Urquhart Point Mineral Sands Project

Initial Advice Statement

Prepared by:
Oresome Australia Pty Ltd

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1. INTRODUCTION

1.1. Project proponent

Oresome Australia Pty Ltd was formed in 2004, with the key objective of securing untenured mineral sands deposits. Currently the primary focus of the company is the western region of Cape York.

Oresome Australia Pty Ltd has applied for a Mining Lease (MLA), **Figure 12**, and this tenement has been called the Urquhart Point Mining Lease, and forms part of our Cape York Mineral Sands Project including EPMs 15268, 15371, 15372, 18015 and EPMAs 15370, 18377, 18737, 18738 and 18739, 18998, 18999, 19001.

Oresome is a subsidiary company (100%) of Metallica Minerals Limited. Oresome is funded through Metallica Minerals.

Metallica Minerals Limited is a Brisbane based, Queensland focused exploration and development company. It is registered in Queensland and has been an active explorer since 1997. Metallica listed on the Australian Stock Exchange in November 2004 (ASX Code: MLM).

At the end of the financial year, June 2010, Metallica had a cash balance of $7.1 million.

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1.2. Project summary

The first priority tenement for exploration and mining will be the Urquhart Point prospect, MLA 20669 within EPM15268.Details of the proposed project for this site are described below and it is assumed that operations for the other sites will eventually be of a similar nature. The exploration area is located three kilometres south of the township of Weipa at Urquhart Point on the west coast of Cape York Peninsula, Queensland (Figure 1).

The site is a previously explored deposit which is considered similar to Matilda Zircons' Andranangoo and Lethbridge deposits on the Tiwi Islands (Northern Territory) and as such, offers significant potential for a heavy minerals suite rich in zircon and rutile. The Urquhart Point deposit and was investigated in 1956 and 1959 and several open file reports held at the Queensland Department of Employment Economic Development and Innovation (DEEDI) give a good indication of the areas potential.

Based on current resource estimates, the project life will be approximately 4 years but this may be extended if further resources are located during exploration. In any case, the maximum mine life would be approximately 6 years. The target commencement date is 2012.

1.2.1. Mining

The first stage will be a 2 week drilling program to ground-truth historic data. Drilling will be conducted to approximately 3 metres using hand augers and air core drilling rigs mounted on a 4WD.The mining method will be a form of slot mining, which will minimise the excavation footprint at any one time. Mining will be undertaken by use of an excavator, which will load the sand into trucks. The excavator will dig to the base of mineralisation.

The depth to which the ore is extracted in the area to be mined depends on the depth and grade of mineralised material. The mining face will progress at a typical rate of about 8 to 10 m per day, depending on the depth of the mineralised material. The width of the mining face will also vary according to the nature of the deposit being mined, but will typically be about 80 m across. The mining technique proposed is aimed at minimising environmental impact and also costs. A continuous rehabilitation program will follow close behind the mining face. Typically each mining slot will take about 2 months to excavate and rehabilitation will take place as soon as practicable after that time, and as the mining face progresses.

Prior to mining progressing, vegetation and topsoil will be pushed separately to one side for later spreading and use as brush cover and seed bank in the site rehabilitation. Within the active mining area the excavated sands will be transported via the articulated trucks up to a stockpile which will likely be located at the end of the mineralised area. The stockpiled sand will then be fed into a vibrating screen by a front end loader, to remove debris. From the screen the sands will pass into a feeder and be mixed with water to approximately 25% solids slurry, and pumped to the wet concentrator plant. The annual water requirement for the project is estimated at 280 megalitres. Water will be sourced from production bores for use in the processing circuit. The debris removed by the trommel screen will also be returned to the rehabilitation area and spread with the topsoil to assist in soil binding. As the Heavy Mineral (HM) removed from the sand will be typically 7%, the original contour of the mined area will generally be maintained once the sand is replaced and rehabilitation is complete.

The slurry is then fed via poly-pipes to the Heavy Mineral (HM) processing plant. The HM processing plant separates the final product of HM concentrate from the sand via a spiral centrifugal separation process. Specifically, the slurry that is piped to the plant will be fed into a series of water irrigated-spirals that separate the sand into the heavy minerals and sand tailings, by use of splitters. The splitters divert the sand tailings to a hopper, and the heavy mineral concentrate to a wash hopper. The separation process does not require any chemicals, and will utilise recycled water for the separation of sand and HM concentrate. The method is a well-established and proven method of chemical-free separation.

From the tailings hopper the tailings will be pumped back to the pit area via dewatering cyclones and poly-pipes. Water is reused in the feed hopper, and the tailings are stockpiled for re-shaping into the natural landform for later rehabilitation. The concentrate is pumped from the concentrator wash hopper to a dewatering cyclone, where the water is recovered for re-use in the processing plant. The HM concentrate passes from the bottom discharge of the dewatering cyclone to a temporary stockpile, from which it would be periodically dispatched for sale. Any excess water from the concentrate dewatering cyclone would also be recovered for re-use in the processing plant.

1.2.2. Infrastructure

Given the close proximity to Weipa, it is unlikely that personnel will live on site so no camp will be required. Road access to the site will only be temporary. Narrow tracks (cleared but not formed) will be sufficient for the traffic expected on site. The track will be revegetated when the site is decommissioned. All plant and equipment will be barged to site and all HM product will be barged off site so there won't be any heavy haulage by road. Site office and amenities will be designed and constructed in consultation with the Traditional Landowners for end use as an outstation, so built with their longer term use in mind. Buildings will be refurbished once mining is complete and handed over to the landowner group. It is proposed that should the operation require the infrastructure past the expected 4 year period the buildings will be rented back to Oresome at an agreed rate through to the end of the project. Other than the site offices and amenities discussed above there will be no infrastructure remaining once the mining operation is complete, and the site will be completely rehabilitated.

1.2.3. Human resources

Whilst the labour force will be small, (less than 10, including contractors) operator positions and a traineeship will be offered first to Traditional Landowners and/or members of the Aurukun and Napranum communities. It will be Oresome's proposal that mine site preparation, mining operations, and rehabilitation will be carried out under contract. Oresome will offer 'first right of refusal' for these contracts to suitably qualified Traditional Landowners. Mineral processing will be carried out by Oresome. The operation is intended to run on single day shift basis, 5 – 6 days per week and as the township of Weipa is only three kilometres away by boat, it is expected that a significant proportion of the labour force will reside there.

1.3. Project location and tenure

1.3.1. Existing tenure

ORESOME holds a granted EPM over the resource area together with a Mining Lease Application (MLA). Oresome also holds 4 additional EPMs granted and 8 under application to cover other prospective areas on the Cape making up the 'Cape York Mineral Sands Project'.

Access to Urquhart Point will be via the Embley River. The site has no road access

The mining tenures relevant to the Project are detailed in Table 1; however this IAS is related to the EPM15268 (Urquhart Point) and the Mining Lease Application within.

Table 1: Mining tenure

Tenure ID	Name	Holder/Applicant	Status	Expiry
MLA 20669	Urquhart Point	Oresome Australia Pty Ltd	Application	TBA
EPM 15268	Urquhart Point	Oresome Australia Pty Ltd	Granted	*24.10.2012*
EPMA 15370	Jackson River	Oresome Australia Pty Ltd	Grant Offered	TBA
EPM 15371	Doughboy	Oresome Australia Pty Ltd	Granted	*29.09.2014*
EPM 15372	Jardine	Oresome Australia Pty Ltd	Granted	*28.09.2014*
EPMA18015	Jackson River #2	Oresome Australia Pty Ltd	Granted	TBA
EPMA 18377	Sandman #1	Oresome Australia Pty Ltd	Grant Offered	TBA
EPMA 18738	Sandman #2	Oresome Australia Pty Ltd	Application	TBA
EPMA 18737	Sandman #3	Oresome Australia Pty Ltd	Application	TBA
EPMA 18739	Sandman #4	Oresome Australia Pty Ltd	Application	TBA
EPMA 18998	Sandman #5	Oresome Australia Pty Ltd	Application	TBA
EPMA 19001	Sandman #6	Oresome Australia Pty Ltd	Application	TBA
EPMA 18999	Sandman #7	Oresome Australia Pty Ltd	Application	TBA

There is one parcel of land affected by the Project. See Table 2.

