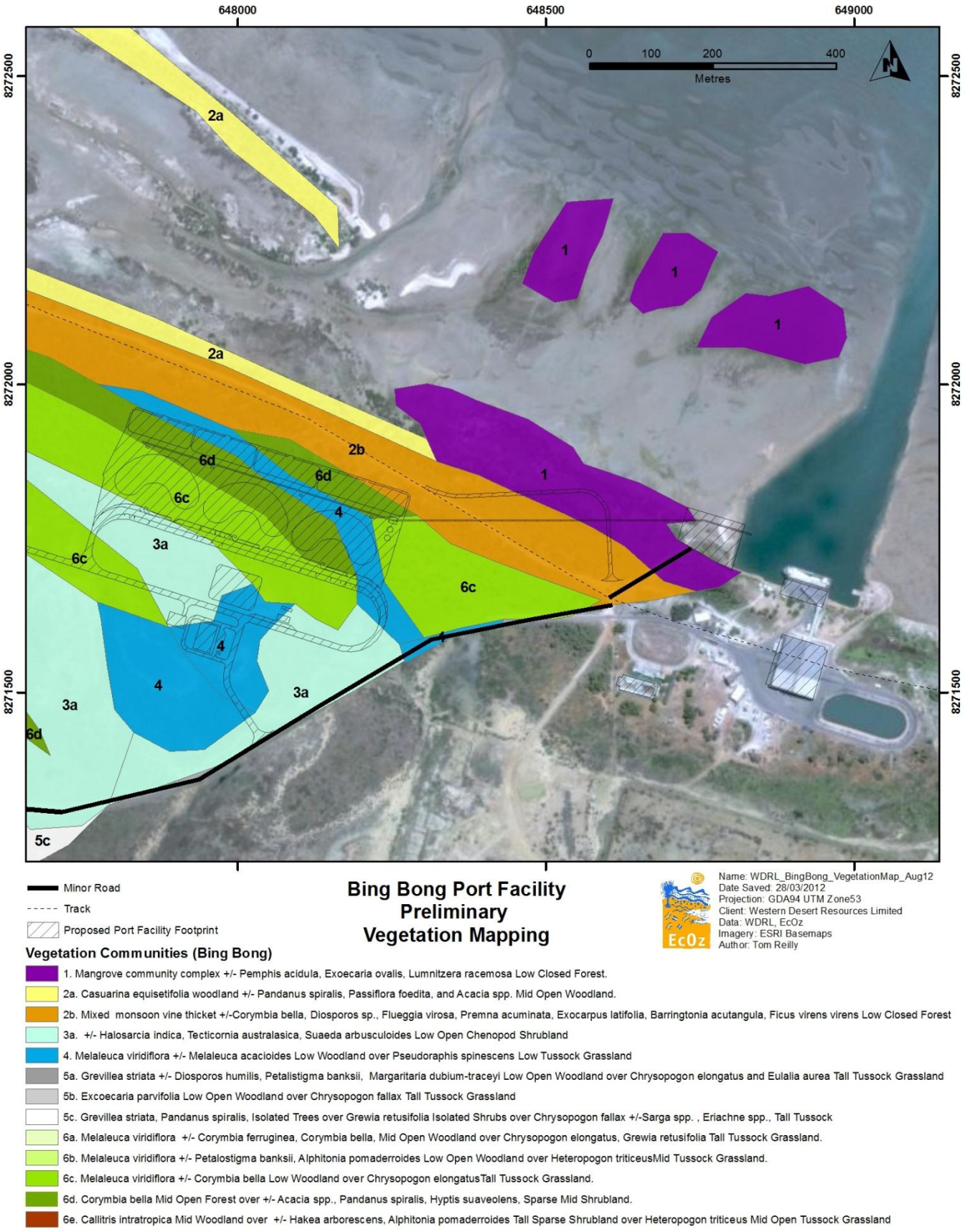


Figure 3-4: Vegetation Map of the Iron-ore Stockyard facility at Bing Bong

3.4.4 Haul Road

Flora survey effort in the vicinity of the Limmen River Crossing is currently inadequate if the final road corridor passes over the saddle to the east of the river. A field visit to this location was attempted on the 18th July 2012 by EcOz Environmental Services but vehicular access was not possible at that period of time.

Western Desert Resources commit to comprehensive flora surveys, including targeted Thorny Solanum (*Solanum carduiforme*) surveys if this route choice is confirmed.

3.5 Fauna Survey

3.5.1 Haul Road

Fauna survey effort in the vicinity of the Limmen River Crossing is currently inadequate if the final road corridor passes over the saddle to the east of the river. A field visit to this location was attempted on the 18th July 2012 with the aim to conduct preliminary vegetation assessment of the site, however 4WD access was not possible due to difficult terrain and unmaintained access tracks.

Western Desert Resources will commit to comprehensive surveys within the saddle vegetation communities if this route path is selected as preferred option. This will aim to determine presence and likelihood of threated fauna, and will also provide a better insight into the biodiversity value of this particular crossing.

3.5.2 Haul Road Wildlife Passages

The following guideline was not covered in the DEIS:

"Identify the need for provision of wildlife passages along the haul road, associated with fragmentation of habitats"

The proposed haul road is approximately 165 km long and passes through a variety of landforms and habitat types. Habitat fragmentation is considered a risk due to establishment of a raised bitumen road and a high frequency of road train movements (estimated at 1 every 9 minutes during peak activity).

To reduce habitat fragmentation and impact on areas of high ecological value, EcOz conducted sensitive habitat surveys (combined with representative flora and fauna surveys) along the proposed route. This resulted in the haul road route being re-aligned to avoid sensitive locations such as riparian vegetation, water bodies, and rocky outcrops.

As it is not possible for the haul road to avoid several rivers and creeks, fragmentation of waterways will be minimised by the installation of culverts and bridges which will maintain natural water flow and also vegetation connection. All crossings have also been selected in sections of the waterways that have a reduced form of riparian vegetation.

The haul road route does not pass through (i.e. bisect) any habitat or vegetation types that have potential to impact ecological connectivity (with the exception of waterways), such as monsoon forest, vine-thicket, billabongs, and rocky ridges. The haul road route only occurs on broad scale vegetation types.

Roadside grasses will be managed to reduce the attractiveness to native fauna (mainly targeting macropods). This includes grass-cutting, suitable drainage so water-ponding doesn't occur on the road verge, and possibly prescribed burns. This will be a commitment by WDRL during mining operation and will be audited during the MMP process. Grass cutting during the dry season will also reduce fuel load along the haul road in the corridor, thereby provide a firebreak for the area.

Road-kill cannot be cleaned off the road as the proposed road train frequency presents too great a safety risk.

No wildlife tunnels or wildlife bridges are proposed as part of the construction plan of the haul road as it does not pass through habitat types that would justify this action. However, as discussed above, there are culverts and vehicular bridges in sections of the road that bisect waterways or floodways to allow natural water flow.

4 Further Information on Key Impacts

4.1 AMD / PAF

This is presented as work completed since the submission of the DEIS.

4.1.1 AMD and Refinement of Block Model

Locations and depths at which potential-acid-forming (PAF) materials occur are indicated in Table 10 of the detailed report on the AMD investigations. Additionally, Tables 11 and 15 illustrate the percentages of PAF material distribution with depth and a mass waste rock/ore balance. The latter details the amounts of maximum potential acidity (MPA) and the acid neutralizing capacity (ANC) of the samples; both are fundamental in the management of AMD. These mass balances are to be refined further as follows:

Identification of overburden, ore and PAF layer materials:

a) The top 30m of the stratigraphic column will be grade controlled/assessed before the ore extraction starts. This includes the minimum 15m oxide layer which blankets most of the mine footprint.

b) The grade control, which will incorporate vertical and diagonal drilling to depths of 30m will be ongoing until the final depth of the pit is reached.

c) The drilling program will provide samples for the assessment, mapping, delimitation and quantification of ore resources, low grade ore and PAF materials.

Field geochemical characterisation/screening of PAF materials:

a) XRF sample assessment: Extracted samples will be scanned for sulphur concentrations and all materials that present >0.2% of total sulphur will be further assessed for their PAF characteristics.

b) Paste pH assessment: The in-situ paste pH is a simple method for determining readily available acidity and alkalinity and indicates the immediate reactivity of sulphides and acid neutralising minerals present in the samples and this shall be the principal screening test during operations. In this context:

- A paste pH > 5.0 suggest the presence of reactive carbonates.
- A paste pH < 5.0 suggests that the materials contain acidity from prior acid generation.

c) Groundwater quality assessment: water samples will be obtained to assess potential production of acid waters.

d) ABA assessment: Where materials shows low paste-pHs (<5.0), representative samples will be send to the laboratory for full ABA assessment and these results will be incorporated into the overall mass waste rock ABA evaluation.

Targeted materials for PAF assessment will be those sections/areas identified during the initial AMD assessment and grade control.

Disposal of PAF materials:

a) Top soils will be stored to be used as final covers for the Waste Rock Dumps (WRDs).

b) Soil investigations indicated that substantial clays are present and these will be purposely contoured and quantified to be used as liner materials.

c) NAF (non-acid forming) materials, mixed with clay to reduce permeability, will be used to construct basement pads and subsequent liners of the PAF cells.

d) PAF materials will be placed in prepared cells and these will be covered immediately using finer NAF materials to prevent oxidation of reactive sulphides. Covering of PAF materials will be an ongoing activity during the construction of the entire WRD. This will prevent wider interaction of PAF materials with the atmosphere, particularly with rainfall during wet seasons.

e) If disposal of PAF materials is hampered by operational activities, materials will be provisionally encapsulated with NAF materials until it can be disposed of appropriately.

Column Kinetic Tests: Kinetic tests to adequately assess the acid/base balance in the waste/ore/low grade ore materials are in the process of being implemented. These are medium to long-term tests in which samples of mine wastes will be subject to dissolution with the objective of estimating the sulphide oxidation rates (SOR) and quality of leachates produced under field conditions. Key objectives of these tests are to:

- Assess the relative potentials of mine wastes to produce acidic and/or alkaline drainage.
- Determining the rates of mineral oxidation and solute loading.
- Assess whether solutes are highly mobile and become bio-available and toxic.

Results will assist with:

a) Predict reactivity of both alkaline and PAF materials.

b) Predict loading of solutes on leachates due to natural weathering of both alkaline and PAF materials.

c) Adequate procedures for selective handling of both alkaline and PAF materials.

d) Development of adequate liner and cover systems.

e) Development of adequate drainage systems to monitor, collect and treat potential AMD solutions.

f) Develop site specific objectives in relation to closure and rehabilitation.

4.1.2 AMD Trigger Values and Toxicity of Solutes

Trigger values will take cognisance of ambient water qualities (site specific) but generally the 95% ANZECC Protection Level, adjusted for Hardness where relevant, shall apply.

AMD investigations (refer hydrogeochemistry analysis in the AMD report) indicate that initial seepage qualities will be characterised by a pH ranging from 3.0 to 8.2 with low concentrations of Al, As, Cd, Cr, Cu, Ni, and Zn.

Analytes	Unit	Assessment Level	Min	Max	Average	Median	95th Percentile
pH Value	pH Unit	**6 -8.5**	3.0	8.2	6.3	6.7	7.6
Electrical Conductivity (EC)	µS/cm	**-**	10	1550	231	105	985
Total Dissolved Solids(TDS)	mg/L	**-**	12	2510	256	106	849
Sulfate as SO_4	mg/L	**5,000**	1	999	97	24	561
Aluminium	mg/L	**2**	0.01	10.50	1.05	0.19	6.42
Arsenic	mg/L	**0.07**	0.0010	0.07	0.006	0.003	0.009
Cadmium	mg/L	**0.02**	0.0001	0.004	0.0005	0.0002	0.002
Chromium	mg/L	**0.5**	0.001	0.007	0.003	0.002	0.006
Copper	mg/L	**20**	0.0010	0.05	0.006	0.002	0.02
Iron	mg/L	**3**	0.05	245.0	13.79	0.76	79.68
Lead	mg/L	**0.1**	0.004	0.01	0.009	0.009	0.012

Analytes	Unit	Assessment Level	Min	Max	Average	Median	95th Percentile
Manganese	mg/L	**5**	0.001	22.30	1.95	0.064	11.12
Nickel	mg/L	**0.2**	0.001	0.27	0.034	0.013	0.13
Zinc	mg/L	**30**	0.030	0.93	0.16	0.103	0.462
Uranium	mg/L	**0.2**	0.002	0.007	0.004	0.004	0.007
Note: Assessment levels from DoH WA (2006) Contaminated Sites Reporting Guideline for Chemicals in Groundwater: domestic non-potable groundwater use.							

When compared against their assessment levels, some of the analytes, particularly aluminium, iron and manganese are relatively high in leachates from samples taken from E East and F East Pit 1 (see tabulations above and below). Whilst these preliminary evaluations are important in understanding the geochemical evolution of rock-water interaction, they are not the end-rates occurring due to natural weathering processes.

The determination of rate of water-rock reaction and their total loading signifies a combining interaction of various hydrological and geochemical processes such as fluid and gas fluxes, pH variability and redox processes. Also, according to several experiences including those reported by Stockwell et al (2006), determination of water-rock reaction and consequent mobilisation and loading of metals, are difficult to predict as the oxidation activities are mostly kinetically driven processes. Thus when the purpose is to qualify and quantify the quality and loading of mine site drainage, experimental activities is best achieved from *in situ* field observations as this offer the possibility of combining measurements of ground-surface water age/residence time with estimates of mineral mass transfer (Glynn and Plummer 2005). On the basis of these observations, WDRL commits to undertake assessments of toxicity and potential impacts on human health as part of the proposed field kinetic tests.

Analytes	Number of Samples Above DoH Assessment Levels, n = 84
Aluminium	7
Arsenic	1
Cadmium	1
Iron	16
Manganese	7
Nickel	2

4.1.3 Low Grade Ore

Some low grade ores may have the capacity to produce acidity. Where there is a potential for AMD to occur, materials will be placed within well-structured PAF cells and covered by NAF materials. As has been indicated elsewhere, particularly within the management of AMD, all waste streams will be monitored for PAF/AMD potential, quantified and adequately disposed of in purposely constructed cells.

4.1.4 AMD and Groundwater Management

Groundwater investigations indicated that high water bearing/yielding zones are absent and there are no indications that the existing multiple water strikes in both shallow aquitard and deep semi-confined to confined aquifer systems are interconnected. Whilst groundwater levels imitate the local and regional topography and are deeper than 9m below surface, groundwater level behaviour indicates that the groundwater regime is not hydraulically interconnected with surface waters. Aquifer hydraulic parameters in the sandstones and siltstones and the hematite iron ore are low, with transmissivities in the order of 0.1m^2/day to 4.0m^2/day. The lower transmissivity pertains to the dominantly ferruginous sandstone materials and the highest to the quartzitic sandstone interbedded with ferruginous sandstones. The hematite iron ore interbedded with sandstones,

mudstones and siltstones have an average transmissivity of 0.4m^2/d. Groundwater modelling indicate that dewatering zones are likely to be within 0.9km to 1.2km from the edges of the pits and the impact on surface watercourses from dewatering is considered to be insignificant as the regional groundwater level is well below the levels of the streambeds.

It is unlikely that possible ground water contamination will migrate off site during mining as most ore stockpiles and WRDs are located upstream of the open pits and groundwater flow will be towards the open pits which will intercept pre- and post-mining contamination, in the case of groundwater contamination by AMD, WDRL will implement remediation processes which will include:

a) Construct WRDs to minimize seepage control and infiltration of contaminants into groundwater and with appropriate drainage collection systems.

b) Sterilisation of pit exposed PAF materials using NAF wastes.

c) Implementation of environmental monitoring bores around the pits and mining infrastructure such as WRDs and processing plant.

d) Implementation monitoring programs to define water quality evolution.

e) Recovery of contaminated water and treatment by mixing/liming.

f) Recycling of treated water in various mining activities such as dust suppression at the plant (not roads), irrigation, and replenishment of pits.

Considering that every mine is unique in terms of its AMD potential, treatment of contaminated water may include:

a) Passive treatment including neutralization via cut-off walls, trenches or wells or in collection systems intercepting both surface-runoff and groundwater flows.

b) Active treatments including neutralisation using biological, chemical processes or water treatment.

These however will be assessed to define whether the technologies selected are appropriate to the site and financially viable.

4.1.5 AMD Sample Selection Criteria

The first initial assessment comprised of 97 samples from all areas in addition to the field exploration XRF scans (see table below). Analytical results in addition to the XRF evaluation indicated that in contrast to the E-East area, areas E-South and F-East and West contain significantly less PAF material concentrations. Regardless of this indicative assessment and to cover a wider footprint of the proposed pit areas, samples were selected for further assessments. Area E East was targeted due to significant concentrations of PAF materials (see table below).

Prospect Areas	Number of Samples		
	First Initial Assessment	Second Assessment	Final Assessment
Area E East	30	30	60
Area E South	20	15	35
Area F East Pit 1	8	8	16
Area F East Pit 2	11	22	33
Area F East Pit 3	13	24	37
Area F West - Pit 4	15	8	23
Total Samples	**97**	**107**	**204**

Further characterisation and quantification of PAF samples/areas will follow the procedure detailed in the AMD and Refinement of Block Model detailed above (identification of overburden, ore and PAF layer materials) which also details the day-to-day and long-term PAF management processes.

4.1.6 AMD and Guidelines

Although there are no specific guidelines pertaining to AMD, the current investigations took due cognisance of internationally knowledge based assessments and included key references such as those recommended by NRETAS and DoR:

1) Department of Industry Tourism and Resources (DITR), 2007: Managing Acid and Metalliferous Drainage. Leading Practice Sustainable Development Program for the Mining Industry. 107pp.
2) The International Network for Acid Prevention (INAP), 2009: Global Acid Rock Drainage Guide (GARD Guide). http://www.gardguide.com/.
3) NRETAS, 2012. Guidelines for Preparation of an Environmental Impact Statement, Roper Bar Iron Ore Project – Western Desert Resources Ltd – May 2012.

The AMD management program outlines the key steps for the management of PAF materials. In addition, the Section: PAF and Block Model Refinement above explains detailed day to day and long term management plans.

WDRL considers that the proposed PAF management program expresses and is suitable to *extreme* AMD conditions. Additionally, WDRL has proposed a comprehensive risk assessment framework and is committed to further improve monitoring processes for the identification, laboratory and field testing, quantification and overall management of *uncertain* and PAF materials. The commitment to undertake field kinetic tests is an example of proactive environmental AMD management.

The risk assessment framework will also help with alerting, in a timely manner, whether the proposed management processes suffice requirements for an environmentally sustainable mining activity.

When and wherever PAF materials are encountered, the following contingency approach will apply:

- Materials will go through a rigorous characterisation, testing, quantification and risk assessment process.
- The day to day block model will be updated to consider these conditions and will trigger a case specific management approach.
- Materials will be immediately segregated and protected by well-designed multi-layered cover systems. Studies to achieve optimum encapsulation and/or covers (dry or wet) are to be initiated.
- Depending on the severity and extent of PAF materials, multilayered cover systems may include clay liners and mixing with high ANC materials. NAF materials may also be crushed to achieve optimum conductivities and prevent water and oxygen entering into the PAF materials.
- Capping of PAF materials will follow the criteria “PAF placement in cells-immediate capping-compaction of cover- PAF placement in cells” to completion of the WRD.

The preliminary block model has indicated that an approximate 70% of excavated materials will be NAF. Soil investigations have also indicated that clay materials at the site are significant and extent in thickness and surface area.

WDRL committed to a grade control approach to quantify both ore and waste materials.

These approaches facilitate budgeting and optimising materials for both PAF encapsulation and construction of the mine infrastructure. The E South area has an estimated 4 million m^3 (equal to the current estimate of PAF) of NAF materials that have not been included in the current estimates.

Liner systems to encapsulated PAF will be approached on terms of their hydrological, geotechnical and geochemical properties.

4.1.7 AMD and Pit Infilling

Currently no pits will be backfilled; they will be allowed to flood via high level flood inflows to maintain water levels well above the depths at which PAF materials are present.

WRDs will be engineered to be sustainable over the long term.

Pit 4 will be constructed for the sole purpose of storing and re-cycling mine waters and as such do not form part of the stream realignment and neither will it be connected to facilitate rainwater harvesting as sufficient freeboard is required to prevent spilling and/or leaking into Pit 3 or the Towns River realignment.

Once Pit 3 has been mined out during the dry season, it will be allowed to flood as an integral part of the stream realignment.

Backfilling of pits may be considered once sterilization of reserves is no longer a concern and/or it is economically viable and does not present a source of contamination. Future risk assessments would be integral in this process.

4.1.8 Monitoring of Waste Rock Dumps

Waste rock dumps will be monitored at the start and end of the wet season to:

a) Ascertain that the cover systems are geotechnically stable, there are no significant differential settlement and that there are no erosion and/o unwanted porosity forming.

b) Detect that accelerated infiltration through preferential pathways is not originating within non uniformly compacted cover areas.

c) Check that surface water is not eroding the lower portions of the WRD and that drainage systems are free draining and functioning optimally.

d) Evaluate that waste cover materials are geochemically stable and are not originating salinity or any other potentially polluting leachates.

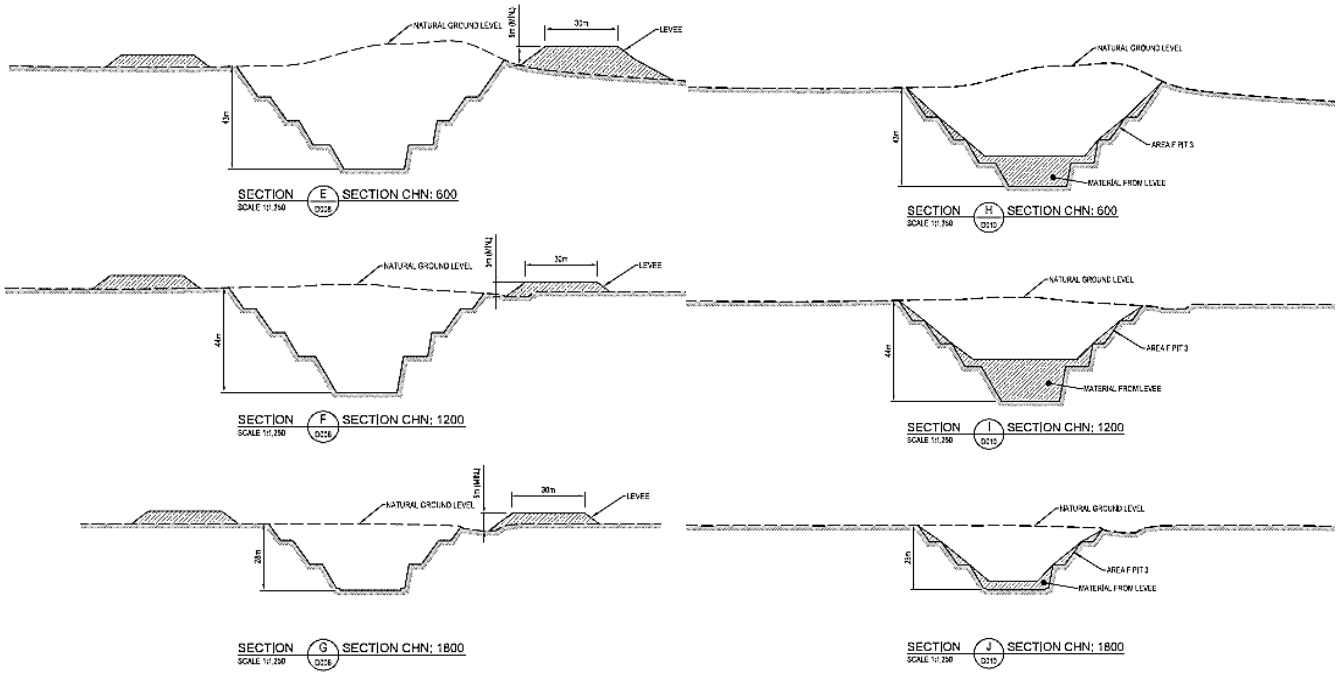
e) Ascertain whether vegetation establishes as a result of well-placed soil covers with soils having sustainable nutrient capacities.

Groundwater within and around these facilities will be monitored by using shallow boreholes installed within the vicinity of these facilities. Wherever contamination is detected, a risk assessment will be completed and remediation measures will be implemented immediately.

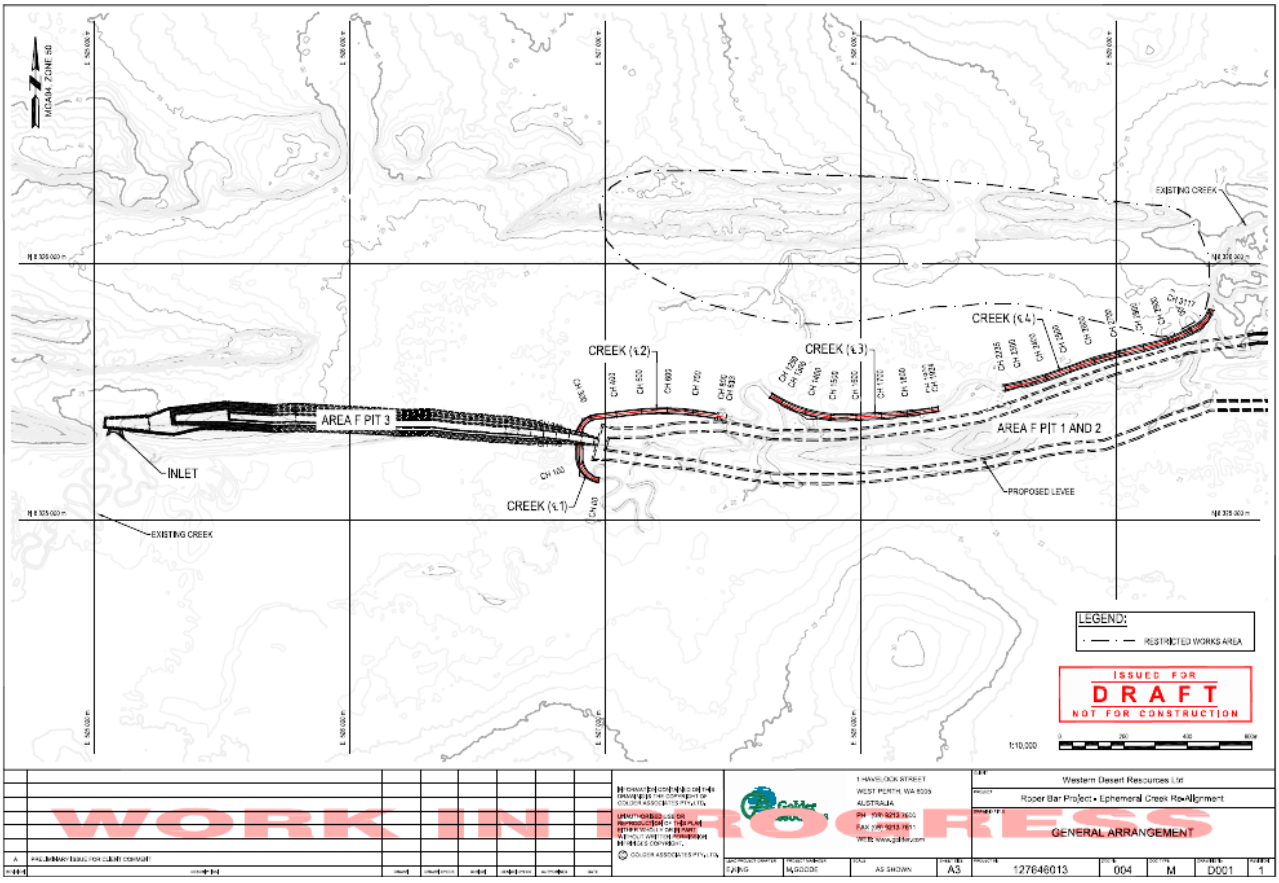
4.2 Towns River Re-alignment

4.2.1 Stream Re-alignment and Flooding of Pit 3

The pit bunds will be pushed into Pit 3 effectively decreasing the angle of repose from 55^{o} to 39^{o} (refer also Golders Technical Memorandum Appendix C.



Inlet and outlet structures are provided to direct flows into and out of the pit (refer the attached Golders Technical Memorandum Appendix C):



Reference should be made to the attached Golders Technical Memorandum in Appendix C. Refer to the Map titled: Towns River Pre- and Post-Development Channel Alignment and Drawing General Arrangement which indicates where the western inlet into Pit 3 and the eastern inlet to and outflow from Pit 3 are located. In addition, the Plan and Longitudinal Section Sheet 1 of 5 details the eastern inlet and outlet. In essence Pit 3 will receive inflows from the Towns River and its tributaries at the eastern and western inlets. This water will enter Pit 3 and

discharges from a single outlet at the eastern end of Pit 3 into the first leg/channel of the stream realignment. Also refer to the detailed cross sections contained within the memorandum. The Flood Map Post-Development Option C illustrates the extent of flooding during and up to the 100-year ARI event. In general terms there is little difference between the larger events i.e. 50-year ARI and larger, due to the flatness of the terrain. Pits 1 and 2 (eastern side of Pit 3 and Towns River) and Pit 4 (western side) will be provided with bunds to elevations 0.6m above the 100-year flood level. The pit bunds are nominally (See cross sections in the Golders Technical Memorandum Appendix C: Area F Pit 3 Longitudinal and Cross Sections for Year 1 and Year 2):

- 5m high and well over 600mm above the 100-year ARI flood level; and
- 30m wide on top to accommodate mine haul roads and safety bunds on top.

Any rain water, and ground water influx, collecting in Pits 1 and 2 is to be pumped to Pit 4 pit water storage (PWS) for re-use.

Should flows occur during mining; the bunds around Pit 3 will protect the pit from flooding and direct the water around the pit. Smaller flows are to be pumped around the pit into the Towns River downstream of Pit 3.

Section 3.0 in the Golders Technical Memorandum in Appendix C details the seasonal assessment of potential impacts on downstream volumes including pit water balances for Pit 3 for several flow/rainfall scenarios:

- Scenario 1: Two consecutive dry years.
- Scenario 2: Dry year followed by an average year.
- Scenario 3: Two consecutive average years.
- Scenario 4: After the pit is full, a dry year with a sustained dry season.

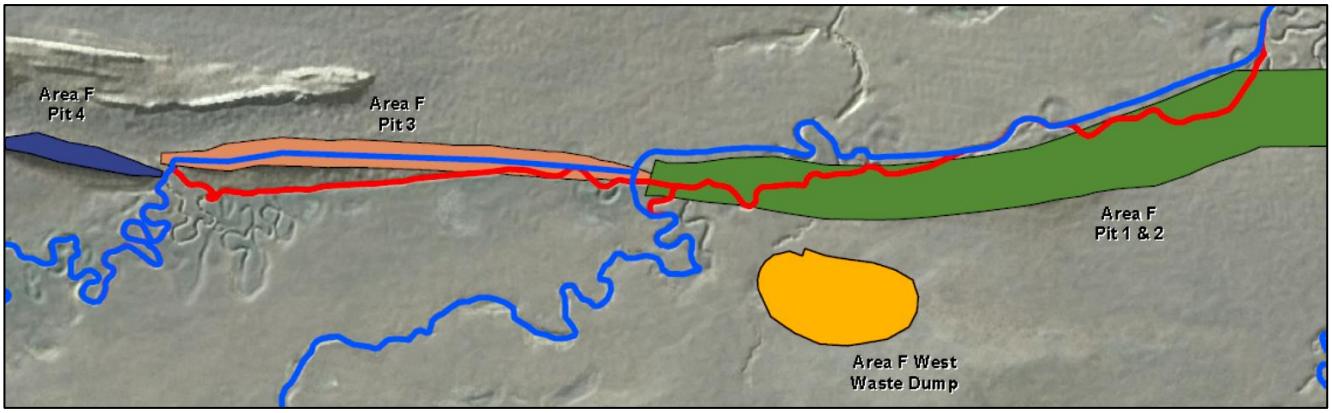
Demonstrating that:

- During a very dry year, and also during an average wet season, there may be impacts on stream flow downstream of the pit lake due to interception of flows during filling of Pit 3;
- The option of managed pit lake filling using pumped augmentation can be used to mitigate the impact of the pit lake interception on downstream flows, particularly during a drier than average wet season;
- After the pit lake has filled, the ongoing impacts on downstream flows is reduced considerably and the pit lake will reach a full level early the following wet season, even during drier than average years; and
- During the dry season, as the pit storage level naturally falls there will be no flow downstream of the pit. However, these reaches of the Towns River generally do not have flows in the dry season.

Simulation of the pit lake water balance after it is completely full indicated that natural evaporative losses during the dry season may reduce water storage to no less that 90% to 95% of total storage (equivalent to a deficit of up to 400ML). Therefore, even during a dryer than average year the pit lake will be negligible impact on total seasonal flows downstream of the pit.

4.2.2 Channel

The sinuosity of the current river and designed channel is indicated on the map ‘Towns River Pre- and Post-Development Channel Alignment’ in Appendix C indicating little difference between the existing and future channels as indicated by the calculations. In this instance, where the billabongs are to be protected, preference was given to relatively straight sections close to the pit bunds to minimize disturbance.



Meandering remnants of the original river channel are included where possible. The new channel sections will be constructed to duplicate the profile and bottom structure of the existing river in the area (refer attached Photo File – Appendix E). Revegetation of the banks of any new channels will duplicate vegetation along the original stream. Further information on management of the movement of fish is provided in response to **Comment #317.**

4.2.3 Pit Water Quality

There are no anticipated AMD issues in Pits 3 and 4. In general PAF materials are absent in the zone which has been oxidised between surface and 15m deep (i.e. to about the regional ground water level). The depths (m below ground level) at which PAF materials become dominant are indicated in Table 4-1:

Table 4-1. Depths at Which PAF Materials become Dominant

Pit:	Area	Length	Width	Depth	Approximate Pit Volume	PAF in Pitwalls	GWL	pH	TDS
	(m^2)	(m)	(m)	(m)	(million m^3)	(mbgl)	(mbgl)		(mg/L)
F Pit 3	310,000	1550	200	40	6.20	>30	9.0	-	-
F Pit 4	58,500	650	90	40	1.17	>30	13.8	6.7	17,010

These pits are to be mined over a relatively short period of time i.e. within eight months in the dry season. Pit 3 will be emptied of rain and ground water influx into Pit 4: PWS prior to flooding to the surface immediately at the onset of the wet season (refer responses above with regard to the pit water balance) as it forms an integral part of the stream realignment.

