Sherwin Creek and Hodgson Downs Mining Area

Iron Ore Project

Notice of intent

Area C, X, and W

SHERWIN IRON LTD

November 2012

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1 Introduction

1.1 Project Background

Between 1955 and 1961, BHP Billiton (BHP) investigated iron ore prospects in the district around Roper Valley. In January 2010 Sherwin Iron Limited (Sherwin Iron) (then known as Batavia Mining Limited) acquired the Roper River Iron Ore Project. Under the terms of the option agreement, Sherwin Iron had until 29 July 2010 to conduct due diligence, including exploration, and decide whether to exercise the option. Sherwin Iron later secured an extension to exploration activities until 29 August 2010. In late August 2010, Sherwin Iron exercised the option to acquire the Project and the acquisition was complete 24 September 2010.

The Roper River Iron Ore Project comprises six areas across three Exploration Leases. The total resource is 488 million tonnes (Mt) at 42% Fe (combined deposits X, W, T, U, Y, M, B, and C). For the development strategy, Sherwin Iron has identified and optimised for three groups of deposits:

- HG (High grade) ore at 57% Fe;
- LG (Low Grade) ore at 48% Fe; and
- MW (Mineralized Waste) at 40% Fe

The High Grade ore is suitable as a Direct Shipping Ore (DSO) resource. The LG ore can be beneficiated to 60% Fe. The MW is not currently considered saleable ore. The latest study on mineral resource estimate shows that there is a potential Direct Shipping Ore (DSO) resource in Deposit C (18.2 Mt at 58.3%Fe), Deposit X (8.07 Mt at 57.51%Fe) and Deposit W (7.39 Mt at 56.71%Fe).

Sherwin Iron plans to commence DSO operations within the Sherwin Creek Area (MLA 29584) and Hodgson Downs Mining Area (MLA 29070, 29071 and 29437) (Figure 1-1), on Deposits C, X and W. These tenements lie within Exploration Licences held in the name of Sherwin Iron (NT) Pty Ltd, which is a subsidiary company owned by Sherwin Iron Ltd

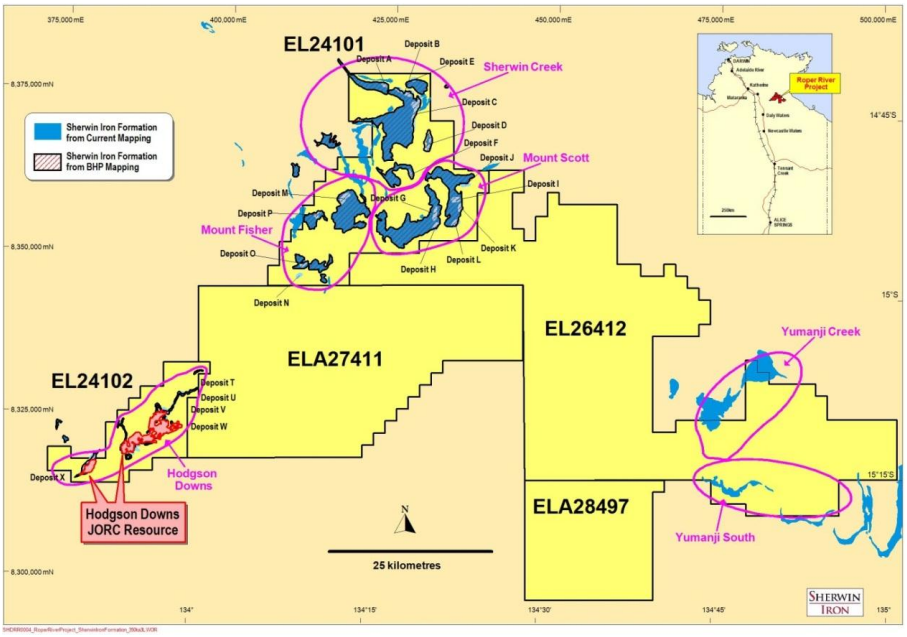

Figure 1-1. Location of the project.

1.2 Project Location

The project is located in the Northern Territory 450km SE of Darwin and 120km east of Mataranka. The project is linked to Darwin and Katherine by the Stuart Highway and the nearby Darwin to Adelaide railway, which pass within 120km of the tenements. A good quality sealed road connects the project area with the main Stuart Highway.

It is intended that the iron ore from Mineral Leases over Deposits C, W and X will be transported via land access and railway to Darwin Port (Figure 1-2). The closest settlements to this area are Mataranka, roughly 100km west, Ngukurr approximately 100km North East and Minyerri 16km south. Ngukurr is the largest settlement in the region with more than 1500 residents.