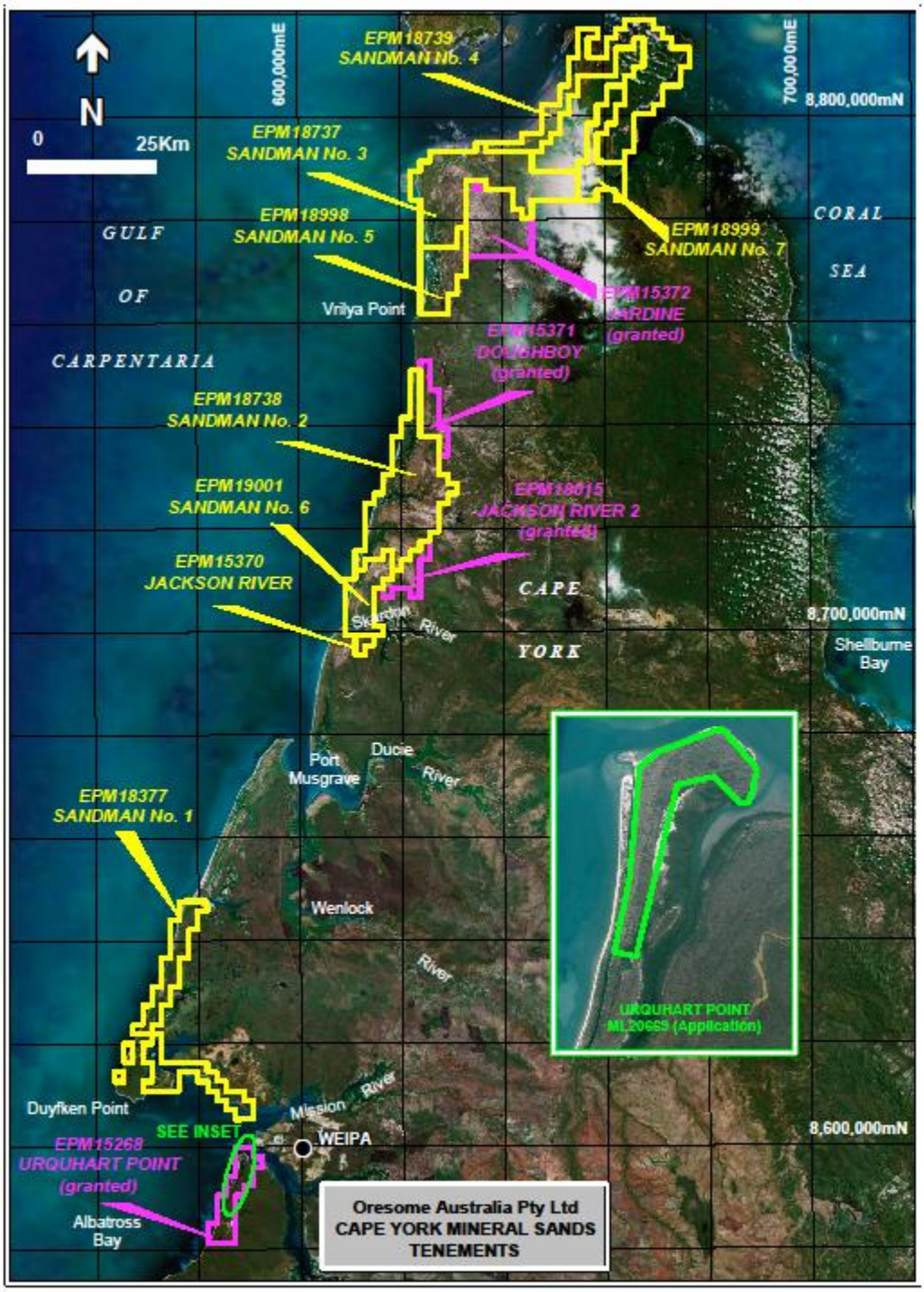
Table 2 Cadastral details

Real property description	Project area
Lot 1 SC211 Aurukun Shire	Mining Lease 20669 (application)

The whole Urquhart Point MLA lies within Lot 1 SC211 and the registered owner is the Aurukun Shire Council. As site access will be via the Embley River, access will be through Lot 4 SP120446 which is a lease to Ports Corporation of Queensland Limited. Whilst Lot 4 is owned by the Cook Shire Council, it is administered by North Queensland Bulk Ports Corporation.

The whole of the Urquhart Point MLA is within an area where Native Tile has been determined to be held by the Wik and Wik Way People. The prescribed Body Corporate is Ngan Aak Kunch Aboriginal Corporation.

Figure 1: Oresome's Cape York tenement position


N
0
25Km
600,000mE
700,000mE
8,800,000mN
8,700,000mN
8,600,000mN
EPM18739
SANDMAN No. 4
EPM18737
SANDMAN No. 3
EPM18998
SANDMAN No. 5
EPM18999
SANDMAN No. 7
EPM15372
JARDINE
(granted)
EPM15371
DOUGHBOY
(granted)
EPM18738
SANDMAN No. 2
EPM19001
SANDMAN No. 6
EPM18015
JACKSON RIVER 2
(granted)
EPM15370
JACKSON RIVER
EPM18377
SANDMAN No. 1
EPM15268
URQUHART POINT
(granted)
GULF
OF
CARPENTARIA
CORAL
SEA
CAPE
YORK
Vrilya Point
Skardon River
Port
Musgrave
Ducie
River
Wenlock
River
Mission River
WEIPA
Duyfken Point
Albatross
Bay
Shelburne
Bay
SEE INSET
URQUHART POINT
ML20669 (Application)
Oresome Australia Pty Ltd
CAPE YORK MINERAL SANDS
TENEMENTS

2. ENVIRONMENTAL AUTHORITY INFORMATION

The current amended EA (received 8th February 2010) is a standard exploration EA with the number MIC200374205 and includes carrying out Exploration Activities in accordance with the Code of Environmental Compliance for Chapter 4 activities under Section 22 of the EP Act. This EA currently applies to EPM15268.

2.1. Proposed Environmentally Relevant Activity (ERA)

The *Environmental Protection Regulation 2008* came into force on 1 January 2009. This project proposes the following level 1 chapter 4 Environmentally Relevant Activity as defined under the *Environmental Protection Regulation 2008*:

Table 3: ERA – Mining mineral sand

Item	Aggregate Environmental Score
Mining Mineral Sand	120

2.2. EIS triggers

As outlined in the DERM Application Form for an environmental authority (mining activities) for a level one mining project, the Environmental Impact Statement (EIS) triggers considered by the DERM for mining activities are:

(a) have a significant impact on Category A or B environmentally sensitive areas?
(b) involve activities in a marine area?
(c) involve activities less than 500m from highest astronomical tide?
(d) require the construction of >150 new dwelling units?
(e) include an activity that would otherwise be an ERA with an aggregate environmental score >165?
(f) involve the mining of >2 million tonnes of mineral or run of mine ore per year?
(g) involve the abstraction of >2 million m^3 of water per year from natural surface or groundwater sources?
(h) result in >25ha remaining post-mining in a non beneficial land capability?
(i) involve any level 1 mining activity less than 2km from a town
(j) involve the construction of a mining refining or processing facility (ERA 12 or ERA 13, as defined in Schedule 1 of the *Environmental Protection Regulation 1998*)?

Of this list the project triggers only (c) and potentially (a) and (e). The project overall will be 'low impact' with an open pit of less than 10ha at any one time and mining to a maximum depth of 3 metres. As the pit progresses, disturbed areas will be continuously rehabilitated. All associated impacts will be addressed in the EIS.

3. DESCRIPTION OF THE EXISTING ENVIRONMENT

3.1. Geology and geomorphology

The vegetation of the area consists of mixed scrubby sclerophyll vine woodland on well drained deep siliceous sands. These sands appear to be principally aeolian in origin forming a series of low, elongated shore-parallel ridges and, due to their origin, are composed principally of quite fine sands. These ridges overlie a more heterogenous deposit of coarse sand, bauxite and ironstone nodules and fragmented and whole shells. These are highly similar to beach ridge plains described elsewhere in the Albatross Bay region (e.g. Hayne 1992). It is likely that sands forming the aeolian dune ridges originate from westerly winds redepositing fine sands from the beach ridge deposits to form the sequence of low dune ridges.

Density and composition of the woodland varies and several distinct micro-environments occur in the area. These include paperbark swamps and dry notophyll vine forest which occupy low-lying depressions and elevated areas of sand ridges respectively. Extensive areas of mangrove forest and swamp occur along Roberts Creek.

As the proposed project is located at near to sea level, there is potential for acid sulphate soils to occur at this site. These soils are of marine origin and contain iron sulphides that on exposure to air may react to produce acid.

Exploration activities to date have not indicated the presence of acid sulphate soils in the areas to be mined. Should they be encountered Oresome will take immediate steps to comply with its general environmental duty (Queensland Acid Sulfate Soil Technical Manual, Legislation and Policy Guide Version 2.2) and a management plan will be developed to mitigate any potential environmental impacts.

3.1.1. Introduced fauna

Feral pigs and cattle are present in the project area. These species have increased the number of weeds in the project area and probably changed the nature of the understorey and ground layer in many places.

3.1.2. Illegal structures

There are extensive beach hut developments across the area, particularly on the eastern end of the project area and along the banks of Wooldrum Creek **(Figures 3 & 4)**. The development, use and abandonment of the places may have disturbed some archaeological sites. This disturbance may have impacted on the archaeological / scientific significance of some sites.

3.1.3. Previous land use

A significant area of Urquhart Point has been used as an onshore dump site for dredge spoil at some stage in the 1960's. The area covered by spoil is estimated to be greater than 4ha and has very little regrowth after nearly 60 years. The area can be clearly seen in the satellite photograph **Figure 2.**

Figure 2: Dredge spoil (Map 1)

Figure 3: Typical beach hut

Figure 4: Typical example of refuse dump

3.2. Regional climate

The Project site experiences distinct wet and dry seasons typical of the tropical monsoonal area. Data from the closest Bureau of Meteorology weather station located approximately 4km north-east of the Project at Weipa airport, indicates a dry season occurring between June and September with the wet season peaking between January and March. Mean annual rainfall recorded at this station is 2004mm, based on data collected from 1992 to the present day. Rainfall patterns for the area are illustrated in **Figure 5.**

The annual mean maximum temperature in the region is 32.7°C with an annual mean minimum temperature of 21.8°C. **Figure 6** illustrates that the coolest temperatures occur in July and August with average minimum temperatures of 18.7°C and 18.4°C respectively. The highest temperatures were recorded between October and November with average maximum temperatures of 35.5°C and 35.6°C respectively.

Figure 5: Monthly rainfall and rain-days.