Pit 4 will not be flooded to maintain maximum capacity and freeboard (the Pit will not be allowed to spill due to its location close to the Towns River) to receive rain falling into the remainder of the pits, ground water influx and storm water captured at the Plant.

Uncertainty pertaining PAF materials below the oxide zone in the pit walls will be addressed by:

- The top 30m of the stratigraphic column will be grade controlled before mining commences. This includes the 15m oxide layer (that will yield the materials for the pit bunds) which blankets most of the mine footprint;
- The grade control, which will incorporate vertical and diagonal drilling to depths of 30m will be ongoing until the final depth of the pit (in this instance 40m) is reached;
- The drilling program will provide samples for the assessment, mapping, delimitation and quantification of ore resources, low grade ore and PAF materials;

- These samples will be subject to field geochemical characterisation/screening for PAF materials including XRF, paste pH and ABA assessments where materials with low paste-pHs (<5.0) will be send to a laboratory;
- These results of these will be incorporated into the overall mass waste rock ABA evaluation; and
- Kinetic testing to ascertain sulphur oxidation rates.

The primary impacts of mining and flooding Pit 3 are:

During mining

Ground water flux is towards the pit and is to be collected in sumps and pumped to Pit 4: PWS.

Ground water level drawdown to between 900m and 1,200m from the pits.

The Towns River and billabongs will not be impacted as they are not connected to ground water (evidenced by water holding capacities in mid-July, soil profile, low permeability of terrain and depth to ground water).

Post Mining and Flooding

Pit 3 is to be kept empty i.e. rain and ground water influx is to be pumped to Pit 4: PWS until flooding of Pit 3 commences.

Once flooded, the pit water level is to be maintained at a level no deeper than 25m below surface to ensure that PAF materials remain permanently submerged.

The pit lake water level will remain at full surface level throughout the wet season. During the dry season the pit water level is likely to recede by up to:

- 2.4m due to pit lake evaporation; and
- 5.0m due to pit lake seepage

Totalling 7.4m or some 2.3ML. Pit water balances indicated that this water will be replaced as soon as runoff from rain commences (dry year December runoff equals 1,316ML) i.e. the pit will receive rain and runoff each season.

Groundwater is unlikely to enter the pit once it is flooded; water in the shallow aquifer will be displaced by fresh water seeping downstream.

4.2.4 Monitoring

The eleven bores drilled to date were to investigate and assess potential impacts to the local and regional ground water regime. They did not consider monitoring requirements for specific infrastructure elements such as stream realignments, waste rock dumps (WRDs) and plant as their exact locations and designs were largely unknown at the time of the ground water study in November 2011.

The latest revised monitoring plans and programs (detailed throughout this document) allow for several new shallow and deep monitoring bores and surface water sampling sites upstream and downstream of the WRDs, Plant, Towns River and billabongs.

Reference should be made to current surface and ground water monitoring programs. These programs will continue until closure objectives can be achieved.

4.2.5 Flood Levels

In the following map (taken from the Golders Technical Memorandum – Appendix C) the green line depicts the 5-year ARI, yellow 20-year, turquoise 50-year, and purple the 100-year flood extents. The plant and Run of Mine (ROM) pad and Area Feast WRD will be outside the 100-year ARI flood level whilst the Area F West WRD will be partially within the 100-year ARI flood extent. All the WRDs, plant and ROM Pad will be on elevated pads at least 0.5m above the 100-year ARI flood level.

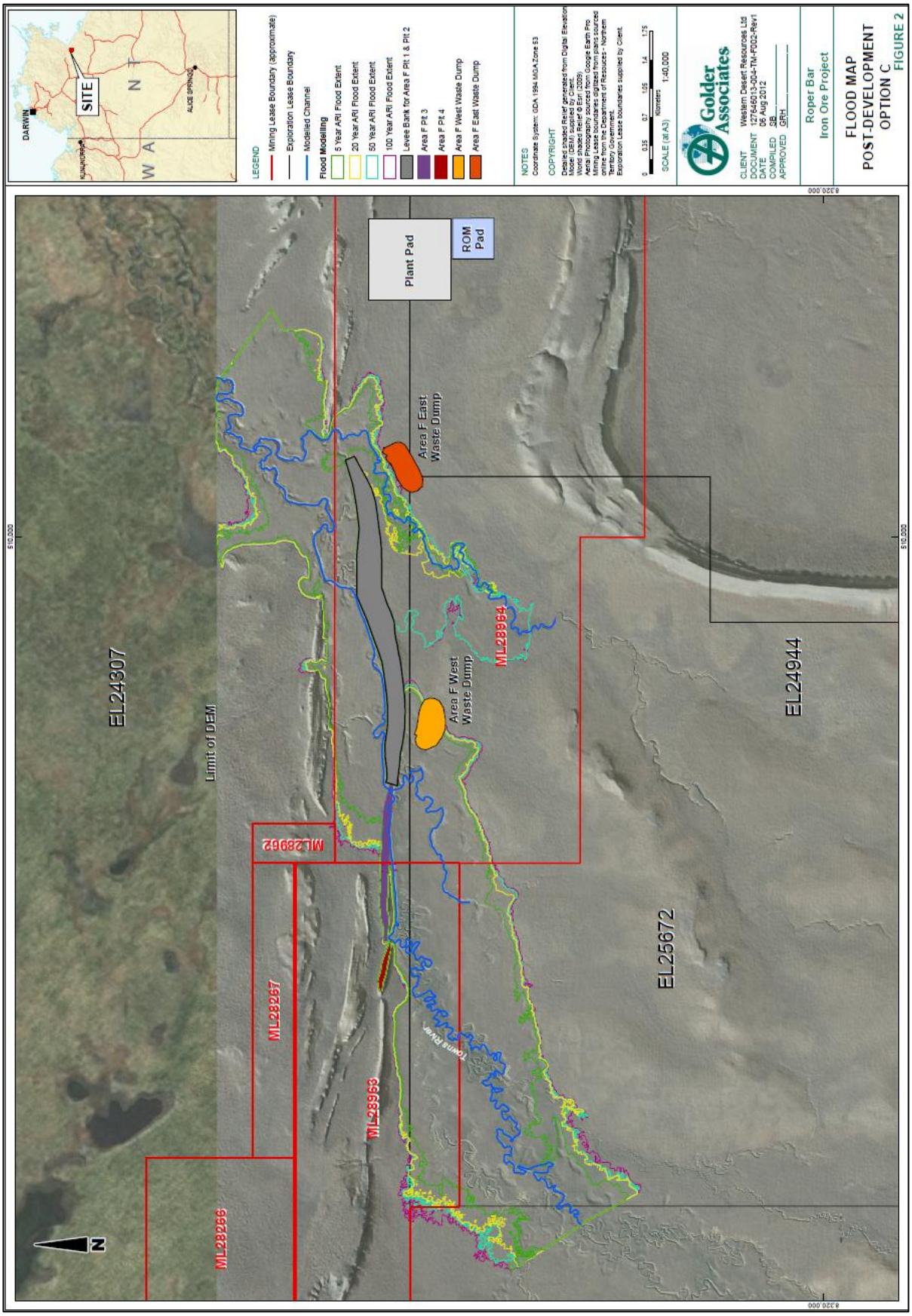


Figure 4-1: Flood map post development option

4.2.6 Geotechnical Investigations

The geotechnical investigation has been completed – refer Appendix D. The investigation indicated that:

- Based on the laboratory test results, the materials along the Option A alignment are predominantly lateritic sands with minor clays, silts and gravels. Plasticity testing indicated that the clays are slightly to moderately reactive to changes in soil moisture content and as such, some shrink/swell behaviour and minor cracking may occur when exposed to seasonal moisture variations;

- Based on observations along sections of the Towns River, the materials exposed along the river banks were relatively consistent with those seen in the test pit excavations. It is possible that the rock material in the floor of the Towns River is the same rock unit that the majority of the test pits encountered where backhoe/excavator bucket penetration refusal occurred; and

- Based on the results of Emerson Class testing, the materials encountered along the Option A alignment are considered to generally have a low dispersion potential. Pinhole Dispersion testing of soils between 0.5m and 2.0m below surface (Unit B) generally support this conclusion. Soils deeper than 2m below surface (Unit C) may be particularly susceptible to erosion.

The results of the investigation recommended that:

- During construction, the removal of vegetation (particularly trees) within and near the constructed batters may lead to localised areas of loose disturbed material which should be removed and reinstated with engineered fill prior to construction proceeding further; and

- Channels constructed in these materials have batters of three horizontal to one vertical (3H:1V) in Unit A. The batters may be steepened to two horizontal to one vertical (2H:1V) in the Unit B and Unit C materials.

Review of the Mt Young 1:250,000 map sheet indicates that the Option C alignment appears to also be within the '*Qa*' geological unit which is the same unit as the river realignment Option A. However, it is close to the southern boundary of this unit and the Moraok Sandstone Member which may be encountered at or near surface by portions along the length of Option C. If Option C alignment channel is constructed within the same materials observed in the field investigation, the following are relevant:

- A channel constructed in these materials subject to natural processes will likely form a similar profile, with steep banks and a flat channel floor (where laterite is encountered), to the existing river profile.

Some erosion and scour will occur in the banks of the realigned river channel, particularly during flood events, and particularly in the soils immediately above the laterite siltstone/sandstone. This is expected to be more pronounced on the outer side of bends in the river. Scour protection measures such as the placement of rip-rap and geotextiles are included in the design to mitigate the prospect of this occurring (refer to Appendix N of the DEIS).

5 Draft EIS Public Review and Comments

5.1 Summary

The following sections provide a copy of all submissions received on the Draft Environmental Impact Statement (DEIS), with a statement of response to each submission. The comments have been grouped by theme, so that each section addresses relevant chapters from the DEIS. This enables ease of reference for the reader, and so that the DEIS and the Supplementary EIS may be viewed together as the Final Environmental Impact Statement. Please note, that the comment number provided in the tables below corresponds with the reference number in the 'Submissions Table' attached as Appendix B.

Where submissions contain multiple points which require addressing, these have been divided in order that specific components may be addressed. Similarly, where responses given relate to more than one submission, the reader may be directed to other sections or content within the Supplementary Environmental Impact Statement (SEIS).

5.2 Response to Submissions

5.2.1 CHAPTER 1

SECTION 1.2

Comment #585

FIGURE 1.3 More information on the disturbance footprint for each of the infrastructure shown on the map is required. Clearing within the mining tenements will total approximately 450 hectares - A breakdown of this disturbance size is required.

The airstrip extends beyond the northern boundary of the MLA. The MLA should be extended, or another MLA should be proposed, to cover the whole airstrip

Although the airstrip area identified as outside of the WDRL Mineral Lease (ML) is not, and will not be used for any purposes other than a required clear zone as per Legislative Requirements, WDRL plan to submit an application for a new (simple infrastructure) ML for this purpose in the near future.

The following table outlines the disturbance footprint for each of the infrastructure shown in the map (Figure 5-1) below.

Table 5-1. Clearing Footprints for Mining Infrastructure (hectares)

Infrastructure Area	Ha
LG Stockpile	27.7
MG Stockpile	15
Plant Area	102.9
Haul Road Area F to Plant	7.4
Area F Pits 1 & 2	44.2
Area F Pit 3	12.4
Area F Pit Crest roads	10.2
Area F pit crest barrier	54.3
Haul Road Area E to Plant	2.9

Infrastructure Area	Ha
Area E Pit 4	14.3
Area E Pit 4 Crest roads	3.1
Area E pit 4 crest barrier	14
River tributary channel diversion	0.03
F East Waste dump	100
F West pit for airstrip gravel plus road	6.8
TOTAL	**415.23**

SECTION 1.8

Comment #591

The Mining Management Act does not look at any health and safety aspects (apart from those that may subsequently impact on the environment). These are all covered under the *Workplace Health and Safety (National Uniform Legislations) Act 2011.*

Noted.

SECTION 1.9

Comment #592

The use of public roads between the mine site and the Port of Bing Bong was not considered due to the poor state of the road, public safety, the indirect length of the Savannah way and the likely level of disturbance to the wider community. Therefore a separate private haul road was suggested.

The reasons put forward here don't justify why the use of the Nathan River Road isn't considered.

Firstly, the condition of the Nathan River road is going to be better than starting with no road at all. As it is an existing road it is likely to already avoid all cultural heritage areas. Finally, the use of a public road would mean fewer trespassers on the private road which WDR may find difficult to police, especially during the wet season when the Nathan River road becomes inaccessible. It seems that joint use of the public road, in conjunction with an adequate traffic management plan, would make economic and environmental conservation sense.

Please refer to response to **Comment #107** below.

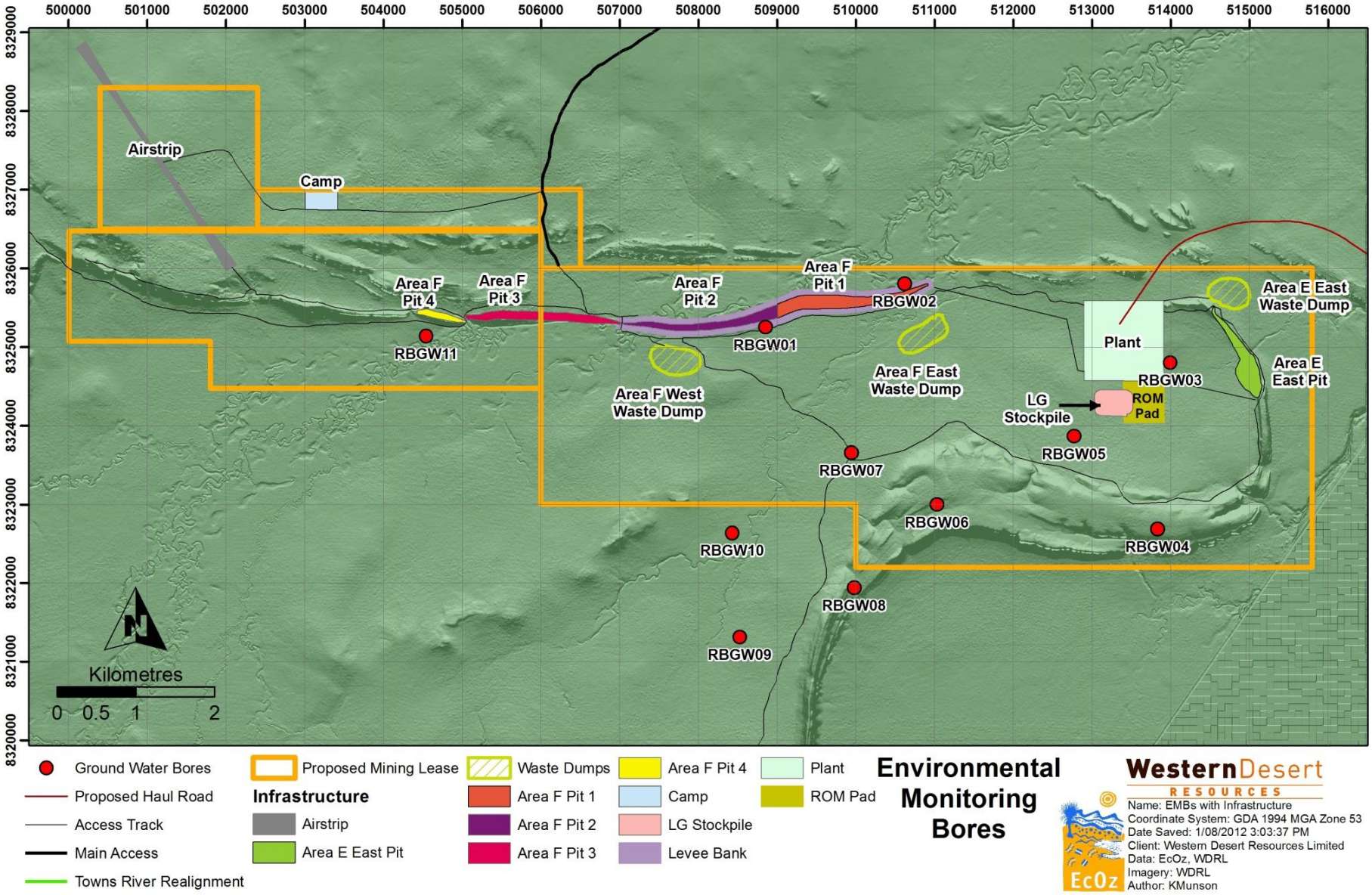


Figure 5-1: Environmental Monitoring Bores

SECTION 1.9

Comment #593

Further information is required on the volume of water expected to be drawn from the existing bore for the camp and how will this impact on groundwater supplies in the area.

Further information is also required on the volume of water that is anticipated to be drawn from bores along the haul road.

Refer to **Comment #122** for water requirements at the camp.

Water use during haul road construction is estimated to be approximately 33,600kL/a (as per the Draft EIS Section 2.9.1), during maintenance this may increase to around 50,000kL/a.

During operations camp water may decrease due to less construction people but road dust suppression will increase as the roads will be used continuously.

SECTION 1.9

Comment #105

The proponent should explain how the long-term economic sustainability of the region will be assisted with investment of funding if economic development in the region is limited to mining to sustain the community. The positive aspects of not proceeding with the proposal include the maintenance of the environment in its current condition and avoidance of the potential legacy issues created by mining. Also, mining activities have the potential to create an economic bubble with subsequent depressed conditions following mine closure. Mining projects also have the potential to lead to unforeseen negative social impacts. These potential consequences should be acknowledged and discussed.

The Offsets Chapter identifies that the establishment of mining operations in proximity to remote communities can provide temporary relief to the paucity of jobs, but the long term prosperity and functionality of remote communities requires intelligent application of transitory resources in order to provide enduring benefits.

The income stream generated during the life of a mine is a “one-off” opportunity that should not be squandered. Mining creates direct employment opportunities for the life of the mine, however the mining industry has a chequered history of Indigenous workforce participation and retention. Aboriginal communities require and deserve social and economic benefits that endure long after the departure of the mining company. These benefits should not be another form of “sit down money”.

Jobs are a point of commencement and in association with the establishment and delivery of a range of services can lead to social and economic inclusion for communities. In order to achieve sustainability, jobs must be permanently incorporated into the economic fabric of communities.

The potential consequences associated with the statement “Mining projects also have the potential to lead to unforeseen negative social impacts” has been strongly acknowledged in the consultation and social impact sections and appendices and rather than further discussing, WDRL have made it clear that they have developed and committed to ongoing consultation and social impact studies so as to actually study the social impact rather than simply delivering a desktop pre development study.

The statement that mining projects also have the potential to lead to unforeseen negative social is also discussed in Appendix H2 of the DEIS.

SECTION 1.9

Comment #106

In consideration of the options for mine development, and given that the river diversion represents a significant environmental impact, what is the economic consequence of removing the exploitation of ore resources from Pit 3 Area F on the overall Direct Shipping Ore (DSO) project viability?

As presented in Section 1.9.2 of the DEIS:

The location of the Towns River near deposit F makes mining of this deposit impossible without altering the location of the water flow. The only alternative option identified associated with this issue was whether the deposit would be mined or not. If deposit F is removed from the potential ore reserves the viability of the project is dramatically impacted to the point where it would no longer be a viable project.

SECTION 1.9

Comment #107

In proposing a private haul road of some 165 km from the mine site to Bing Bong the option of using the existing public road was rejected (PPI-27 and 2-21).
Given the significant cost and disturbance footprint of a new road, further social, economic and environmental reasons should be provided to inform this decision. Provide suggested post-closure uses for the haul-road. Explain the reasons why the proposed haul road corridor must be cleared up to 50m wide.

Use of the existing road network has been rejected for social and economic reasons. Economic and cultural considerations have been taken into account during the identification of the proposed route.

Issues that have led to the decisions include;

- The distance from the mine site to Bing Bong via the existing road infrastructure is approximately 340kms, more than twice the distance of the proposed private Haul Road. This factor results in a minor difference in capital requirements and major differences in operational and maintenance costs.
- Iron ore is a bulk commodity and transport costs are a significant influence on project viability.
- The existing road network would require adherence to load and road restrictions resulting in the need for many more smaller trucks as they would have a reduced carrying capacity. Additionally, road weight restrictions and seasonal closures would be restrictive and threaten project viability.
- There would be a major and totally unacceptable disruption to existing road users. More than one truck every 9 minutes would result in serious safety management issues.
- The Nathan River Rd is used by mostly Indigenous People from local communities and travellers along the iconic Savannah Way. Travellers along the Savannah Way would be seriously impacted by travelling along a road carrying iron ore trucks. The impact on the safety of all road users along with the major impact on the tourist experience were preclusive factors.

The Savannah Way is Australia's Adventure Drive, linking Cairns in Tropical North Queensland with the historic pearling town of Broome in Western Australia's Kimberley, via the natural wonders of Australia's tropical savannahs and the Northern Territory's Top End. (www.australia.com)

Four wheel drivers enjoy the adventurously remote Roper Bar route to Borroloola section of the Savannah Way for great fishing, unsealed roads with few facilities and some gorgeous riverside camping spots. (www.savannahway.com.au)

- Management of trespassing on the private road will be a management issue.

Project refinements have reduced the construction needs for the haul road to within a corridor of 30 metres. This may need to be larger in certain locations, such as where trucks are required to turn around during construction.

SECTION 1.9

Comment #108

If water from the anticipated pit dewatering is to be used for mining related water use, and a significant proportion of the ore and waste rock extracted is potentially acid-forming (PAF), explain how water quality will be maintained to ensure that problems with acid water are minimised.

Refer to **Section 4.1.4** of Supplementary EIS Report

SECTION 1.9

Comment #109

Explain '... potentially some minor other processes' with respect to energy use requirements. Discuss the possibility of solar power at the workers camp.

" ….potentially some minor other processes" refers to further processes that may be required over and above crushing, such as pulverising and preparation of ore for transport.

Solar will be investigated for use at the camp and WDRL will carry out due diligence to ensure that where possible, they take advantage of this natural resource.

SECTION 1.9

Comment #110

Rehabilitation alternatives should include consideration of seed collection from species that will be cleared (to retain local diversity) and establishment of a nursery to ensure viability of species. This could contribute to social outcomes if a local workforce is involved. Initial indications are that top soil retention during clearing will be minimal but any top soil should be appropriately stored to maintain a viable seed bank in view of a lengthy duration of storage. Options should be discussed.

Please refer to Rehabilitation and Closure Plan. Local seed collection and nursery establishment is a standard expectation of the Company and the stakeholders. Top soil will be stored where available, however it is common in the wet dry tropics that seed viability within top soil has a very short life expectancy and should not be relied on for rehabilitation purposes unless used within 2 years of disturbance.

5.2.2 CHAPTER 2

SECTION 2.1

Comment #595

Early preparation works utilising overburden, as stated in Section 2.3.3, will need to be approved in the MMP before works can commence. This timeline is unrealistic, considering the EIS has not yet been approved and the MMP still needs to be prepared and submitted to DOR for approval once the EIS process is complete.

Noted.

SECTION 2.1

Comment #596

The haul road will be 165 km long with a cleared width of 50m. Section 2.6.1 states ... *the haul road will be approximately 12m wide with 7.5m shoulders, and be positioned in a cleared area of approximately 50m width.*

Clarification and justification required as to the large area to be cleared for the haul road.

Project refinements have reduced the construction needs for the haul road to within a corridor of 30 metres. This may need to be larger in certain locations, such as where trucks are required to turn around during construction, where there are bridges, culverts or intersections.

SECTION 2.1

Comment #112

An annual shutdown of 40 days is anticipated due to regional rains, flooding and road closures. Management of this shutdown should be discussed with respect to on-going maintenance and monitoring regimes.

Shut down will allow for regular equipment maintenance. Environmental staff will remain on site to attend to necessary works including environmental monitoring.

SECTION 2.2

Comment #113

It is stated that the Area E stage 1 pit and Area F pit 4 are planned for use as potential water storages during the early stages of the project. At Table 2-4 summary statistics of the pit dimensions are provided for Area F and Area E and Figure 2-1 provides a general plan view of the proposed pits. Clarification is required on whether pits 1 and 2 of Area F are proposed as separate pits, or are contiguous. The Supplement should also clarify whether the Area E, East pit is to be mined in stages as implied or is to be mined at 10 metres per month uniformly as stated. Dimensions and ore/waste data for each pit (as per pit 4 dimensions at Table 2-17 page 2-68) and waste rock dump should be presented individually given that-three waste rock dumps are proposed (Figure 2-I).

Area E Pit 1 is not to be used as a water storage area.

Pits 1 and 2 of Area F are contiguous. This large pit was split for scheduling purposes. Pit 1 will be accessed from the eastern end and Pit 2 accessed from the western end.

Area E East pit is to be mined at 10 metres per month uniformly as stated.

Provisional dimensions and area of Waste Rock Dumps is provided below. It should be noted that full comprehensive designs will be established for the MMP, a provisional design is provided at Figure 5-5.

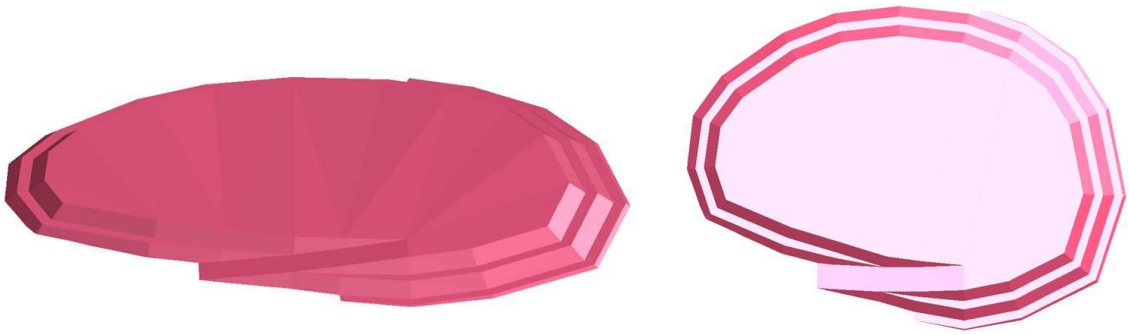


Figure 5-2. Area E East Waste Dump - 15.67 hectares

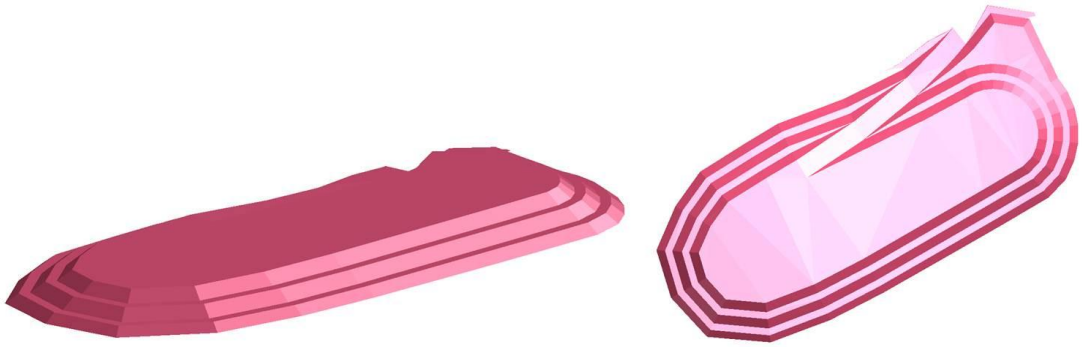


Figure 5-3. Area F East Waste Dump - 16.98 hectares

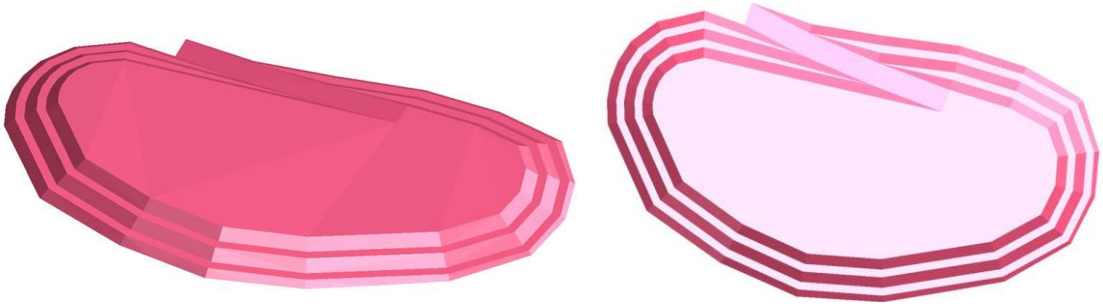


Figure 5-4. Area F East 2 Waste Dump - 18.06 hectares

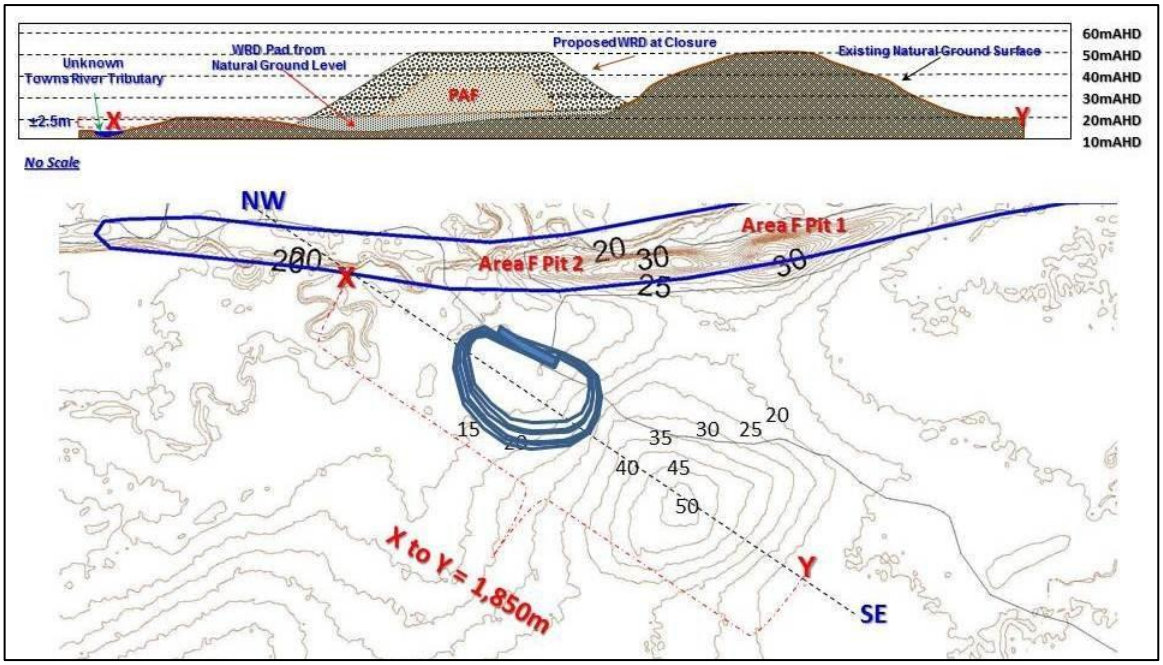


Figure 5-5. Provisional WRD Detailed Design – Area F East 2

SECTION 2.2

Comment #114

Mine pit dewatering - depending on the reactivity of the mine pit walls and the potential for deterioration in pit water quality, discuss the potential impacts of using this water for dust suppression and how such impacts might be managed. Clarify whether water from crushing and screening would be re-used/recycled.

Refer to **Section 4.1.4** of Supplementary EIS Report.

SECTION 2.3

Comment #598

Management of Non Acid Forming (NAF)/Potentially Acid Forming (PAF) material has not been adequately addressed here. Further information is required on how PAF material will be managed during the wet season.

Refer to **Section 4.1.1** of Supplementary EIS Report.

SECTION 2.3

Comment #599

Will there be enough benign/oxide overburden material suitable for PAF encapsulation after approx. 4 million m^3 has been used in the construction of various infrastructure?

The priority for appropriate material on site should be adequate encapsulation of PAF material rather than the camp pad and haul roads etc.

What criteria does waste rock have to meet to be determined as being appropriate for PAF encapsulation material? Geochemistry, particle size, hydraulic conductivity etc.?

Refer to **Section 4.1.1 and Section 4.1.6** of the Supplementary EIS Report.

SECTION 2.3

Comment #14

WDRL should commit to, and plan for, in-pit burial of all PAF material

One of the issued that has been identified during the project development refinements that have occurred during 2012 includes the lack of availability for a pit to immediately store PAF material and therefore the need to store it on surface. Best practice management would therefore suggest that a well-designed and permanent facility be constructed for this purpose. Additionally, there is insufficient material to allow for the complete infill of pits which adds complications to the planning and viability of in pit PAF storage. Actual studies of in situ conditions, particularly associated with groundwater, would be required so as to provide the level of knowledge required to safely design and operate in pit storage and covers, as opposed to the more conventional waste rock dump encapsulation method.

SECTION 2.3

Comment #115

The low grade ore storage facility has the potential to retain material for eight or more years. The proposed facility design, inclusive of erosion and sediment control mitigations, should be provided particularly if large quantities of mined ore fall under the specified DSO iron concentrations. Discuss the potential for this to be a source of acid and metalliferous mine drainage (AMD).

Refer to **Section 4.1.3** of Supplementary EIS Report

SECTION 2.3

Comment #116

Top soil should be managed to ensure seed banks are maintained in view of the time lag expected between stripping, mining and backfilling of pits (eight+ years taking into account BFO quantities in pits, etc.).

Refer to response to **Comment #110** above (section 5.2.2).

SECTION 2.3

Comment #117

It is proposed to use Area F pit 3 as a diversion buffer against downstream velocity extremes (minimising afflux). Consideration needs to be given to the low-flow situations (the pit would have to fill first before the river will flow) and the changed hydrologic regime and fish passage constraints potentially generated. What could this mean for water quality in the river, particularly if there are AMD issues with pit 3? What happens to pit 3 on decommissioning? Discuss the requirements for long term legacy monitoring and management.

See **Section 4.2.1** above.

SECTION 2.5

Comment #807

The future management of any airstrip following closure of the mining operation will need further discussion with the NT Government.

Noted. WDRL commit to ensuring that any future management of the airstrip post mining will be discussed with the NT Government.

SECTION 2.6

Comment #602

The figures contained in this section are illegible (too small) and contain no keys as to what lines, colours etc. mean.

Further information and clarification is required on the proposed construction methods for the haul road. Specifically on the spray seal method, anticipated maintenance requirements for the haul road and timeframes for the haul road to be completely bituminised Should the road remain unsealed then it is highly likely there will be impacts from dust to vegetation and water quality. In their experience, departmental officers have observed significant impacts to water quality in surrounding water bodies and vegetation some distance from the road, particularly downwind of prevailing winds.