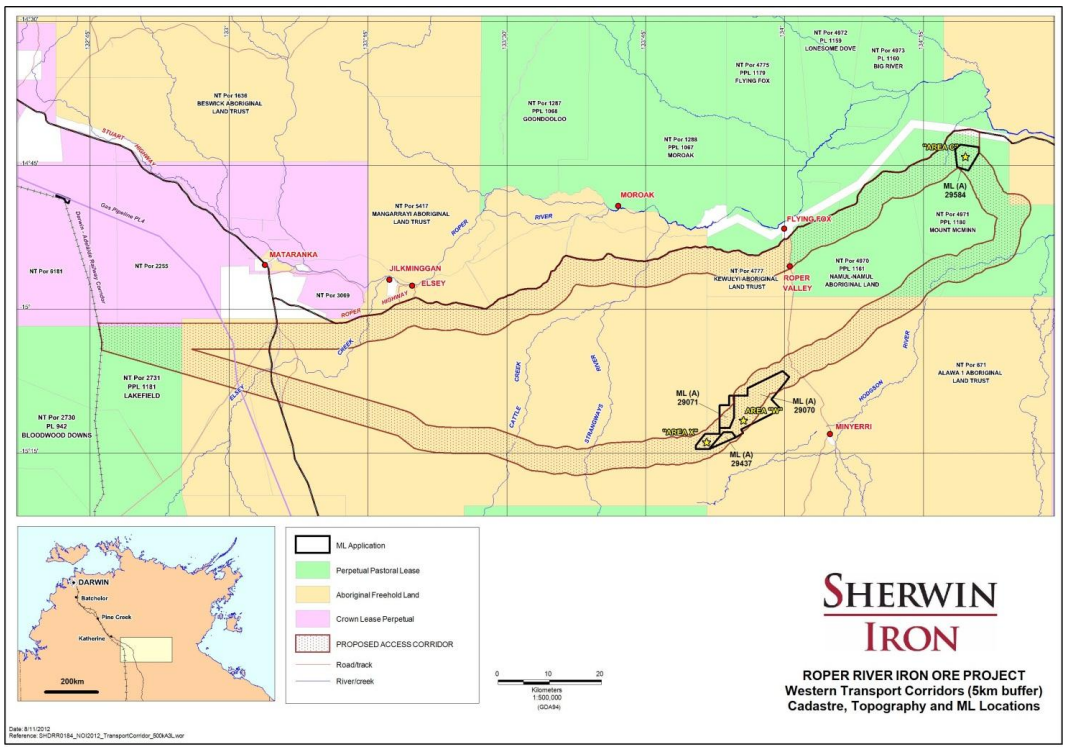

Figure 1-2. Location of Deposits; C, X, and W & Access to Darwin Port

1.3 Purpose of the Notice of Intent

This Notice of Intent (NOI) provides formal notification to the Northern Territory Government and other interested parties of Sherwin Iron's intention to develop first stage mining of DSO at Sherwin Creek (Area C) within EL24101 and Hodgson Downs (Area X and W) within EL24102, and associated facilities to support the project. It provides the required information to the Department of Mines and Energy (DME) and Department of Land, Planning and Environment (DLPE) to determine the appropriate level of environmental assessment for the Project.

This NOI has been prepared in accordance with the DLPE *Information Guidelines for a Notice of Intent* (DLPE 2007, Appendix 1), as summarised in Table 1-1, and the DME *Environmental Assessment of Mining Proposals Advisory Note* (DME, 2008).

Table 1-1. Information requirements for an NOI (DLPE)

NOI Requirement	Report Section
1. Name of proponent and consultant	1.4
2. Address and contact details of proponent	1.4
3. Location of proposal	1.2
4. Description of a proposal	2
5. Outline of legislative consent and licensing requirements	4
6. Description of site and existing environment	3
7. Description of existing marine and land uses in and adjacent to proposal	3.2
8. Description of waste management and pollution control on and offsite	2.5
9. Description of other environmental factors	3
10. Identification of greenhouse gas emissions from the proposal	5.5
11. Aboriginal and sacred sites clearance	3.8 & 4
12. Description of timing, including stages and decommissioning	2.9
13. Description of environmental commitments, safeguards, and monitoring	5 & 6
14. Description of proposed rehabilitation and decommissioning	5.8

1.4 Proponent Details Company Details and Contacts

Name:	Sherwin Iron Ltd
Address:	GPO Box 3494, Darwin, NT 0801, Australia
Telephone:	(08) 8941 3844
Facsimile:	(08) 8941 4355
ABN:	98 009 075 861
Point of Contact:	Mr Rodney Illingworth
Mobile	0439 844 830
Email:	rodney.illingworth@sherwiniron.com.au

2 Project Description

2.1 Proposed Development Overview

The Roper River Iron Ore Project is a large resource with a predicted long mine life. Sherwin Creek area (Deposit A, B, and C) currently has a total of 320 million tonnes of resource at 40.1%Fe while the Hodgson Downs area (Deposit X and W) has a total of 107 million tonnes of resource at 47.0%Fe. The deposits are large low-grade hematite-goethite iron resources and exploration results infer more extensive deposits. For the development strategy, Sherwin Iron has identified and optimised for three groups of deposits:

- HG (High Grade) ore at 57% Fe for DSO;
- LG (Low Grade) ore at 48% Fe, which can be beneficiated to 60% Fe product from current Metallurgical test work; and
- MW (Mineralized Waste) at 40% Fe which is currently not considered saleable.