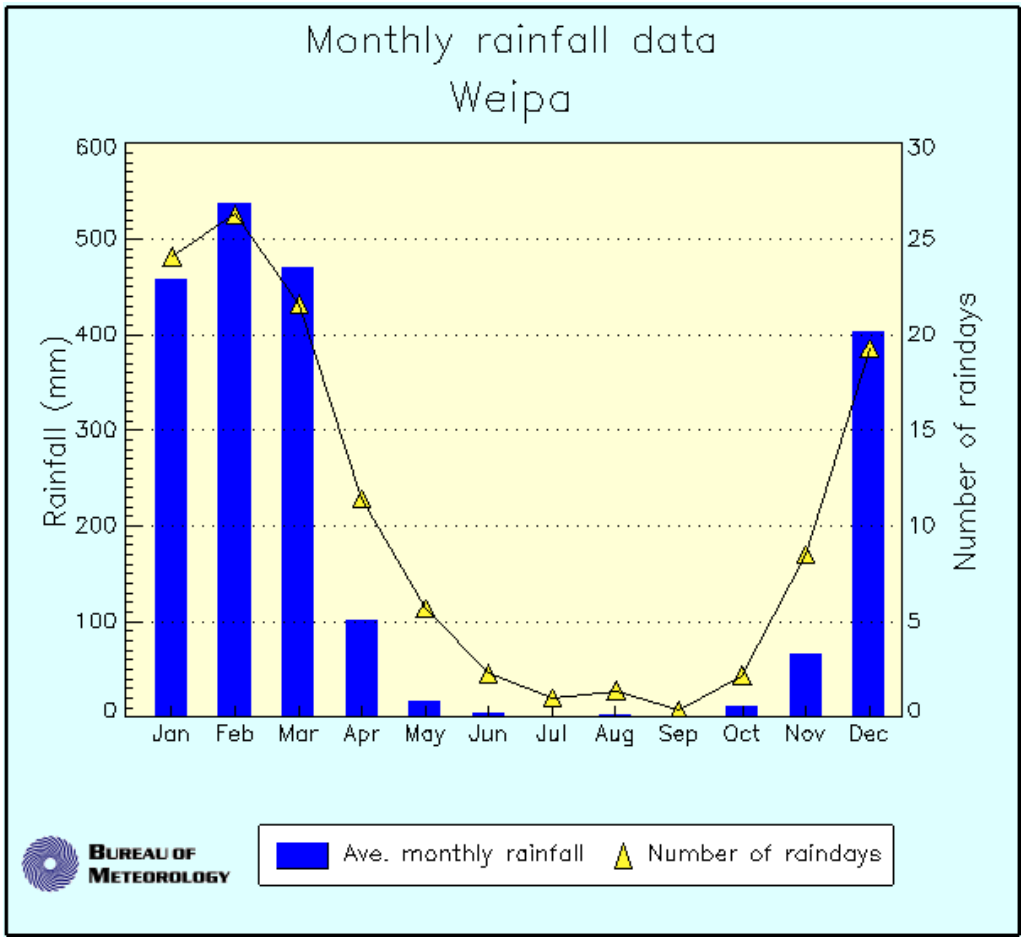
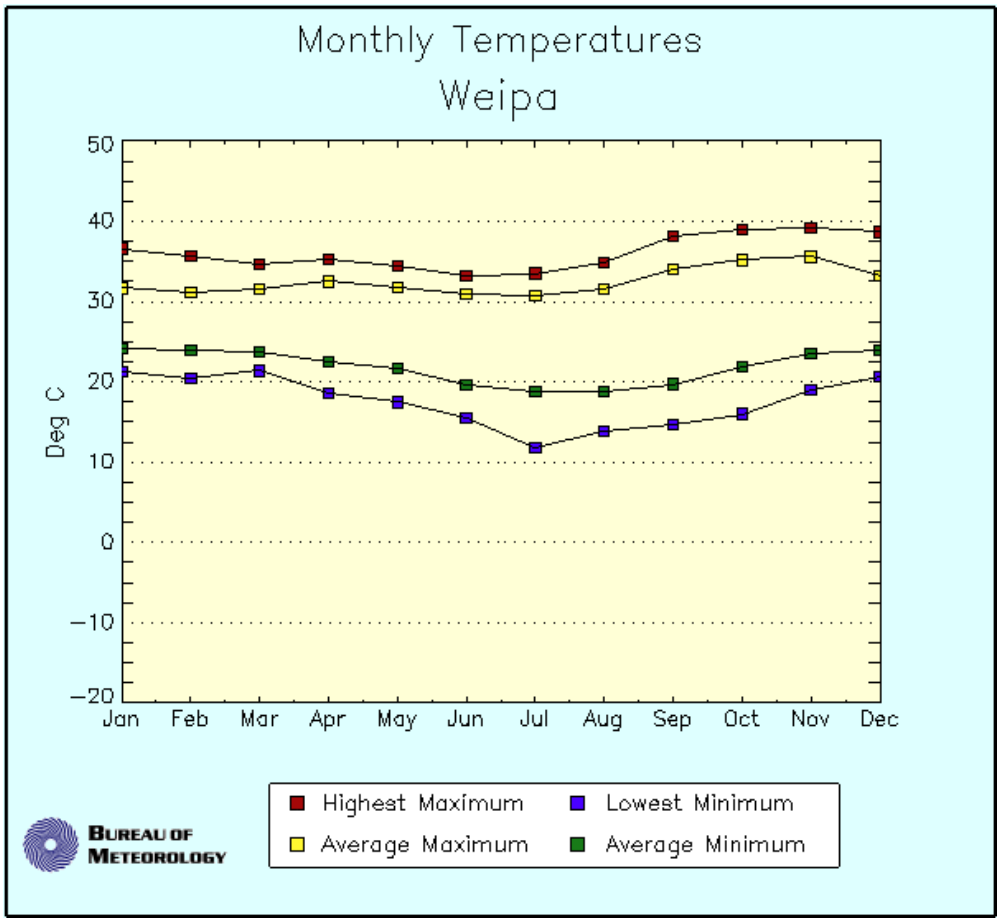


Figure 6: Monthly Temperatures



4. DESCRIPTION OF MINING ACTIVITIES

The first stage will be a 2 week drilling program to ground-truth historic data. Drilling will be conducted to approximately 3 metres using hand augers.

The mining method will be a form of slot mining, which will minimise the excavation footprint at any one time. Mining will be undertaken by use of an excavator, which will load the sand into trucks. The excavator will dig to the base of mineralisation. The depth to which the ore is extracted in the area to be mined depends on the depth and grade of mineralised material.

The mining face will progress at a typical rate of about 8 to 10 m per day, depending on the depth of the mineralised material. The width of the mining face will also vary according to the nature of the deposit being mined, but will typically be about 80m across. The mining technique proposed is aimed at minimising environmental impact and also costs.

A continuous rehabilitation program will follow close behind the mining face. Typically each mining slot will take about 2 months to excavate and rehabilitation will take place as soon as practicable after that time and as the mining face progresses. Prior to mining progressing, vegetation and topsoil will be pushed separately to one side for later spreading and use as brush cover and seed bank in the site rehabilitation.

Within the active mining area the excavated sands will be transported via articulated trucks up to

a stockpile which will likely be located at the end of the mineralised area. The stockpiled sand will then be fed into a trammel screen by a front end loader, to remove debris. From the screen the sands will pass into a feeder and be mixed with water to approximately 25% solids slurry, and pumped to the wet concentrator plant. The annual water requirement for the project is estimated at 280 megalitres.

Water will be sourced from a production bore for use in the processing circuit. The debris removed by the trammel screen will also be returned to the rehabilitation area and spread with the topsoil to assist in soil binding.

The slurry is then fed via poly-pipes to the Heavy Mineral (HM) processing plant. The HM processing plant separates the final product of HM concentrate from the sand via a spiral centrifugal separation process. Specifically, the slurry that is piped to the plant will be fed into a series of water irrigated-spirals that separate the sand into the heavy minerals and sand tailings, by use of splitters. The splitters divert the sand tailings to a hopper, and the heavy mineral concentrate to a wash hopper. The separation process does not require any chemicals, and will utilise recycled water for the separation of sand and HM concentrate. The method is a well-established and proven method of chemical-free separation.

From the tailings hopper the tailings will be pumped back to the pit area via dewatering cyclones and poly-pipes. Water is reused in the feed hopper, and the tailings are stockpiled for re-shaping into the natural landform for later rehabilitation.

The concentrate is pumped from the concentrator wash hopper to a dewatering cyclone, where the water is recovered for re-use in the processing plant. The HM concentrate passes from the bottom discharge of the dewatering cyclone to a temporary stockpile, from which it would be periodically forwarded to a, yet to be determined, end user.

Any excess water from the concentrate dewatering cyclone would also be recovered for re-use in the processing plant.

4.1. Exploration and appraisal programs

Exploration programs will be implemented over the other tenements held by Oresome (see **Figure 1**) as they are granted and exploration agreements are struck with relevant landowners and traditional landowners. The first priority tenement to complete exploration and begin mining will be the Urquhart Point prospect EPM15268. Details of the proposed project for this site are described above and it is assumed that operations for the other sites will eventually be of a similar nature.

The exploration area continues to the south of the proposed mining lease and was investigated in 1956 and 1959 and several open file reports held at the Queensland Department of Employment Economic Development and Innovation (DEEDI) give a good indication of the areas potential.

Based on current resource estimates, the project life at Urquhart Point will be approximately 4 years but this may be extended if further resources are located during exploration.

4.2. Process water

Process water will predominantly come from a sub-artesian bore. It is contemplated that a series of 3 1.0 megalitre above ground storage tanks will provide a buffer supply and a smaller tank adjacent to the plant will manage reclaimed water. Rainwater will be stored in tanks and available to supplement feedwater, but the bulk of process water is intended to come from groundwater sources. As the project proposes to treat 700,000 to 800,000tpa of sand, and the estimated water requirement per tonne is approximately .35m^3/tonne, the estimated water requirement is 280,000m^3 per annum. Through recycling, the projects reliance on ground water sources will be minimised.

5. ENVIRONMENTAL AND SOCIAL VALUES

The environmental values that may be impacted by the mining, construction, operation, maintenance, decommissioning and rehabilitation stages of the project have been identified as part of this IAS, and are detailed in the following sections. The potential impacts of the detailed mining activities on the environmental values have been assessed and identified; forming the basis for developing the conceptual management strategies.

The assessment of the beneficial or adverse effects on environmental values has included an assessment of the aspects detailed below.

- A description of the existing environmental and social values of the area which may be affected by the mining activities.
- A description of the potential adverse and beneficial impacts of the mining activities on the identified environmental and social values. Any likely environmental harm to the environmental values is described.
- A description of potential cumulative impacts on environmental values caused by the mining activities, either in isolation or by combination with other known existing or planned development or sources of contamination.

5.1. Air

The EP Act provides for the *Environmental Protection (Air) Policy 2008* (EPP Air) to deal specifically with environmental values relating to the quality of the air environment. The environmental values to be enhanced or protected under this policy are the qualities of the air environment that are conducive to protecting the health and biodiversity of ecosystems, human health and wellbeing, the aesthetics of the environment and traditional use of the environment.

Potential issues associated with the deterioration of local and regional air quality include but are not limited to:

- Dust and emissions generated during construction activities.
- Dust and emissions generated during mining activities
- Seasonal influences on local and regional air quality.

5.1.1. Existing air quality

DERM maintains a network of ambient pollutant monitoring stations throughout Queensland, with the location of the Townsville Port monitoring station being closest to the project area.

The air quality index is calculated by converting the measured pollutant concentrations into index values. To generate these values, pollutant concentrations are expressed as a proportion of the Air NEPM standards or EPP (Air) goals, and then categorised according to that value. These values make it easier to interpret current air quality data because they overcome the complexity associated with displaying pollutant concentrations.

The five categories in DERM's Air Quality Index, ranging from very poor to very good are defined by index value ranges as shown in **Table 4**.

Table 4: Air Quality Index ranges

Not Available	Very Good 9-33	Good 34-66	Fair 67-99	Poor 100-149	Very Poor >150

Air quality standards and goals for pollutants have been set by governments, health and environment organisations around the world. The Environmental Protection (Air) Policy goals for the major pollutants assessed as part of this EM Plan are listed in **Table 5.**

Table 5: Air quality standards objectives

Indicator	Environmental Value	Air quality objectives		Period	Days
		µg/m3 at 0 degrees C	ppm		
nitrogen dioxide	health and wellbeing	250	0.12	1 hr	1 day each yr
		62	0.03	1 yr	
	health and biodiversity of ecosystems	33	0.016	1 yr	
carbon monoxide	health and wellbeing	11mg/m3	9	8hrs	1 day each yr
visibility reducing particles	protecting aesthetic environment	20km visibility in the air environment		1 hr	

5.1.2. Dust

Whilst dust will be emitted during construction and mining this will be mitigated with the use of water for dust suppression. A water truck will be utilised for the bulk of dust suppression and management. The project site is >3km at its closet point to the township of Weipa. The mining and processing will generally take place over 5 km from Weipa. Oresome submit that it is unlikely that dust will cause an environmental nuisance to any sensitive or commercial place.