Figures are reproduced in legible format; refer to Attachment A at the end of this document).

The placement of spray seal on the road is anticipated after the first wet season.

Dust control/road maintenance will include a minimum of two graders and two water trucks until the road is sealed. Water will be sourced from the bore fields at the mine site and along the haul road. Water use during haul road construction is estimated to be approximately 33,600kL/a (as per the Draft EIS Section 2.9.1), during maintenance this may increase to around 50,000kL/a.

SECTION 2.6

Comment #603

".. *waste water will be retained for appropriate disposal…"*

Further information is required on what is considered appropriate disposal.

Please refer to Section 2.9.4 of the Draft EIS:

- Septic tanks will also be installed at construction camps along the haul road and will receive all ("grey" and "black") wastewaters. These septic tanks will be pumped out and removed when construction camps are dismantled.

See also Section 2.10.2 of the Draft EIS:

- All wastewater generated from the mine site and main camp will be treated to a high quality and recycled according to the Northern Territory Department of Health *Guidelines for Management of Recycled Water Systems* (2011) and;

- Septic tanks will be installed at each of the camps established for the construction of the haul road and will receive all waste water from the camps. After extended use, septic tanks will need to be pumped out. This will require the services of a waste disposal contractor, who will remove the effluent from site.

Section 2.6

Comment #317

"AFANT needs to be certain that the proposed haul road allows for existing water flows and passages in the rivers, streams, wetlands and flood out areas that it crosses. As acknowledged in the EIS, the road will cross many significant rivers and streams and interact with a number of wetlands and possible flood out areas. Upstream movement of fish and aquatic life through the road alignment can only be provided for if river and stream crossings do not become restriction points because they are not wide enough or do not provide for sufficient flow volumes. They can also become restriction points if the longitudinal in-stream profile of areas under bridges and in culverts and pipes is built up higher than the existing stream profile forming barriers which fish have to find a way over if they are to maintain their natural movement. Similarly, the fish movement impact from the various catch drains, check dams, diversion channels, sediment fences and so on needs careful consideration.

We note and welcome the assurance given tin the EIS that "In all cases the precautionary principle will be applied by assuming that fish and aquatic habitat exists and the appropriate river crossing will be used to ensure that fish passage will not be impeded" but the same principle needs to be applied to all water crossings unless it is certain that they are not used by fish and other aquatic animals for movement up and downstream.

The same consideration should be applied during the road construction process. We note that the construction methods proposed for bridges and culverts involve significant stream flow interruptions but, lack of detailed information on individual crossing construction and timing make it difficult to form an opinion on possible impacts on normal fish movement. More detailed plans need to be developed and fully considered in terms of fish and aquatic life impacts before this project is approved.

Water crossings, particularly in areas where flooding occurs, should be sufficiently large to allow water to flow under the road without forming dams on the upstream side that could retain water for any length of time. Inadvertent damming of water in these circumstances could impact on water quality.

Another issue with the haul road design is the considerable areas of land that will be cleared during its construction and maintained during its operation. Runoff from these areas during rain and flooding events could be considerable and there is potential for high sediment loads to be transported into rivers and streams flowing into the Gulf of Carpentaria. If such large areas are needed to be cleared for the haul road then considerable planning, careful construction and ongoing maintenance will be necessary to ensure downstream water quality."

Further assessments will be made to understand what fish habitats exist upstream of the crossings. If there is no permanent water and/or suitable habitat upstream of a crossing then accounting for fish passage may not be required or requirements adjusted accordingly.

However, in most cases designs will ensure that flow velocities remain at no more than 0.3m/sec as most native fish can sustain swimming at velocities below this (Sawynok, W 2012 pers. Comm., 31 July).

It has been identified (Kapitzke 2010) that the wet tropics waterways generally contain more diverse habitat types and fish species than the waterways in other regions of Australia. Further, some species rely on intermittent flow rather than perennial flow for spawning, making them more susceptible to barriers due to suitable flow conditions existing for only a very short period of time. Minimum flow depth for small and medium size species is 0.2 – 0.3m and native fish generally have very little capacity to jump or negotiate small water surface drops (Kapitzke 2010). It is therefore critical that suitable flow conditions (i.e. velocities, depths, turbulence levels, flow patterns) be provided to encompass the swimming capabilities for all species likely to be passing upstream or downstream of the crossings during periods of flow.

In the large systems (Magaranyi, Nathan and Limmen Bight Rivers, Pine, Rosie and Bing Bong Creeks) bridges will not impede flow due to these waterways being crossed by large bridges hence not influencing fish migration. However for the smaller creeks and floodways there is more potential for impact on fish migration. WDRL commits to further survey work to determine which waterways have suitable habitat upstream and therefore which waterways will need to have particular consideration for fish passage.

WDRL commits to providing for fish passage within the above identified waterways and to design waterway crossings in accordance with the general principles as contained in the documents *Culvert Fishway Planning and Design Guidelines* (Kapitzke 2010) and *Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings* (Fairfull & Witheridge 2003) during construction. WDRL will monitor, prior to the start of each wet season, the integrity of the culvert installation to ensure that there are no impediments to fish passage such as washed out bases.

The same principles will be applied to guarantee fish passage at the Towns River re-alignment.

For management of runoff from the haul road and management of the potential for high sediment loads to be transported into rivers and streams please see the Haul Road Erosion and Sediment Control Plan (Appendix L3 of the Draft EIS).

SECTION 2.6

Comment #409

The Draft informs us of infrastructure for numerous stream crossings, and a further 60 locations may also require culverts to ensure adequate cross-drainage. ECNT recognise this as a significant feature, and welcome design criteria related to water quality, flow and fish passage. The Statement should include detail about monitoring the performance of this important component.

See response to **Comment #317** above.

SECTION 2.6

Comment #318

The issue of ore spills either along the haul road, during barge loading or during transshipment in the Gulf of Carpentaria is a concern. If, as appears to be possible, the ore being transported is potentially acid forming, then ensuring transport spillages and dust retention through all phases of transportation will need to be a priority.

We note that ore will be hauled in covered trailers but this does not indicate to us that they will be sealed in any way so that ore spillages and ore dust will not spread along the haul road. Given the sensitive nature of some of the areas to be traversed by the haul road including important rivers and streams we believe that an effective system of sealing the trailers should be employed.

We are also concerned to ensure that plans are in place to effectively deal with any major ore spills resulting from trucking accidents. We were unable to locate details of such plans in the EIS. Plans should include the emergency containment of any ore spilled in accidents, the rapid removal of such ore from the accident site and any necessary measures to clean and rehabilitate areas impacted by such accidents.

Any ore spills will be cleaned up immediately as is standard practice in the mining industry:

- Ore at the mine and at all stages of processing and transport will be conditioned to the Dust Extinction Moisture Level; and

- Clean-up under conveyors/transfer points will occur daily/weekly or as required as part of routine running and maintenance of the equipment.

Although this is a remote possibility, iron ore spills will be managed as follows:

1. A nominated principal link with the responsibility of elaborating transport and accident response management will be incorporated within the operational structure of the WDRL. This will also be the first point of communication action with the relevant authorities;

2. Maintain expertise within WDRL staff and/or contractor in the control and management of IO spill. Personnel will also concatenate mechanisms to manage potential oil or other toxic spills in a timely manner;

3. Maintain functional equipment to be mobilised and/or deployed on the advice of the mining operations manager.
   Determine what environmental and social values are relevant at the site at which the spill has occurred. This will assist with defining environmental and/or social consequences and to select rigor of clean-up processes;

4. Water where deemed contaminated and where feasible will be contained and treated. Where turbidity becomes an environmental effect on water bodies, environmentally friendly coagulants will be used to remediate the waters;

5. Spilled materials will be removed and where needed site soils removed to depths at which infiltrations fronts are observed;

6. Reporting of incident will be compiled and submitted. This shall indicate actions used and implemented remediation measures; and

7. The incident investigation will discuss future corrective and preventative actions.

Note: If iron ore does not contain toxic substances and/or reactive materials the environmental consequences (regardless of water bodies existing in the site affected) will be minimal.

SECTION 2.6

Comment #808

It is a must that public traffic on public roads (eg Nathan River Road) will have priority at intersections over private traffic on the haul route

Section 4.2 of Appendix T - Traffic Management Plan submitted with the Draft EIS.

- Haul vehicles must come to a complete stop at the intersection with Savannah Way and give way to any traffic on the Savannah Way.

And Section 5.1:

- The intersection with Savannah Way will be a four-way crossroads, operating under priority control. Savannah Way will have priority.

In all cases public traffic will have priority over vehicles using the private Haul Road.

SECTION 2.6

Comment #809

The issue of public safety in terms of any public road crossing (e.g. Nathan River Road) shall not be jeopardised by any aspect of this mine proposal.

Noted.

SECTION 2.6

Comment #810

The standard of the proposed Nathan River Road (Savannah Way) intersection/crossing (including road signage and any infrastructure to address road safety issues) has to be submitted to DLP for approval and construction permits.

Noted.

SECTION 2.6

Comment #811

The modification of the Bing Bong Port facility intersection will need to be to DLP standards and will need to be submitted to DLP for approval and construction permits.

Noted.

SECTION 2.6

Comment #812

Ongoing maintenance of the haul road will be the responsibility of WDR. However, there will need to be an arrangement set in place with the NT Government for the maintenance of the haul road/Nathan River Road and the haul road/Bing Bong Road intersections as these are in remote locations and are likely to require regular maintenance due to the nature of the bulk material transport task.

Noted.

SECTION 2.6

Comment #813

The type of vehicles crossing the public road may be an issue if WDR is to use innovative vehicles. Special permits are likely to be required. The costs of maintaining the road intersections due to heavy vehicle usage will be borne by WDR.

Noted.

SECTION 2.6

Comment #121

The EIS Guidelines state: *Provide details on the impacts of road construction, including the haul road, on creeks and river crossings including construction and management of any proposed creek diversions*.

The DEIS lacks an adequate level of detail, particularly for haul road waterway crossings and areas of sensitive riparian vegetation, as the exact route of the haul road and all associated works are not finalised. Therefore, a final assessment of biodiversity-related issues has not been provided. It is expected that appropriate detail will be provided in the Supplement. The construction of the 165 km haul road over an anticipated five month period represents a significant and strategic component of the project proposal. It also represents a significant, if temporary, environmental impact from the construction process, especially at waterway crossings. The DEIS provides extensive commentary on this component at S 2.61 - S 26.14. Access to overburden from the mine site will not be available for much of the road alignment. Some mention (page 2-29) is made of a 5km exclusion zone from the Savannah Way intersection for gravel resources and also the need for some rock blasting of rocky ridges near the Limmen Bight and Cox Rivers. There is an impression given that the bulk of fill material will be available at site from the table drain cuts but it is not unreasonable to anticipate that, given the low-lying nature of much of the traversed length, additional fill material will be required. Some indication of the net requirement (if any - note comment at page 2-26) for additional material to that sourced from the cut and fill construction process, and where this material might be sourced, is required (other than the 676,000m' for 20km as specified in Table 2-5). The process to gain access to the material (whether all may be within the mining-tenured road corridor) and the rehabilitation protocols for any borrow pits should be provided. Discuss whether this will represent a significant additional disturbance footprint to the overall project.

On the question of riparian vegetation.

Riparian vegetation is considered as one of the sensitive communities examined as part of the DEIS. These communities were selected on the basis that they have high intrinsic biodiversity values (eg rainforest) or are a surrogate for other values (eg rock piles). Riparian vegetation is seen as the former.

The project proposes to install bridges at each of the six major waterway crossings (Cox, Nathan, Limmen, Pine, Rosie, Bing Bong) along the haul road route; on smaller creeks the project proposes to install culverts. This will impact directly on riparian vegetation in that it will be cleared to allow for the installation of bridges and culverts. It is expected that this will be less than the 30m width that the road corridor will be.

In the DEIS riparian vegetation was assessed at each of the six river crossings along the haul road. At each of these crossings riparian vegetation width, structure and composition was assessed. These results are presented in Appendix D-10 of the DEIS.

NRETAS comments are correct in that the exact route of the haul road and all associated works had not yet been finalised. Therefore, a final assessment of biodiversity-related issues was not provided. But, as will be shown below, we believe that the haul road will have no significant impact on riparian vegetation and the species that utilise them.

In work on riparian corridors to date none of the corridors was substantial in width, composition or intactness (see discussion for each river in Appendix D-10). Consequently, for the areas examined, it can be reasonably assumed that there will be no significant impact on riparian vegetation as the riparian vegetation is not considered substantial in any of the factors assessed.

On the issue of corridors (vegetation continuity) there will be disruptions at the bridges at least during bridge installation. For some bridges where armouring is required at the water's edge it is fair to assume that this break in connectivity will be permanent.

On the question of management of waterway crossings and fish passage see response to **Comment #317**.

On the question of earthworks fill material, this will be available from the table drains cut adjacent and on both sides of the road formation. WDRL have ensured that design of the Haul road will allow a balance of cut to fill utilising this process. All material will be sourced within the haul road corridor of 200m.

Also see responses to **Comments #609**, #**416** and #**670** and **Chapter 4.**

SECTION 2.6

Comment #122

Further information on the number of camps and their location is required inclusive of their potable water requirements and means of access to this water and the disposal mode of wastewaters.

Number of camps and location (Haul Rd construction):

- Section 2.6.11 of the Draft EIS - It is expected that approximately 120 workers will be required on site at various stages during the construction phase of the haul road.
- Section 2.9.2 of the Draft EIS - Potable water for the four temporary construction camps.

Each construction camp within the nominated construction section will consist of approximately 30 workers, therefore four camps will be required.

Potable water requirements:

- Section 2.9.2 of the Draft EIS - Potable water for the four temporary construction camps along the haul road will be obtained from bores to be constructed at the camp sites and treated prior to use, if required. Alternatively, water will be imported by road tanker from the mine site and stored on site in temporary storage tanks. Where construction camp water bores are to be established, consideration will be given to local existing users (i.e. human and environmental), such that they will not be impacted; and
- Section 2.9.5 of the Draft EIS - 120 people accommodated in haul road construction camps for a period of 16 weeks. Consumption of potable water is 300 L/person/day

Based on this the total requirements will be 4032kL over the 16 weeks of construction.

Disposal of wastewater:

- Section 2.9.4 of the Draft EIS - Septic tanks will also be installed at construction camps along the haul road and will receive all ("grey" and "black") wastewaters. These septic tanks will be pumped out and removed when construction camps are dismantled; and
- Section 2.10 of the Draft EIS - Septic tanks will be installed at each of the camps established for the construction of the haul road and will receive all waste water from the camps. After extended use, septic tanks will need to be pumped out. This will require the services of a waste disposal contractor, who will remove the effluent from site.

SECTION 2.7

Comment #319

Ore spill prevention and dust suppression at the Bing Bong stockyard, overland conveyor and barge loader should also be addressed as significant risk areas. We note that the barge loading process will not utilise a closed loading system and it will therefore be necessary to carefully manage Ore moisture content and loading procedures to ensure dust is not generated that can spread in the Bing Bong Port and adjacent coastal environment.

Finally, we believe that the proposal for barge to bulk carrier transshipment at sea in the Gulf of Carpentaria using a floating crane system poses too great a risk of ore spills and the spread of dust in the loading area. We believe

that a closed or covered loader system should be utilised given that this is an area of open sea prone to wave movement and winds. With such large ore quantities proposed for transshipment, even minor spills and dust escapes will quickly accumulate in the marine environment.

We note the loading facilities, barge design and transshipping processes utilised by McArthur River Mining and we believe that they should be established as a "minimum standard" for such processes in the western Gulf of Carpentaria.

Floating Cranes will no longer be used. The ore will be transferred from barge to OGV (Ocean Going Vessel) by using the ship gear and grabs.

Ore will be continuously maintained at the Dust Extinction Moisture (DEM) Level to reduce the likelihood of dust generation. The following commitments were made in the Draft EIS with regard to management of dust:

- WDRL commits to dust suppression measures specific to coastal and maritime operations as specified in Chapter 5;
- WDRL commit to contributions toward Xstrata's existing dust monitoring program at Bing Bong Port, including monetary contributions and personnel as required;
- WDRL commit to employing stringent dust control measures to minimise the impact of its operations on the surrounding environment. This will include but is not limited to appropriate training for all personnel during site inductions;
- WDRL commit to undertake baseline surveys of air quality at the mine site and mine camp using dust deposition gauges during the dry season, 2012 in order to provide a baseline against which expected and actual dust nuisance can be measured against; and
- WDRL also commit to undertaking ongoing dust monitoring to monitor dust generation for the life of the mine.

Baseline monitoring has commenced at Bing Bong and WDRL and Xstrata will work together to ensure that dust is managed appropriately. Xstrata are committed to installing an additional two monitoring stations and have also commenced use of MiniVol ambient air monitors - WDRL understands and appreciates that fugitive and point source dust emissions are an important consideration for both the construction and operational phases of this Project and will continuously seek to provide a quantitative measure of dust to better understand this issue to develop and improve appropriate management strategies. Further to this, WDRL makes the commitment to continuously work towards reducing the fugitive dust emissions at Bing Bong and if it is deemed necessary, WDRL will develop a Dust Management Plan.

SECTION 2.9

Comment #606

Chlorination can affect certain RO membranes. How will RO waste water be disposed of?

Further investigation into the use of secondary treated effluent for dust suppression. High nutrient loads, salinity and biological contaminants may make it unacceptable to be sprayed around the site.

Chlorine is topped up as water leaves the RO water storage facility and into the potable water system.

Waste water treatment is based on the Activated Sludge process comprising of two x 9 metre fibreglass cylinders interconnected and inclusive of the control room, walkway and interconnection. This is a passive system requiring minimal electrical power to operate. Electrical control is based on circuit breakers and timers. This is suitable for all level of electrical application and operation.

All pumps, stirrers and electromechanical components are submersible and fitted to the actual operating chamber. The blower and irrigation pump is fitted to the control room as is the control panel and chlorine dosing tank and pump.

This complies with the requirements of most major mining companies and all applicable Australian standards.

The treated water is then fed to the Spray irrigation field to statutory requirements for effluent disposal.

In addition, Section 2.9.4 of the Draft EIS states:

The project requires construction of sewage treatment plants (STP) to treat the domestic stream generated from the mining camp and mine site. These systems will have the capacity to treat the entire domestic stream of both "black" and "grey" waste waters. The facilities will be Biological Nutrient Reduction (BNR) configurations, capable of treating daily volumes of waste water far in excess of those predicted. Two 'TransPAC Mega ISO Type 4' treatment systems will be utilised, each suitable to treat up to 50,000L per day.

These systems provide secondary treatment to achieve final effluent quality with reduced nutrients, suitable for reuse via sub soil irrigation or evaporation irrigation.

Section 2.10.2 of the Draft EIS also states:

Effluent from the newly installed sewage treatment plant will need to be validated for a period of twelve weeks before being recycled. During this period, as the water produced cannot be recycled, the four 3000L temporary sewage pits, currently in place for Exploration camp, will be utilised. It has been determined that they are of adequate size to deal with the short term additional material.

Once validated, the recycled water will be used for irrigation and dust suppression around the mining site.

Irrigation of recycled water will be in accordance with the *Guidelines for Management of Recycled Water Systems* (Department of Health 2011) and *Environmental Health Factsheet No. 513 Recycled Water Irrigation: Information Guide for Applicants* (Department of Health 2011).

SECTION 2.9

Comment #125

Softening filters remove 'hardness' (Ca & Mg ions), not carbonates. These systems require regular recharging with a consequent backwash of brackish water discuss how this waste stream will be compatible with the proposed waste water treatment system.

Other than the schematic at Figure 2-23, there is no indication of where the raw water dam (RWD) is positioned on site nor how water will be transferred from the pit water store (PWS -pit 4) nor how sediment basin waters will be transferred to supplement the site water requirements. Taking into account the above, provide further information with respect to the availability and management of water resources to sustain the mining operation for the duration of the mine life.

The operational description of the proposed filtration system is as follows (Note: Existing bore water has extremely low saline levels):

Below outlines how the system operates (see Figure 5-6):

- Bore water is pumped into an aeration tank to oxygenate the water;
- Oxygenated water is pumped into the Birm filter to filter out ferric oxide;
- Filtrate is softened with a water softener using cation exchange;
- Chlorine is dosed as water flows into a storage tank;

- Softened and chlorinated water is stored in the potable water storage tank;
- On demand, water is reticulated to the camp site for ablution and kitchen for cooking and drinking; and
- A UV steriliser will be installed on the Kitchen and drinking water supply feed.

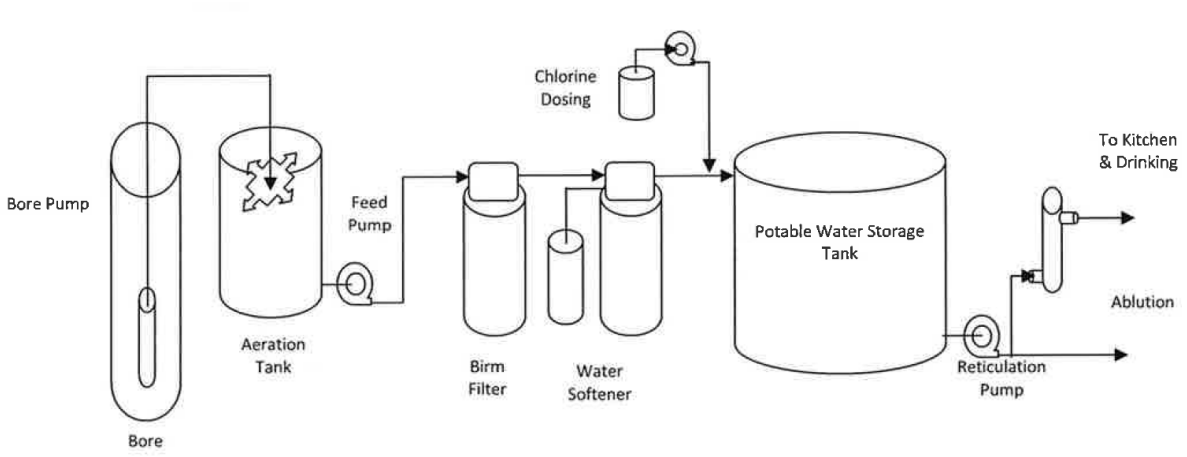


Figure 5-6. Filtration System

The turkey nest (RWD), located at the start of the haul road, will be able to receive water from the borefield, pit 4 (western pit), and any sediment dams. The sediment dams will also be connected to pit 4 if the water turbidity is too much to pump into the turkeys nest (RWD).

See also **Chapter 4** for management of water resources.

SECTION 2.9

Comment #126

Discharge to the RWD and use of treated wastewater for dust suppression and wash down (Figure 2-23) needs to be endorsed by the Department of Health as an appropriate use for secondary treated wastewater. Spray aerosols can allow for pathogenic virus particles to be dispersed and to generate a potential human health hazard.

Noted and WDRL will ensure that endorsement is received from the Department of Health prior to operations.

Section 2.10.2 in the Draft EIS states: All wastewater generated from the mine site and main camp will be treated to a high quality and recycled according to the Northern Territory Department of Health *Guidelines for Management of Recycled Water Systems* (2011).

Effluent from the newly installed sewage treatment plant will need to be validated for a period of twelve weeks before being recycled. During this period, as the water produced cannot be recycled, the four 3000L temporary sewage pits, currently in place for Exploration camp, will be utilised. It has been determined that they are of adequate size to deal with the short term additional material.

Once validated, the recycled water will be used for irrigation and dust suppression around the mining site. Irrigation of recycled water will be in accordance with the *Guidelines for Management of Recycled Water Systems* (Department of Health 2011) and Environmental Health Factsheet No. 513 *Recycled Water Irrigation: Information Guide for Applicants* (Department of Health 2011)

SECTION 2.12

Comment #609

Waste Rock Dumps (WRD) should be designed with natural existing landforms in mind. Justification is required on how the proposed 30m high WRD with 2:1 slopes fit in with the surrounding topography. It is better to have an appropriately designed WRD prior to operations rather than leaving it until it's too late, i.e. spend money on appropriate design now rather than spending money trying to rectify poor design.

Haul Road Rehabilitation: The term ""natural seeding"" requires clarification. It is likely that, due to the significant disturbance associated with the haul road, direct seeding may be required

Environmental Issues: The mine site is currently weed free. No soils will be able to be imported to site, including soil for seedlings propagated for revegetation purposes.

It is recommended that Western Desert Resources investigate sources of treated, weed free certified soils that can be used in rehabilitation

Post Closure Land Tenure and Use: *Parts of this area will be repatriated into the park*. This statement should be verified with Parks and Wildlife

Area E-East west dump will be blended to the northern flanks of the ridge. Final countering and capping will aim to have the same slope to the continuing south, south-western flank of the ridge. Revegetation will aim to cover all exposed areas, as far as is practicable.

Area F East Waste Dump is proposed to the placed eastern end of a ridge and this will also be blended with the topographical features of the area. This is planned to be located high above of the current flood lines and the south-eastern slopes of the dump, is predicted, to blend to the undulated topography of the site.

Area F West waste dump will also be blended to the hilly area existing to the south-western end of the proposed WRD site. The observed flood lines are not near to the elevation of the sites selected for the WRD.

Haul Road Rehabilitation:

Direct seeding will be undertaken should it be required. An assessment will be made on site at the time of rehabilitation and following trials undertaken prior to decommissioning of the road.

Environmental Issues:

Noted.

Post Closure Land Tenure and Use:

"The Northern Territory Government has commenced this process of declaring the park based on the excision of the highly prospective iron ore deposits within the St Vidgeon portion. Parts of this area will be repatriated into the park if subsequently shown to be unlikely to provide for future mining potential and, in mined areas, when the resource is no longer economically viable for mining and the areas have been appropriately rehabilitated."

Copied from -

Have Your Say: Park Declaration

Territory Parks and Wildlife Conservation Act, Section 14 Report Pertaining to a Section 12 Declaration of Billengarah (NTP 1323), Nathan River (NTP 1334), Maria Island (NTP 2373) and part of St Vidgeon (NTP 819), to become the Limmen National Park, March 2012. Report by the Parks and Wildlife Commission of the Northern Territory.

SECTION 2.12

Comment #819

It is noted that WDRL states that at the cessation of the project they will *look to the NT Government for advice as to their preferences regarding decommissioning*. Road Network Division advises that, at this time, this haul road provides little advantage to it in terms of its strategic location once the mining operation ceases. The pressure on RND to maintain the road infrastructure in this remote location is already a challenge. Any additional roads in this area would need to be supported by an appropriate budget for ongoing maintenance.

Noted.

SECTION 2.12

Comment #129

It is unclear whether 'Pit F West' refers to pit 3 or pit 4 (PWS). It is clear that pit 3 is to be retained as a flow through pit as part of the modified flow hydrology of the Towns River. Clarification should be given on the intended fate of pit 4. Further information is required on how pit 3 will be rehabilitated and stabilised from its mining phase configuration, including how and when the initial bunding is to be removed when it is incorporated as a flow through lake early in the proposed DSO mining campaign.

The names of the pits have changed throughout the project development. The maps in this supplementary report identify the correct pit names.

Pit 4 will be retained as a water storage facility for the life of the project and its intended fate is to remain as an open void.

When full, the pit will have shallow edges as the pit bunds will have been pushed in and the first benches will therefore have their steep sides removed. This plan is identified as creating a more natural type system that does not exclude animals form the pit edges and does not create the safety issues associated with a steep walled pit. This will occur prior to the onset of the wet season.

SECTION 2.13

Comment #610

The Exclusion Zone has not been highlighted in Figure 2-25

The Restricted Works Area is shown below.

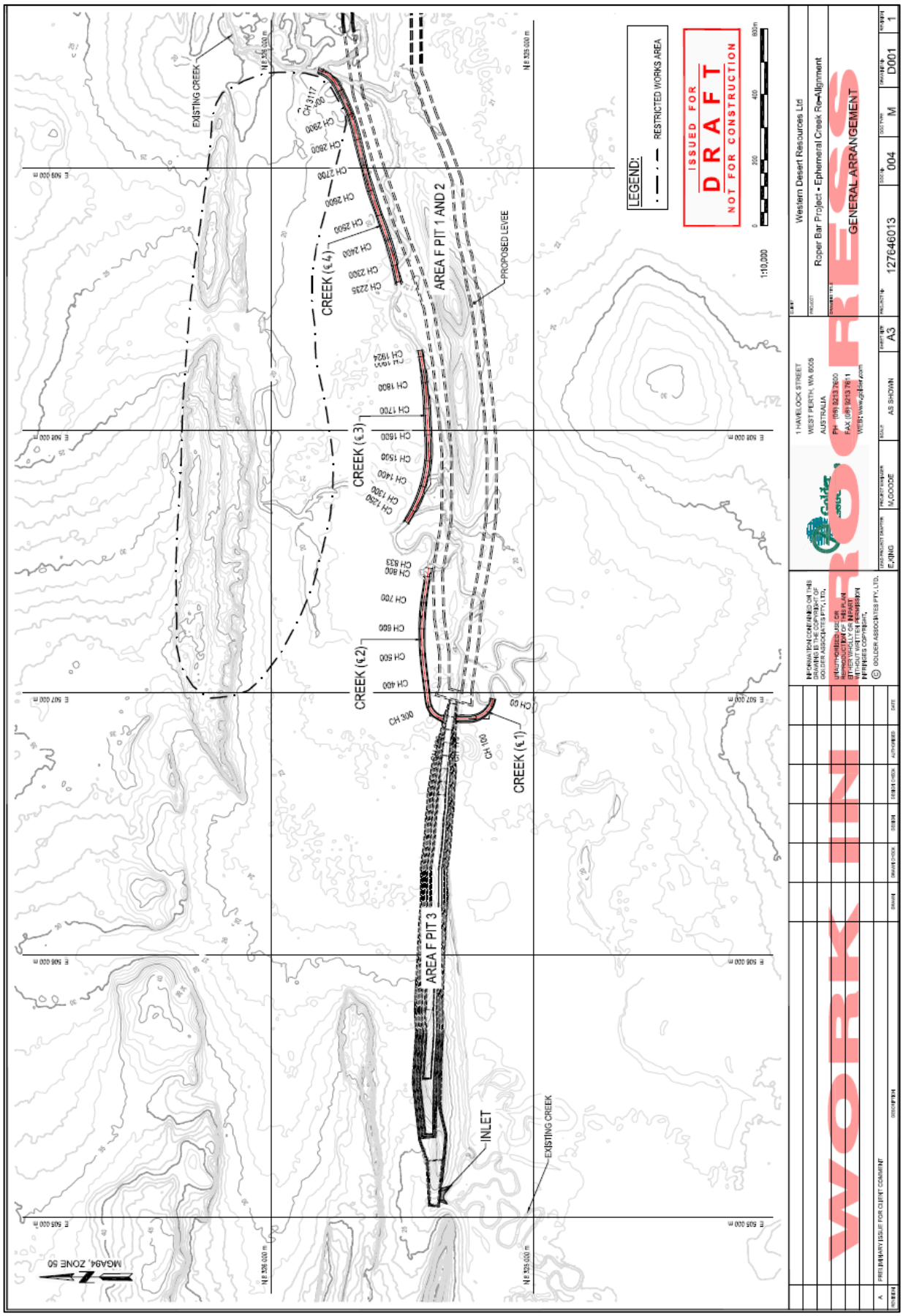


Figure 5-7: Restricted Works Area

SECTION 2.13

Comment #325

AFANT needs to be certain that the proposed diversion and associated activities will not become a vector for contamination and/or sediments flowing downstream in the Towns River and that they will not restrict the upstream and downstream passage of fish and other aquatic life.

Plans for the river diversion appear to have sufficient meandering remnants of the original river channel to provide for reasonable fish passage. New channel sections should, as far as possible, be constructed to duplicate the profile and bottom structure (rocks of variable sizes, sand sections and so) of the existing river in the area. In addition, plans should include revegetation of the banks of any new channels to duplicate vegetation along the original stream.

AFANT does not have the expertise to determine whether or not the incorporation of a mined pit into the river channel will impact on fish movement but it is very different to existing channel conditions in the area.

The issue of fish movement in the Towns River and its realignment through the mine site should be studied and, if necessary, plans modified to accommodate it. This should be detailed in the Supplementary EIS.

The latest diversion proposal has the river flowing through a pit which is to be mined before other diversion and mining work commences. Because potentially acid forming (PAF) characteristics of the material that will remain in the pit walls post-mining has not been fully determined and because the water level in the pit will fluctuate significantly during wet and dry cycles we believe there is a potential for acidification and subsequent heavy metal contamination downstream from this pit.

There is also the question of the quality of retained water in the pit and its possible impact on fish, other aquatic life and wildlife in the area. If this pit is to be used as part of the new watercourse of the Towns River it will be necessary to ensure water quality of a standard that will not have adverse impacts.

We are not comfortable that the use of the mined pit as part of the Towns River realignment is the best option given our concerns that it could be a possible source of downstream contamination, the uncertainty of retained water quality in the pit and its impact on fish movement. Other options should be reconsidered.

Although the remaining diversion channels and the retained bed sections in the diversion appear to be slightly upslope of the other proposed mine pits they are in very close proximity to them. Any potential for flood events overflowing mine pits into the diversion needs to be carefully considered. The diversion channel, mine pits and separation bunds must be designed and constructed to eliminate the potential for cross contamination. If not, the mine's plan that any contaminated water is to be retained on site and that a waste discharge licence will not be required may be compromised.

In addition, there will be a need to ensure that bunds and any other rock material in the flood zone of the river diversion are not potentially acid forming.

The current uncertainty about the PAF characteristics of the ore and rock in the mine area make it very difficult to be confident that the current river diversion and mining plans will not result in acid mine drainage from the mine site into the Towns River. Detailed studies of the PAF characteristics of all rock and ore in the mine area where run off and drainage channels enter the Towns River and the diversion need to be completed before the Supplementary EIS is developed. Mining and river diversions plans should, if necessary, be modified to ensure no contamination can occur.

Meandering remnants of the original river channel were included where possible. The new channel sections will be constructed to duplicate the profile and bottom structure of the existing river in the area (refer attached Photo File). Revegetation of the banks of any new channels will duplicate vegetation along the original stream.

There are no pools or water bodies remaining upstream post flows of the pit 3 area in the current stream. Therefore fish and other species that would be transiting the pit would only be doing so during periods when the pit is completely full. When full, the pit will have shallow edges as the pit bunds will be pushed in and the first

benches will therefore have their steep sides removed. This plan is identified as creating a more natural type system that does not exclude animals form the pit edges and does not create the safety issues associated with a steep walled pit.