In the initial stages the project will involve the development of open pits to mine DSO at the Sherwin Creek (Deposit C) and at the Hodgson Downs (Deposits X and W); the development of some infrastructure (workshops, office, laydown, magazine, drainage, others); an area for DSO stockpile at the Mine (ROM), Rail Siding and Loading Facility, and Stockpile at Darwin Port; Low Grade stockpile area and Waste dump area at the mine site; Area for Fines Reject Storage; Transport corridor construction between Deposit C to W, W to X, and from each of Deposits C and X via separate haul routes to a new proposed Railway Siding west of the Stuart Highway, near Mataranka (as shown in Figure 1-2); Haul Road between pit and stockpiles; Service Roads within the project; and accommodation village. The project will also involve the construction of a dam to supply the project with water.

The current proposed logistic of DSO product from Deposits C, X, and W to Darwin Port will be accomplished through several steps as illustrated in Figure 2-1.

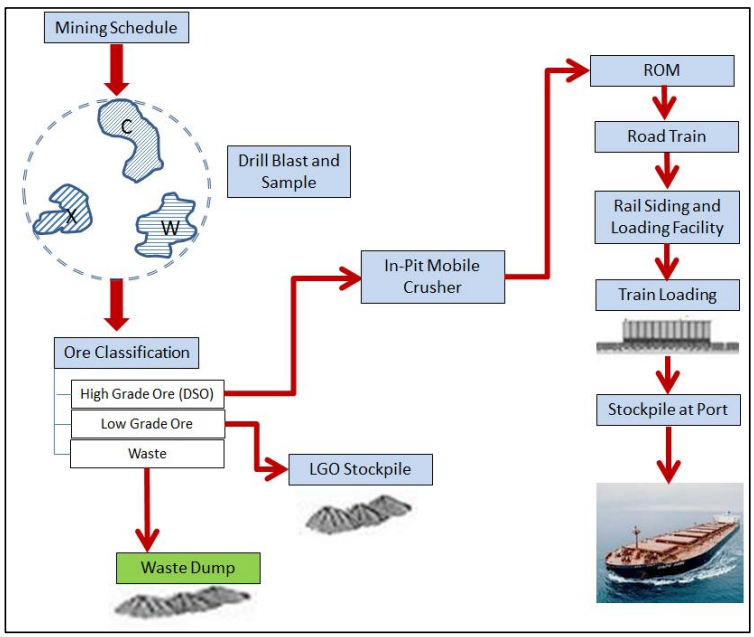

Figure 2-1. DSO logistic from Deposit C, X, and W

DSO will be mined, crushed, and stockpiled at ROM stockpile for blending if it is required, before it is transported by Road Train to the Railway Loading Facility. During mining, LG ore will be mainly stockpiled while mine waste material will be used to construct roads, the berm wall of Fine Reject Storage (FRS) area, laydown area, and stockpile area. However, an out of pit waste dump will be built during the initial mining stages for each pit. However as the pits progress or are completed in-pit waste dumps and stockpiles will be utilised to minimise our environmental footprint.

The following table 2-1 shows the total disturbance area associated with the DSO operations.

Table 2-1: Total Disturbance Area of DSO Operations

Location		Area Disturbed (ha)
Deposit C	Pit Area	221.0
	Low Grade Stockpile	30.0
	Waste dump	66.0
	ROM + Ramp + Workshop	45.0
	Camp and Access	4.5
	Mine Office	1.0
	Magazine	0.4
	FRS and Dam Wall	60.0
	Road from C to Rail Side	405.0
	Road from C to W deposit	270.0
Deposit X and W	Pit W Area	263.9
	Pit X Area	145.0
	Low Grade Stockpile X and W	14.1
	Waste dump X deposit	35.4
	Waste Dump W deposit	47.2
	ROM for X and W	10.0
	Camp and Access	4.5
	Mine Office	1.0
	Magazine	0.4
	Workshop	5.0
	Road Service X and W	20.0
	Road from X to Rail Side	360
Dam	Located between W and X	173.0
Total		2057.4

A combination of Surface Miner and Haul Truck will be used for mine operation. A combination of Hydraulic Excavator and Haul Truck will be used for pre-stripping work. There will be limited drill and blast activity in the area as the material will be mostly excavated by excavator equipment directly, however a magazine will be constructed to anticipate requirement for drill and blast activities. A Mobile Crushing Plant will be used during the initial stage of DSO operation.