5.1.3. Light

Whilst it is not envisaged the project will operate a night shift, any visible light released from the project will be managed to minimise nuisance to any environmentally sensitive area. Flood lights will be shielded such that the lamp itself or the lamp image is not directly visible outside the area perimeter of any activity that forms part of the project as a minimum.

5.2. Water

The EP Act provides for the *Environmental Protection (Water) Policy 1997* (EPP Water) to deal specifically with environmental values relating to the quality of the water environment.

The environmental values to be enhanced or protected are the qualities of the water environment include:

•Biological integrity
•Recreational use
•Suitability for minimal treatment before supply as drinking water
•Suitability for agriculture use

•Suitability for aquaculture use
•Suitability for producing aquatic food for human consumption
•Suitability for industrial use
•The cultural and spiritual values of water.

5.2.1. Surface waters

The mining lease application fronts onto the Embley River .The Hey-Embley Rivers Area has natural conservation significance because:

- it contains extensive shell mounds, which although being cultural deposits, contain valuable information about past environmental conditions and the interaction of people with their environment;
- about 70% of the area is of very high wilderness quality;
- about 40% of the area (chiefly the eastern section) is covered by vegetation areas that are amongst the best examples of their vegetation class on the Peninsula. Representative vegetation occurring in the area is predominantly types of *Eucalyptus tetrodonta* woodlands; and
- the estuary of the Embley River is the only known habitat of River Garfish *(Zenarchopterus buffonis)* on Cape York Peninsula.

It is envisaged the mining activities will have no impact on the water quality of the Embley River due the size of the operation and the shallow mining (<3m) to take place. The slot mining and sand processing will be totally contained with regard to potential contaminants.

5.2.2. Ground water

The shallow mining operation has little opportunity to impact the environmental values of groundwater resources. However the potential for impact exists and will be monitored.

There are two discrete groundwater regimes of interest. These include:

•Shallow subsurface groundwater.
•Deeper subsurface groundwater.

The project area is located on an isolated spit with groundwater recharge areas unknown. Oresome has applied for appropriate licensing to explore for groundwater.

On a regional scale, potential groundwater use from the Urquhart Point project is not considered significant.

5.3. Noise

The EP Act provides for the *Environmental Protection (Noise) Policy 1997* (EPP Noise) to deal specifically with environmental values relating to noise quality and levels. The environmental values that are required to be enhanced or protected are:

•The well being of the community or part of the community including its social and economic amenity; or
•The well being of an individual, including the individuals opportunity to have sleep, relaxation

and conversation without reasonable interference from intrusive noise.

There are numerous and widely varied sources that contribute to ambient noise levels, from both natural and manmade activity. In the project area there are no urban areas, industrial zones, and agricultural practices to generate ambient noise levels that could serve to elevate background noise levels.

Equally there are no permanent residences within the project area and the closest township (Weipa) is over 3km to the north; so whilst all plant equipment and machinery will be suitably constrained, noise concerns are relative to the separation distances to sensitive receptors and no issues of a noise related manner are expected.

Typical ambient background noise levels have been adopted based on *AS1055.2 – 1997 Acoustics -Description and measurement of environmental noise* Part 2. AS1055 classifies residences based on their location. The whole of the project falls into noise area category R1 (Areas with negligible transportation) Expected sound level ranges for this area has been taken from AS1055.2 -1997 and is listed in **Table 4.**

Table 6: Summary of AS1055.2 Description and measurement of environmental noise

Description of neighbourhood		Average background sound pressure level (L90)		
		Day	Evening	Night
R1	Areas with negligible transportation	40	35	30
R2	Areas with low density transportation	45	40	35
R3	Areas with medium density transportation or some commerce or industry	50	45	40
R4	Areas with dense transportation or some commerce or industry	55	50	45
R5	Areas with very dense transportation or in commercial districts or bordering industrial districts	60	55	50
R6	Areas with extremely dense transportation or within predominantly industrial districts	65	60	55

5.4. Waste

The EP Act provides for the *Environmental Protection (Waste Management) Policy 2000* (EPP Waste) to deal specifically with environmental values relating to waste management. It does this

by establishing a preferred waste management hierarchy and various principles as the basis for waste management. The environmental values to be enhanced or protected under this policy includes human health and safety, more effective use of resources and avoiding clean-up costs.

In accordance with EPP (Waste), waste management will be based on the following hierarchy:

- Waste avoidance
- Waste re-use
- Waste recycling
- Energy recovery
- Waste disposal

5.4.1. Air emissions

This waste stream is addressed under *Section 5.1*.

5.4.2. Excavated waste

The main wastes of concern include:

- Topsoil generated during the preparation of pit sites.
- Waste cut/fill materials generated during the construction of pits.

5.4.3. Solid and liquid waste

Various streams of solid and liquid domestic and industrial wastes will be generated during each phase of the project. All waste materials will be removed from the work area and disposed of appropriately. Waste will be generated at various locations. Wastes will be consolidated in applicable waste streams and transported from each of these areas for disposal. Bins will be provided for various types of waste. Indicative sources, types and estimated volumes of wastes generated by the mining activities are detailed in **Table 5.**

Table 7: Typical summary of solid and liquid wastes generated

Activity	Waste Material	Approximate Quantities	Disposal Options
Mining	Vegetation		Replaced as mulch
	Topsoil		Replaced for rehabilitation
	Sand tailings	650,000 tpa	Replaced in pit and re-contoured
	Hard waste	Removal of bush huts and associated scrap timber, metal and general hard rubbish	Removal by licensed waste disposal contractor
Operation and maintenance	Oils, filters, parts, equipment and tyres	As per maintenance schedules for onsite equipment	Removal by licensed waste disposal contractor

5.4.4. Sewerage disposal

During the construction and operation of the project there will be a requirement for ablution blocks sized appropriately for the workforce. All sewerage will be treated and disposed of by a licensed waste disposal contractor.

Sewerage treatment plant will be installed onsite as per the water management plan. Water discharge will comply with the Queensland Water Recycling Guidelines December 2005.

5.4.5. Stormwater discharge

During preparatory, construction, operational and rehabilitation activities, stormwater runoff has little potential to impact on sensitive areas. To ensure this, silt traps will be appropriately installed.

5.5. Land

5.5.1. Land environment

EPM15268 occurs on the Weipa 1:100,000 topographic survey map [sheet 7272; grid zone 54L] part of 1:250,000 map SD54-3 Weipa Special.

The northern end of EPM15268 is situated approximately 4km south-west of Weipa on Cape York (see **Figure 1**). Access is generally via boat from Weipa or helicopter. There is no road access to EPM15268.

The vegetation in the area consists of mixed scrubby sclerophyll vine woodland on well drained deep siliceous sands. These sands are mainly aeolian in origin forming a series of low, elongated shore-parallel ridges and are composed mainly of fine sands. These ridges overlie a more heterogeneous deposit of coarse sand, bauxite and ironstone nodules and fragmented and whole shells. These are highly similar to beach ridge plains described elsewhere in the Albatross Bay region.

Marine shell is commonly found in the area. The process of aeolian re-deposition of sand from the primary dune to secondary dunes is unlikely to move marine or estuarine shell. Therefore marine shell found in dune areas is likely to be result of past human activity. This hypothesis is reinforced by the fact that all the shell deposits in the secondary dune system are composed of edible species favoured by Aboriginal people both past and present. The beach ridge deposits themselves were observed to contain a wide range of marine shellfish species.

Density and composition of the woodland varies and several distinct micro-environments occur in the area. These include paperbark swamps and dry notophyll vine forest which occupy low-lying depressions and elevated areas of sand ridges respectively. Extensive areas of mangrove forest and swamp occur along Roberts Creek.

5.5.2. Land tenure and use

Oresome holds the granted EPM 15268 over the resource area. The project area is within Lot 1 on SC211 presently owned by the Aurukun Shire Council but is part of an Aboriginal Land Act freehold package to the Wik and Wik Way People. The proposed mining operation is located on sandy plateaux at Urquhart Point. The landscape is generally very flat, with vegetation in the

area consisting of mixed scrubby sclerophyll vine woodland on well drained deep siliceous sands.

Feral pigs and cattle are present in the project area. These species have increased the number of weeds in the project area and probably changed the nature of the understorey and ground layer in many places. There are extensive beach hut developments across the area, particularly on the eastern end of the project area and along the banks of Wooldrum Creek. Meetings with both the traditional owners and the Aurukun Council have determined that these buildings have been illegally constructed and part of Oresome's proposal is to remove the huts and rehabilitate the ground in line with the rehabilitation of other disturbed areas, such as the Dredge Spoil area shown in **Figures 2 and 7**. The tenement area lies within the Aurukun Shire Council Boundary and within Wik and Wik Way determined native title.

Figure 7: Dredge spoil at Urquhart Point

5.5.3. Bioregions

The Gaps Analysis Study carried out by URS for Matilda Minerals during the period of their joint venture arrangement with Oresome, and before Matilda Minerals went into voluntary administration, provides constraint mapping investigating the environmentally sensitive areas within the project area. Targeted field investigations will take place prior to conducting mining activities. **Figure 8** below overlays the proposed mining lease application area.