Also refer to **Section 4.2.2** above and response to **comment #317.**

SECTION 2.13

Comment #416

It is of some concern that a further (albeit less radical) diversion of a significant stream in the same region is being proposed some years later in the absence of any progress towards filling this identified policy gap.

The Statement should include more detail on the merits and detriments of all relevant rehabilitation options, including fully reverting the stream to its former course, and scenarios for flooding events that may include irregular (extreme events) or seasonal flooding from the realignment to the former channel.

Refer to **Section 4.2.** and Appendices C and D.

SECTION 2.13

Comment #417

Concerns are not explored in relation to the design plan to divert the stream to flow through pit 3 of area F.

The pit bunds will be pushed into Pit 3 effectively decreasing the angle of repose from 55^{o} to 39^{o} (refer also to Golders Technical Memorandum Appendix C).

See **Section 4.2.1** above.

SECTION 2.13

Comment #418

The argument that reverting the stream *would most likely occur during closure, rather than during the operational phase, meaning that there would be fewer resources available to monitor and manage the channel post operations* is insufficient justification for dismissing this alternative. Clearly, if this alternative is found to represent the best rehabilitation outcome, then whatever monitoring and management resources may be required must be provided for. Some more detail on this option might make the decision clearer.

Agreed, however if the project evolves beyond the current known DSO resource then all options will be explored. For the current project, as Iron Ore is a bulk commodity, a large volume of ore is removed and as the project development has been further refined it has been identified that there is insufficient material to infill the pits, especially since waste material is required to construct ROM pad and internal roads and infrastructure and development of separate gravel pits for this material would be a further and unwanted disturbance.

To construct a channel within an in filled pit would offer a significant engineering risk, which adds significant environmental risk to such an endeavour.

SECTION 2.13

Comment #130

It is unclear, other than from Table 2-25, whether the WRDs are within the 5, 20 & 50 year ARI flood levels. It would be helpful to include an overlay of the flood modelling contours, together with the proposed sites for all the WRDs as per Appendix N2 Figure 8, for all other key mine site infrastructure.

Please discuss why a 100 ARI contour was not graphically presented and whether some of the proposed WRDs footprints will remain within these flood contours.

See **Section 4.2.5** above.

5.2.3 CHAPTER 3

Section 3.2

Comment #613

The Little Towns River flows north of the Project Area, however, no mining or infrastructure will be developed in this catchment.

The airstrip appears to fall within the catchment of the Little Towns River. Impacts from run off from the airstrip should be considered later in the EIS.

Part of airstrip may be within Little Towns River catchment. The potential issues associated with this relate to sedimentation. It has been included in the ESCP and will be included in ongoing ESCP's and MMP's.

SECTION 3.6

Comment #617

Due to the reported high acid neutralising capacity of the waste rock, the potential of neutral or alkaline drainage that may be high in dissolved metals should be addressed. Ongoing testing should be conducted to ensure that the neutralising capacity is available at the same time as acid generation, particularly if it is going to be used for rehabilitation or management of PAF material.

Refer to **Section 4.1.1** of Supplementary EIS Report.

SECTION 3.6

Comment #31

WDRL should provide greater detail in respect to how PAF materials will be segregated and managed

Refer to **Section 4.1.1** of Supplementary EIS Report.

SECTION 3.6

Comment #425

ECNT remain unconvinced that Acid Mine Drainage will not be an issue on this project. While the acid potential is lower, and associated metal species softer and less toxic, than some other mines, the prevalence of sulfur means

that appropriate management of PAF hazards is essential. The work so far on characterisation of a couple of hundred drill core samples is a welcome start, and ongoing characterisation will be essential to ensure wastes are managed appropriately. However given that little more than half the samples were reliably identified as non-acid forming, there remains clear risk that AMD estimates may blow out.

It's appropriate that characterisation of materials be continuously undertaken, however at the outset we require more detail about contingency plans and designs for the eventuality of encountering higher volumes or PAF materials, or materials of higher acid forming potential, during operation. It is not immediately clear from Section 3.6.7 how the contingency design in fig 3.18 might be realised at likely stages during operation. The proponent should describe likely scenarios, based on the pit schedule that quantifies uncertainty at each stage to demonstrate that the required infrastructure may be readily arranged if indeed higher volumes or concentrations of PAF material are encountered.

While reference is made to the implications for staged rehabilitation, it would be helpful to have likely scenarios spelled out, to describe what the staged rehabilitation rollout may look like in the eventuality of uncovering higher than anticipated levels of PAF material, or lower than expected volumes of ANC material. In the absence of this detail it remains unclear just what staged rehabilitation we will actually see. This detail may also inform a discussion of the merits of alternatives for lining the waste rock dump.

We are assured of ""a detailed PAF Management Plan, to be developed by WDRL and approved by the regulating authorities prior to commencement of mining". ECNT see no reason for environmental assessment to proceed ahead of this essential component. While it is expected that management plans referenced by the MMP will be publicly accessible, we believe that such a plan should inform environmental assessment.

Refer to **Section 4.1.6** of the Supplementary EIS Report.

Section 3.6

Comment #137

It is unclear how many samples for detailed assessment were taken from the proposed target locations at Area E and F. Tables 3-7 and 3-8 provide useful summary information on sulphide spatial distribution in the pits based on extrapolated lithologies. Figures 3-14 to 3-16 are likewise helpful in presenting cross sectional representations of the analysed rock cores. Discuss the uncertainties generated by this reliance on extrapolation to inform the amount of PAF and potential risk of acid formation. The DEIS-recommended additional and on-ground assessment work is supported. Please provide any updated/interim results of kinetic testing and/or further analysis in the Supplement.

Refer to **Section 4.1.1 and Section 4.1.5** of Supplementary EIS Report.

5.2.4 CHAPTER 4

GENERAL COMMENT

Comment #620

An assessment of the potential for short range endemic species to be significantly impacted has not been sufficiently addressed

Appendix D discusses survey results for vertebrate fauna species, but invertebrate species were not addressed. In addition, the potential for subterranean fauna species to be impacted has not been assessed

The Western Australian Environmental Protection Authority has guidance statements that provide useful information on sampling methodology and survey considerations, including:

- 20. Sampling of Short Range Endemic Invertebrate Fauna for Environmental Impact Assessment in Western Australia; and

- 54. Consideration of subterranean fauna in groundwater and caves during Environmental Impact Assessment in Western Australia.

The DEIS did cover short range endemic species for vertebrates, and we referred to these species as "restricted range species" which included *Gehyra borroloola*, *Cryptoblepharus zoticus*, and *Ctenotus striaticeps*. *G. borroloola* and *C. zoticus* are restricted to medium to large rocky ridge and *Gehyra borroloola* was the only species found during surveys. This species will be impacted at a local scale so there will be direct loss of habitat (in mining areas), however the haul road alignment was selected in a way that avoided clearing of rocky ridge habitat – thereby minimising impact on this species. The Haul road surveys did identify *G. borroloola* on many occasions, which suggests that the species is fairly common throughout suitable rocky habitat in the local region. *C. striaticeps* occurs on hard stony soils vegetated with Spinifex which does occur in the corridor but was not recorded during our surveys.

There are no short range endemic invertebrate fauna known from this region; Appendix D of the DEIS describes the process undertaken to determine notable species (i.e. rare, threatened or restricted in range). The potential for short range endemic invertebrate and subterranean fauna was not assessed as there is no legislative requirement for this in the NT and not requested within the DEIS Guidelines.

SECTION 4.1

Comment #141

The DEIS states that the MLA areas fall within the boundary of the recently declared Limmen National Park. This is not correct and needs to be amended.

Fish survey data are presented in Appendix D Section 4.6. Please discuss how this baseline information and any further monitoring might best inform whether the proposed mining activity and river realignment has impacted on fish diversity and fish passage in the mining lease over the proposed life of the mine.

The assessment of potential impacts and mitigation measures for significant terrestrial vertebrate fauna is generally sound. However, the DEIS identifies the Carpentarian Grasswren as a significant species likely to occur along the haul route (Table 4.7, page 4-54), but does not refer to this species in the Risk Chapter.

Given the high significance of any populations of this species that may persist in the area of the haul route please discuss what further survey work in potential habitat might be undertaken for the species. Appropriate mitigation measures should be proposed, in particular to ensure that the haul road development does not contribute to deleterious fire regimes that would have high impact on the species distribution.

Flora and fauna survey effort and methodology was generally considered to be sufficient. However, the following requires further survey work:
1. Habitat and vegetation description surveys at the Bing Bong port facility due to change in stockyard location since the original surveys in February 2012 (note that the facility proposed in the DEIS is current.) The original fauna survey sites are still considered representative because the stockyard falls within the same vegetation communities. One fauna site falls within the area proposed for disturbance;

2. Flora surveys within the mangrove patch adjacent to the conveyer and barge loading facility at the Bing Bong port. These should focus on determining patch condition and also allow for a species account of the small mangrove community; and

3. Flora and fauna surveys on the western side of the ridge crossing near Limmen Bight River. It is understood that habitat surveys of this site were undertaken on 18 July 2012, which will be followed by a fauna survey.

….the MLA areas fall within the boundary of the recently declared Limmen National Park

With the final boundaries of the NP now declared this is in error.

How does the fish survey baseline aid impact assessment?

In determining impact assessment an important piece of information is receptors, in this case the fish community may be a receptor to mine site development. The fish baseline informs the species assemblage that exist downstream of the mine and associated development, and by considering each species ecology, the habitat requirements (such as flow seasonality, any movement requirements, turbidity thresholds) and the potential for the development to deleteriously affect these habitat requirements can be considered. The DEIS outlines hazard mitigation to the river and creek systems. There it was concluded that the issues that affect fish presence and persistence were ameliorated sufficiently that there will be no substantive or sustained change to this species assemblage.

What survey work is required to resolve the potential presence of Carpentarian Grasswren along the haul road route?

Firstly it should be clarified that it is not expected that the Carpentarian Grasswren will be found near the proposed haul road route. This species was discussed as it is a threatened species with habitat and fire history requirements nearby to the haul road (**Section 4.5.2** suggests that this could be as close as 15km). This section also states that a recent survey for this species (Perry 2011) failed to find the species and that the last record in the NT was 21 years ago. This section also states, because this species is not considered to be found within the haul road corridor that it is not considered a risk for this development.

What **Section 4.5.2** does identify is that the fire history of some nearby sites may make it suitable for this species.

What mitigation measures are proposed to ensure that the haul road development will not contribute to deleterious fire regimes?

One of the expected vectors of decline for the Carpentarian Grasswren is a change in fire regimes in particular an increase in fire frequency. Consequently, it is critical that the installation and operation of the road does not initiate any fires.

Mitigation measures to ensure this include:

- Fuel load of road side (in the dry season) will be kept to a minimum as part of the grass cutting regime; which will also make the haul road a fire break.
- No fires to be lit by any employees or consultants to Western Deserts.
- No cigarette butts to be thrown out of vehicle windows.
- All vehicles to be serviced regularly to ensure that they do not create sparks.
- No spark creating activities during periods of high fire danger.

Additional Survey Requirements

See Chapter 3.3 and 3.4 of the SEIS which discusses the vegetation and flora and fauna surveys that were conducted since the DEIS.

SECTION 4.3

Comment #143

The DEIS states that the flora along the haul route was assessed by "... *determining the dominant flora species and vegetation type boundaries from the air [helicopter]"* and *"Riparian surveys recorded data on patch width. .. vegetation structural descriptions with the percentage cover and average height recorded for the dominant species. ..*". No detailed methodology for the flora survey along the haul route is provided, nor does the DEIS (or its appendices) provide the results of any floral inventories. Based on this, it appears that no on-ground surveys

were conducted for flora along the proposed haul route corridor. The EIS Guidelines state that the EIS should: *Present flora and fauna surveys of the Project area, including the haul road route. Identify flora and fauna species of conservation significance*. In addition, the EIS guidelines note that vegetation surveys should follow the *'Northern Territory Guidelines and Field Methodology for Vegetation Survey and Mapping'* (Brocklehurst *et al*. 2007). Given that existing information on flora within the vicinity of the haul route is sparse, the assessment in the DEIS of the potential impact on significant species is not adequate. On-ground flora surveys with a focus on threatened species likely to occur in the area should be conducted, and an assessment of potential impacts on significant flora should be reported in the Supplement.

Appendix D of the DEIS identifies only a single threatened flora species that may be found within the development area: the Thorny Solanum *Solanum carduiforme*. This species is considered data Deficient in the NT but is listed as Vulnerable at the national level.

The closest this species has been recorded to the development is at Limmen gate approximately 40km south of the haul road. This species is known to occur on conglomerate rock formations and larger sandstone ridges.

WDRL commits to surveying for this species along the final haul road route prior to road development.

SECTION 4.3

Comment #144

Based on discussions with consultants EcOz (5/7/2012), the proponent has provided an undertaking to conduct additional flora surveys at areas to be affected by infrastructure works at the Bing Bong Port facility. It is expected that these results and associated mitigation measures will be reported in the Supplement.

Refer to Chapter 3.3.

SECTION 4.5

Comment #146

The Supplement should explicitly state that no weed-prone species will be used in any amenity planting at the mining camp.

WDRL commits to ensuring that no weed prone species will be used in any amenity planting at the mining camp.

5.2.5 CHAPTER 5

GENERAL COMMENT

Comment #149

The DEIS provides a desktop review of the status of EPBC Act-listed species within the NT Gulf of Carpentaria and acknowledges that this area is important for coastal dolphins, dugong, marine turtles and sawfish. However, the DEIS does not provide any site-specific baseline information to inform the assessment of potential impacts from the proposed development.

The DEIS acknowledges that marine habitats are important for these species but does not provide information on the distribution of these habitats for those listed species or other marine fauna in the area. Given that the port facility has been established and operational for an extended period, there is an expectation that information is available relating to habitat distribution for marine species, together with information on the frequency and

intensity of their use. Please provide data/information that is currently available for site specific baseline information on local marine habitats and the use of these areas as recruitment or feeding grounds by various species inclusive of EPBC Act listed species. This baseline information should be used to inform discussion on the level of risk from the proposal to the marine environment. Discuss the adequacy of this baseline information and where information gaps may be to inform the development of an on-going marine health condition assessment program relating to port usage.

The intention of WDRL to expand on the marine ecological monitoring program developed by Xstrata to demonstrate that the project will not cause adverse environmental impacts is supported. Discuss what additional baseline work and ongoing monitoring might be required to address a marine condition assessment program scaled to address the environmental risks from the port operations. This may include, but not necessarily be limited to, some of the following:

1. Marine habitat data and maps (detail similar to those presented for terrestrial environments, including the extent and seasonal variability of significant habitats):
a) showing the locations and spatial extent of the different marine benthic habitat types and parameters such as percentage cover for each dominant taxon; and

b) Recording the abundance and health of benthic taxa observed within indicator communities.

2. Marine fauna surveys for EPBC Act listed species (dolphin, dugong, turtles, and sawfish), consistent with EPBC Guidelines, including:

a) Spatial distribution for dolphin, dugong, turtles, sawfish and estimates of population sizes and distribution; and

b) Assessment of potential impacts and mitigation measures.

Chapter 5 of the DEIS reviews and summaries the existing knowledge of the marine biodiversity and current marine monitoring in and nearby to the study area. It also acknowledges that this is not comprehensive and that further work is required. The knowledge gaps identified include paucity of knowledge of regional species and habitat assemblage, the relative significance of the immediate area to each of these species, the effectiveness of the proposed mitigation measures and the comprehensiveness of the existing monitoring program. Notwithstanding these data deficiencies the risk assessment approach considered all species to be present, used existing habitat information (such as seagrass extent and bathymetric information) to profile the species/hazard relationship. Broadly it was concluded that the marine habitats are broad and contiguous such that the impact zone is comparatively small.

However, while it was considered that the proposed hazards where either not significant at the regional scale and/or where mitigated to a lower risk class there was still a need to further knowledge of the local species assemblage, regional habitats and the impacts from this proposal and others on these. While baseline surveys were considered it was thought that a more strategic and meaningful approach would be to engage known experts in the region and regional species to develop an integrated approach to each of the above issues by filling knowledge gaps, clarifying risks and ensuring that they have been appropriated mitigated and monitored for these species and habitats. Furthermore, in order to ensure that the cumulative impacts of both the McArthur River Mining Pty Ltd (MRM) expansion and WDRL's proposal are appropriately assessed and mitigated, this will be an integrated process driven by WDRL in partnership with MRM. The DEIS commits WDRL to supporting this program, the marine risk assessment and management and monitoring program.

The program will have two main components:

1. A marine risk assessment component; and

2. An integrated marine management and monitoring program.

The marine risk assessment aims to determine the relative importance of the marine environment in the Bing Bong project area, with a particular focus on EPBC-listed species, look at the hazards to these species from the proposed development and resolve the potential impact. Most likely taking the form of a technical workshop

invitees will include those with marine fauna experience and marine hazard reduction experience from universities and relevant authorities.

This workshop will be informed by a review of all current knowledge specific to the Bing Bong region; the current MRM Marine Monitoring program; and any other relevant published and un-published data. Risks to marine biota will be quantified in this context, with the requirement for additional studies to be identified as part of this process.

The outcomes of the risk assessment workshop will be used to develop the integrated marine management and monitoring program for Bing Bong. WDRL commits to undertaking any further investigations that arise from this process, including any further studies, mitigation measures and monitoring as required.

GENERAL COMMENT

Comment #150

Acoustic disturbance (marine) - page 5-42 - The development and subsequent use of the proposed new wharf facilities will create additional underwater noise in various forms and intensity above current ambient levels within marine waters near Bing Bong. The sources of noise relevant to the project include pile driving, dredging and shipping noise. Cetaceans, dugongs and marine turtles may be impacted by increased noise in the underwater environment.

The DEIS has identified that noise from pile driving and boat traffic will have an effect on *EPBC Act* listed species. The DEIS states that w*ithin the waters of the Port and access channel, noise is expected to be attenuated significantly within tens of metres due to the shallow depths, soft substrates and expected high ambient noise levels. For example, noise from a 200dB source is estimated to drop to approximately 770dB within 700m*. However no data were provided to support these statements. It is recommended that further information is provided in regards to:

1. An assessment of noise propagation within the Port facility and surrounding marine environment;

2. Determination of impact zones; and

3. Detailed monitoring and mitigation measures associated with impacts from underwater noise.

The DEIS acknowledges that noise sources from both the construction and operation phases are likely to result in at least temporary disturbance and displacement of some species, given that there are overlaps between noise sources generated from the proposal and the frequencies used by marine fauna likely to be present within proximity to the Port. Given the dearth of baseline data for regional fauna assemblages in the Bing Bong marine environment, we have made best efforts to provide an assessment of worst-case scenario impacts on key marine species, including cetaceans, dugongs, turtles and other marine vertebrates. This has been based on current available data, including studies undertaken for other projects.

As described in the DEIS, the proposal represents the intensification of an existing use that most marine mammals, including cetaceans and dugongs, are likely to be habituated to some degree. More importantly, given the extensive areas of suitable habitat to the north, south and east of Bing Bong, displacement of animals from the Bing Bong region owing to increased shipping traffic would, whilst being far from optimal, represent a worst case scenario in this instance. The intensification of use is not considered to be occurring in an area of critical habitat for any marine species, nor is it expected to prevent migration of populations, disrupt feeding on seasonally restricted prey, or have the potential to mask the calls of great whales given that such species are unlikely to be present within auditory range of the Bing Bong and transhipment anchorages.

Furthermore, where possible within the limitations of the project, we have provided mitigation measures in line with other operations of a similar nature in Queensland and Western Australia; specifically vessel speed restrictions, soft-start procedures during construction, and the use of observers prior to and during construction works.

Nonetheless, we recognise that statements as identified in Comment #150 should be addressed comprehensively, and therefore we provide the following additional information in order to provide further context.

Construction Noise

With respect to noise from pile driving during construction, this has been the subject of recent studies in support of projects in the Northern Territory (URS, 2009) and Western Australia (Woodside, 2011; and SVT Engineering Consultants, 2010). Notwithstanding the difficulties of extrapolating site specific data to this project, a number of inferences may be made with respect to noise generation at Bing Bong and worst-case impacts for marine fauna assemblages.

The literature gives some guidance on the impacts of pile-driving noise on a range of taxa. McCauley and Salgado Kent, reported in the Browse LNG Development Upstream EIS (2011) identify three zones of impact for fish from piling activities:

- Zone 1 (10–20 m away from source): fish within this zone can suffer serious internal injuries.
- Zone 2 (up to 300 m away from source): at 20 m most fish are expected to suffer some form of hearing damage or temporary threshold shifts from continual impact piling. At 300 m some fish, presumably stationary for long periods of time during continuous impact piling, can begin to suffer hearing damage or temporary threshold shifts.
- Zone 3 (out to 500 m away from source): impacts on fish at this zone can include behavioural responses such as avoidance or startle response to increased alertness.

McCauley and Salgado Kent (2011) also modelled the zone of potential injury for cetaceans and dugongs as 12 m, and the zone of potential behavioural disturbance as 4,500 m for piling operations, however assessed residual risk to marine taxa as low given the availability of habitat in the region, and short duration of piling activities.

SVT Engineering Consultants undertook an underwater noise assessment to investigate the impacts on marine turtles, dugong and cetaceans associated with piling and dredging operations of the proposed Anketell Point Port Facility in the Pilbara region of Western Australia. This study also determined zones of possible injury, as well as zones of disturbance where avoidance behaviour was likely, for pile driving activities for a wharf based on worst-case spring tide conditions [Lowest Astronomical Tide (LAT) + 5 m].

For Turtles, the furthest distance from the source to zone of possible injury was calculated to be 55 m, and the furthest distance from the source to a zone of avoidance was calculated to be 303 m (SVT Engineering Consultants, 2010). For cetaceans and dugongs, the furthest distance from the source to zone of possible injury was calculated to be 22 m, and the furthest distance from the source to a zone of avoidance was calculated to be 3 km (SVT Engineering Consultants, 2010). Consequently, exclusion zones of 55 m for turtles and 22 m for cetaceans and dugongs were recommended for pile driving operations. This study also recommended the deployment of trained marine fauna observers for pile-driving activities.

It should be recognised in the context of the WDRL project; piling associated with construction of the combi-pile wall is expected to be of short duration, limited to 1-2 weeks only (this will be occurring only in the confined barge swing basin). Given the availability of habitat in the region, it is expected that animals may move further away from Bing Bong to avoid chronic or temporary noise exposure. Furthermore, a number of mitigation measures are proposed including the use of alternative engineering methods, soft start procedures and the use of trained observers prior to start-up, as detailed below. Given this, no further investigations or monitoring is proposed for the construction phase with respect to acoustic modelling.

Operational Noise

Noise during the operational phase imposes a longer-term impact. This will be from barges transhipping ore to Ocean Going Vessels (OGVs) at offshore anchorages, and from OGVs using established shipping routes to transport the product to markets in Asia.

It should be noted, that the propagation and transmission of noise in water differs from that in air, for instance, a noise source level of 80-90dB in air has an underwater equivalent of 140-150dB. Low frequency sounds are least absorbed by sea water and as such are the principal source of ambient background noise levels in the marine environment (URS 2009). Background ambient noise in a marine environment is in the order of 80-100dB and shipping is often the dominant source of ambient noise in the low frequency range. Propeller cavitation, main diesel engines and auxillary diesel engines are important components of shipping noise, and hull induced vibration (generated by operating machinery) is the dominant noise source at lower vessel speeds (International Maritime Organisation 2009). Factors such as size, speed, load, condition, age and engine type all contribute to the generation of sound from a vessel (Scholik and Southall 2009).

During operations, the Ocean Going Vessels, barges and supply vessels will be the most significant sound sources and are all expected to be in the range of 180-190dB and tug boats in the range of 160-180dB (Southall and Hatch 2008) when operational at the source level (as opposed to the received level, which is the level experienced by the organism of interest).

The received level thresholds that may cause behavioural disturbance to fauna were summarised by McCauley and Salgado Kent (2008; reported on page 237 the Browse EIA) and is summarised in Table xx below:

Table 5-2 Received Level Thresholds that may cause Behavioural Disturbance to Fauna

(derived from McCauley and Salgado Kent 2008)

Receptor	**Approximate Received Level Threshold for Behavioural Disturbance (dB (re 1µPa)**	**Reference**
Cetaceans	Variable beginning at 120-160	Southall *et al*. 2007
Dugong	Unknown	Wartzok and Ketten 1999
Fish (hearing specialists)	Variable > 90 dB above hearing thresholds	Popper et al. 2003; Scholik and Yan 2002a; 2002b; Xodus 2009; Hastings *et al*. 1996.
Fish (hearing generalists)	Variable > 90 dB above hearing thresholds	Popper et al. 2003; Xodus 2009; Hastings *et al*. 1996
Marine turtles	> 170	Bartol and Musick 2003; McCauley *et al*. 2000

The implications of received level thresholds with respect to noise emissions from shipping operations were discussed in Chapter 5 of the EIS. As discussed within this chapter and summarised in Table xx above; the predominantly low frequency sounds produced by large vessels is similar to the auditory sensitivity of large whales and several fish species, whereas commercial sonar may overlap with the hearing range of dolphins and porpoises (Scholik and Southall 2009). Sounds between 120-190dB (re 1µPa) nonetheless have been demonstrated to result in avoidance and other behavioural impacts upon baleen whales and dolphins, and noises of 175dB have been reported to result in avoidance behaviour in green turtles (URS 2009).

As indicated in Table xx above, studies on received level thresholds on dugongs are scarce, however a number of studies on manatees demonstrate that this species may not immediately abandon feeding in high noise level environments, suggesting that habitat type and behavioural state may influence the reaction of manatees to environmental signals such as approaching vessels (Miskis-Olds and Wagner 2011). Variation in bony fish with respect to sensitivity to sound is very large, and some species may be sensitive to very low sound levels, particularly fish that have morphological adaptations that connect otilithic hearing organs to gas filled bullae or swim bladders (URS 2011).

However, studies which attempt to investigate and quantify the effects of long term boating noise traffic upon the behavioural ecology of marine species are scarce. This is particularly the case for noise impacts associated with larger vessels such as OGV's and tug boats, with most studies focusing on smaller vessels such as recreational pleasure craft, and commercial tourism vessels.

As described in Chapter 5, documented examples are generally from the northern hemisphere and are focused on whale and delphinid species. Documented impacts include temporary or permanent movement of local populations to less disturbed locations (Stewart et al.; Speckmann and Piat, cited in Hodgson 2004), and potential changes to migratory routes (Nishiwaki and Sasao, cited in Hodgson 2004). Conversely, other studies have shown no observable difference in behaviours such as surface resting behaviour and swimming speed in response to merchant ships in a busy shipping lane (Madsen 2003, cited in URS 2009).

One study in Queensland sought to determine zones of impact associated with shipping activities at Gladstone Port. An acoustic model was developed to detect the distance at which activities associated with the Western Basin Dredging and Disposal Project in Queensland, including bulk carrier noise, became lower than ambient noise levels (Gladstone Ports Corporation 2011). For bulk carrier-generated noise this was predicted to be between 1.3 and 4 km (Gladstone Ports Corporation 2011). It should be noted however that this range represents the point at which noise was modelled as attenuating to background levels, rather than a defined zone of impact.

However, it is possible to use this range as an indication of the likely extent of noise impacts associated with increased shipping rates from the swing basin to the transhipment anchorages. Using 4 km as a projected worst-case scenario, and given the known acoustic sensitivity of several marine taxa likely to be present in this range, it is probable that increased shipping activities will result in at least temporary disturbance and displacement of some species within a 4 km range from the entrance channel and route to the offshore transhipment anchorages. This may result in short-term energetic costs and potential impacts upon foraging, reproductive and other behaviours.

Again however, that given that the proposal represents the intensification of an existing use, it is likely that marine taxa currently utilising the entrance channel and environs, including cetaceans, dugongs and turtles, are likely to be habituated to some degree to activities at Bing Bong. Furthermore, given the extensive areas of suitable habitat to the north and south of the Port, i.e. abundant seagrass beds and soft sediment communities suggests that the energy intake of species is unlikely to be significantly affected given that they may move to other, less disturbed areas if noise levels exceed species-specific thresholds.

Similarly, the intensification of use is not considered to be occurring in an area of critical habitat for any marine species, nor is it expected to prevent migration of populations, or disrupt feeding on seasonally restricted seagrass species.

For species with high site fidelity i.e. some inshore dolphin species, populations may temporarily or permanently move away from feeding grounds in proximity to Bing Bong in preference to less-disturbed locations, however no known populations are known to exist in close proximity to Bing Bong. The closest known resident population is a population of Indian Ocean Bottlenose dolphins in waters adjacent to the Sir Edward Pellew Island Group (DEWHA 2008), located over 4 km from Bing Bong.

Displacement and relocation of animals from the Port region owing to increased noise emissions associated with shipping traffic would, whilst being far from optimal, represent a worst case behavioural response in this instance.

As described above, a number of mitigation and monitoring measures were proposed in the EIS. These are stated below:

- During construction, a trained marine fauna observer is to make regular inspections (suggested frequency every half hour) both prior to start up and during construction within an observation zone 200 m from the construction area. Note that construction of maritime infrastructure will be undertaken during daylight hours only both for safety requirements and to ensure optimal visibility of marine mega-fauna.

- In addition to visual observation, the potential to use passive/active detection acoustic detection methods will be investigated. As silt curtains will be utilised as is practical to do so for dredging and construction works, it will be necessary to ensure that no marine megafauna is trapped within the curtain bounds prior to start-up, specifically cetaceans, dugongs, turtles and crocodiles.

- Piles can be installed using a leader rig with vibrator, but may also be pressed in where silent vibrationless piling is required. If piles are able to be pressed in (subject to engineering considerations and prevailing conditions) then this method should be utilised to minimise noise emissions. Alternatively, soft-start procedures for pile driving using a leader rig, are to be utilised (i.e. gradually increasing the power of the leader rig) so that the potential for startle responses and injury or death is minimised.

- It is recognised that marine megafauna are mobile and can generally avoid impacted areas for the duration of disturbance. However, if a cetacean, dugong, or turtle is sighted within the 200m radius observation area during construction, then operations are to cease until the animal has left the observation zone.

- To further minimise potential noise emissions associated with vessel movements, a go slow zone (suggested 4 knots) is suggested for the access channel and swing basin. Barges will have operational maximum of approximately 6 knots empty and 4 knots loaded. Vessels are to avoid interactions with marine mammals where possible – noting the limitations imposed by the lack of manoeuvrability of barges.

GENERAL COMMENT

Comment #151

Boat strike - page 5-48 - Boat strike to dolphins, marine turtles and dugongs is identified as a significant risk associated with the development, particularly where extensive seagrass habitats exist, which are used by these fauna as foraging areas. The DEIS identifies that boat traffic will increase, but does not provide an assessment of the extent of this increase. The mitigation actions described in the DEIS are limited and rely solely on boat speed restrictions within the Port facility, but do not address management of vessel speeds outside the Port. It is recommended that further information is provided in relation to:
1. an assessment of increase in boat activity;
2. an assessment of how vessel traffic effects habitat use by EPBC Act Listed marine species; and
3. effective monitoring and mitigation measures.

Section 5.3 of the DEIS identifies the extent of the increase in boat traffic due to this development, as well as that associated with the planned expansion of the McArthur River Mine (MRM). In summary, during Phase 1 of the project, 240 return barge trips per annum will be required. This will increase to 480 return barge trips per annum in Phase 2. Xstrata currently require 110 return barge trips to service their operations, and this is planned to increase to 250 return trips per annum to enable Phase 3 of their operations.

Given that boat speed is considered to be the principal factor influencing the incidence of boat strikes on marine megafauna, vessel speed restrictions are considered the most appropriate means of reducing their likelihood.

Furthermore, the potential for boat strike has been assessed as highest within the swing basin and entrance channel (due to both the shallow bathymetry and concentration of vessel traffic) and consequently speed restrictions are considered most appropriate in this location. Given the greater depths attained in offshore waters beyond the entrance channel and swing basin, and that boat speeds for the self-propelled barge will be 4 knots fully laden, and 6 knots empty (considered to be a low speed operation) additional speed restrictions outside of this area are not considered necessary.

The OGV's associated with transport of the product offshore are also expected to be large and slow, reducing the overall threat of vessels striking and injuring cetaceans.

An assessment of how vessel traffic affects habitat use by EPBC listed marine species was provided in Chapter 5 of the DEIS under the associated impacts of both acoustic disturbance and boat strike. However, as acknowledged in this chapter, there is a paucity of data with respect to marine assemblages in the region, and therefore components 2 and 3 are expected to be further addressed in the Marine Risk Assessment, Management and Monitoring Program (see **Comment #150** for more detail).

5.2.6 CHAPTER 6

SECTION FIGURES AND TABLES

Comment #637

Table 6-6 and 6-7 Monitoring Bore Construction - Groundwater monitoring bores have extremely large screen lengths that appear to cross two or three water strikes, potentially interconnecting different fractures.

There is concern that water samples will not be representative of a target aquifer and may be interconnecting separate fractures and aquifers, perhaps even draining aquifers

The bores were drilled as investigative bores to subsequently serve as dewatering bores. Bores encountered mostly single shallow (less than 30m below surface) and single deep fractures between 30m and 107m below surface. Shallow water strikes were not screened and typically yielded less than 0.1L/s. Where multiple deeper fractures were encountered, they were generally within a few metres from each other (generally less than 10m) and may be regarded as *a single fractured rock system*.

Since modelling indicated that dewatering by means of bores will not be required, these bores will be used for monitoring purposes. However, the monitoring network and program will be extended to include several more bores targeting the shallow aquitard and deeper aquifer systems separately. The new monitoring bores will be located around mine infrastructure such as WRDs (predominantly shallow bores), Plant and Stockpiles (predominantly shallow bores), Pits and the Stream Realignment (combination of nested bores targeting shallow and deep systems separately).

SECTION FIGURES AND TABLES

Comment #638

FIGURE 6-9 - There do not appear to be enough groundwater monitoring bores to establish a baseline, flow directions or monitor for impacts around the proposed waste rock dumps and Area F pits.

Bore locations need to be both up gradient and in multiple down gradient locations to identify impacts and track contaminants.

Bores should circle waste rock dumps to ensure all directions are covered as flow direction may be influenced by ground water mounding beneath the dumps.

Area F pits, in particular pit 4 that will be used for water storage, should have bores surrounding the pit to ensure seepage is monitored. There should be multiple down gradient bores to track contaminants. Focused attention should be paid to the area between pit 4 and the meandering section of the Towns River.

Groundwater bores should be installed around the Bing Bong facility to establish any impacts from seepage of sediment ponds.