As DSO material is mostly located at shallow depth there are unlikely to be any water issues during mining. However a groundwater borehole may be required to control the water level in the pit as well as to provide water supply to the Project. Within the project area, numerous small creek channels and gullies are present. Flow into these channels and gullies only occurs during the wet season between December and March. As

the groundwater and water table are mostly located below the deposit, there is likely very minor occurrence of acid forming in the area, i.e. according to the current block model there is 11,302 tonnes of ore containing an average Sulphur (S) grade of 0.32% at Area C.

2.2 Project Components and Timing

Table 2-2. Project Components and Timeframe.

Component	Details and timeframe
Proposed Construction Commencement	Q3 2013
Proposed Operation Commencement	Q1 2014
Life of Mine	7years (with provision to 12 years)
Estimated Year of Decommissioning	2021
Size of Orebody (DSO)	39.2Mt
Ore Type	Oolitic Haematite
Estimated Total DSO Production	3Mtpa to 6Mtpa
Strip Ratio	2:1
Number of Pits	3
Depth of Pits	10m to 40m
Estimated Recoverable Topsoil	0 to 2m thick and average of 0.5m
Crushing Rate	3-6Mtpa max
Ore Grade	58.0% Fe
Estimated Total Disturbance Footprint	1,545 hectares or 15.45 km^2
Workforce construction	200
Workforce operations	Maximum 300 (150 at C and 150 at X&W)

2.3 Mining Activities and Design

2.3.1 Mineral Resources

Mineral Resources estimates for Deposit C, X, and W have been reported during early 2012. The DSO iron materials estimate is carried out by Sherwin Iron and externally audited, based on assay data from drilling of 252 RC drillholes and 18 diamond drillholes for deposit C; 159 RC drillholes and 6 diamond drillholes for deposit X; and of 461 RC drillholes and 72 diamond drillholes for deposit W. The drillhole spacing at Deposit C, X and W was to a nominal 400 x 200m pattern for low grade area and 200 x 100m pattern for DSO resource area.

Based on the input data quality and the approach to interpretation, modelling and estimation, Mineral Resource confidence is sufficient to classify Inferred Mineral Resources, according to JORC 2004, for the higher grade mineralisation only.

The indicated and inferred DSO resource category breakdown of Deposits C, X, and W reported with cut-off grade above 55% Fe is shown in Table 2-3.

Table 2-3. In-situ Mineral Resource Estimate Result for Deposits C, X, and W

Deposit	Cut-off Fe (%)	Category	Tonnes (Mt)	sg	Fe (%)	SiO2 (%)	Al2O3 (%)	P (%)	S (%)	LOI (%)
Sherwin Creek Deposit C	55	ind/Inf	18.4	2.68	58.3	12.4	1.1	0.027	0.003	2.5
Hodgson Downs Deposit X	55	ind/Inf	9.2	2.68	58.1	11.7	2.1	0.093	0.011	2.5
Hodgson Downs Deposit W	55	ind/Inf	11.6	2.68	57.5	11.6	2.3	0.086	0.008	2.7
Total	**55**	**ind/Inf**	**39.2**	**2.68**	**58.0**	**12.0**	**1.7**	**0.060**	**0.006**	**2.5**

Note: 96% indicated Resource

2.3.2 Geotechnical

Geotechnical parameters are obtained from drill core information and field inspection. A formal geotechnical study is scheduled prior to the development of a detailed feasibility study. A typical geotechnical parameter for Deposit C, X, and W pit design is provided in Table 2-4. It is unlikely that there will be geotechnical issues for the DSO operation as it involves a shallow pit with pit depth varying from 0 to 30 metres.

Table 2-4. Typical Pit Design Parameter at C, X, and W Deposits

Geotechnical Parameters at Deposit C, X, and W			
Deposit	Single Wall (^{o})	Berm Width (m)	Bench Height (m)
C, X, W	45	5	10

2.3.3 Hydrogeology

2.3.3.1 Surface Water

The Project area is located within the Daly Roper Water Control District (WCD), with the mine tenements located within two catchments, i.e. the Roper River and Towns River Catchment (URS, 2010).

The major river systems, including Strangways, Hodgson and Roper River, are both perennial (Roper River) and intermittent (URS, 2010), both the Strangways River (west of the Project area) and Hodgson River (within ELA27411) flow north then north-easterly towards Roper River that is located on the northern region of the Project area. The Roper River then flows easterly towards the Gulf of Carpentaria.

Within the Project area, numerous small creek channels and gullies are present. Flows in these channels and gullies are only expected in the wet season between December and March, unless they are fed by groundwater baseflow (URS, 2010).