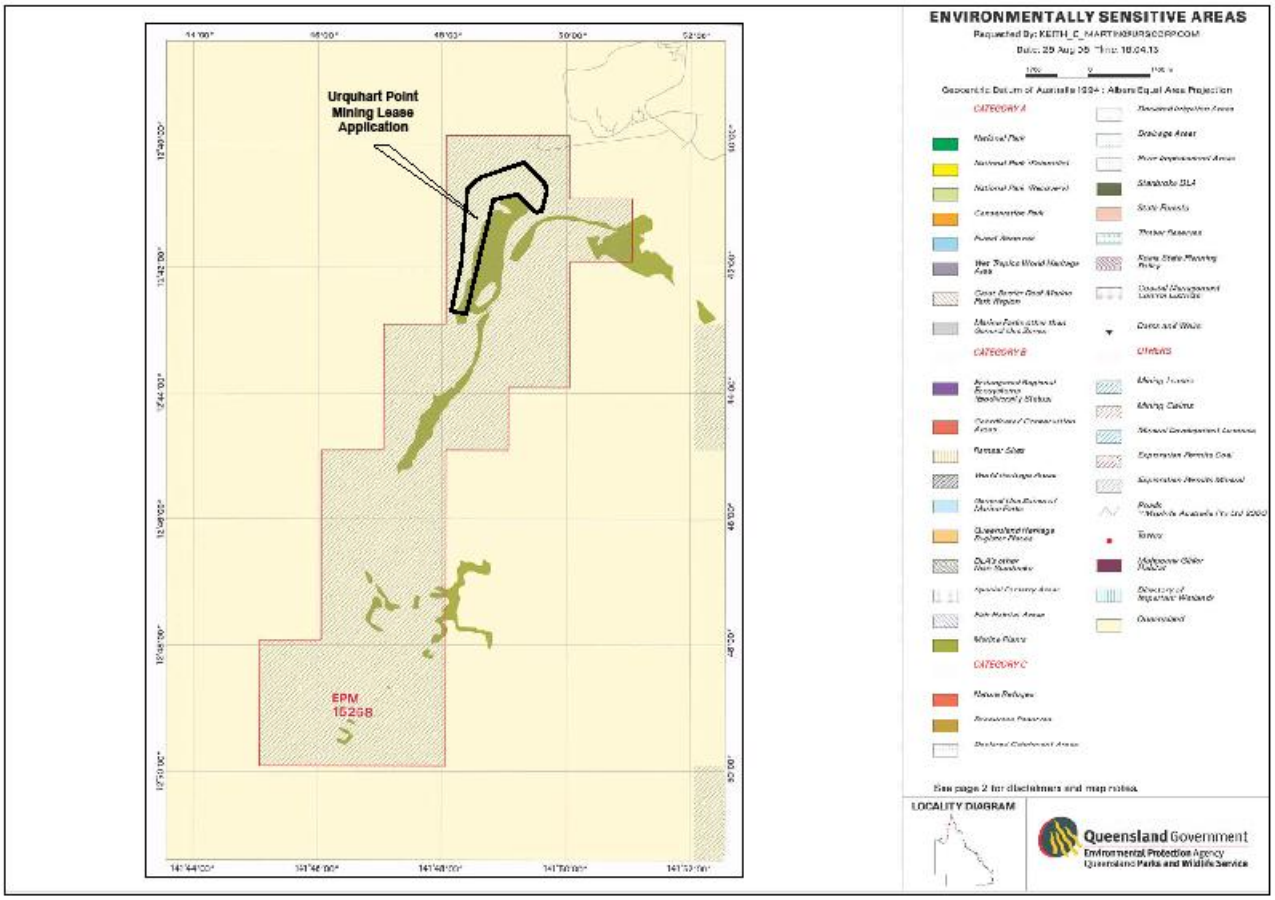


Figure 8: Urquhart Point ESA map

5.5.4. Flora

A desktop analysis utilising 'Wildlife Online' to identify endangered, rare and vulnerable species within the project area resulted in no threatened flora species that may occur within the project area. Targeted field investigations will take place as part of the EIS and prior to conducting mining activities.

Table 8: Flora species

Class	Family	Scientific Name	Common Name	Status
Higher Dicots	Amaranthaceae	Gomphrena flaccida		Least Concern
Higher Dicots	Asteraceae	Bidens bipinnata	bipinnate beggars tricks	Least Concern
Higher Dicots	Convolvulaceae	Xenostegia tridentate		Least Concern
Higher Dicots	Lamiaceae	Anisomeles malabarica		Least Concern
Higher Dicots	Loganiaceae	Strychnos lucida		Least Concern
Higher Dicots	Plumbaginaceae	Aegialitis annulata	club mangrove	Least Concern
Higher Dicots	Rhizophoraceae	Ceriops tagal	yellow mangrove	Least Concern

Higher Dicots	Rhizophoraceae	Bruguiera exaristata		Least Concern
Higher Dicots	Rubiaceae	Spermacoce stenophylla		Least Concern
Monocots	Poaceae	Perotis rara	comet grass	Least Concern

5.5.5. Fauna

A desktop analysis utilising 'Wildlife Online' to identify all terrestrial vertebrae species, resulted in ninety three (93) fauna species likely to (or may) occur within the project area. Two species are noted as having 'Near Threatened' Queensland Conservation Status and one has 'Vulnerable' Queensland Conservation Status. The rest have a Queensland conservation status of 'Least Concern'. There is no indication that any species are endangered in relation to the EPBC Act. Targeted field investigations will take place as part of the EIS and prior to conducting mining activities; this includes detection of any animal breeding places.

Table 9: Fauna species

Class	Family	Scientific Name	Common Name	Status
Birds	Acanthizidae	*Gerygone palpebrosa*	fairy gerygone	Least Concern
Birds	Acanthizidae	*Gerygone magnirostris*	large-billed gerygone	Least Concern
Birds	Accipitridae	*Milvus migrans*	black kite	Least Concern
Birds	Accipitridae	*Haliastur indus*	brahminy kite	Least Concern
Birds	Accipitridae	*Haliaeetus leucogaster*	white-bellied sea-eagle	Least Concern
Birds	Accipitridae	*Haliastur sphenurus*	whistling kite	Least Concern
Birds	Accipitridae	*Accipiter fasciatus*	brown goshawk	Least Concern
Birds	Accipitridae	*Pandion cristatus*	eastern osprey	Least Concern
Birds	Anatidae	*Anas gracilis*	grey teal	Least Concern
Birds	Anatidae	*Tadorna radjah*	radjah shelduck	Near Threatened
Birds	Anatidae	*Anas superciliosa*	Pacific black duck	Least Concern
Birds	Anhingidae	*Anhinga novaehollandiae*	Australasian darter	Least Concern
Birds	Ardeidae	*Ardea modesta*	eastern great egret	Least Concern
Birds	Ardeidae	*Ardea intermedia*	intermediate egret	Least Concern
Birds	Ardeidae	*Butorides striata*	striated heron	Least Concern
Birds	Ardeidae	*Egretta novaehollandiae*	white-faced heron	Least Concern
Birds	Ardeidae	*Egretta garzetta*	little egret	Least Concern
Birds	Ardeidae	*Egretta sacra*	eastern reef egret	Least Concern
Birds	Artamidae	*Cracticus quoyi*	black butcherbird	Least Concern
Birds	Artamidae	*Cracticus mentalis*	black-backed butcherbird	Least Concern
Birds	Burhinidae	*Esacus magnirostris*	beach stone-curlew	Vunerable
Birds	Cacatuidae	*Cacatua galerita*	sulphur-crested cockatoo	Least Concern
Birds	Cacatuidae	*Probosciger aterrimus*	palm cockatoo	Near Threatened
Birds	Campephagidae	*Lalage leucomela*	varied triller	Least Concern
Birds	Campephagidae	*Lalage leucomela*	varied triller	Least Concern
Birds	Campephagidae	*Coracina papuensis*	white-bellied cuckoo-shrike	Least Concern
Birds	Campephagidae	*Coracina novaehollandiae*	black-faced cuckoo-shrike	Least Concern
Birds	Charadriidae	*Vanellus miles*	masked lapwing	Least Concern
Birds	Charadriidae	*Charadrius ruficapillus*	red-capped plover	Least Concern
Birds	Charadriidae	*Vanellus miles miles*	masked lapwing (northern subspecies)	Least Concern

Birds	Columbidae	*Ducula bicolor*	pied imperial-pigeon	Least Concern
Birds	Columbidae	*Ptilinopus regina*	rose-crowned fruit-dove	Least Concern
Birds	Columbidae	*Geopelia striata*	peaceful dove	Least Concern
Birds	Columbidae	*Geopelia humeralis*	bar-shouldered dove	Least Concern
Birds	Coraciidae	*Eurystomus orientalis*	dollarbird	Least Concern
Birds	Corvidae	*Corvus orru*	Torresian crow	Least Concern
Birds	Cuculidae	*Chalcites minutillus minutillus*	little bronze-cuckoo	Least Concern
Birds	Estrildidae	*Neochmia temporalis*	red-browed finch	Least Concern
Birds	Eurostopodidae	*Eurostopodus argus*	spotted nightjar	Least Concern
Birds	Fregatidae	*Fregata ariel*	lesser frigatebird	Least Concern
Birds	Fregatidae	*Fregata minor*	great frigatebird	Least Concern
Birds	Haematopodidae	*Haematopus longirostris*	Australian pied oystercatcher	Least Concern
Birds	Halcyonidae	*Dacelo leachii*	blue-winged kookaburra	Least Concern
Birds	Halcyonidae	*Todiramphus macleayii*	forest kingfisher	Least Concern
Birds	Halcyonidae	*Dacelo novaeguineae*	laughing kookaburra	Least Concern
Birds	Halcyonidae	*Todiramphus sanctus*	sacred kingfisher	Least Concern
Birds	Hirundinidae	*Hirundo neoxena*	welcome swallow	Least Concern
Birds	Laridae	*Thalasseus bengalensis*	lesser crested tern	Least Concern
Birds	Laridae	*Chroicocephalus novaehollandiae*	silver gull	Least Concern
Birds	Laridae	*Gelochelidon nilotica*	gull-billed tern	Least Concern
Birds	Laridae	*Sterna sumatrana*	black-naped tern	Least Concern
Birds	Laridae	*Hydroprogne caspia*	Caspian tern	Least Concern
Birds	Laridae	*Thalasseus bergii*	crested tern	Least Concern
Birds	Maluridae	*Malurus amabilis*	lovely fairy-wren	Least Concern
Birds	Megapodiidae	*Alectura lathami*	Australian brush-turkey	Least Concern
Birds	Megapodiidae	*Megapodius reinwardt*	orange-footed scrubfowl	Least Concern
Birds	Meliphagidae	*Xanthotis flaviventer*	tawny-breasted honeyeater	Least Concern
Birds	Meliphagidae	*Philemon citreogularis*	little friarbird	Least Concern
Birds	Meliphagidae	*Myzomela erythrocephala*	red-headed honeyeater	Least Concern
Birds	Meliphagidae	*Melithreptus albogularis*	white-throated honeyeater	Least Concern
Birds	Meliphagidae	*Philemon corniculatus*	noisy friarbird	Least Concern
Birds	Meliphagidae	*Ramsayornis modestus*	brown-backed honeyeater	Least Concern
Birds	Meliphagidae	*Lichmera indistincta*	brown honeyeater	Least Concern
Birds	Meliphagidae	*Lichenostomus flavus*	yellow honeyeater	Least Concern
Birds	Meliphagidae	*Cissomela pectoralis*	banded honeyeater	Least Concern
Birds	Meliphagidae	*Meliphaga gracilis*	graceful honeyeater	Least Concern
Birds	Meliphagidae	*Myzomela obscura*	dusky honeyeater	Least Concern
Birds	Meliphagidae	*Meliphaga notata*	yellow-spotted honeyeater	Least Concern
Birds	Meropidae	*Merops ornatus*	rainbow bee-eater	Least Concern
Birds	Monarchidae	*Myiagra rubecula*	leaden flycatcher	Least Concern
Birds	Monarchidae	*Myiagra ruficollis*	broad-billed flycatcher	Least Concern
Birds	Monarchidae	*Grallina cyanoleuca*	magpie-lark	Least Concern
Birds	Nectariniidae	*Nectarinia jugularis*	olive-backed sunbird	Least Concern