Noted. Please see map below for additional bores as requested.

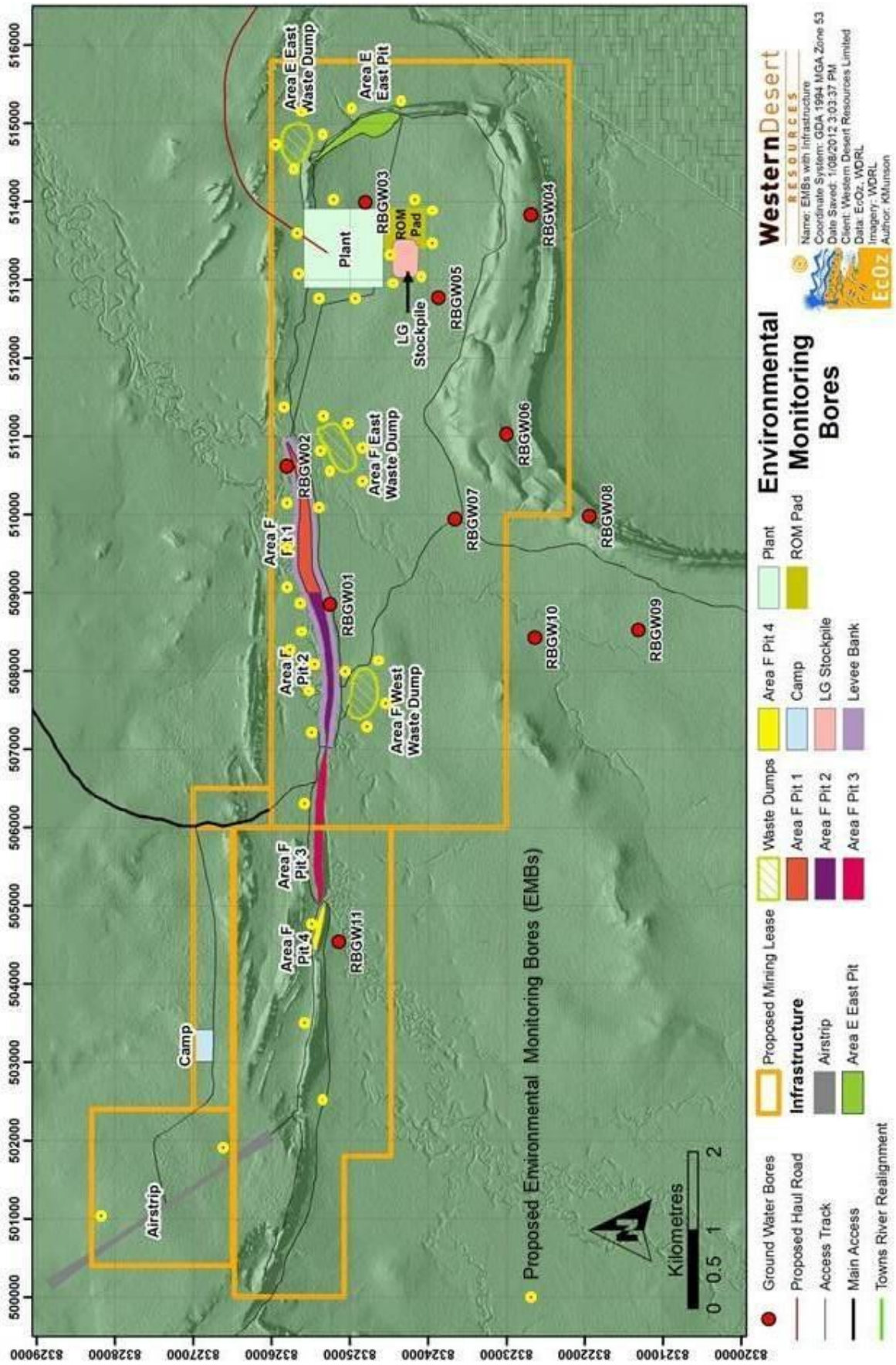


Figure 5-8: Mine site Environmental Monitoring Bores

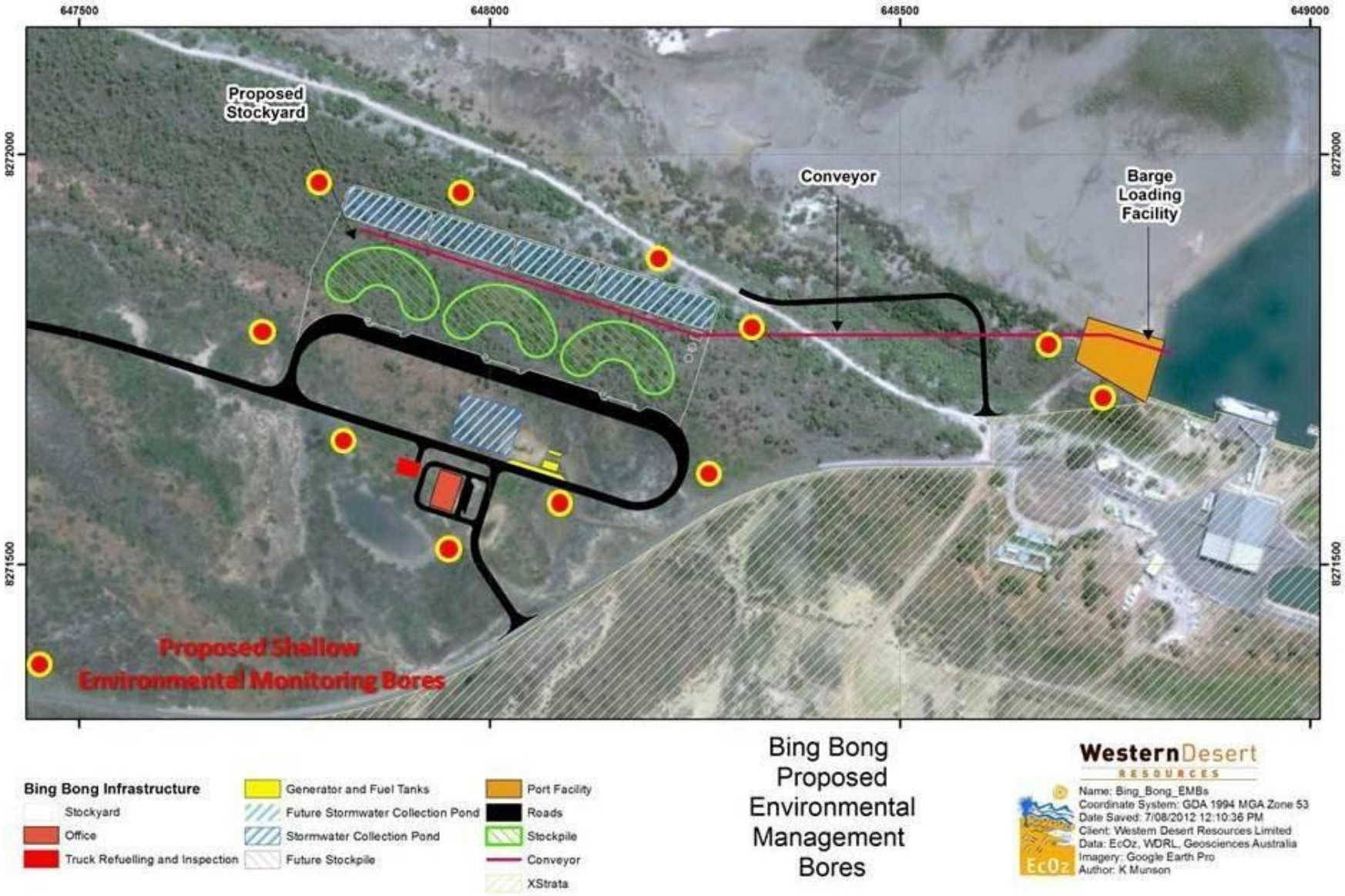


Figure 5-9: Bing Bong Environmental Monitoring Bores (proposed)

SECTION 6.1

Comment #639

The EIS should state the number of macro invertebrate studies that were completed to form the baseline. Including the time of year that the studies were undertaken e. g. wet or dry season.

As stated in Section 6.1.5 of the DEIS, a baseline macroinvertebrate survey was conducted during the wet season recessional flow period (April) of 2012, in accordance with AUSRIVAS protocols. Specific details of the survey were provided in Appendix S of the DEIS.

SECTION 6.1

Comment #640

mAHD should be used for elevations.

AMSL (Above Mean Sea Level) was used instead of mAHD in error: *"In 1971 the mean sea level for 1966-1968 was assigned the value of 0.000m on the Australian Height Datum at thirty tide gauges around the coast of the Australian continent. The resulting datum surface, with minor modifications in two metropolitan areas, has been termed the Australian Height Datum (AHD) and was adopted by the National Mapping Council as the datum to which all vertical control for mapping (and other surveying functions) is to be referred".*

SECTION 6.1

Comment #641

Turbidity is affected by fine colloidal material dissolved in the water column

Experience with turbidity caused by dissolved colloids has shown that it is very difficult to manage i.e. sediment traps are ineffective at reducing turbidity.

Western Desert Resources should investigate how mining will affect turbidity caused by colloidal material dissolved in the water column and investigate management techniques.

In reference to sediment basins, flocculation will be applied to get dropout of colloidal suspensions to occur and the water in the basin will be tested for meeting release criteria shown it Table 5-3 below prior to release/pump out occurring.

Table 5-3. Release Criteria

Parameter	Release Criteria
Suspended Solids	50mg/L Max.
pH	Within range 6.5 - 8.5
Visual Amenity	No visual plume

Attached as Appendix I is a detail drawing outlining this methodology under the heading “Sediment Basin Notes”, this sheet is part of the detail design drawings for each stage of Haul Road Design issued as part of the original Draft EIS submission.

SECTION 6.1

Comment #642

Sampling only from the wet season does not allow us to understand water quality during the dry season and water quality during first flush events. This is important data as it enables monitoring to identify impacts during the dry season and what extremes in water quality flora and fauna experience.

It is recommended that the proponent undertake dry season and first flush sampling.

As outlined in Section 6.1.2 of the DEIS, the Towns River is highly ephemeral in nature and surface water is restricted to remnant pools during the dry season. In such systems, water quality degrades naturally during the dry season (i.e. evapoconcentration) and it may be difficult to distinguish between potential impacts of mining on water quality and natural degradation of water quality. WDRL commits to sampling remnant pools in the Towns River on a quarterly basis during the dry season and where possible, sampling of first flush events.

SECTION 6.1

Comment #643

A complete suite of metals should have been analysed as part of the baseline. Iron should be included at a minimum. Metals analysis should be for total and dissolved metals.

The metals suite provided in the EIS includes the majority of metals that would be expected to be associated with the mining of iron ore, noting that iron and aluminium have been added to the suite of metals to be sampled. In accordance with what is understood to be standard DoR sampling protocols, totals analysis will be limited to occasional samples (e.g. 1 in 10) for quality control purposes. As DoR would be aware, dissolved metals represent the bioavailable fraction in surface waters, so WDRL will focus on sampling/analysis of dissolved metals unless DoR is able to provide adequate justification for routine sampling of the total fraction.

SECTION 6.1

Comment #644

Results should be shown for each monitoring event, not averaged.

The intent of presenting water quality data in the EIS is to provide a summary of baseline water quality, which is generally achieved by presenting averaged data. It is acknowledged that presenting ranges in data would also ideally be presented but given the limited data available at the time of the EIS preparation (i.e. two sampling occasions), this would be unlikely to represent a true range in natural variability in water quality.

SECTION 6.1

Comment #645

FIGURE 6.6 If the piper plot was based on averaged data then it should be redrawn and replaced with a piper plot for each monitoring event

The Piper Diagram was plotted for the wet season February 2012 sampling event and did not use averaged values for sampling points.

The chemical composition of surface- and ground-water is controlled by many factors including chemistry of precipitation, mineralogy of the watershed particularly that of exposed outcrops, climate, aquifer composition and topography. These factors combine to create diverse water types that change spatially and temporally. Güler et al (2002) indicate that a classification scheme for partitioning water chemistry samples into homogenous groups is an important tool for the characterisation of hydrologic systems. Accordingly, **data entered into the model are full sets pertaining to each site** but due to affinity sites were grouped to convey specific catchment systems with physical and hydrogeochemical compatibility (Güler *et al*. 2002).

SECTION 6.1

Comment #646

Hardness modified trigger values will not be based on averaged hardness data but on the hardness for that particular sample It will be expected that when presenting monitoring data, the 95% trigger value be shown in conjunction with any modified trigger value Hence each time series graph would show the variable line of analytical data, the variable line of hardness modified trigger value and the constant line of the ANZECC 95% trigger value.

WDRL is not able to find any reference within the ANZECC (2000) guidelines specifying that hardness-modified trigger values should be applied on a sample by sample basis. Unless DoR is able to provide justification for the suggested approach, WDRL will apply hardness-modified trigger values (i.e. Tables 3.4.1, 3.4.3 and 3.4.4 in ANZECC guidelines) based on average alkalinity for a given sampling site and the trigger values will be updated periodically (i.e. at least annually) to incorporate additional alkalinity data as it becomes available.

SECTION 6.1

Comment #647

Surface water sampling locations should be increased near pits, particularly in the meandering section near the Area F Pit 4. If this pit is used to store water then seepage may enter this meandering section of the Towns River. Isolated water bodies closest to the pits may be impacted by seepage, hence additional monitoring locations need to be situated at locations where pools remain during the dry season. These additional sample locations also require baseline sampling and analysis Additional downstream locations are required between RBSW, 4 and RBSW13 and RBSW05 to cover both the Towns and Magaranyi Rivers before they join near RBSW14. RBSWIO needs to be moved downstream of the confluence of the water bodies shown in figure 6-4.

Up and down stream locations of haul road crossings should be undertaken daily for in situ monitoring of pH, SEC, Dissolved Oxygen, Turbidity and Temperature. Laboratory Analysis should be undertaken weekly up and down stream of haul road crossings during construction and then monthly once road traffic begins to operate on the haul road. The upstream location should be far enough upstream of the crossing to ensure no impact from dust. Analysis should include at a minimum: major ions, TDS, TSS, total and dissolved metals (As, B, Cd, Co, Cu, Fe, Mn, Ni, Pb, Zn).

Baseline sampling events at these monitoring locations should be undertaken before the construction begins.

Water within pits should also be regularly sampled and analysed; this should include water from dewatering.

Surface water monitoring should be undertaken at the Bing Bong facility including at a minimum, sediments ponds, local surface water and immediately off the coast.

More surface and groundwater sampling locations are proposed. **See Comment #638.**

SECTION 6.1

Comment #52

WDRL should:

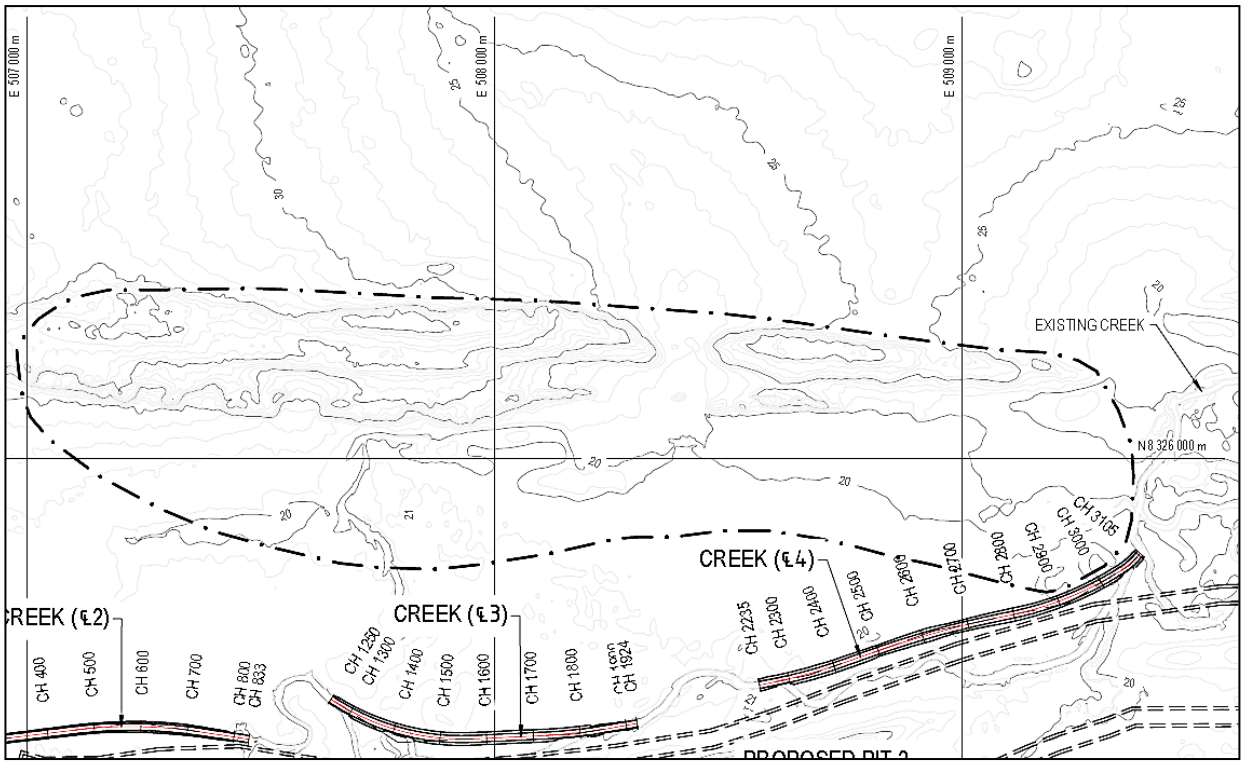
1. Provide a detailed baseline assessment and develop a monitoring and management plan that assures protection of the natural values of the billabong system immediately to the north of Area F pits 1 and 2.

The billabongs have been identified by the Traditional Owners as sites of significance hence the Exclusion Zone (dotted line). They are old river paleo-channels distinctly separate from and not connected to the current course of the Towns River.

They receive their water from:

1. The higher lying ground and catchment to the north during low flow events.
2. Flooding of the area when flows greater than 1-year ARI burst the banks of the Towns River.

They are therefore independent and not connected or reliant on the Towns River, particularly those further away from the river in the exclusion zone (black dotted line shown below); neither are they connected to ground water. They receive runoff from the surrounding areas and probably overtop, due to their size and elevations, about the time when the river overtops during flooding. Excluding the larger northernmost ones adjacent to the hill (fed by the fracture systems in the sandstone), they all dry, as the river itself, towards the end of the dry season as evapotranspiration depletes the shallow perched ground water in clayey, silty sands about 1.0m to 1.5m thick which overlies thick clays forming a confining layer to the ground water level which is some 9m below.



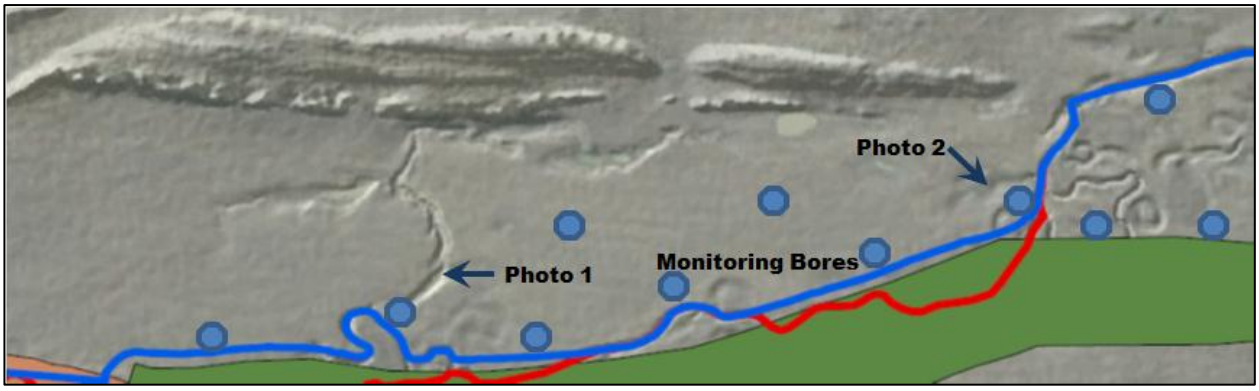


PHOTO 1

PHOTO 2

WDRL acknowledged the exclusion zone and it will be treated as such. Management is to be limited to not interfere with local drainage other than the stream diversion. The exclusion zone will only be entered to undertake monitoring. No vehicles are to access the exclusion zone.

Shallow monitoring bores are to be located between stream realignment and billabongs and are to be included in the ground water monitoring program. The surface monitoring program will be extended to include monitoring of the vegetation around the edges, water levels and water quality.

SECTION 6.1

Comment #53

2. Agree trigger values for chemical species that will serve for monitoring of surface water and groundwater quality and as indicators of the presence (or otherwise) of AMD.

Refer to **Section 4.1.2** of Supplementary EIS Report.

SECTION 6.1

Comment #54

3. Provide information about the toxicity and potential impacts on human health of chemical species that might enter the environment as a result of AMD.

Refer to **Section 4.1.2** of Supplementary EIS Report.

SECTION 6.2

Comment #648

Western Desert Resources should initiate investigations into the location of additional bores to monitor the impacts of mining on regional groundwater. Justification is required of how the current groundwater monitoring program addresses this information gap.

No consideration has been given as to how draw down from water extraction will affect PAF material in-situ.

Given the relatively slow recovery of water levels after pumping consideration should be given to further investigation into the sustainability of using groundwater at the camp site.

See response to **Comment #638.**

This aspect will be monitored. The cone of dewatering is steep and within 1.2km radius from the open pits. Most PAF materials that will be drained occur at depths greater than 30m below ground level. During mining and subsequent until the pits are flooded with surface water runoff, flow will be towards the pits. The poor water quality in the cone of dewatering and in the pits will be offset by flooding the pits, and maintain the pit water level well above the ground water level with seasonal high level inflows, with good quality surface runoff. The camp water requirement is relatively small (1.1L/s) compared to the sustainable yield (up to 1.5L/s/bh) of the aquifer around the camp. Bores will be spread far apart and not used for longer than 12hrs/day at a time to prevent excessive drawdown and insufficient recovery.

SECTION 6.2

Comment #649

A complete suite of all metals should have been undertaken as part of the baseline. This should still be completed before mining commences.

Sampling should be undertaken across the different seasons to understand variability.

Details of the number of sampling events should be provided.

Leachate assessments of dominant lithotypes indicate that the metal/metalloids analysed for aluminium, arsenic, cadmium, chromium, copper, iron, lead, manganese, nickel and zinc are the dominant ones present. Groundwater sampling at quarterly frequencies will define seasonal variability - taking cognisance of the confining nature of the aquifer, variability is expected to be limited.

SECTION 6.2

Comment #650

Groundwater monitoring should include total and dissolved metals.

Metals should include barium (Ba) considering the naturally elevated background concentrations.

Ground water occurs in hard rock fractures free of colloids/fines; as a consequence Dissolved and Total concentrations will be very similar.

SEM analysis has detected traces of barium and these are related with minor silicon and aluminium. Source materials appear to be barite ($BaSO_4$) and barium-carbonate ($BaCO_3$) within the sandstones. Ba is not a concern unless pH decreases as a result of excessive oxidation of pyrite.

SECTION 6.2

Comment #55

How will AMD contaminated groundwater be treated?

Refer to **Section 4.1.4** of Supplementary EIS Report

SECTION 6.2

Comment #162

Further information should be provided on the potential of the proposed development on the small spring (potential groundwater dependent ecosystem) located in the south-eastern corner of the project area.

The small spring in question is located 1.5 km from the Area E East Pit; the vegetation of the spring is described as Corymbia polycarpa mid-open woodland (the full description of this vegetation community-called Vegetation Community 21- is in Appendix D of the DEIS). As this spring does not support a typical spring fed vegetation community, and no aquatic species were identified at the location it is thought that this spring is more a seepage.

There will be a drawdown of groundwater, modelling (Section 6.2.6 of the DEIS) shows that there will be a drawdown to be 1m at 1.2 km from the edge of the mine pits. The implications for this seepage is unclear as the seepage may be supplied not from groundwater but from rain fed rock fractures.

SECTION 6.2

Comment #163

Given that the proposal includes flooding of pits 3 and 4 in Area F, discuss the potential for seepage from these flooded pits to interact with the local groundwater systems. Discuss whether additional monitoring bores should be located in proximity to these pits.

See **Section 4.2.3** above.

SECTION 6.3

Comment #164

Please detail proposed measures to re-vegetate the riparian zone of the realigned Towns River inclusive of the perimeter of the proposed pit 3 diversion.

The intended outcome of re-vegetation of the realigned sections of the Town River is to replicate, as best as possible, the riparian vegetation that is being lost. The stages in this are:

(i) Prior to disturbance, to survey the species composition and structure along the existing stream bank.

(ii) Source local seed stock of these species for propagation and direct seeding purposes.

Revegetation activities will be planned for year 2, so that the dynamics of the constructed stream can be observed during the first wet season.

The existing riparian specific vegetation is very sparse, so revegetation will focus on riparian species but obtaining a sustainable vegetation community will require the revegetation program to mostly include general and widespread species, such as those that currently dominate.

SECTION 6.3

Comment #651

There is no detail of the realignment in this section to put the description in context with what is proposed

Refer to **Section 4.2** for further information on the Towns River re-alignment.

5.2.7 CHAPTER 7

SECTION 7.4

Comment #169

The DEIS states "The noise propagation modelling results, considering a conservative number of road train movements, indicate full compliance with the Queensland Environmental Protection (Noise) Policy 2008 (EPP [Noise]) criteria for the camping ground. Consequently, the haul road noise emissions are unlikely to cause nuisance to the people using the Limmen River camp ground in the proposed Limmen National Park. This statement raises concerns that the potential degradation of the natural bush experience at the Limmen River Camp has been underplayed in the DEIS. Firstly, the modelling was based on "a conservative number of road train movements." What is this number? Secondly, the DEIS shows road trains will be heard at the campground (noise increases from 24 to 29dB) and this will be every 18 minutes initially rising to every nine minutes on a 24/7 basis. The DEIS claims that this is "unlikely to cause nuisance."

The issue of noise at the campground should be clarified and the aim should be to ensure no increase in noise at the campground.

See **Section 2.1.4** above for noise assessment carried out for the Campground.

SECTION 7.6

Comment #455

We maintain that the existing regime at Bing Bong is inadequate. It is therefore unsatisfactory for WDR to address their (smaller) contribution to the growing burden through that inadequate regime. While dust suppression, containment and trapping infrastructure are described, the proponent should be required to provide more detail on monitoring, management, thresholds and contingencies for dust and other impacts at Bing Bong.

The assessment should be informed by a fuller picture of the current environment, including soil and fluvial sediment data - which may or may not be available via Xstrata.

Refer to response to **Comment #319**.

5.2.8 CHAPTER 8

SECTION 8.2

Comment #67

WDRL should:

Provide an assessment of TEK that exists for the area impacted by the mine, haul road and port facility and include this information in a cultural heritage management plan (CHMP).

Traditional Ecological Knowledge" (TEK) refers to Aboriginal knowledge regarding local environmental resources. TEK is commonly used in natural resource management as a substitute for baseline environmental data to measure changes over time in remote regions that have little recorded scientific data

WDR recognises all Indigenous sites in the Northern Territory are protected under State legislation by the *Heritage Conservation Act 1991* and the *Northern Territory Sacred Sites Act 1989*, and under Federal legislation by the *Aboriginal Land Rights (Northern Territory) Act 1976.*

To ensure successful identification of Indigenous sites of significance and adhere to relevant legislative requirements, WDR has undertaken desktop research and comprehensive archaeological surveys that identify and propose mitigation strategies for potential disturbance.

Survey findings from the Mining Lease Application (MLA) area and the proposed 165km haul road corridor have indicated minimal human presence in most locations, with high-energy areas such as river banks only showing limited prior occupation and archaeological sites. Observation of the Roper Region in the live NT Heritage Register (search performed Tuesday, 31 July 2012) also identified predominantly European sites outside of the project's footprint.

Through extensive consultation with Traditional Owners, Elders and recognised Indigenous groups, WDR has validated these findings and provided further insight into sites of cultural significance, including scared sites and song lines, which now accompany research findings and have been incorporated into the project's final design concept.

Consultation revealed that whilst archaeological findings were a significant and important element to constructing and operating the project in a culturally responsible manner, the emphasis for Indigenous Australians in the Roper Region was maintaining their cultural heritage through daily practices, ceremony, youth education and mentoring. Culture is a living and breathing practice that is not encapsulated within a historical artifact, but rather a way of life.

To this effect, WDR will manage cultural heritage through:

1. Avoiding sensitive areas identified during research and consultation;
2. Project planning and design to minimise disturbance on identified areas of cultural significance including further consultation (if required) to outline protection procedures;
3. Education of all WDR employees in legislative requirements and culturally sensitive areas of significance;
4. Collaboration with Traditional Owners, Elders and recognised Indigenous groups to inform, manage and mitigate any culturally significant areas or findings discovered during construction and/or operation of the project; and
5. Recording of any new cultural heritage sites into the WDR corporate database and reporting to relevant regulators as required.

These commitments and their progress are outlined in the table below.

Table 1 – Cultural heritage commitments

Activity	Reference	Status
Avoiding sensitive areas identified during research and consultation	• Construction Management Plan • Mining Management Plan	Drafted
Project planning and design to minimise disturbance on identified areas of cultural significance including further consultation to outline protection procedures	• Construction Management Plan • Mining Management Plan	Drafted
Education of all WDR employees in legislative requirements and culturally sensitive areas of significance	• Employment Contracts • HR Policies • Indigenous Employment Framework • Daily toolbox talks prior to work commencement	Drafted
Collaboration with Traditional Owners, Elders and recognised Indigenous groups to inform, manage and mitigate any culturally significant areas or findings discovered during construction and/or operation of the project	• Stakeholder Engagement Plan • Community Liaison and Indigenous Employment Coordinator	Ongoing
Recording of any new cultural heritage sites into the WDR corporate database and reporting to relevant regulators as required	• Workplace Health, Safety, Environment and Quality procedures • Mining Management Plan	Drafted

SECTION 8.2

Comment #68

WDRL should:

Develop local business, employment and training schemes that utilize traditional land management practices and TEK and integrate these into all aspects of the mine from development through to post-closure maintenance.

The environmental and socio cultural offsets proposal (Chapter 11) identifies that the Company proposes investment in the areas of governance, community rangers, social enterprise organisations, health, youth, education and training, and cultural maintenance. The authors of this section, being extremely familiar with this subject may not have elaborated on the details of how these may operate and the intention is that the governing body of this arrangement would be the decision maker for the actual outcomes of what happens in this regard.

DEIS section 11.1.3 introduces the concept of Indigenous Rangers, a program that encourages the use of traditional land management practices and TEK so as to achieve land management and innovative enterprise development programs that are particularly suited to bringing people not suited for or ready for a 'typical job' into the workforce.

SECTION 8.2

Comment #69

Seek to modify their approach to consultation so that transfer of knowledge in both directions improves and can be demonstrated to be effective.

Western Desert Resources (WDR) has made a commitment to undertake continuous consultation over the life of the Roper Bar Iron Ore project. A significant component of this consultation is demonstrating respect for Elders, Traditional Owners and ancestors who are recognised by WDR as fundamental to the responsible development of the project.

WDR's commitment began in June 2010 when consultation with key stakeholders and the communities of Borroloola, Minyerri, Ngukurr and Numbulwar was undertaken during pre-feasibility studies. This early engagement ensured critical concerns could be incorporated in the project's final design and a key outcome of consultation with Elders and Traditional Owners resulted in WDR's preferred transport option changed from a slurry pipeline to Maria Island to a 165km haul road which will transport the product to an existing loading facility.

The continuation of robust and meaningful stakeholder engagement is proposed by WDR to build lasting relationships with stakeholders that will facilitate whole-of-project engagement, communication and participation. WDR has made five key commitments to facilitate such an approach and support all-inclusive, equitable engagement through communication:

1. Demonstrate through engagement that all stakeholder issues, concerns and opportunities associated with the project have been effectively addressed through consultation and engagement
2. Provide factual, timely and relevant information to stakeholders at key project milestones
3. Maintain and nurture existing stakeholder relationships through regular communication tools
4. Profile WDR's capability to engage in sustainable mining practices, and
5. Build a robust management framework that manages potential and real stakeholder issues and opportunities.

These commitments and their progress are outlined in the table below.