Based on climatological data at Ngukurr and Larrimah weather stations (URS, 2010), the average annual rainfall is between 800 and 900 mm, and with low rainfalls expected between May and October. Flooding

during the wet season is likely to occur in low-lying areas, with access by road reportedly restricted between January and mid-March.

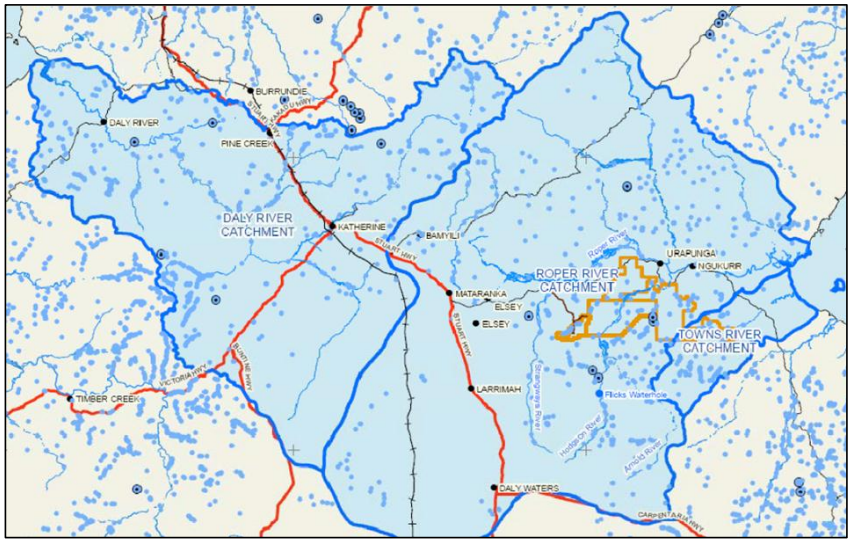

Figure 2-2. Catchment Area

The Project proposes to construct a dam where LD Creek runs along the western side of the Hodgson Downs deposit (Figure 2-3). The dam will cover an area of 173 hectares. The dam will be filled by wet season rains.

The MOC will be supplied by raw water from the dam. The accommodation village water supply will be provided from the dam and stored in three 45kL and two 35kL tanks and treated via a Reverse Osmosis (RO) Water Treatment Plant.