Birds	Nectariniidae	*Dicaeum hirundinaceum*	mistletoebird	Least Concern
Birds	Oriolidae	*Oriolus sagittatus*	olive-backed oriole	Least Concern
Birds	Oriolidae	*Sphecotheres vieilloti*	Australasian figbird	Least Concern
Birds	Oriolidae	*Oriolus flavocinctus*	yellow oriole	Least Concern
Birds	Pachycephalidae	*Colluricincla megarhyncha*	little shrike-thrush	Least Concern
Birds	Pardalotidae	*Pardalotus striatus*	striated pardalote	Least Concern
Birds	Pelecanidae	*Pelecanus conspicillatus*	Australian pelican	Least Concern
Birds	Petroicidae	*Microeca flavigaster*	lemon-bellied flycatcher	Least Concern
Birds	Podargidae	*Podargus papuensis*	Papuan frogmouth	Least Concern
Birds	Psittacidae	*Aprosmictus erythropterus*	red-winged parrot	Least Concern
Birds	Phalacrocoracidae	*Microcarbo melanoleucos*	little pied cormorant	Least Concern
Birds	Psittacidae	*Trichoglossus haematodus moluccanus*	rainbow lorikeet	Least Concern
Birds	Ptilonorhynchidae	*Ptilonorhynchus nuchalis*	great bowerbird	Least Concern
Birds	Scolopacidae	*Tringa nebularia*	common greenshank	Least Concern
Birds	Scolopacidae	*Numenius madagascariensis*	eastern curlew	Near Threatend
Birds	Sulidae	*Sula leucogaster*	brown booby	Least Concern
Birds	Threskiornithidae	*Threskiornis molucca*	Australian white ibis	Least Concern
Mammals	Muridae	*Melomys burtoni*	grassland melomys	Least Concern
Mammals	Muridae	*Rattus sordidus*	canefield rat	Least Concern
Mammals	Muridae	*Pseudomys delicatulus*	delicate mouse	Least Concern

5.5.6. Key biodiversity and conservation features

A desktop analysis identifying high ecological value areas (protected areas) within the project area resulted in the following.

EPM15268 – Urquhart Point, south of Weipa

- Very little data on flora and fauna are available through previous regional studies. No previous flora/fauna studies conducted within tenement.
- Sub-dominant "Of Concern" Regional Ecosystem covers northern sector of tenement.
- Vegetation mapping at 1:100,000 scale available for northern half of tenement (Specht *et al* (1977).
- Areas of mangroves through tenement are classified as an Environmentally Sensitive Area.
- Occurrence of threatened species in tenement unknown. Beaches may contain turtle nesting habitat. Coastal vine forests may support Cooktown orchid.
- Migratory species likely to be present.
- Tenement is within a CYPLUS "area of conservation significance" (Hey-Embley Rivers).

Sections 25 and 26 of the EP Act provide for environmental values relating to environmentally sensitive areas. These include Category A and Category B environmentally sensitive areas. The following Category B environmentally sensitive area was identified to be within the project area:

• Marine plants

There are ten wild rivers declared under the *Wild Rivers Act 2005* (the WR Act). The project is

not located or in proximity of any of the ten wild river areas and as such, it is considered that the mining activities will not impact or be a source of contamination.

The Schedule of the *River Improvement Trust Regulation 1998* details the river improvement areas and trusts continued in existence. No river improvement area, trust, local government area or part comprising river improvement area was found to be within the project area

5.6. Community

In consultation with traditional owners and the Aurukun Shire Council, it is Oresome's intention that the community outcome of this project will be the restoration of traditional owner's connection with the land. The handing over of the outstation at the conclusion of mining activities should be the beginning of a new era of indigenous association with Urquhart Point.

5.6.1. Landscape and visual

Visual sensitivity relates to impacts on views, visual amenity and other features contributing to the visual quality of the area, such as landmarks. Landscape sensitivity refers to the vulnerability of the landscape to change, including aspects associated with landscape character. The project area is unoccupied and predominately consists of primary beach dunes; an extensive dune field and paper bark swamps adjacent to Roberts and Wooldrum Creeks. The area is littered with derelict beach huts and feral pigs and cattle are present in the area. Included in Oresome's proposal is the remediation of some existing damage to the project area.

Figure 9: Digital example of proposed remediation

Infrastructure associated with mining activities will be predominantly constructed and installed on land currently occupied by squatter's huts or their remnants. Infrastructure will be constructed to minimise impact to surrounding landscapes during construction, operation and eventual decommissioning. At the end of the estimated 4 year project life it is intended that the visual impact of the beach huts will be removed and the only infrastructure to remain will be that handed over to the traditional owners. It is proposed that the site offices will be handed over as on outstation, or possibly a ranger station. See proposed outstation in **Figure 10** below.

Figure 10: Proposed outstation (Digitally created)

5.6.2. Traffic, roads and infrastructure

There is currently no viable infrastructure on site, and it is intended that at the end of the estimated 4 year mine life, the only infrastructure remaining will be an outstation handed over to the traditional owners.

5.6.3. Cultural Heritage

The Urquhart Point Mineral Sands Project has the potential to become a model for business development in remote Aboriginal lands with opportunities for training, employment and business. Oresome has spent much of the last year engaging with the community through an extensive process of community consultation.

Prior to this we were engaged in a joint venture arrangement with Matilda Minerals Ltd which ended after Matilda entered into voluntary administration in 2008 and subsequently did not meet their requirements under the joint venture agreement. During the joint venture an archaeological and cultural heritage survey of part of EPM15268 was completed in November and December

2007 by Earth Sea Heritage Surveys (Richard Woolfe) and Northern Cultural Heritage (Michael Morrison).

A description of the project area which encompasses the 366.07ha of the mining lease application is as follows:

The project area consisted of approx 600 hectares of EPM 15268 at the mouth of the Embley/ Hey estuary near Weipa. The EPM totals 79 sq km in 24 sub-blocks (less an area excised for EPM 7024). The area surveyed included primary beach dunes, an extensive dune field and paper bark swamps adjacent to Roberts and Wooldrum Creeks. The survey focused on the primary dune and the inland dune field as this is the area of interest to Matilda Minerals. No mangrove areas were surveyed during this project.

The title to the exploration area is held by the Crown. To the knowledge of the consultant, two interests are held over the area. Firstly, the land is subject to a Native Title determination (Wik and Wikway 2). Secondly, the exploration permit was granted to Oresome on 25 October 2007 and is subject to a farm-in arrangement with Matilda Minerals Ltd. Oresome Australia has entered into a heritage agreement with the Traditional Owners via the Ngon Aak Kunch Aboriginal Corporation. This heritage agreement allows for the cultural heritage survey by a technical expert and team of Traditional Owner representatives. This survey and report will fulfil the duty of care provisions under Section 23 (3) of the Queensland Aboriginal Cultural Heritage Act 2003, provided that the provisions of the agreement are met."

Figure 11: Archaeological and Cultural Heritage survey area

A summary of the report is as follows:

The report presented the findings of a cultural heritage and archaeological survey of part of EPM15268, Urquhart Point, and Cape York. The survey was conducted by Earth Sea Heritage Surveys and Northern Cultural Heritage in November and December of 2007. Senior Traditional Owners Lenford Matthew, Joseph Chevathun and Robert Dick represented the Native Title owner group. Senior Traditional Owner Anthony Kerindun provided some information and comment on sites from his home in Aurukun. Steve Milner of Matilda Minerals accompanied the team for one day of the field component.

Vegetation coverage in the survey area varied from extremely dense (nil ground visibility) to areas of no vegetation at all (high ground visibility). Despite this, the survey located two shell midden clusters, 52 shell scatters, one stone artefact and one memorial cross to a local person during the field time. No culturally modified trees were located during the survey. The Aboriginal Traditional Owners who participated in the survey (including Anthony Kerindun) stated that there were no dreaming sites within the area.

The recommendations arising from the survey include:

1. Avoidance of all sites during exploration work;
2. Employment of an appropriate Aboriginal person to assist with the exploration program, including assisting with the avoidance of sites;
3. Further consultation with senior Traditional Owners on any sites that may be impacted upon by mineral extraction;
4. Detailed surface recording and sub-surface testing of some of the shell scatters that may be impacted upon by mineral extraction;
5. Commission some sub-surface sampling of one of the middens, including obtaining C14 dates for the base strata.
6. Avoidance of the memorial cross in exploration and mining.

We have the strong support of the local Aboriginal people and we have executed an agreement for exploration access with the Wik and Wik Way People.

A signed Exploration Agreement provides the consent and support of the Wik and Wik Way People and sets out the terms under which Oresome has conducted exploration on the Urquhart Point tenement.

During the pegging of the mining lease on 4/08/2010 the traditional owner group was represented by Tony Kerindun, Sammy Kerindun and Lenford Matthew.

Figure 12 below shows all sites of cultural and archaeological significance overlaid on the ore block plan. All sites noted within the ore block areas are of 'low' cultural significance, and all but shell scatters 33 and 35 are listed as 'low' archaeological significance.
A program of cultural heritage clearance will be incorporated into the cultural heritage management plan to be negotiated with traditional Land Owners. This will take into account the recommendations of the Archaeological and Cultural heritage survey carried out in 2007 by Earth and Sea Surveys and Northern Cultural Heritage.

Figure 12: Ore blocks, Cultural Heritage sites and features

5.6.4. Company policies or procedures on indigenous activities

The company has an Indigenous Relations Policy, an Environmental Policy and a Code of Conduct, for all dealings with parties associated with its exploration and mining tenements.