Table 1: Stakeholder engagement commitments

Activity	Detail	Reference	Status
Demonstrate through engagement that all stakeholder issues, concerns and opportunities associated with the project have been effectively addressed through consultation and engagement	• Engage all identified stakeholders during the EIS public notification period	• Appendix 1: EIS Public Notification Period Consultation Report, July 2012	Completed
	• Conduct further meetings with stakeholders that are identified as project influencers	• Appendix 2: NLC Consultation Report, 22-29 April 2012	Ongoing
	• Produce and distribute project collateral to advise on final design, construction program and operation	• Appendix 3: Stakeholder Engagement Plan (p. 30)	Ongoing
	• Establish, maintain, respond to and record hotline and email address	• Appendix 3: Stakeholder Engagement Plan, March 2012 (p. 30)	Ongoing
	• Restructure website to include a project site that is updated with current information	• Appendix 3: Stakeholder Engagement Plan, March 2012 (p. 30)	Completed
	• Produce public consultation report that identifies public perceptions and potential issues	• Appendix 1: EIS Public Notification Period Consultation Report, July 2012 • Appendix 2: NLC Consultation Report, 22-29 April 2012 • Appendix 4: Consultation Report, 12-24 February 2012	Completed
Provide factual, timely and relevant information to stakeholders at key project milestones	• Produce and distribute project collateral	• Appendix 3: Stakeholder Engagement Plan, March 2012 (p. 30)	Ongoing
	• Update and maintain content on WDR project website pages	• Appendix 3: Stakeholder Engagement Plan, March 2012 (p. 30)	Ongoing
	• Maintain, respond and record hotline and email enquiries	• Appendix 3: Stakeholder Engagement Plan, March 2012 (p. 30)	Ongoing
	• Review and analyse website reports to ensure website content is aligned with stakeholder expectations and change where necessary	• Appendix 3: Stakeholder Engagement Plan, March 2012 (p. 30)	Ongoing
	• Maintain project key messages and Q&As to ensure the project team is equipped with accurate information	• Appendix 3: Stakeholder Engagement Plan, March 2012 (p. 30)	Ongoing
	• Set and meet response times to ensure timely responses are provided to stakeholders	• Appendix 3: Stakeholder Engagement Plan, March 2012 (p. 30)	Ongoing

Table 1: Stakeholder engagement commitments

	• Prepare communication action plan for stakeholder activities	• Appendix 3: Stakeholder Engagement Plan, March 2012 (p. 30)	Completed
Maintain and nurture existing stakeholder relationships through regular communication tools	• Provide fact sheets, newsletters and proactive contact where appropriate to promote understanding and raise stakeholder awareness	• Appendix 1: Public Notification Period Consultation Report, July 2012 • Appendix 3: Stakeholder Engagement Plan, March 2012 (p. 30) • Appendix 4: Consultation Report, 12-24 February 2012	Completed
	• Conduct stakeholder meetings with appropriate staff members as required	• CMS reports available on request	Ongoing
	• Hold regular meetings with community liaison staff to ensure all stakeholder trends and issues are captured in a timely manner	• CMS reports available on request	Ongoing
	• Record all stakeholder contact in Consultation Manager	• CMS reports available on request	Ongoing
	• Produce monthly report which provides overview and analyses effectiveness of stakeholder contact	• CMS reports available on request	Ongoing
Profile WDR's capability to engage in sustainable mining practices	• Develop and agree on key messages and positioning statement to ensure a consistent message to all stakeholders	• Appendix 1: EIS public notification period consultation report (Appendix 5)	Completed
	• Key messages to be used in communication materials (i.e. fact sheets, newsletter, website, Q&As, media releases)	• Appendix 1: Public Notification Period Consultation Report, July 2012 (Appendices 4-7)	Completed
	• Key messages to form basis for how all WDR staff talk about the project internally and externally with stakeholders	• Appendix 1: EIS Public Notification Period Consultation Report, July 2012 (Appendix 6)	Ongoing
	• Identify and action positive media opportunities (incl. media release and event) which support WDR's positioning	• Appendix 3: Stakeholder Engagement Plan, March 2012 (p. 30)	Ongoing
Build a robust management framework that manages potential and real stakeholder issues and opportunities	• Engage early and regularly with stakeholders to understand potential and real issues	• Appendix 3: Stakeholder Engagement Plan, March 2012 (p. 12-13)	Ongoing
	• Develop and maintain issues register to track issues and mitigation efforts	• Appendix 3: Stakeholder Engagement Plan, March 2012 (p. 12-13)	Ongoing

Table 1: Stakeholder engagement commitments

	• Report regularly between the project team and stakeholder on issue resolution and management	• Appendix 3: Stakeholder Engagement Plan, March 2012 (p. 25-27)	Ongoing
	• Develop media holding statements and Q&As to address any potential issues	• Appendix 3: Stakeholder Engagement Plan, March 2012 (p. 25-27)	Ongoing
	• Engage proactively with media to address potential significant issues	• Appendix 3: Stakeholder Engagement Plan, March 2012 (p. 25-27)	Ongoing
	• Ensure key messages / other project materials are continuously updated	• Appendix 3: Stakeholder Engagement Plan, March 2012 (p. 30)	Ongoing

See Appendix H for a copy of the above mentioned appendices.

SECTION 8.3

Comment #460

Media reports, personal communications with Traditional Owners, and feedback in past community consultation by the Independent Monitor, have identified community concerns regarding the reduction in bush tucker (including wallaby and lizard) due to XStrata's activities at Bing Bong. Although XStrata prepared a report (EMS (2010g) Bing Bong Macropod Assessment) which discounted the view that operations at the port were responsible for the loss of local bush tucker resources, it is curious that the social impact assessment did not identify this as a risk. In fact, Section 2.7 assures us that "*as these areas are within the existing facility and off limits to public access, they will not impact on public access and activities currently undertaken in the Bing Bong area*" Furthermore, we're told (in Section 8.3) that "*Mention of generic types of landscapes that provide productive hunting and gathering and related activities did occur but no potential impact to these sites was identified.*"

ECNT considers it unusual that previous concerns that had been expressed repeatedly and strongly regarding the degradation of hunting capacity around Bing Bong were not aired in social impact consultations for this project that will pose an increased burden on the area. At the very least, the generic landscapes mentioned could be mapped to assure all stakeholders that these local cultural values will be maintained.

In a similar vein, it is curious to note that community consultation and social impact assessment makes no mention of the diversion of a segment of the Towns River. The consultation report notes that: "Previous mining projects are perceived to have environmental concerns, resulting in a general distrust of mining projects in relation to environmental impacts." but no further context is offered. Given the considerable, protracted controversy over XStrata's "realignment" of a segment of the McArthur River for their Stage 2 expansion, which went to cultural impacts of this very action, it is perhaps surprising that no issues are identified with a similar (albeit smaller) assault on the Towns River.

Respect for Elders, Traditional Owners, the land, animals and ancestors are recognised by WDR as fundamental aspects of the Indigenous culture and have been acknowledged during all consultation and feasibility investigations for the Roper Bar Iron Ore project.

This commitment has been extended to include engagement with all identified stakeholders that could be directly impacted by the project and considers areas of cultural significance as a priority during all discussions.

During all stages of the project's planning, through feasibility and detailed design, WDR has communicated with stakeholders in a timely and responsive manner that is receptive to feedback and cooperation. This is evident through formal consultation undertaken at various points in the project's development and the communication material to support changes in the design, including:

- Consultation undertaken in February 2012 that formed part of the Social Impact Assessment and identified impacts and opportunities, thoughts and opinions on the current and future social environment of the communities within the project's footprint (Borroloola, Minyerri, Ngukurr and Numbulwar)
- Provision of a project fact sheet and storyboard during consultation that formed part of the Social Impact Assessment and discussed preliminary project designs and components
- Consultation in collaboration with the Northern Land Council (NLC) undertaken in April 2012 to discuss project design changes in relation to the proposed haul road and ephemeral stream realignment
- Revision of the project fact sheet to support design changes and provide further information on the EIS, EIS process, key milestones and feedback mechanisms
- Consultation undertaken in July 2012 as part of the EIS public notification period that encouraged feedback and comment in relation to areas of significance developed by the Department for Natural Resources, Environment, The Arts and Sport.

All formal consultation, in particular that undertaken in conjunction with the NLC to discuss the haul road and ephemeral stream realignment, addressed stakeholder concerns and WDR has since assessed potential impacts with appropriate mitigation and management techniques, as outlined in the EMP.

SECTION 8.4

Comments #480 and #554 –to #558

Contribution to the NT and Australian Economy

1. Estimated total project value/revenue for the planned project duration (to provide the economic scale of the project)

2. Expected project duration

3. Value of any value-adding in the NT and Australia

4. Estimated overall tax and royalty payments, showing the NT proportion, if available

5. Expected value of exports and any imports

6. Estimated capital expenditure for the whole project, identifying construction cap ex

7. Expected annual operational expenditure, showing the proportion in the NT

8. Impacts if any of neighbouring businesses or projects (costs and benefits)

9. Any overall direct and indirect economic impact data if available"

Contribution to Business Development
Expected value of NT/Australian business supply and service participation during construction and operations.

Contribution through an agreed industry participation plan if required (usually required for all projects over $5m in value which receive 'substantial' NT government assistance).

Contribution to Employment and Training

Expected direct and indirect project employment during construction and operations.

Estimated workforce/contractor numbers by occupational classification if available.

Overall employment training proposed during commencement, construction and operations.

Planned Indigenous employment, training and other project participation.

Expected level of overseas recruitment.

Contribution to Regional Development

Value of the any proposed Community Benefit arrangements.

Estimated overall regional economic benefits.

Other contributions to local communities, including Indigenous traditional owners.

Community value of any residuals infrastructure, such as roads, camps, lakes, etc.

If full economic appraisals, such as computable general equilibrium (CGE) modelling, have been undertaken, the following is an alternative approach:

Both direct and the flow-on (indirect) impacts of a development project should be provided.

For large projects with multi-year construction phase (>$100 million), the value of economic benefits should be provided for both construction and the operational phases separately.

Benefits to Northern Territory and Australia should be Identified separately.

Net annual contribution to GSP/GDP (value-added) i.e. after accounting for any negative impacts such as crowding out impacts on other industry sectors and the Gregory effects ('Dutch disease' effects).

Total contribution to GSP/GDP over the economic life of the project.

Net contribution to domestic consumption.

Total investment value of the development project.

Total annual value of exports and imports.

Total and annual value of tax and royalty payments.

The Roper Bar Iron Ore project will support the growth of the Northern Territory's mining industry and WDR are committed to building and operating it responsibly.

During EIS and commercial feasibility investigations, WDR identified a growing need for investment in the Northern Territory and the projections for the project's development dovetail with the then Department for Primary Industry, Fisheries and Resources *Investment Framework 2010* and the Department of Resources, Mines and Energy initiative, *(2011).*

Both papers highlighted a vision to become the destination for exploration investment in Northern Australia and consider the Northern Territory mining industry as under explored and see investment strategies, such as the Roper Bar Iron Ore project, as catalysts to secure the future wealth of the Territory.

An economic value assessment for the Roper Bar Iron Ore project identifies potential project benefits based on studies into inherent risk profiles and risk mitigation strategies:

1. Long-term benefits for the Northern Territory & Australian economy through royalties, as well as delivering immediate outcomes such as employment, business and service opportunities and social enterprise
2. Long-term benefits for local communities within the project's footprint – Borroloola, Minyerri, Ngukurr and Numbulwar – through Indigenous participation strategies and economic growth opportunities
3. A social offsets program that will be the first of its kind in the Northern Territory and will set a benchmark for future mining operations and commercial entities in the Territory
4. Involvement from local authorities, such as the Northern Land Council, in preserving cultural heritage and environmental management.

These benefits are considered in the table below based on their contribution to the national, territory, regional and community prosperity.

Table 1 – Project contributions and local participation

Activity	Detail	Reference	Status
Contribution to the Northern Territory and Australian Economy			
Establish commerciality to sustain project longevity.	• Significant interest from investors has been secured to ensure the project's commercial viability over the life of the mine • Estimated capital expenditure for the entire Roper Bar Iron Ore Project is currently approximately $180 million for construction and development phases, with a further $20 million anticipated on future exploration.	• Economic Value Assessment, July 2012 (p. 22) • Capital raising placement achieved, June 2012.	Completed
Demonstrate expected project revenue.	• The estimated total project value/revenue for the planned project duration is approximately $2.6 billion dollars. With the expected value of exports and any imports also $2.6 billion dollars • The expected annual operational expenditure in the Northern Territory alone exceeds $180 million, with a revenue stream to Xstrata Zinc of approximately $9 million per annum.	• Economic Value Assessment, July 2012 (p. 22)	Completed
Likelihood of generating new business opportunities and royalties for the Northern Territory government.	• The total estimated tax and royalty payments for the project are $120 million in royalties and $230 million in applicable tax payments.	• Economic Value Assessment, July 2012 (p. 23)	Completed
Current operating environment is unlikely to produce future economic injection on a significant scale.	• Proposed projects in the Roper Region and communities of Borroloola, Minyerri, Ngukurr and Numbulwar indicate that low-risk, low-return ventures are existent and significant economic stimulation as a result of investment are unlikely.	• Economic Value Assessment, July 2012 (p. 5)	Completed
Contribution to Business Development			

Activity	Detail	Reference	Status
Identification of business opportunities in the Northern Territory and wider Roper Region.	• Opportunities for the surrounding community's economy have been identified through flow-on expenditure arising from increased employment opportunities and an expected increase in new purchases of goods and services.	• Consultation Report, 12-24 February 2012	Completed
Contribution and facilitation business opportunities in the communities of Borroloola, Minyerri, Ngukurr and Numbulwar.	• Ongoing consultation with communities within the project's footprint will enable continuous participation in local and regional business initiatives.	• Community Liaison and Indigenous Employment Coordinator	Ongoing
Contribution to Employment and Training			
Employment, training and development opportunities for those living in the Roper Region and greater Northern Territory.	• Comprehensive research and modelling into mine construction and operation has estimated that during the project's construction there will be a peak workforce of around 150 people, increasing during the project's operation • Positions identified include engineers, tradespeople and technicians, machine operators and drivers, labourers, transport services and support services.	• Construction Management Plan	Completed
Indigenous employment initiatives that acknowledge and respect cultural requirements of Indigenous Australians, while presenting real job opportunities that promote long-term personal and professional growth and learning.	• Maximize the number of Indigenous workers employed by Western Desert Resources' Roper Bar Iron Ore project • Develop the skills, qualifications and experiences of Indigenous employees so that they are better equipped for long-term employment in connection with the Roper Bar Iron Ore project • Identify potential barriers to employment of Indigenous Australians living within the project's footprint and develop mentor and training opportunities to overcome such barriers and facilitate transition into long-term employment at the Roper Bar Iron Ore project.	• Indigenous Employment Framework, April 2012	Completed
Contribution to Regional Development			
Local participation in the Roper Region and remote communities that delivers fair, equitable and all-inclusive benefits.	• A social offset strategy framework has been proposed to ensure communities within the project's footprint can benefit from the project's direct and indirect economic stimulation. The framework will incorporate a range of participation strategies including an Indigenous employment strategy, cultural heritage management and training programs, and a local supplier engagement program.	• Social Offset Strategy Framework	Completed

Activity	Detail	Reference	Status
Social enterprise initiatives that facilitate regional and community growth through shared benefits.	• Support for the community will be achieved through sponsorship and a proposed Social Enterprise Scheme • The proposed Scheme will be developed based on community consultation to ensure benefits are distributed to the community in a fair and equitable manner.	• Consultation Report, 12-24 February 2012 • EIS Public Notification Period Consultation Report, July 2012 • Social Offset Strategy Framework	Ongoing

Further information can be found in Appendix H.

5.2.9 CHAPTER 9

SECTION 9.2

Comment #667

The risk assessment does not seem to consider the locations of the Waste Rock Dumps.

No justification is given to the current layout of the site and how this will minimise risks to surface and groundwater. Comparison to other layout options should also be provided.

The current locations of the WRDs take due consideration of topography and drainage and were located, where possible, on the upstream sides of the pits which may be used to collect surface runoff and/or seepage from these structures although they are to be constructed:

- With drains to collect and retain runoff in toe dams; and
- Inhibit seepage by placing the dumps on pads constructed with NAF materials mixed with clay.

SECTION 9.5

Comment #670

Mine closure planning should be treated as an essential part of mine development planning. Western Desert Resources should be aware that final approval from DOR will not be signed off until a closure plan demonstrating that ecologically sustainable closure can be achieved

As the NTG Mine Closure Guidelines are still in development, it is recommended that the WA guidelines be referred to in the preparation of this document.

Rehabilitation and mine closure planning has been taken into account during all stages of project development. Successful closure is an economic imperative of modern mining companies as poorly planned closure requires very expensive and lengthy remedies and at a time when the mine no longer produces an income. All aspects of the development are planned with the knowledge that they will need to be either stable and functional during the project and then require removal or rehabilitation, or they are designed to be constructed and managed so that they will be permanent features of the future landscape.

Demonstrating ecologically sustainable closure prior to any disturbance and therefore rehabilitation trials and tests is not possible and cannot be expected. At this stage of the development WDRL have performed soils

studies that will feed valuable information into the soil stability, capacity and viability for rehabilitation. Ecological studies have identified vegetation communities and more detailed species specific mapping will take place in key areas such as the stream channel edges so as to identify rehabilitation requirements. Seed collections will take place and both direct seeding and planting of seedling trials will occur.

SECTION 9.7

Comment #469

ECNT are very concerned at the cumulative impacts of mining pressures in this region. We've described in the past how piecemeal assessment risks significant considerations falling through the cracks between each specific assessment process. The EPBC process specifically inquires as to whether a proposal should be assessed as a component of a larger action, and memoranda describe limited circumstances in which staged assessment may be appropriate. Unfortunately, NT legislation does not allow for the kind of Strategic Environmental Assessment that may be applied in other jurisdictions, to consider the cumulative risks and impacts presented by successive development or land management programs, such as the emergence of iron ore in the Roper, and the increasing pressures at Bing Bong. ECNT are particularly concerned that approval for the Roper Bar Iron Ore proposal before us risks loading a subsequent proposal for exploiting the BFO resource in the project area with the weight of inevitability. We've witnessed previous projects where poor performance in early stages is presented as an argument in favour of further expansion, to fund necessary waste management and rehabilitation works. ECNT are concerned to see that appropriate environmental performance is recognised by all parties as an essential pre-requisite for any further applications.

Noting the likelihood of further applications, and related activity in the region, ECNT urge that assessment should maintain the perspective of a likely expansion to beneficiation, and the need to set an appropriate standard for the potential exploitation of the large exploration areas so sensitively avoided by the new Limmen boundaries. To aid this perspective, the proponent could offer some helpful discussion that more clearly describes the likelihood of impacting on the long-term management of PAF materials.

The DEIS presents a discussion about cumulative impacts for the proposed development within the region. Any further developments would also have to consider cumulative impacts including, if it went ahead, a BFO project. Any discussion of the BFO project, at this stage, would be speculative.

The management of PAF materials is further described in **Chapter 4**.

SECTION 9.7

Comment #470

ECNT are particularly concerned about the implications of increased activities at Bing Bong. The Draft appears to some extent to hide behind the shadow cast by XStrata's operations. However ECNT have already had to express dissatisfaction with the McArthur River Mine's management of impacts at the port. ECNT calls upon all parties to recognise this new proposal as another important opportunity to take a closer look at the mounting burdens being presented around Bing Bong, and to work towards improved understanding and management of those burdens.

Considerations and mitigation of cumulative marine impacts for the current proposal are outlined in Chapter 5 of the DEIS, and addressed again in **Comment #149** with respect to the proposed marine risk assessment and management and monitoring program.

This project will further investigate cumulative impacts of both the MRM expansion and WDRL's proposal, in order to ensure they are appropriately assessed and mitigated. This will be an integrated process driven by WDRL in partnership with MRM.

Any discussion of the BFO project at this stage would be speculative.

SECTION 9.7

Comment #471

As described above, ECNT are concerned as to the cumulative impacts of a likely subsequent expansion into the BFO resource. Although the description makes it clear that this project is headed towards a much larger BFO operation, which will be subject to further assessment, it is not at all clear what the loading configuration for BFO slurry may be, or if in fact this will have any component at Bing Bong. If indeed this is to present even further burden to Bing Bong, it would have been preferable to take this opportunity to begin to get a better picture of the cumulative impacts of two expanding mining operations at the port.

There is no certainty of the project progressing beyond this proposed DSO phase. There is known DSO resource below the current economically mineable DSO resource and there is a large BFO resource in and around the existing proposed mining areas. Future mining of these potential resources are far from 'near certain' as they will be dependent on commodity prices, costs of production and importantly the knowledge that the development and construction of a BFO plant to support the project will require a capital investment of approximately $1B, a figure that would be very hard to attract in what appears to be a protracted period of World economic uncertainty.

SECTION 9.8

Comment #673

Bushfires: Bushfires NT conduct Nationally Accredited courses - Basic Wildfire Awareness Course, and a Fire Fighter NT Course.

Noted.

SECTION 9.8

Comment #186

In dealing with the risk minimisation of bushfire to impact on people and infrastructure, the need to control fuel loads should be included. Any burning for mitigation purposes should be planned in accordance with advice from Bushfires NT and Bushfire Council regional committees, taking into account fire danger periods and fire ban days.

To minimise risk of bushfire impact on people and infrastructure fuel loads will be controlled, including appropriate burning off schedules, and developed in accordance with advice from Bushfires NT and Bushfire Council regional committees, taking into account fire danger periods and fire ban days. Any fire mitigation activities will be carried out in accordance with the *Bushfires Act 1980* and associated Regulations.

5.2.10 CHAPTER 10

No comments were received for this chapter.

5.2.11 CHAPTER 11

CHAPTER 11 OFFSETS

Comment #480

ECNT welcome the detailed emphasis on socio-cultural benefits of offsets, but the paucity of substance on environmental offsets is unacceptable.

The draft merely acknowledges that both federal and NT governments have offset requirements. ECNT call for carbon neutrality in any development or management proposal in the NT, in order to make a fair contribution to the NT's commitment to play our challenging responsibility to meet national carbon emissions reduction targets.

The proponent's lack of commitment to any target, let alone parity, is entirely unsatisfactory. ECNT calls upon WDR to offset 100% of their greenhouse gas burden.

The draft is similarly lacking in detail to address the requirement for biodiversity offsets. Again, it is regrettable that this proposal is being assessed in the absence of progress towards an identified need for government policy on stream diversions that includes guidelines for biodiversity offsets for this practice.

NT policy does describe the objective to "deliver real conservation benefits that exceed the magnitude of the development impacts", however the draft doesn't even recognise this vague objective, let alone describe any targets or actions.

Although government policy gives no further direction, other jurisdictions, such as the NSW Biodiversity Banking and Offsets Scheme ('BioBank') calculate the offset ratio at around ten-for-one (although in certain instances, the ratio has been as low as 4:1, and as high as 50:1) by applying an associated Assessment Methodology. The Federal Department ??? applies similar offset ratios for revegetation. The Environment Centre considers that this standard should be the absolute minimum for the NT.

Responding to previous proposals in this region, ECNT have recommended a 10:1 biodiversity offset. The proponent should be required to quantify the anticipated impact on habitat and other biodiversity values, and propose appropriate actions to attain an acceptable offset ratio.

Refer to response to **Comments #194 and #554 –to #557 in Sections 5.2.9. and 5.2.11**.

Carbon Neutrality and Offsets is a separate issue to Environmental Offsets and the recent introduction of the Carbon Tax has confused this issue as the tax is designed to offset certain aspects of carbon impacts. WDRL have investigated the use of natural gas as a less carbon intense fuel source, however the components of the project that could operate on this fuel source are minimal and the potential savings are far outweighed by the added cost of infrastructure to support this fuel source.

WDRL are also currently exploring their granted geothermal exploration tenements in the region.

CHAPTER 11 – OFFSETS

Comment #194

The DEIS presents a positive approach to addressing issues of Indigenous disadvantage through benefits the project will bring. The overall approach taken by WDRL is supported, however due to its emphasis on local community issues rather than the effect of the project on the biophysical environment, the proposed

offsets would be better suited to the Community Benefits Package (CBP) which the responsible Minister may request through provisions in the Mining Management Act.

The proponent therefore is requested to review its proposed environmental offsets provided to align their proposal with the draft NT Environmental Offset Policy. The proponent is encouraged to discuss its proposed offsets with the Department. The relevant contact is Dr Tony Griffiths, who may be contacted by telephone on 8995 5004. The policy may be accessed at:www.greeningnt.nt.gov.au/climate/environmental_offset.html

In summary: The focus on employment opportunities for local communities to assist addressing environmental impacts is recognised and encouraged.

The chapter focuses on people and has an employment centred approach. Whilst this is largely positive from a social perspective, further consideration will need to be given to environmental measures through the draft Offsets Policy.

The chapter outlines a range of ambitious and commendable actions in relation to maximising employment opportunities.

Whilst this direction is seen as positive, the actions which are not directly related to biophysical environmental issues are better suited to the CBP.

Due to considerations of additionality, items should not be duplicated between the CBP and environmental offsets

It is understood there may be additional actions being included in relation to native title negotiations. In order to understand the cumulative effect of three separate plans, duplication should be avoided and all plans shared so that the scope of total commitment, gaps and overlaps can be better understood; and

Actions related to social impacts should recognise the current broader Working Future policy and consider positive ways to interact with mutual outcomes. The chapter states that the package is designed to fulfil both the Australian Government's and Northern Territory Government's offset requirements but it does not provide details to substantiate the statement. Please discuss how offsets have been assessed against the Draft Policy Statement.

WDRL have identified an Offsets program that is more than commensurate with the magnitude of the projects potential impact and is consistent with the principles of ESD as it seeks to ensure that the health, diversity and productivity of the environment is maintained or enhanced.

The Environmental Assessment Act NT defines environment as: all aspects of the surroundings of man including the physical, biological, economic, cultural and social aspects.

The environmental and socio cultural offsets proposal (Chapter 11 of the DEIS) identifies that the Company proposes investment in the areas of governance, community rangers, social enterprise organisations, health, youth, education and training, and cultural maintenance. The authors of this section, being experts in this field and therefore extremely familiar with this subject may not have elaborated on the details of how these may operate and the intention is that the governing body of this arrangement would be the decision maker for the actual outcomes of what happens in this regard. Experience with Indigenous Community representatives, such as those that would make up this governing committee has identified that “Country” and “Caring for Country” is a standard component of any decision making process.

Many Indigenous People who maintain strong linkages to their country, especially where their country is a relatively intact cultural landscape, do not separate their wellbeing from that of their country and experience has demonstrated that a healthy and economically strong community allows for solid formal and informal Caring for Country via land management programs and simple land and resource management activities as a result of the ability to access country and undertake social and cultural maintenance pursuits.

Investment in all of the areas identified above are likely to have positive outcomes for ‘biodiversity conservation’ which often seems to be the single focus of those interested in ‘the environment’.

With the recent declaration of Limmen National Park, the proposed offsets program will assist with the training and provision of suitable land management staff to resource this remote National Park.

In order to increase efficiencies and ensure that the greatest value results from all 'compensation' programs, WDRL propose to manage all through this one governing body.

5.2.12 CHAPTER 12

No Comments were received for this chapter.

5.2.13 Appendices Comments

APPENDIX D

Comment #202

A reference is cited as follows:
The lower, more estuarine reaches of the Towns River were judged to be likely habitat for freshwater sawfish (Dave Wilson pers comm. 2010).

Please discuss the proximity of likely habitat for the freshwater sawfish in relation to the location of the mine.

Discuss potential for the mine to impact on sawfish habitat.

The DEIS states in Section 4.5.4 that freshwater sawfish may occur in the downstream habitats of the mine site and are likely to occur within several waterways that the haul road crosses. For these reasons, the freshwater sawfish was referred to the risk chapter of the DEIS which focused on managing water quality parameters (i.e. sedimentation, acid rock drainage, hydrocarbon spills etc.) to ensure minimal impact on the species. Refer to sections 9.2 and 9.3.2 of the DEIS for discussion on risk assessment and mitigation of risks.

Typical freshwater sawfish habitat was identified 20 km downstream of the mine site within the perennial sections of Towns River situated close to the Savannah Way crossing. However, the DEIS also states that little is known about breeding habits of sawfish and therefore we cannot confirm if sawfish would travel upstream to the mine site during the wet season. Onsite fish surveys did not detect the species.

APPENDIX K

Comment #689

There are only single drill holes identified for PAF assessment in Area F pit 4 and the western end of pit 3. Additionally Area F pit 1 and pit 2 have considerably less drill holes than Area E or the eastern end of Area F pit 3. This appears to be too few to give confidence in the PAF assessment. No justification is provided for the low number of drill holes used at these locations.

Refer to **Section 4.1.5** of Supplementary EIS Report.

APPENDIX K

Comment #203

Please provide details on the relevant guidelines or standards which were used to develop the Acid Mine Drainage Plan.

Potential acid forming minerals have been identified in the target resource and careful management of ores and waste rock is identified as a requirement to mitigate environmental effects. Development of a 'refined' block model and kinetic testing has been identified to better manage this risk. Continuous and detailed geochemical characterisation of waste/ore material is recommended in the Appendix as a means to inform on-going management of this issue.

Given the limited number of drill cores and samples analysed for sulfide, discuss the availability of opportunities prior to operational activity to get improved definition of the spatial distribution and reactivity of the PAF material in those areas to be mined.

It is not clear how many samples were taken from the location of proposed pit 4 or what testing of those samples indicated. Given that this pit is proposed for use as a water storage (PWS) discuss the potential for acidification of this pit and propose mitigation measures that can be implemented both during the mining campaign and over the longer term.

Refer to **Sections 4.1.5 and 4.1.6** of Supplementary EIS Report.

APPENDIX L

Comment #690

Table 3.1 is difficult to understand and assess without further explanation.

As stated earlier, turbidity associated with dissolved colloidal material has not been addressed.

The purpose of the table is to indicate the spacing at which check dams will be placed along the edge of the road formation depending upon the longitudinal slope of the existing surface.

Colloidal suspension is normally treated by causing flocculation which is outlined in section 3.3.6 of the DEIS appendix; "…Artificial flocculation will be applied on retained runoff to assist in the settling process….."

Also see response to **Comment #641.**

APPENDIX L

Comment #204

The Catchment Plan for Haul Road Package N0 2 (Drawing N003) should include the road and sub-catchment boundaries.

See image below.

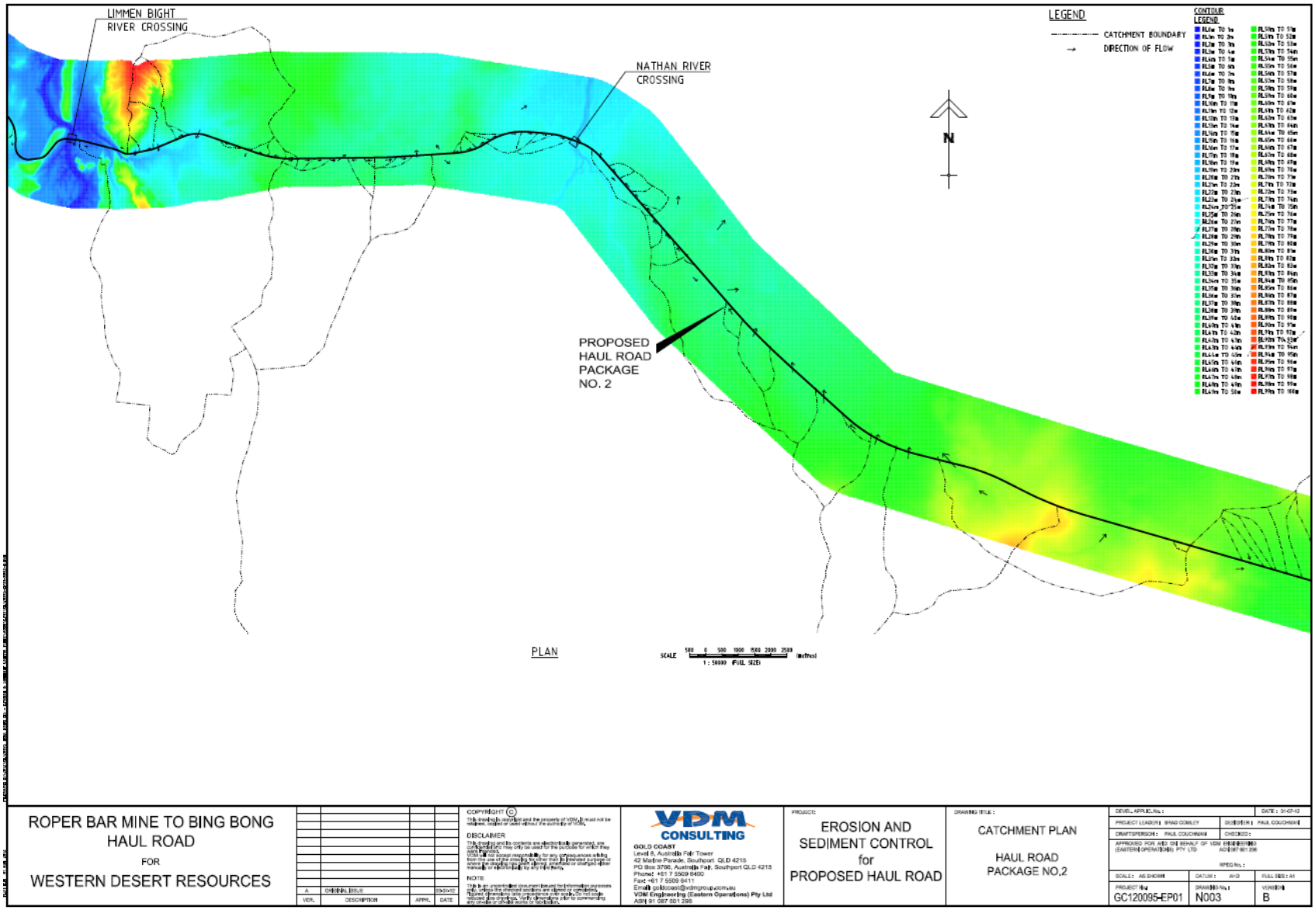


Figure 5-10: Haul Road Catchment Plan (No2)

APPENDIX N2

Comment #691

3.2 Design Standard

Design allows for a 20 year ARI and is considered by the author to be commensurate of the life of the mine

Phase 1 is targeting DSO and expected to have a life of 8 - 10 years. This does not consider the possible continuation to target BFO in later years, Therefore designs should allow for at least a 100 year ARI.

Refer to **Section 4.2**.

APPENDIX N2

Comment #692

5.3 Estimated Downstream Volume Changes – First Fill of Pit Void

There are concerns about downstream volume changes and water quality.

The data provided in Table 9 gives the impression that the pit will refill with a flood. Those wet seasons that begin with lighter rainfall will result in much greater times to fill the pit and hence provide connectivity up and down stream. This should be reflected in the report.

How has the proponent concluded that water quality will not be impacted by the inclusion of the pit in the flow path of the Towns River? Oxidised PAF, groundwater influx, evapo-concentration and sediments and contaminants from the pit excavation may impact on water quality, at least in the short term.

There are no pools or water bodies remaining upstream post flows of the pit 3 area in the current stream. Therefore fish and other species that would be transiting the pit would only be doing so during periods when the pit is completely full. When full, the pit will have shallow edges as the pit bunds will be pushed in and the first benches will therefore have their steep sides removed. This plan is identified as creating a more natural type system that does not exclude animals form the pit edges and does not create the safety issues associated with a steep walled pit.

Also See **Section 4.2.3** above.

APPENDIX N2

Comment #693

Option C Design

There is concern that aquatic species reliant on shelter and shallow water will find the deep, vegetated pit void a barrier Have surveys identified species present that would find the pit void a barrier?

There are no pools or water bodies remaining upstream post flows of the pit 3 area in the current stream. Therefore fish and other species that would be transiting the pit would only be doing so during periods when the pit is completely full. When full, the pit will have shallow edges as the pit bunds will be pushed in and the first benches will therefore have their steep sides removed. This plan is identified as creating a more natural type system that does not exclude animals form the pit edges and does not create the safety issues associated with a steep walled pit.

APPENDIX N

Comment #206

The sub-appendix E - Geotechnical investigation - is also incomplete and has undertaken test-pitting on an alignment that is no longer proposed. This is important to establish the erodibility or otherwise of the proposed/preferred diversion channel.

Include the results of relevant test pit studies in the Supplement.