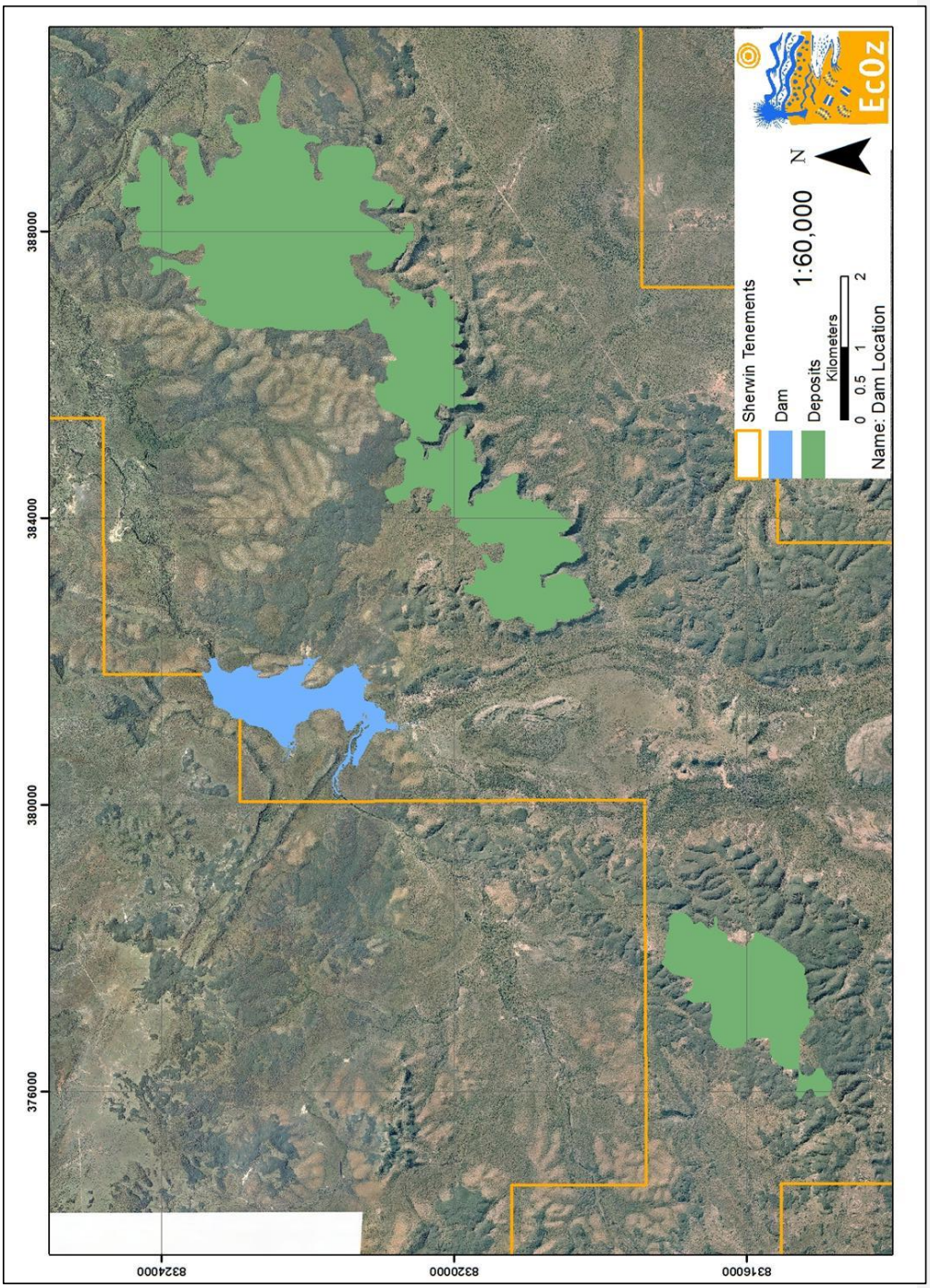

Figure 2-3. Location of the Dam

2.3.3.2 Ground Water

Groundwater reserves in the region are extensive and are responsible for surface water flows during the dry season (Kraatz 2004). The Project area is situated in the McArthur Basin, an extensive area dominated by fractured and weathered sedimentary rock supporting local scale aquifers, where discharge areas are typically less than 5km from recharge areas (Tickell 1994).

A desktop hydrological review was carried out by URS in 2010 to assess the potential of supplying 5.8ML/d (or 67L/s) of groundwater within the radius of 100km of Hodgson Downs area (i.e. one of the mine tenements within the Project area). According to the URS report (2010), the Project area is underlain by Roper Group (essentially sedimentary rocks) within the McArthur Basin, and the groundwater is expected to be sourced from fractured and weathered rock aquifer(s) underlying the site.

The groundwater potential within the Project area and its vicinity is indicated by the presence of three main borefields:

- Roper Valley Borefield (adjacent west of Area C and north of Area B, outside the Project area);
- Hodgson Downs Borefield (southern region of EL27411, i.e. south of Area B); and
- Minyerri Borefield (immediate south of mine tenements; upstream of Hodgson Downs Borefield).

Potential groundwater yield per bore is thought to be less than 5L/s and groundwater salinity ranges from fresh to brackish (URS, 2010).

Further hydrogeological investigations, however, will be required to establish the baseline groundwater data (including water quality) and to ascertain the actual yield or groundwater potential underlying the Project area for water supply purposes. Potential environmental impacts towards the surrounding areas due to possible groundwater abstraction or pit dewatering will also be evaluated in the later investigations.

2.3.3.3 Water Management

The following water management for both surface and groundwater are anticipated:

- Drainage structures will be designed and constructed to ensure minimal alteration to existing surface drainage patterns;
- Pre-existing haul roads and access tracks will be used to minimise interference to natural drainage;
- Drainage areas and settling basins will be suitably designed to minimise contamination of surface water;
- Any new disturbance areas will be located to avoid drainage lines and designed for minimal impact on surface drainage as far as practicable;
- Develop and implement the Surface Water Management Plan and Surface Water Sampling Procedure;
- Design, install and manage surface water diversion structures that enable non-contaminated water to be directed around disturbance areas;
- Install erosion and sediment control structures downstream of disturbance areas;
- Groundwater, if feasible for extraction, will be used for construction and operation activities and excess will be disposed / discharged off-site in an approved manner;
- Saline groundwater, if encountered, will be discharged to an evaporation/infiltration pond;
- The mine will be designed to ensure the safe storage and handling of hazardous materials (and to Australian Standards) to prevent contamination;

- Groundwater extraction will be in accordance with groundwater extraction licenses issued by the relevant NT Government authority; and
- Monitoring will be carried out as per groundwater extraction licence conditions.

2.3.4 Mine Design

Sherwin Iron has completed the conceptual design of Deposit C, X, and W. The current pit design work is based on pit optimisation shells. The current pit design for Deposit C, X, and W covers approximately 221 hectares, 145 hectares, and 264 hectares respectively. The Pit is designed following the floor of the ore, intersected with topography. Design parameters are as shown in Table 2-4 above. The current pit design has not considered the in-pit roads as, at this stage, the pit design is still not final and needs further revision once more information is gathered (see Figure 2-4 to Figure 2-6 for provisional design of pits).