5.6.5. Economic

The project will compliment the makeup of the regional economy. The regional economy has a strong cultural background, along with developed mining sectors, driven by expansion of activities in the bauxite mining sectors delivering significant employment and business opportunities to the regional economy. The beneficial impact is not limited to the mining sectors as the regions agricultural and tourism industries are maintaining a strong presence in the wider region and the project will impact on these indirectly.

Capital expenditure on construction as well as associated infrastructure and ongoing expenditure for project operation and maintenance over the life of the project has the potential to deliver ongoing economic benefits. Whilst the Urquhart Point Project has an estimated life of 4 years, Oresome holds prospective ground for further mineral sands exploration, and it is our hope that the project will develop and Oresome will become a long term supplier of mineral sands.

5.6.6. Social

The project area is located > 3km from Weipa and is inaccessible by land. As such its impact on the regions dispersed rural population is minimal. Predominant land uses regionally include agriculture and bauxite mining. The proposed project area is currently host to feral animals including pigs and cattle and has number of illegal huts in various states of disrepair. Most are accompanied by rubbish dumps of varying sizes.

Population and demographics: The project has minimal potential to alter the population and demographic profile of the local community. The availability of skilled labour in the project area and the project workforce requirements during construction and operations will influence the extent to which a workforce – and their families – is required to migrate to the region. It is proposed that the workforce will be made up predominantly of traditional landowners and individuals from the Aurukun and Napranum communities as a commitment has been made to provide these groups with the first option of employment.

Employment: The project has the potential to provide direct and indirect employment opportunities. The extent of these opportunities will not only be linked to the types of occupations associated with mineral sand mining and beneficiation, but also the construction of project infrastructure and the shipping of approximately 50,000 tonne of material per annum for 4 years. The communities of Weipa, Napranum and Aurukun have the capacity and the human resources to support the Urquhart Point Mineral Sand Project.

Availability of skilled labour: One of the issues facing the project – and other projects in Queensland – is the competition for skilled labour and technical personnel. Increased pressure on the primary agricultural industry is already being observed as a result of segments of the skilled workforce transitioning from traditional regional industries such as agriculture and forestry and entering the mining sector. The workforce directly required for this project is estimated to be 10 full time personnel. Oresome Pty Ltd has made a commitment to source its human resource from the Aurukun and Napranum communities, and has begun discussions with the Aurukun Shire Council regarding appropriate training related to the skills required for the project.

Housing and accommodation: The development of this project will have little impact on the availability and affordability of accommodation and housing. The project will draw from a workforce with established housing and accommodation already integrated into the community

associated with the project area.

Health facilities and services: The presence of a project workforce can place an increased demand on health care services. In this event there is no significant short or longer-term increase in population, so it is not envisaged there will be an increased demand on existing health care practitioners, facilities and services.

Water, utilities and infrastructure: Increased population and the demands of a project can impact on the availability, reliability and sustainability of utilities and infrastructure such as electricity, gas, water, telecommunications and road networks. This project has very little potential to impact on current utilities and infrastructure.

Community, recreational and cultural facilities: The presence of the project and the associated local and regional economic impacts can provide an opportunity for increased range and quality of community facilities. Oresome's proposal to the traditional landowners includes the establishment of an outstation / ranger station when mining ceases. This will create an opportunity to develop Urquhart Point's cultural significance and manage the future impact of the community and recreational use of the land. Due to the sites proximity to Weipa yet its distance from its administering authority it has been misused and is suffering environmentally, culturally and aesthetically.

Community values and lifestyle: Understanding what community's value about their way of life and where they live is an integral component of social impact assessment. Oresome's consultation with the traditional landowners has influenced the decision making processes related to hours of operation and throughput in order to attract full time staff to the project. As a result all aspects of the project through to plant design have been affected.

Cumulative social impacts: There are a number of other existing and potential developments in this region. The impact of these concurrent projects and future developments needs to be considered on a cumulative basis as the presence of multiple projects can have a greater impact on areas such as workforce availability and the capacity of social services, public utilities, accommodation and retail services to accommodate the requirements of a project. The projects direct workforce of approximately 10 personnel is not expected to add significantly to the cumulative social impacts of the region.

5.6.7. Hazard and risk

Mining mineral sands at Urquhart Point will be an operation low in hazards and risk compared to most mining operations. The open pit mining process will not mine deeper than 3m, and on average 93% of the sand will be returned to the pit. The open pit will not share the risks associated with a classic drill and blast operation with 10m pit faces and with pits remaining open once mining is complete.

The beneficiation of the sands is a chemical free process utilising cyclones and spirals to separate the Valuable Heavy Minerals (on average 7% of the resource) from the ore bearing sands.

The inherent risks of exploration, mining and production activities will be well managed through Oresome's standard operational and development controls including specifically, Occupational Health and Safety Policies and procedures, and Engineering and Construction Procedures.

6. MINING ACTIVITIES AND POTENTIAL IMPACTS

All core operations that will be undertaken in the field have been identified, grouped logically and documented below. Potential issues associated with each activity have been identified and documented. The mitigations to be applied have also been documented. The risks of the activities are generally assessed using Oresome's internal risk assessment (risk matrix) processes, however for the purposes of discussion in terms of this IAS, risks after mitigations have been applied have been categorised as being either *'Of Concern'* or *'Not of Concern'*. Risks determined as being *'Of Concern'* are those that have:

- Permanent or long term (rather than transient) consequences.
- Consequences that may remain after Oresome operations have ceased and after rehabilitation have been completed.
- Significant likelihood of occurrence after mitigations have been applied.
- Consequences that will likely occur due to the nature of mineral sand extraction and accordingly cannot necessarily be mitigated through operational or environmental management controls.

6.1. Exploration and appraisal programs

To characterise and more accurately define Valuable Heavy Minerals within the project area exploration activities will continue. The key exploration activities are defined below.

6.1.1. Exploration and sample collection

The exploration for mineral sands involves traversing the area of interest, in a straight line grid pattern (if possible) and taking auger samples at regular intervals.

Potential issues include:

Table 10: Potential issues, exploration

Potential Issue	Mitigation	Potential Residual Impact
Disturbance of soil and associated siltation in surface runoff or creation of erosion pathways	Auger holes rehabilitated	Not of concern
Weed and pathogen ingress due to work crews and vehicles entering area	Vehicles washed prior to access	Not of concern
Disturbance of items of cultural value in the soil profile	Induction includes cultural responsibilities	Not of concern

6.2. Pit development

6.2.1. Site preparation

The actual physical location of pits will be dependent upon review of environmental and cultural heritage constraints mapping together with consideration of safety. Pits will generally have 10ha open at any one time. This is an area that is sufficiently large enough to provide adequate supply of sand to maintain production until barren sand is returned to the pit to be re-contoured and

begin the rehabilitation process.

Site preparation generally involves:

- Cultural Heritage clearance.
- Vegetation clearance and stockpile.
- Stockpile of topsoil.
- Excavation of a pit to begin primary screening of sand.

Access to the pit site is prepared. Tracks will be cleared but not formed. Due to the nature of the site one continuous haul road is proposed with very few 'network' tracks required.

Generally mine site facilities will be limited to day workers requirements as miners will generally stay in nearby Weipa or Aurukun and boat in boat out for daily operations. Site activities will generally only be conducted during daylight hours.

Potential issues include:

Table 11: Potential issues, pit development

Potential Issue	Mitigation	Potential Residual Impact
Disturbance of soil and associated siltation in surface runoff or creation of erosion pathways	Pit design to minimise run off	Not of concern
Weed and pathogen ingress due to work crews and vehicles entering area	Vehicles washed prior to access	Not of concern
Disturbance of items of cultural value in the soil profile	Induction includes cultural responsibilities	Not of concern
Release of hydraulic fluids or diesel resulting in contamination of land or stormwater runoff.	All equipment carry spill kit and procedure	Not of concern
Runoff from topsoil stockpiles resulting in siltation in surface and or stormwater runoff.	Stockpiles to be bunded with geo-textile silt trap	Not of concern
Interaction with wildlife during operations.	All staff have first aid certificate and communications	Not of concern
Generation of solid and liquid waste from site activities.	All waste removed from site by waste removal contractor	Not of concern
Emissions of noise from the mining and associated equipment.	All on site equipped with appropriate safety equipment	Not of concern
Emissions to air from mining and associated equipment (from combustion of diesel)	All equipment maintained to AS	Not of concern
Emissions to air from mining and associated equipment (dust)	Water truck	Not of concern

6.2.2. Pit establishment and mining operations

Pits are nominally opened up to 10ha (but total depth is dependent on the mineral sand reserves). Vegetation is stockpiled as is any topsoil utilising a front end loader. Excavation is by front end loader and excavator. Pit depth is generally <3m.

Mining is generally conducted 12 hours per day in one 12 hour shift. Dependent upon the rate of production, operations will generally be five, but may be seven days per week. Mining crews generally comprise a small number of personnel including employees and contracted personnel. Any services required during the mining process are transported to the site by boat or barge, and then along unsealed access tracks. Mining materials are generally transported within the site on support vehicles. Work crews will be accommodated in nearby towns and transported to the mine site by boat on a daily basis. Toilet facilities are provided onsite for the work crew, the facilities will be approved by the local council as necessary and be included in the projects Water Management Plan. These would be maintained by Oresome and pumped out by a contract waste management firm.

Potential issues include:

Table 12: Potential issues, mining

Potential Issue	Mitigation	Potential Residual Impact
Disturbance of soil and associated siltation in surface runoff or creation of erosion pathways	Pit design to minimise run off	Not of concern
Weed and pathogen ingress due to work crews and vehicles entering area	Vehicles washed prior to access	Not of concern
Disturbance of items of cultural value in the soil profile	Induction includes cultural responsibilities	Not of concern
Release of hydraulic fluids or diesel resulting in contamination of land or stormwater runoff.	All equipment carry spill kit and procedure	Not of concern
Runoff from topsoil stockpiles resulting in siltation in surface and or stormwater runoff.	Stockpiles to be bunded with geo-textile silt trap	Not of concern
Interaction with wildlife during operations.	All staff have first aid certificate and communications	Not of concern
Generation of solid and liquid waste from site activities.	All waste removed from site by waste removal contractor	Not of concern
Emissions of noise from the mining and associated equipment.	All on site equipped with appropriate safety equipment	Not of concern
Emissions to air from mining and associated equipment (from combustion of diesel)	All equipment maintained to AS	Not of concern
Emissions to air from mining and associated equipment (dust)	Water truck	Not of concern

6.3. Heavy Mineral Sand separation facility and installation / operations

The sand treatment facility will be designed and built by a specialist construction company, to meet current industry standards for safety, operability and maintenance. The facility will be designed to a large extent for automated, unmanned operation.