The sinuosity of the designed channel is indicated to be similar to the existing channel sinuosity, however, the diagrammatic representation of the engineered channel appears to contain lengthy straight stretches. Account for this apparent discrepancy and discuss the potential impacts that could arise from a lack of sinuosity. The sinuosity of the designed channel is indicated to be similar to the existing channel sinuosity, however, the diagrammatic representation of the engineered channel appears to contain lengthy straight stretches. Account for this apparent discrepancy and discuss the potential impacts that could arise from a lack of sinuosity.

See **Section 4.2.6** above.

APPENDIX N

Comment #205

Discuss how pit 4 Area F (Pit Water Store - PWS) will be developed and incorporated into the overall water management of the site. Also discuss how this pit will accrue (pit sumps, pit seepage, pit runoff as schematically depicted at Figure 2-23) and hold water. Likewise discuss how water would then be transferred from this PWS (other than schematically) to the RWD as proposed at 2.9.3 - Mining Operations. Given the potential water deficit at the mine site, especially groundwater, discuss the option to harvest run-off overflow from the Towns River to the PWS.

Clarify whether this pit is to be back-filled at the point of site rehabilitation or connected to the hydrologic regime of the river.

The location of the RWD should be indicated on a map overlay and an explanation provided as to how stormwater will be transferred from sedimentation basins to the RWD.

Pit 3 is proposed to be mined out in the first year Dry season campaign and then incorporated into the Towns River flow path as Option C discussed at Section 5.0. Although a number of drawings are provided at sub-appendix D to Appendix N, detail is lacking on how the outflow from the proposed Pit 3 Area F will articulate into the proposed Towns River diversion channel. Currently there does not appear to be any detail regarding the inlet to the Area F Pit 3 from the upper section of the Towns River.

This should be provided in the Supplement.

In addition discuss how the bunds established around Pit 3 during its resource extraction will be subsequently managed to bring the pit into play as part of the river diversion. An improved graphical display of this proposal and further commentary should be provided to assist in visualising and assessing this proposal.

Option C would result in two significant pit water bodies being established at the mine site, one of some 0.9GL capacity and some 45m depth (87m X 645m) and the other of 4.4GL capacity (dimensions?) and a similar depth. This would change the regional water resource context in terms of permanent surface water and significant habitat for aquatic species. A description of the existing billabongs, ox-bow lakes or similar and their permanency or otherwise should be provided as context as to how this option would change the regional setting and possible (aquatic) biodiversity impacts. Some of this information is provided at Appendix D Section 4.6 Table 13 as part of the fish survey.

The proposed Area F pit 3 will fill and spill quickly during wet years and major flood events. In a below average rainfall year with lower stream flows and following high evaporation during the preceding Dry season, provide an explanation of how low flows in subsequent years would carry through from upper reaches to downstream reaches of the Towns River if the pit is buffering these flows, and any consequential ecological impacts from such delays.

The risk assessment does not appear to address the possibility of lower or delayed flows as a result of Area F pit 3 buffering Towns River flows in drier-than-average wet seasons. This could impact downstream vegetation communities and the persistence of dry season pools. This risk should be considered and the consequences discussed.

Pit 4 will be constructed during the dry season with the aim to create a storage facility for mine waters (influx and rain falling into the remainder of the pits, storm water captured at the plant, etc.).

As such bunds will extend to above the 100-year flood level to maintain maximum capacity to retain all excess mine waters for re-use.

Owing to the low hydraulic characteristics of the surrounding aquifer, the pit is likely to receive ground water influx over many years until the water level reaches the pre-mining ground water level at around 13.8m below ground level. At this level Pit 4 has a capacity to store an additional 358,800m^3 of water.

The deficit, around 0.5 million m^3 is a result of the large estimated requirements for evaporation and dust suppression. The water requirements for dust suppression can be tailored to meet availability.

Water is to be pumped from a pump in Pit 4 to the Raw Water Dam (RWD) at the plant. The RWD and Sedimentation Ponds are also to be equipped with pumps to return water to Pit 4 should the need arises. The RWD is to be equipped with a sump and pump to pump water to the spray systems for dust suppression.

The primary rationale for water consumption is:

- Fit for purpose, i.e. clean water should not be used where dirty water will suffice; and
- At plant closed circuits: use dirtiest water where possible first.

A pump and pipe will be installed at Pit 4 for trucks to collect water for dust suppression.

Harvesting of runoff/flood waters may be considered in due course but at the onset maximum storage and freeboard is to be maintained in Pit 4 to store all mine waters as WDRL has a zero discharge policy.

Pit 4 will not be backfilled. There is no direct benefit to connect directly to Pit 3. At closure the pit will have a high level inflow which will allow maintaining the pit water level well above the ground water level to minimize the likelihood for salinization and acidification.

The bunds around Pit 3 will be pushed into the pit effectively decreasing the angle of repose from 55^o to 43^o. Inlet and outlet structures are to be provided to direct low level flows into and out of the pit. This will essentially return the area to a topography that resembles pre-mining but with a large pit lake.

Option C does not result in two significant water bodies.

Also see **Section 4.2.1** above.

There are no similar natural waterbodies in the project area or middle reaches. The creation of a deep, permanent water body will provide additional habitat for aquatic species and if anything augment biodiversity in this section of the catchment.

The impact of delayed flows to the lower reaches of the river is more difficult. Given the current lack of large permanent waterholes in the middle and upper catchment, it is unlikely to be an important place for migratory species (eg barramundi, tarpon). In which case delayed flows are unlikely to have much of an impact on the

river in its present biological state. In any case, the flow regimes of Yumanji and Magaranyi Creeks will be unaffected and continue to deliver water to the lower reaches of the catchment. Each of these creeks have a larger catchment area than the Towns River.

APPENDIX P

Comment #694

2.3.2 Rehabilitation Zones

If Pit F West is planned to be the first site rehabilitated and closed out, engineered designs must be provided prior to commencing any mining.

Infill of first available pit - The EIS states that some pits will be backfilled, however it gives no indication on which pit. Mine planning needs to identify which pits are candidates to be backfilled and which of these candidates are likely to be backfilled.

Pit F West, as it was previously called is no longer intended to be rehabilitated first as it will now be utilized as the stream channel. Therefore a level of planning and design works have identified how the pit will be made suitable for that activity.

If the project evolves beyond the current known DSO resource then all potential options for backfilling will be explored. For the current project, as Iron Ore is a bulk commodity, a large volume of ore is removed and as the project development has been further refined it has been identified that there is insufficient material to infill the pits, especially since waste material is required to construct ROM pad and internal roads and infrastructure and development of separate gravel pits for this material would be a further and unwanted disturbance.

Also refer to **Section 4.1.7** of the Supplementary EIS Report.

APPENDIX P

Comment #695

2.3.3 Rehabilitation Methods

Backfilled Pits: Further detail is required on the backfill methodology, including but not limited to;

1. The use of reactive material in the backfill,

2. Encapsulation of reactive material,

3. Volumes of PAF and NAF material to be used and,

4. Sources of top up material (i.e. material to replace ore and other materials removed for construction or other purposes)

Further Rehabilitation Approaches: Constructed landforms should be sited away from natural drains/gullies/ valleys/creeks etc. to avoid directing water through the landform.

Also see response to **Comment #694**.

Some of the issued that have been identified during the project development refinements during 2012 include the lack of availability for a pit to immediately store PAF material and therefore the need to store it on surface. Best practice management would therefore suggest that a well-designed and permanent facility be constructed for this purpose. Additionally, there is insufficient material to allow for the complete infill of pits

which adds complications to the planning and viability of in pit PAF storage. Actual studies of in situ conditions, particularly associated with groundwater, would be required to provide the level of knowledge required to safely design and operate in pit storage and covers, as opposed to the more conventional waste rock dump encapsulation method.

Also refer to **Section 4.1.7** and Section See **Section 4.2.5** above.

APPENDIX P

Comment #696

2.3.3 – Rehabilitation Methods

Waste Rock Dumps (WRD) - There is a lack of critical information regarding the construction of the waste rock dumps.

Issues that need to be addressed:

1. WRDs need proper designs. These need to be developed prior to mining to ensure that suitable materials are available for construction;

2. Designs must meet closure objectives. What are the closure objectives for the WRD?

3. Designs must also take into account the climate and surrounding landscape. Justification is required on how the final design takes this information into account. I. e. how is proposed design suitable for climate? What is justification for 30m height and 2:1 slopes?

4. Alternative designs need to be presented and justification provided as to why they are inappropriate; and

5. QAIQC for the construction of the WRD to ensure that it is built as designed.

Regarding the bunding at the top of the dump - Further detail is required on how the top of the dump is constructed to prevent ponding and infiltration from water captured by the bunds Alternatives such as water shedding designs should be discussed

The Waste Rock Dumps will be battered to 20 degrees at closure (not 2:1 slopes). WDR designs have been presented in **Comment #113**. More detailed designs will be produced for the MMP.

Designs of waste rock dumps were based on keeping them generally consistent with the surrounding topography and to minimise the clearing footprint. All other designs that were considered were deemed to be excessive in size and had potential to encroach on natural erosion channels and floodplains.

The designs of waste rock dumps (WRD) took cognisance of the surrounding topography and relief comprising low ridges up to 30m above a relatively flat terrain whilst minimizing the clearing requirements for their footprints. The WRD will be constructed on pads to be at least 0.6m above the 100-year flood line at 23.3mAHD and their sides are to be battered to 20 degrees at closure. Specifically:

- Area E-East WRD will be blended with the northern flanks of a ridge. Final countering and capping will aim to duplicate the slope to the south, south-western flank of the ridge. Revegetation in well-designed windrows will aim to cover the entire exposed area.

- Area F East WRD is at the eastern end of a ridge and will be blended with the topographical features of the area with the south-eastern slopes of the dump to be blended with the undulated topography of this site.

- Area F West WRD will also be blended with the hilly area to the south-west.

APPENDIX P

Comment #697

2.4.3 - Monitoring and Maintenance

Western Desert Resources will need to develop and implement an appropriate monitoring and maintenance plan to ensure that the waste rock dumps are performing as per design.

Refer to **Section 4.1.8** of the Supplementary EIS Report.

APPENDIX P

Comment #207

Reinstatement of the Towns River channel including backfilling of Area F pit 3 should be considered as an option for mine closure.

Also see response to **Comment #694**.

Also refer to **Section 4.1.7** of the Supplementary EIS Report.

If the project evolves beyond the current known DSO resource then all options will be explored. For the current project, as Iron Ore is a bulk commodity, a large volume of ore is removed and there is insufficient material to infill the pits, especially since waste material is required to construct ROM pad and internal roads and infrastructure and development of separate gravel pits for this material would be a further and unwanted disturbance.

To construct a channel within an in filled pit would offer a significant engineering risk, which adds significant environmental risk to such an endeavour.

APPENDIX R

Comment #208

This plan lacks important elements. There is no indication of where the RWD is to be established, how water will be transferred from sedimentation basins (five depicted in Appendix L) and from pit 4 Area F, nor how water from the RWD will be cycled to the process plant. Given that a preliminary water balance for the site indicates an annual net water deficit and that further groundwater resources are yet to be identified to redress this deficit, a more transparent water budget and how it will be managed should be presented.

See response to **Comment #205**.

APPENDIX T

Comment #698

Draft Haul Road and Traffic Management Plan

Has Western Desert Resources considered minimising the risk to native (and introduced) fauna with the increase in traffic? Have wildlife crossings been considered at selected points along the haul road in addition to the bridges and culverts required for creek crossings. Box culverts, large arch culverts, wildlife over crossings and fencing can all contribute to encouraging wildlife to cross points reducing the risk of road kill. Traditional Owners may be able to provide specific input into where these animals' crossings could be placed.

In considering the haul road route consideration was given to the habitat types that were intersected. Partly this was to ensure that rock pile habitats-known high species diversity hotspots including some threatened species- were avoided. Also, it should be noted, that that in areas where the haul road interferes with surface water drainage to ephemeral wetlands culverts will also be installed.

Discussions have taken place with NRETAS specifically around the topic of wildlife crossings and, importantly where they could meaningfully be located. It was decided that besides those culverts discussed above any wildlife corridors in this contiguous habitat would contribute as there are no 'fauna pathways' as such. What was decided in these discussions, however, was to attempt to reduce the 'attractiveness 'of the haul road easement to native fauna particularly large herbivores. Wallabies are often attracted to roadsides for green pick, by reducing the verge grass this will reduce the road kill.

5.2.14 General Comments

GENERAL COMMENT

Comment #699

The naming of the pits throughout the document is inconsistent. Is it F West Pit or F Pit 3?

Noted.

GENERAL COMMENT

Comment #700

This EIS only considers aspects proposed in the "DSO" phase. The proponent indicates that the backfilling of pits may be delayed or not undertaken to prevent resource sterilisation and there appears to be an undertone of certainty that following phases will target "BFO" and will require beneficiation.

Any activities targeting BFO are likely to mine deeper, encounter additional PAF material and produce more waste rock. This along with the processing of BFO and the transportation of an extremely fine product will create significantly more environmental impacts than the currently proposed phase.

With the expansion into processing the BFO a near certainty, provide justification on the layout of the site and discuss the modifications that may be required to minimise impacts prior to mining the BFO reserves.

There is no certainty of the project progressing beyond this proposed DSO phase. There is known DSO resource below the current economically mineable DSO resource and there is a large BFO resource in and around the existing proposed mining areas. Future mining of these potential resources are far from 'near certain' as they will be dependent on commodity prices, costs of production and importantly the knowledge that the development and construction of a BFO plant to support the project will require a capital investment of approximately $1B, a figure that would be very hard to attract in what appears to be a protracted period of World economic uncertainty.

Notwithstanding the site infrastructure has been proposed on areas that are sterile of ore reserves.

GENERAL COMMENT

Comment #210

We are seriously and emphatically opposed to this short-term venture. An EIS for the WDR Roper Bar Ore Project should seriously consider the ecological sustainability of having this mine. Large-scale, short-term

mining ventures such as this are wars against the environment. Military words such as 'sustainment' and 'collateral damage' apply rather than 'sustainability'. The proposal for a long distance private road in itself will have an extremely significant detrimental effect on the pristine environment of a national park and beyond. To approve this, The NT Government will disregard the future health of the people and environment of the Northern Territory for generations to come.

As another long-term resident of the NT said to us recently, 'Why do these mines have to be dug up this year rather than leaving something for the future? If there are not enough people here to service these mines or NT communities, we should wait until we have the people - by natural process - not by Fly-in, Fly-out. This is madness!'

We agree. We are equally seriously concerned for the health of our environment. The narrow form of economic growth entailed in this mining venture is NOT ecologically sustainable. Any amount of mouthing words like 'sustainable mining' will not change the fact that haul roads, pits and waterway diversions will have a permanent destructive impact that will significantly alter the natural landscape forever.

We should have leaders who care - not who are greedy for capital gain over social/cultural and environmental integrity. Without this integrity, we lose our sense of place and respect for beauty and healthy, peaceful amenity. We become machines, not human beings.

We accept philosophical opposition to this project however must clarify that the local Indigenous Communities are in desperate need of economic opportunities and WDRL have committed to employing as many local people as possible on a local scale fly in fly out basis rather than seek staff from interstate. The employment and royalties and social offsets are aimed at actually enhancing the social (and indirectly the cultural) integrity of the region whilst minimising the environmental impact to as low as is reasonably practical. Our ongoing Indigenous community consultations have provided regular and popular feedback that emphatically states that this project is needed for this region now and not sometime in the future.

6 Errata

This section identifies any minor errors found within the DEIS.

- *….the MLA areas fall within the boundary of the recently declared Limmen National Park* With the final boundaries of the NP now declared, this is in error.
- Appendix D-10 Table 10-11 Title should read: Riparian Vegetation Assessment – Nathan River Crossing.
- Witheridge (2002). This document was incorrectly referenced, it should be: Fairfull, S & Witheridge, G 2003, *Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings*, NSW Fisheries, Cronulla.

7 Commitments

- WDRL commit to establish bore monitoring and vegetation condition monitoring around the billabongs immediately to the north of Area F pits 1 and 2;
- WDRL commits to sampling remnant pools in the Towns River on a quarterly basis during the dry season and where possible, sampling of first flush events;
- WDRL commit to developing detailed Waste Rock Dump designs for the MMP;
- Final Biting Insect Report to be produced January 2013 once baseline study has been completed;
- WDRL will survey along the final haul road route, on suitable substrate, the Thorny Solanum (*Solanum carduiforme*). The location of the haul road will be modified according to the outcomes of this survey. As the area is poorly surveyed all data on the occurrence of this species (including GPS location and habitat) will be sent to NRETAS;
- Western Desert Resources will commit to comprehensive surveys within the saddle vegetation communities if the haul road route is in this vicinity. This will aim to determine presence and likelihood of threated fauna, and will also provide a better insight into the biodiversity value of this particular crossing.
- WDRL commits to developing a Marine Risk Assessment, Management and Monitoring Plan incorporating the outcomes from an expert panel workshop and integrating into MRM's existing monitoring program;
- WDRL commits to management of trespassing on the private road;
- Fuel load of road side (in the dry season) will be kept to a minimum as part of the grass cutting regime;
- WDRL commit to completion of a survey of water pathways and catchment extent to define whether special containment structures need to be erected before the removal of spilled materials;
- WDRL commits to ensuring that no weed prone species will be used in any amenity planting at the mining camp;
- WDRL commits to ensuring that no soils will be imported to site, including soil for seedlings propagated for revegetation purposes;
- WDRL commit to utilise stored top soil within 2 years of disturbance where practicable;
- WDRL commit to ensuring that any future management of the airstrip post mining will be discussed with the NT Government;
- WDRL commits to undertake assessments of toxicity and potential impacts on human health as part of the proposed field kinetic tests;
- WDRL have developed and committed to ongoing consultation and social impact studies to study the social impact rather than delivering a desktop pre development study;
- WDRL commits to providing for fish passage within waterways identified as being critical for fish passage and to design waterway crossings in accordance with the general principles as contained in the documents *Culvert Fishway Planning and Design Guidelines* (Kapitzke 2010) and *Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings* (Fairfull & Witheridge 2003) during construction. WDRL will monitor, prior to the start of each wet season, the

integrity of the culvert installation to ensure that there are no impediments to fish passage such as washed out bases.

- Dust mitigation commitments:
  - WDRL commits to dust suppression measures specific to coastal and maritime operations as specified in Chapter 5 of the Draft EIS;
  - WDRL commit to contributions toward Xstrata's existing dust monitoring program at Bing Bong Port, including monetary contributions and personnel as required;
  - WDRL commit to employing stringent dust control measures to minimise the impact of its operations on the surrounding environment. This will include but is not limited to appropriate training for all personnel during site inductions;
  - WDRL commit to undertake baseline surveys of air quality at the mine site and mine camp using dust deposition gauges during the dry season, 2012 in order to provide a baseline against which expected and actual dust nuisance can be measured against;
  - WDRL also commit to undertaking ongoing dust monitoring to monitor dust generation for the life of the mine; and
  - Further to this, WDRL makes the commitment to continuously work towards reducing the fugitive dust emissions at Bing Bong and if it is deemed necessary, WDRL will develop a Dust Management Plan.
- Western Desert Resources will commit to conducting environmental monitoring programs to ensure that the re-alignment channel is properly stabilised prior to each Wet season, and to ensure that appropriate flora species become established on the banks of the channel. These commitments will be made in the SEIS. Proposed monitoring programs include:
  - Photo point monitoring
  - Revegetation monitoring
  - Surface water monitoring
  - Macro-invertebrate monitoring

8 Definitions & Acronyms

AFANT	Amateur Fisherman's Association of the NT
AHD	Australian Height Datum
AMD	Acid Mine/Metalliferous Drainage
DEIS	Draft Environmental Impact Statement
DLP	Department of Lands and Planning
DoR	Department of Resources
ECNT	Environment Centre NT
MMP	Mining Management Plan
NAF	Non-acid Forming
NLC	Northern Land Council
NRETAS	Department of Natural Resources, Environment, the Arts and Sport
OGV	Ocean Going Vessel
PAF	Potentially Acid Forming
PWS	Pit Water Storage
ROM	Run of Mine
SEIS	Supplementary Environmental Impact Statement
WRD	Waste Rock Dump

9 References

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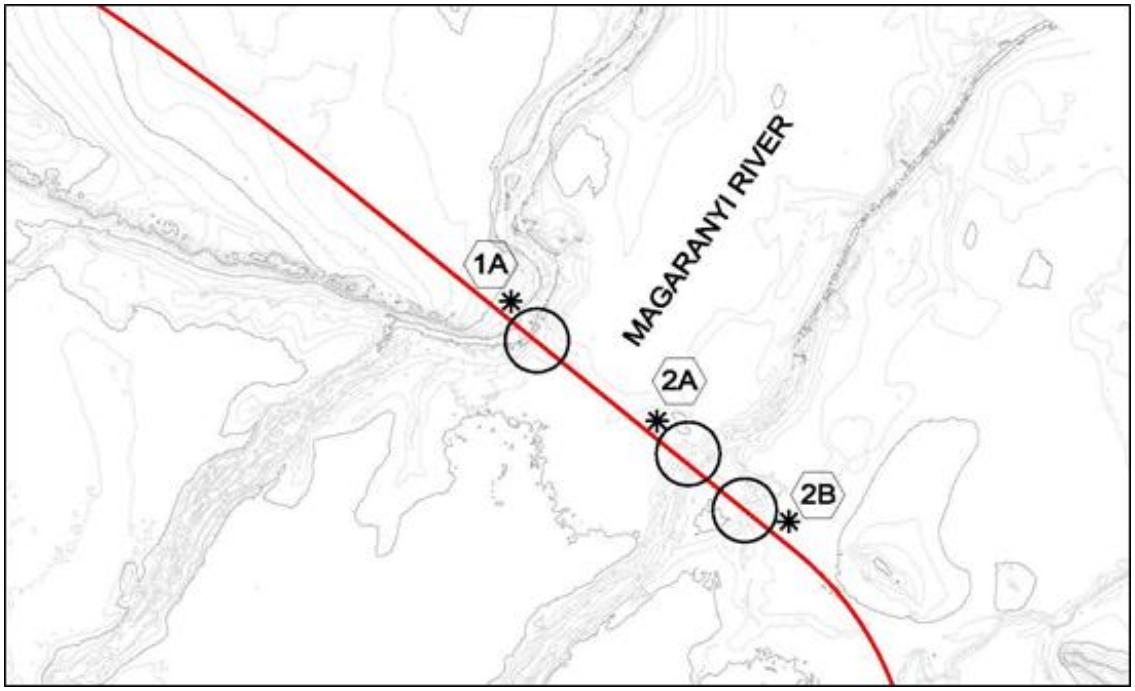
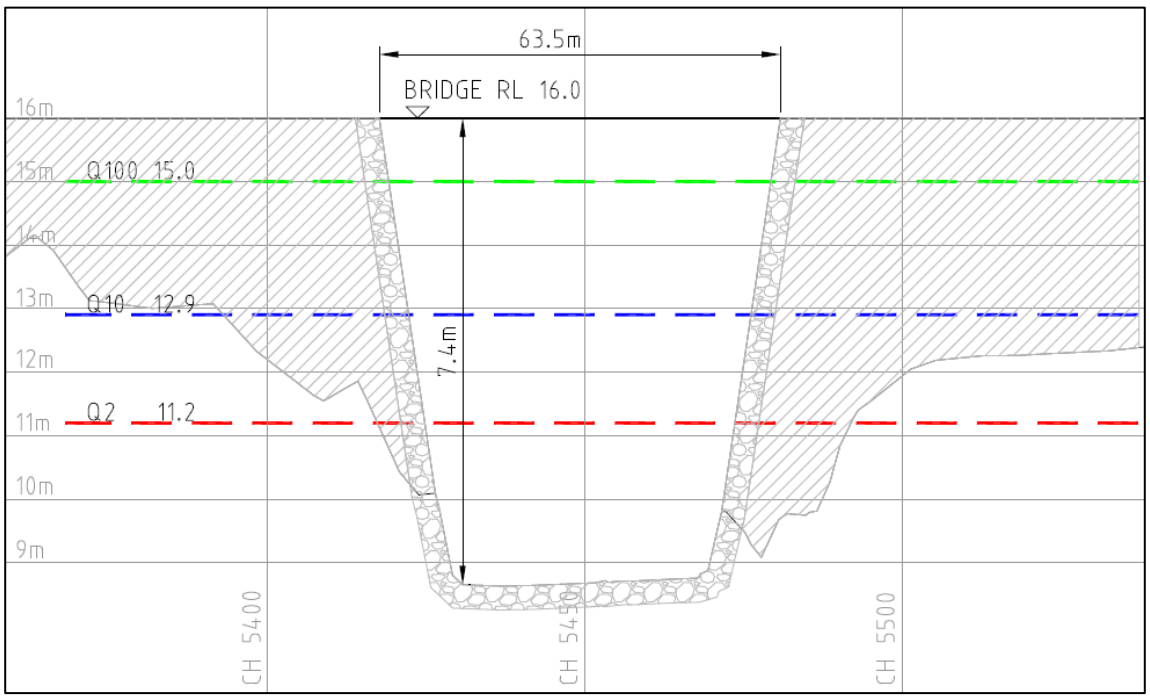
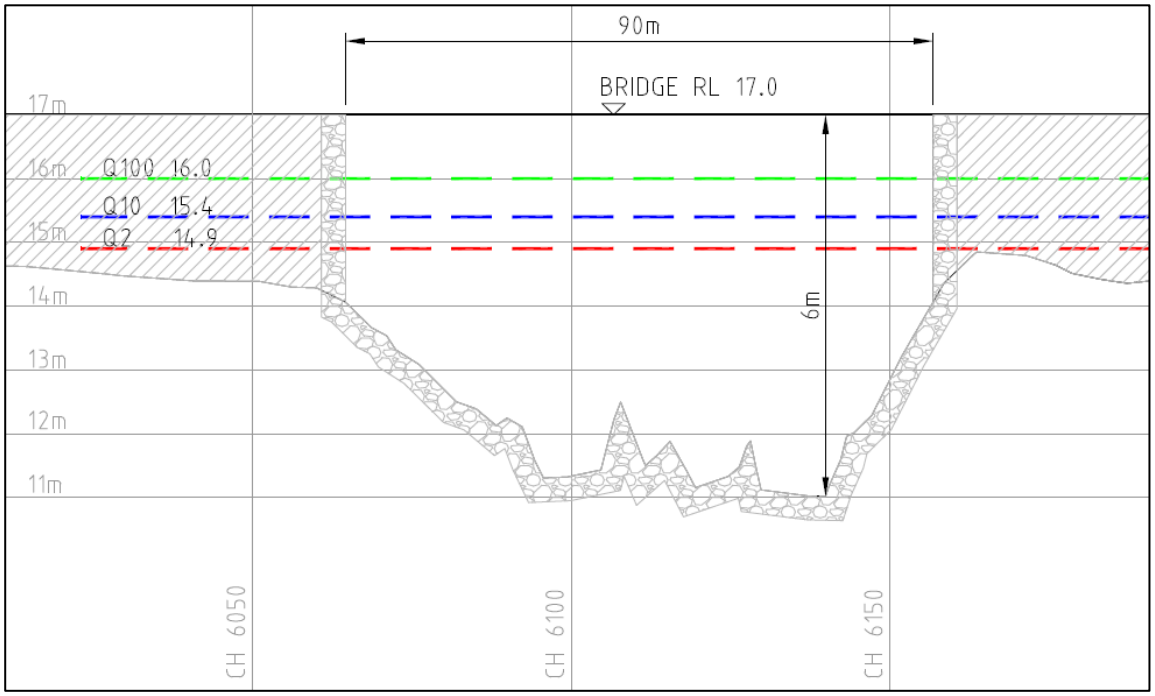
ATTACHMENT A – FIGURES from Chapter 2



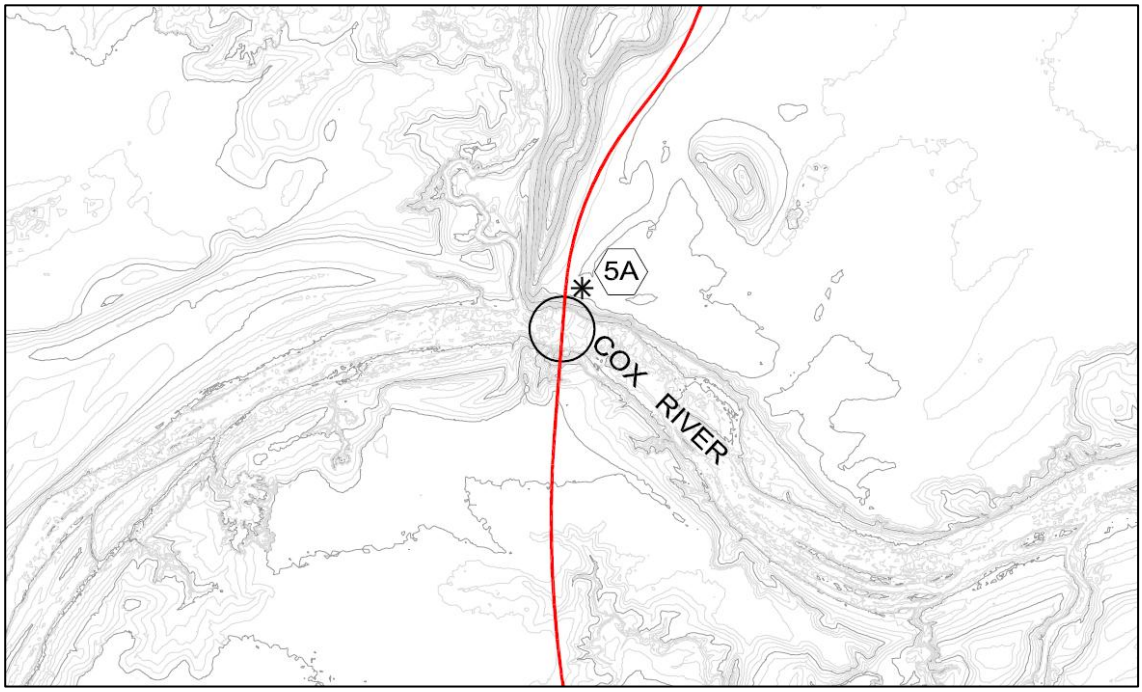
Magaranyi River Crossing Location at Reference Point 1A & 2A



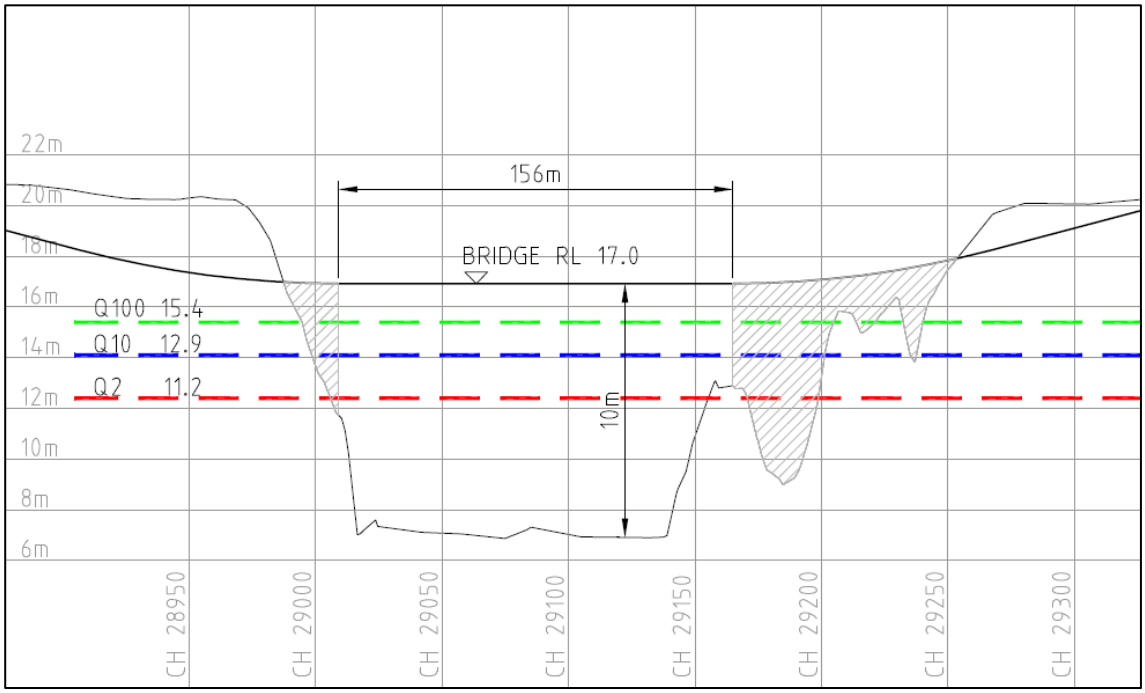
Magaranyi River Crossing Cross Section At Reference Point 1A



Magaranyi River Crossing Cross Section At Reference Point 2A



Cox River Crossing Location at Reference Point 5A



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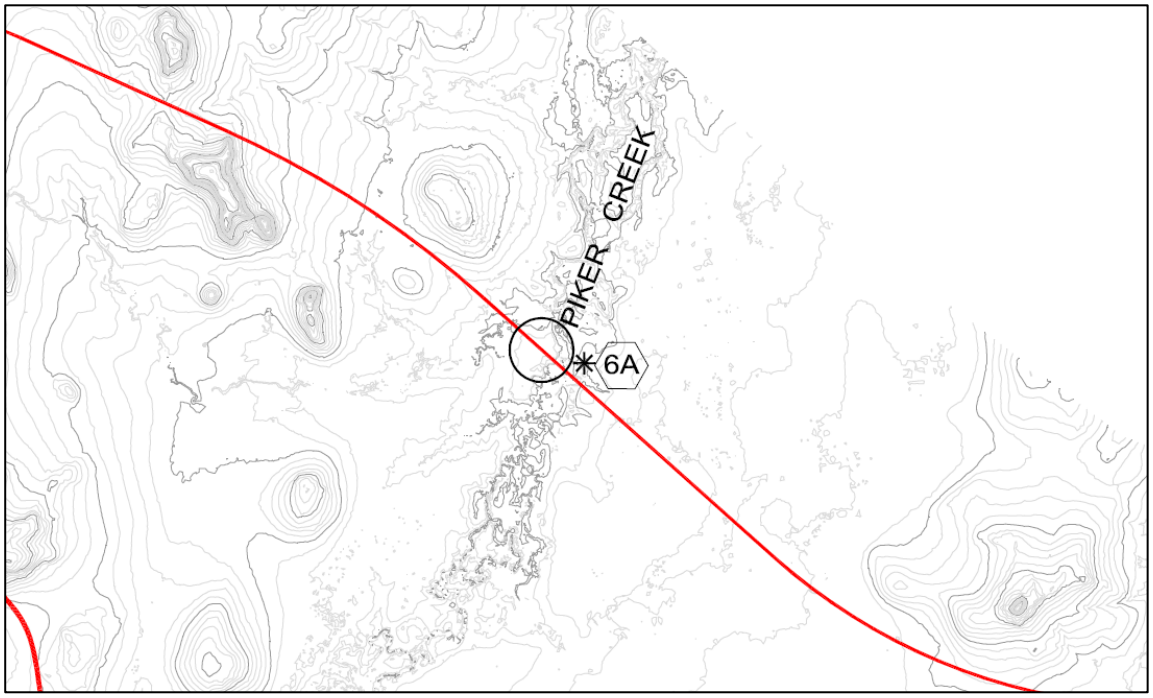
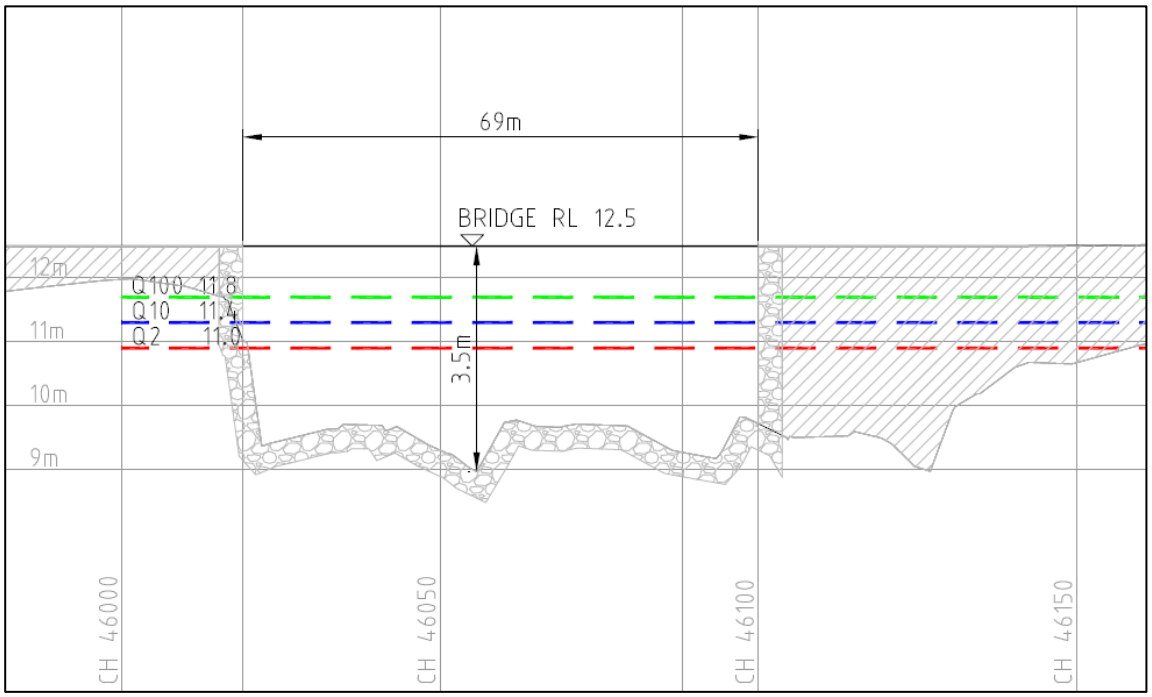
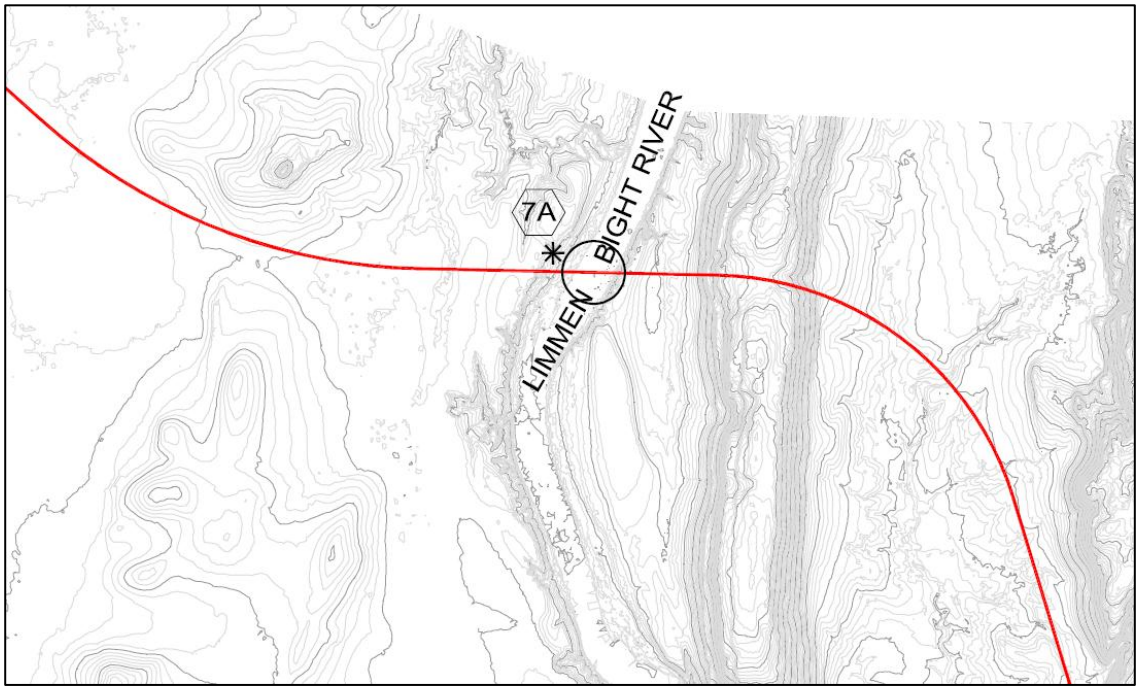


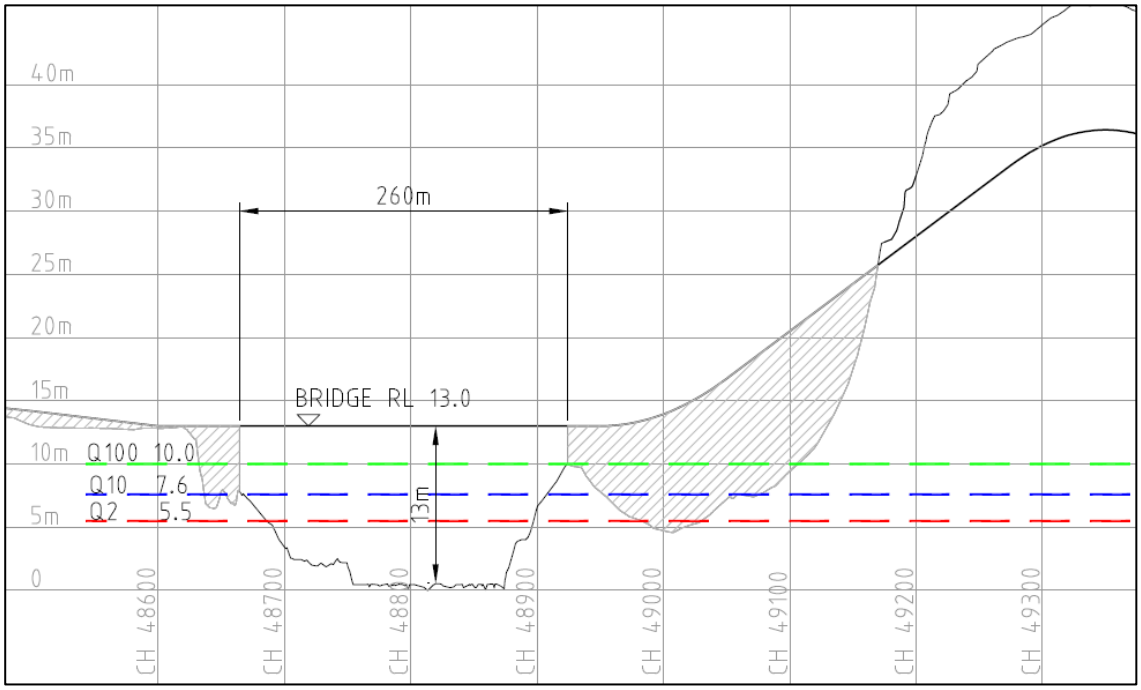
Piker Creek Crossing Location at Reference Point 6A



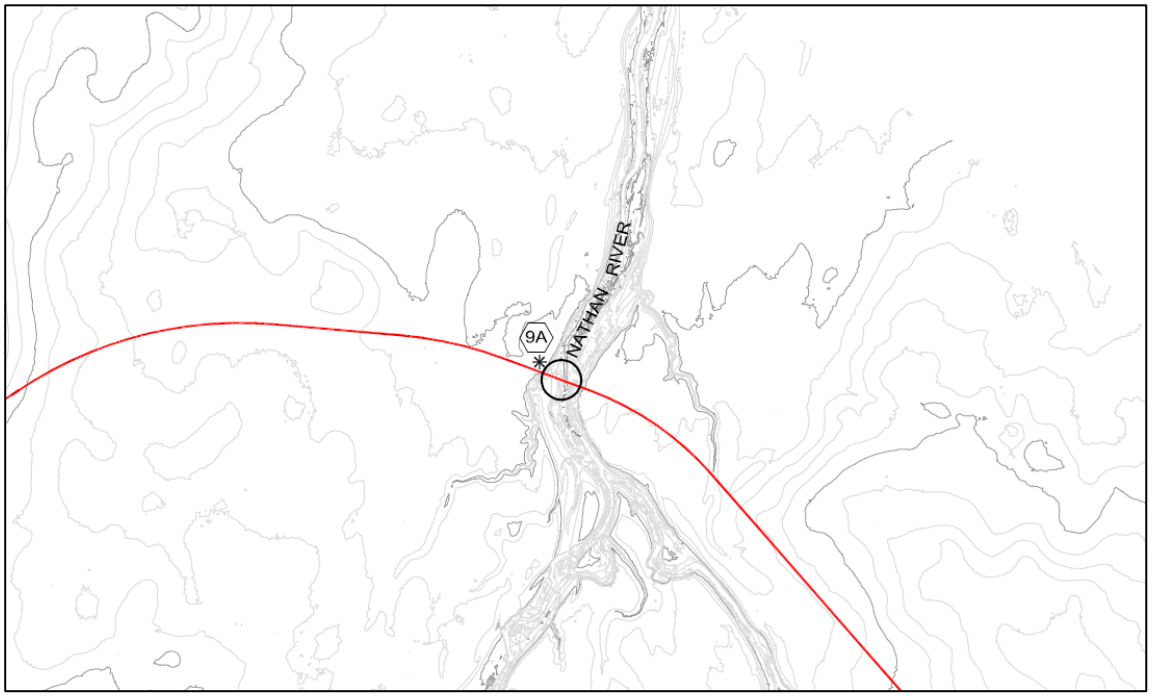
Piker Creek Crossing Cross Section at Reference Point 6A



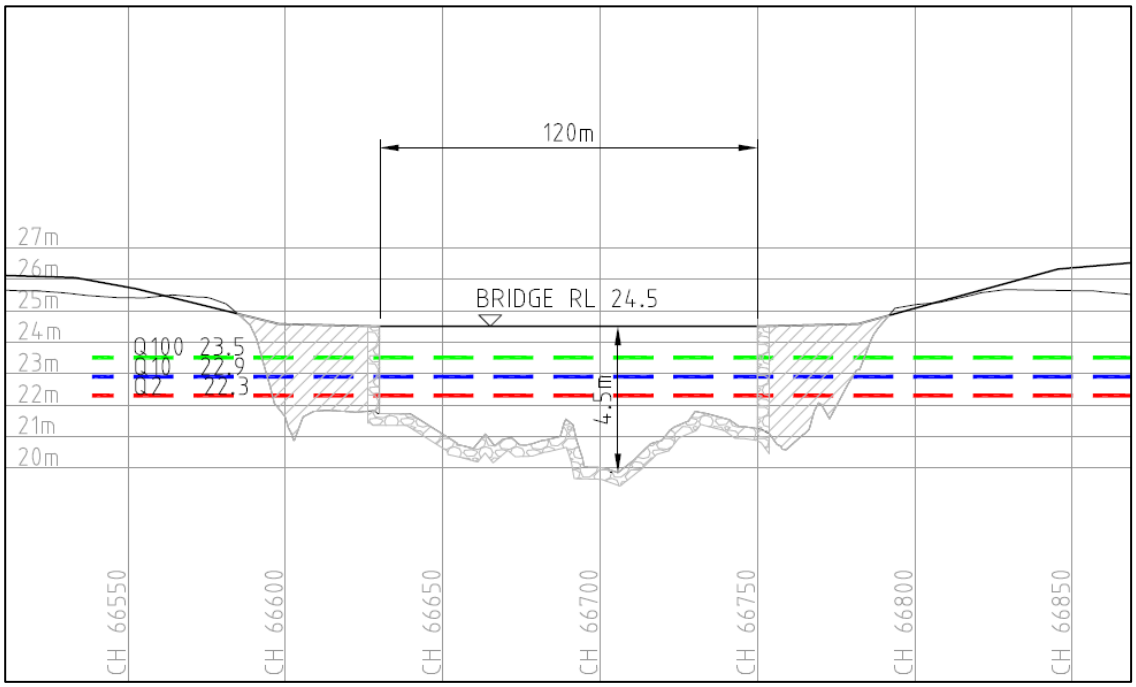
Limmen Bight River Crossing Location at Reference Point 7A



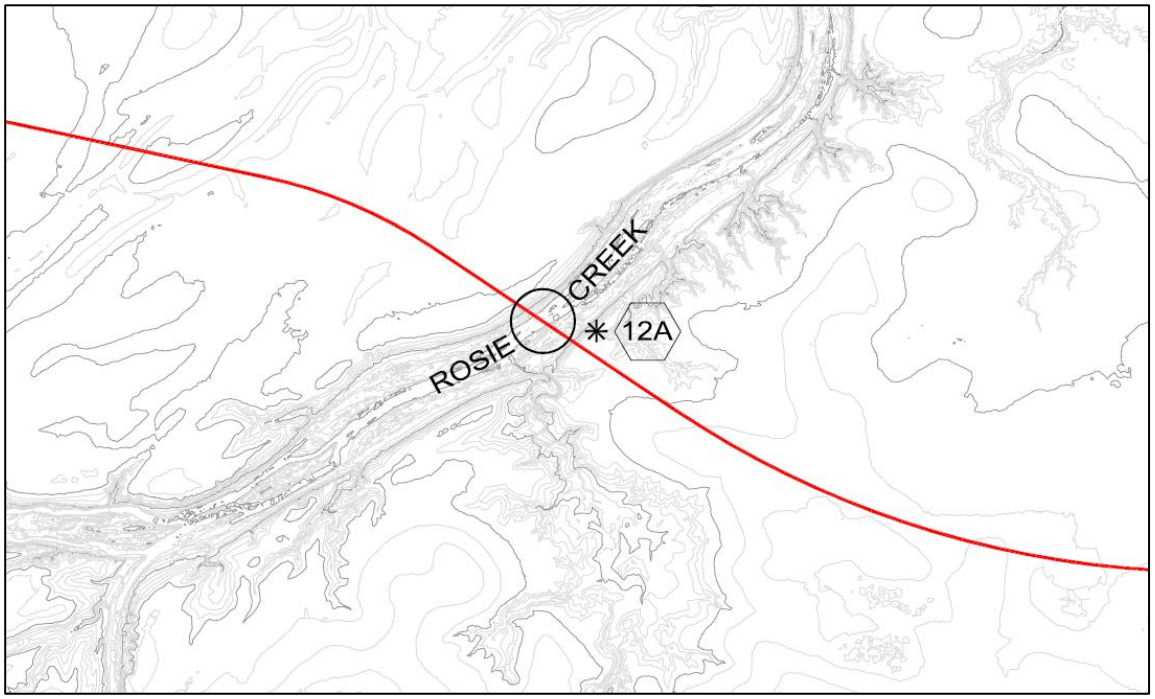
Limmen Bight Crossing Cross Section At Reference Point 7A



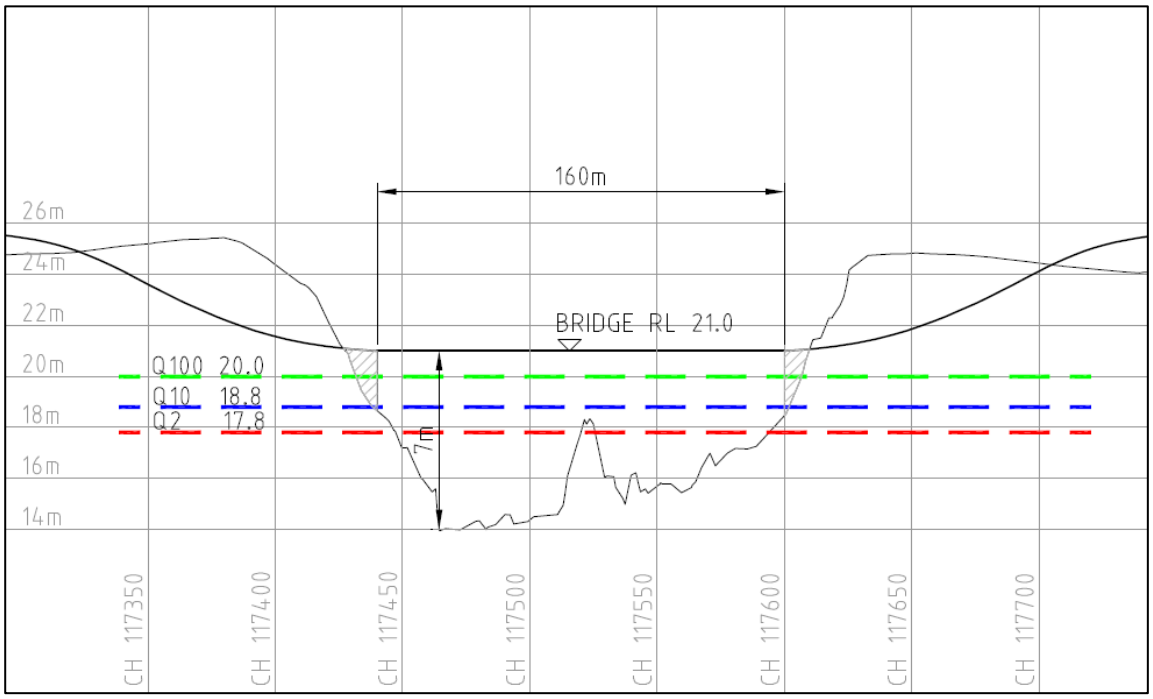
Nathan River Crossing Location at Reference Point 9A



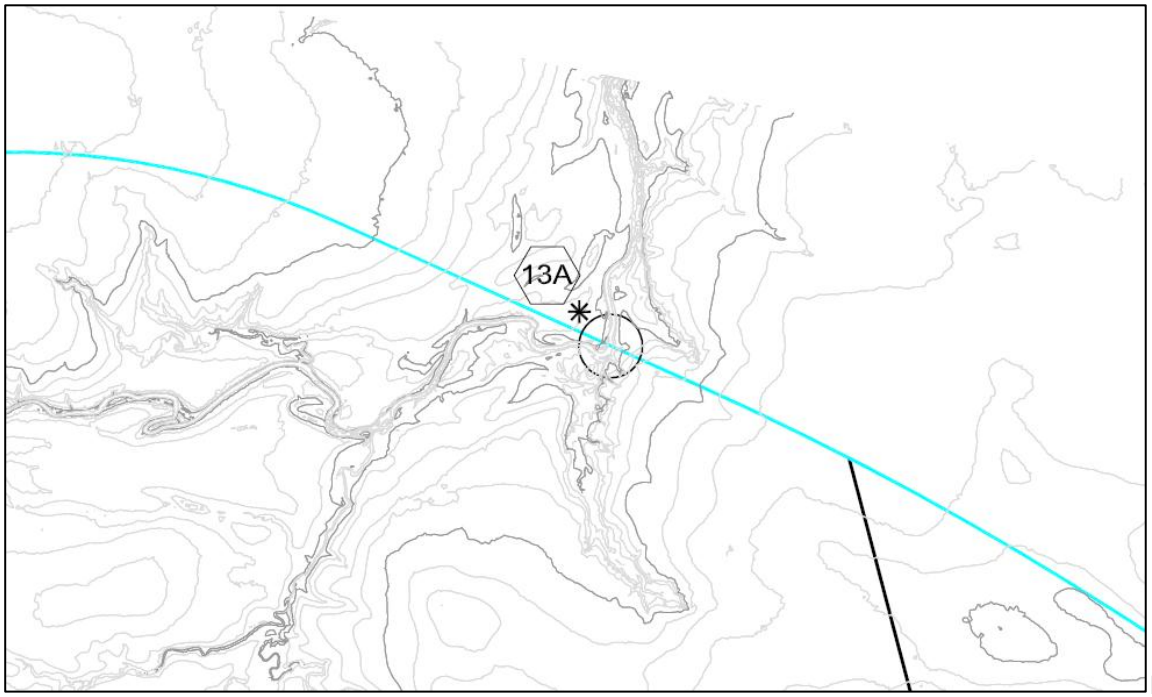
Nathan River Crossing Cross Section at Reference Point 9A



Rosie Creek Crossing Location at Reference Point 12A



Rosie Creek Crossing Cross Section at Reference Point 12A



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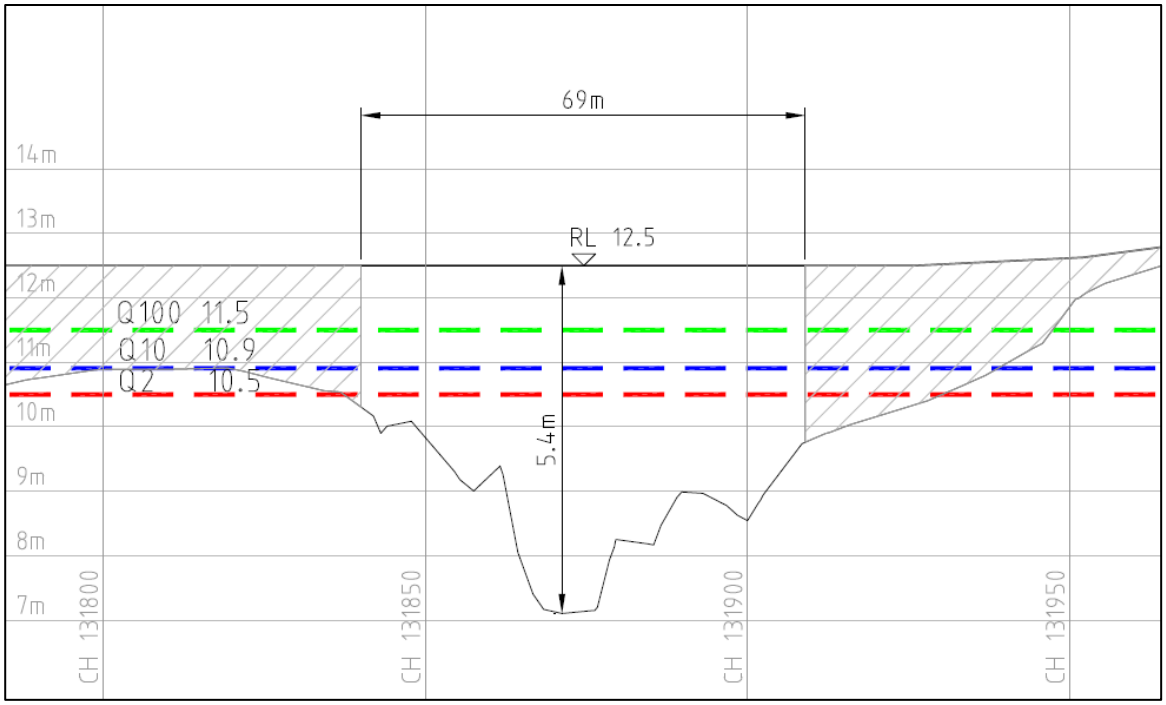

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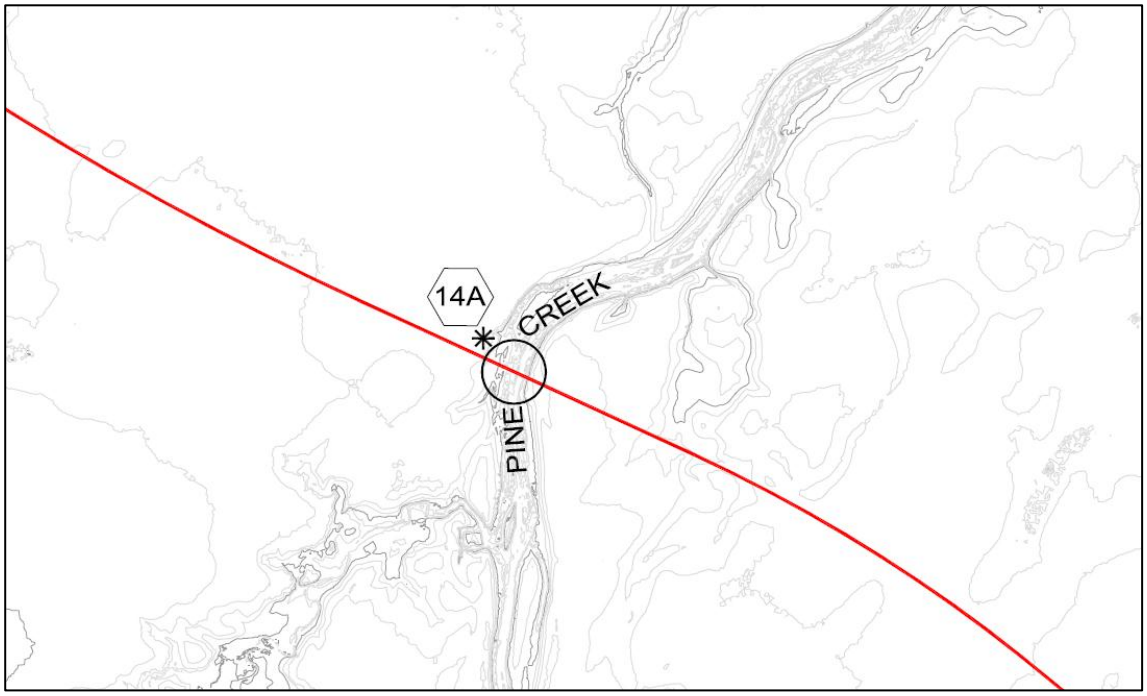
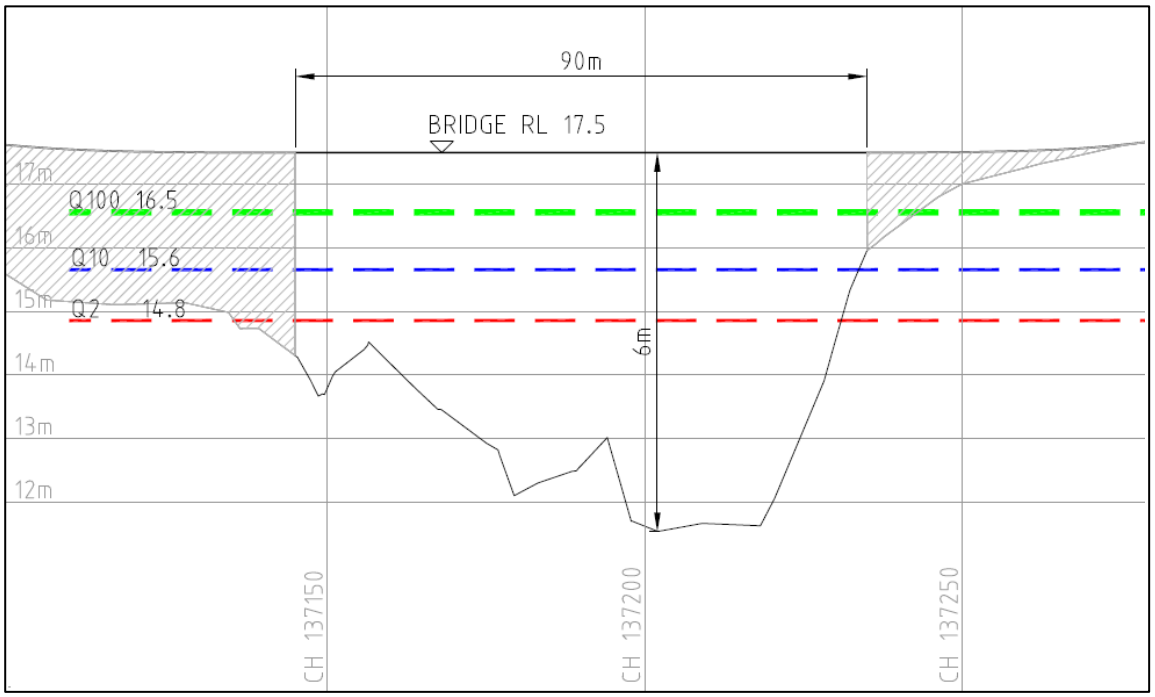
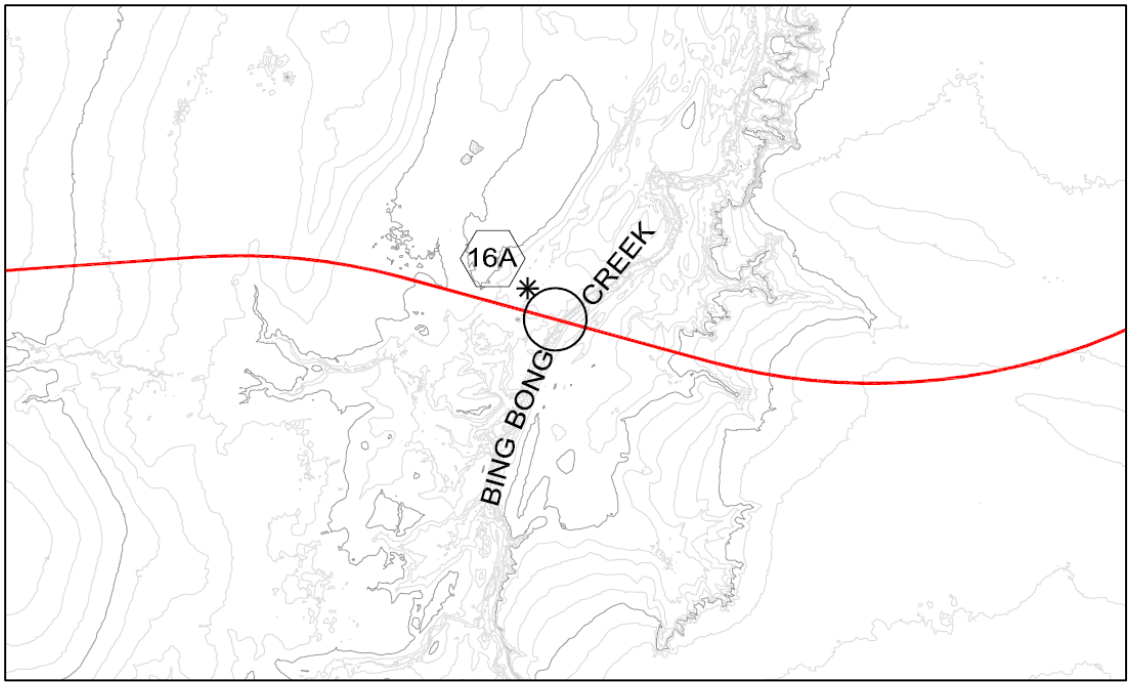


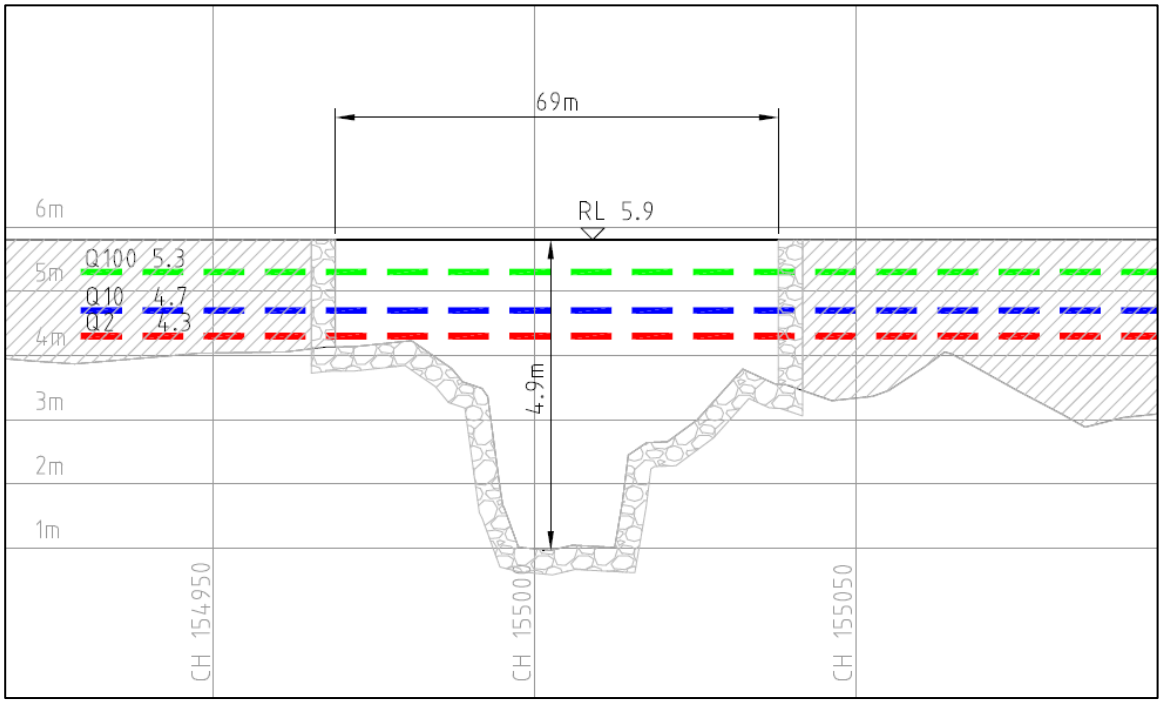
Pine Creek Crossing Location at Reference Point 14A



Pine Creek Crossing Cross Section at Reference Point 14A



Bing Bong Creek Crossing Location at Reference Point 16A



Bing Bong Crossing Cross Section at Reference Point 16A