Sand treatment is by cyclone and spiral separation of heavy mineral sand. The sand treatment facility will comprise:

- Primary screening plant
- Slimes separation by cyclone
- Sand separation by spirals
- Dewatering by cyclone
- Tank for collection of feed water to provide buffer capacity may be required.

Potential issues include:

Table 13: Potential issues, treatment

Potential Issue	Mitigation	Potential Residual Impact
Disturbance of soil and associated siltation in surface runoff or creation of erosion pathways	Construction areas to be bunded with geo-textile silt trap	Not of concern
Weed and pathogen ingress due to work crews and vehicles entering area	Vehicles washed prior to access	Not of concern
Disturbance of items of cultural value in the soil profile	Induction includes cultural responsibilities	Not of concern
Release of hydraulic fluids or diesel resulting in contamination of land or stormwater runoff.	All equipment carry spill kit and procedure	Not of concern
Interaction with wildlife during operations.	All staff have first aid certificate and communications	Not of concern
Generation of solid and liquid waste from site activities.	All waste removed from site by waste removal contractor	Not of concern
Emissions of noise from the construction and associated equipment.	All on site equipped with appropriate safety equipment	Not of concern
Emissions to air from construction and associated equipment (from combustion of diesel)	All equipment maintained to AS	Not of concern

6.4. Operation and maintenance

6.4.1. Site operation and maintenance

Once the plant is operational sand will be introduced to the primary in pit screen / slurry plant that would consist of a feed bin, conveyor / apron feeder to a trommel with undersize slurried in a hopper and pumped to rougher spirals, oversize will be conveyed to a pile and returned to the barren pit.

Sand will then enter a four stage spiral circuit as Rougher spirals (18 triple starts MG4's), Mid Scavenger spirals (9 triple start MG4's), Cleaner spirals (6 twin start HG10's) and Recleaners 4 twin start HG10's.

Tails (Barren Sand) is pumped back to a void behind current mining to a skid mounted cyclone stacker.

The concentrate is pumped to a static cyclone stacker for drainage ahead of trucking to the load out pad.

Plant water returns via an open top tank / slime settling pond with decant going to the process water tank. Bore water is added to maintain the process water level and then distributed to plant and in pit unit (see **Appendix A**, Conceptual Process Flow Diagram).

The maintenance crew will inspect the plant daily to complete scheduled maintenance and tests.

Operation and Maintenance for this equipment is predominately focused around the engines maintenance requirements. This includes the ongoing planned maintenance activities and corrective maintenance for repair of fault conditions. Key tasks completed during plant maintenance include:

Engine and pump maintenance: Maintenance will be carried out daily and incorporated with pre-start checks. This requirement will reduce down time.

Spiral and cyclone maintenance: Spirals and cyclones occasionally fail. When this occurs, units will be replaced or repaired.

Mobile equipment maintenance will take place during prestart checks. Any maintenance that includes the changing of fluids or heavy mechanical work will take place undercover on the bunded workshop floor. This will minimise any potential risk to the environment.

Potential issues include:

Table 14: Potential issues, maintenance

Potential Issue	Mitigation	Potential Residual Impact
Disturbance of soil and associated siltation in surface runoff or creation of erosion pathways	Production area to runoff to channelled to geo-textile silt trap	Not of concern
Weed and pathogen ingress due to work crews and vehicles entering area	Vehicles washed prior to access	Not of concern
Disturbance of items of cultural value in the soil profile	Induction includes cultural responsibilities	Not of concern
Release of hydraulic fluids or diesel resulting in contamination of land or stormwater runoff.	All equipment carry spill kit and procedure	Not of concern
Disposal of maintenance consumables and obsolete parts and equipment	All waste removed from site by waste removal contractor	Not of concern
Interaction with wildlife during operations.	All staff have first aid certificate and communications	Not of concern
Generation of solid and liquid waste from site activities.	All waste removed from site by waste removal contractor	Not of concern
Emissions of noise from the construction and associated equipment.	All on site equipped with appropriate safety equipment	Not of concern
Emissions to air from construction and associated equipment (from combustion of diesel)	All equipment maintained to AS	Not of concern

6.5. Decommissioning and rehabilitation

6.5.1. Mine site decommissioning and rehabilitation

Mines are decommissioned on an ongoing basis as resources are exhausted. The mining operation is a continuous process of pit face development (removing ore bearing sand following the mineral sand 'strands') followed by continuous backfilling of the pit with barren sand returned from the plant. Sand returned to the pit is re-contoured, topsoil and vegetation material replaced to begin the rehabilitation process. The site is rehabilitated with species consistent with the local area. Rehabilitation may involve resurfacing ground levels regrading surface topsoils, ensuring erosion controls are in place, and re-establishing drainage lines and native species.

During the decommissioning and rehabilitation of pit sites, front end loader, excavator, tip trucks, four-wheel drive (4wd) vehicles will be used.

Whilst Oresome is prepared to remove all infrastructure from the site, discussions at this stage with the traditional landowners (Wik and Wik Way Peoples), who will be the owners of the land at the completion of the mining operation, have indicated that they will accept ownership and responsibility for the site offices and associated infrastructure. A letter to this effect will accompany the Plan of Operations in due course.

Potential issues include:

Table 15: Potential issues, decommissioning and rehabilitation

Potential Issue	Mitigation	Potential Residual Impact
Disturbance of soil and associated siltation in surface runoff or creation of erosion pathways	Erosion controls such as geo-textile barriers + silt traps	Not of concern
Weed and pathogen ingress due to work crews and vehicles entering area	Vehicles washed prior to access	Not of concern
Disturbance of items of cultural value in the soil profile	Induction includes cultural responsibilities	Not of concern
Release of hydraulic fluids or diesel resulting in contamination of land or stormwater runoff.	All equipment carry spill kit and procedure	Not of concern
Interaction with wildlife during operations.	All staff have first aid certificate and communications	Not of concern
Generation of solid and liquid waste from site activities.	All waste removed from site by waste removal contractor	Not of concern
Emissions of noise from mobile and associated equipment.	All on site equipped with appropriate safety equipment	Not of concern
Emissions to air from mobile and associated equipment (from combustion of diesel)	All equipment maintained to AS	Not of concern

6.5.2. Site rehabilitation

Oresome has been in discussions with groups that will be potentially affected by the development of this project for some time and part of the commitment that has been made to traditional owners and the Aurukun Shire Council is the assistance with removal of the many illegal squatters huts, removal of the numerous rubbish dumps throughout the area and rehabilitation of the dredge spoil site on the northern point (**Figure 2**). This is a few of the many commitments Oresome has put forward that it is hoped will leave Urquhart Point in a better condition both environmentally and culturally than it is today.

The removal from site of the remains of huts and rubbish, and the re-contouring of dredge spoil and bund walls will open up areas that will be included in the rehabilitation plan for the site.

Potential issues include:

Table 16: Potential issues, site rehabilitation

Potential Issue	Mitigation	Potential Residual Impact
Disturbance of soil and associated siltation in surface runoff or creation of erosion pathways	Erosion controls such as geo-textile barriers + silt traps	Not of concern
Weed and pathogen ingress due to work crews and vehicles entering area	Vehicles washed prior to access	Not of concern
Disturbance of items of cultural value in the soil profile	Induction includes cultural responsibilities	Not of concern
Release of hydraulic fluids or diesel resulting in contamination of land or stormwater runoff.	All equipment carry spill kit and procedure	Not of concern
Interaction with wildlife during operations.	All staff have first aid certificate and communications	Not of concern
Generation of solid and liquid waste from site activities.	All waste removed from site by waste removal contractor	Not of concern
Emissions of noise from mobile and associated equipment.	All on site equipped with appropriate safety equipment	Not of concern
Emissions to air from mobile and associated equipment (from combustion of diesel)	All equipment maintained to AS	Not of concern

7. MANAGEMENT STRATEGIES

7.1. Activity based environmental management process and controls

Management of environmental impacts associated with the project (detailed above) is activity based. For each of the activities a specific set of applicable Environmental Management Procedures will be applied. The appropriate application of specific procedures will be detailed in an *Environmental Management Process & Control Procedure*, which will contain a description of the process that (through a sign off process) will ensure the correct application of specific environmental controls to each of Oresome's site activities.

7.2. Potential residual environmental impacts of concern

The assessment of residual impacts of the proposed operations is a core component of the project. In terms of development planned in the area, it is intended that no impacts that remain will be of concern (after procedures have been implemented). Areas with the highest potential for residual impacts:

7.2.1. Reduction of ecological values of the land and water in the vicinity of the development.

This is particularly due to the fact that the land has been extensively cleared and that remnant vegetation and habitat accordingly have elevated conservation status. Oresome will wherever possible avoid areas of significant ecological value but due to the broad nature of the development this potential impact remains of concern.

7.2.2. Storage and disposal of associated water.

This is anticipated to have minimal effect on the land and ground and surface water resources, as adequate, appropriately designed and constructed management facilities identified in the EIS process.

7.2.3. Emissions of noise from equipment and emissions to air from equipment.

These are identified as potential residual environmental impacts of concern. This is not necessarily because of the noise or pollutants that will be emitted but because emissions that may occur will be emitted into an environment that is predominantly unaffected by noise and air pollutant emissions at this time. Even with noise attenuation at source it will be virtually impossible for the operations to sustain those low background levels. Similarly the air environment has been exposed to limited point source emissions. Even with a clean burning fuel and low emissions technology applied, changes to the air shed may result from this development (and those of a similar nature in the region).

8. REFERENCES

Air NEPM Standards
Archaeological and cultural heritage survey by Earth Sea Heritage Surveys (Richard Woolfe) and Northern Cultural Heritage (Michael Morrison) completed in November and December 2007
URS Gaps Analysis Study – Biodiversity Information and Environmental Assessment Requirements for Mineral Sand Leases near Weipa, Qld – 2nd November 2006.
Queensland Acid Sulfate Soil Technical Manual, Legislation and Policy Guide Version 2.2
Environment Protection Act 1994 (QLD)
Environmental Protection (Air) Policy 2008 (QLD)
Environmental Protection Regulation 2008 (QLD)
Environmental Protection (Waste Management) Policy 2000 (QLD)
Environmental Protection (Water) Policy 1997 (QLD)
Queensland Water Recycling Guidelines December 2005
Queensland Government – Wildlife Online 6/01/2011
River Improvement Trust Regulation 1998
Wild Rivers Act 2005

Appendix A.
Conceptual Process Flow Diagram