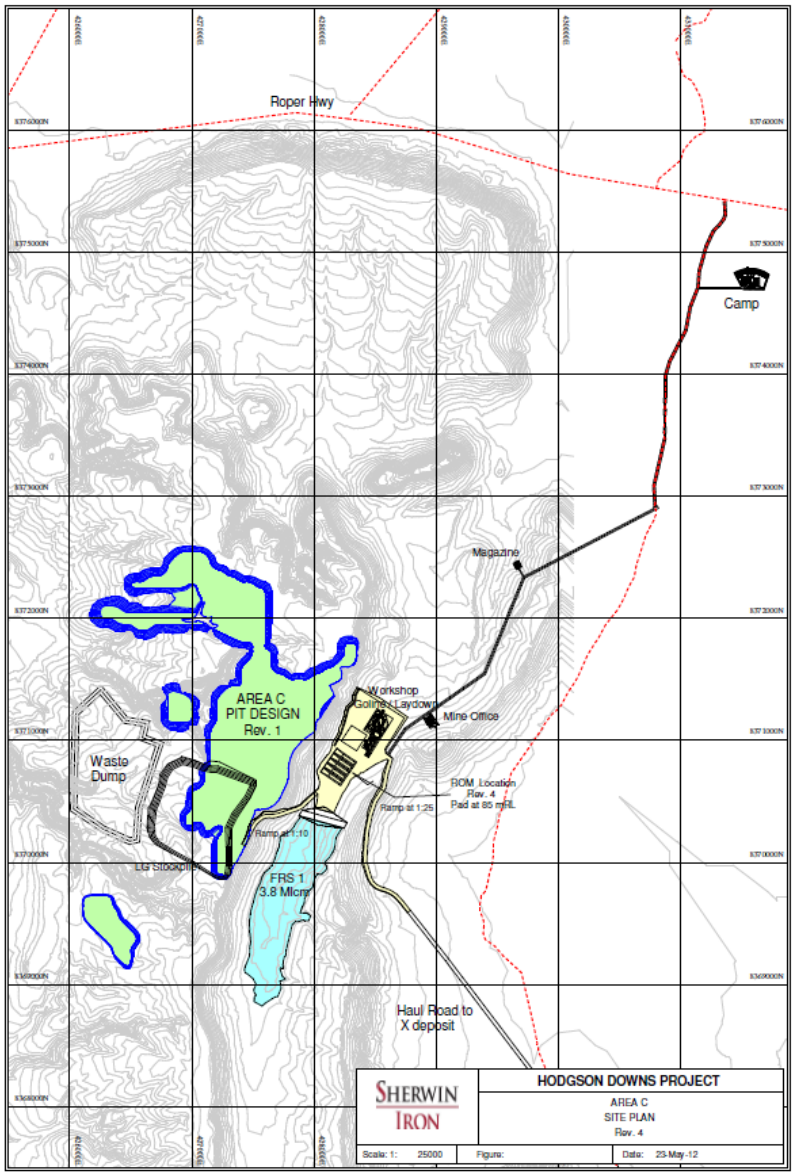

Figure 2-4. Deposit C Pit Layout

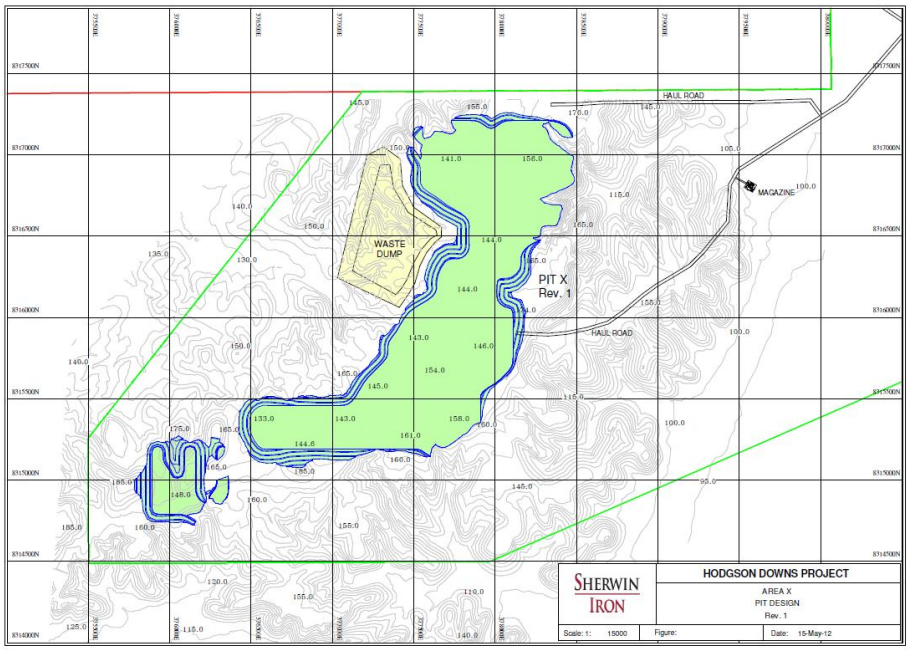

Figure 2-5. Deposit X Pit Layout

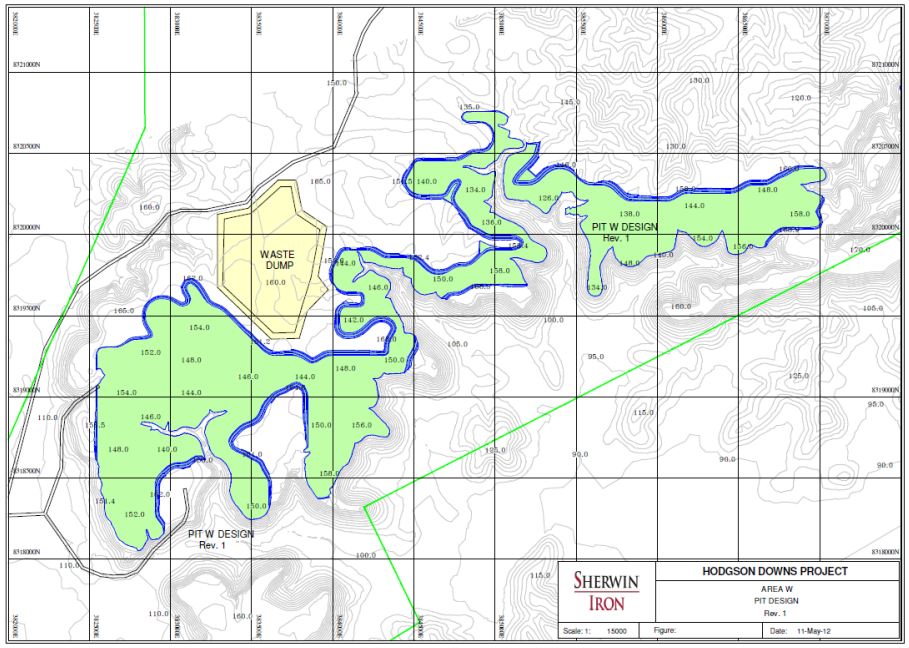

Figure 2-6. Deposit W Pit Layout

2.3.5 Proposed Mining Operation

2.3.5.1 Contract Mining

All stages of the mining operations will be mined by a competent open pit mining contractor, under the supervision of the Sherwin Iron site mining personnel. The supply of the mining equipment will be the responsibility of the contractor.

2.3.5.2 Mining Equipment

Deposits C, X and W will be open pit operations, with a mining beneficiation method involving loading, hauling, and crushing. The selection of the load and haul fleet is still to be fully determined, possible options are hydraulic excavators and surface miners for load operations and off highway rear dump trucks will be used for haul operations. The selection of Surface Miner for ore extraction is considered appropriate as the deposits are sedimentary type deposits and current testing shows it to be quite friable. The utilisation of Surface Miners will also bring additional benefit to reduce the dilution due to selective mining, increased recovery, reduction of ultra-fines material, reduction of blasting requirements, and reducing crushing activity. However, the possibility of using a combination of hydraulic excavator and trucks will also be explored when it is required, especially during pre-strip and overburden removal.

Limited drilling and blasting activities are anticipated but further geotechnical work is required to determine ore hardness, abrasiveness, drilling and blasting patterns, and powder factors. For a crushing operation, at this preliminary stage, an in-pit mobile crusher is anticipated.

2.3.5.3 Mining Sequence

At Deposit C, the sequence of mining within the pit is from the Southern end and moving gradually towards the Northern end of the pit. The void created at the Southern end of the pit is to be temporarily used as additional storage of the LG ore. The LG ore will mainly be placed South West of the pit with total a capacity of 16 million loose cubic metres (LCM) including inside the southern side of the pit. It will take approximately five to six years to mine out the DSO at deposit C, as shown in Figure 2-7.

The mining sequence at Deposit X and W will begin in Deposit X from the Northern side of the pit and progress to the southern side of the pit; however the sequence may change depending on further detailed studies. It will take approximately four years to mine Deposit X at which stage mining will commence within Deposit W. The southern end of the Deposit W will be mined initially and progress to the northern end of the pit. The mining at Deposit W is expected to take approximately six years. Figure 2-8 below shows mining sequence in Deposits X and W. It should be noted that during the DSO operation, the LG ore mined will be stockpiled in a location between Deposit X and W, covering an area of approximately 14 ha.

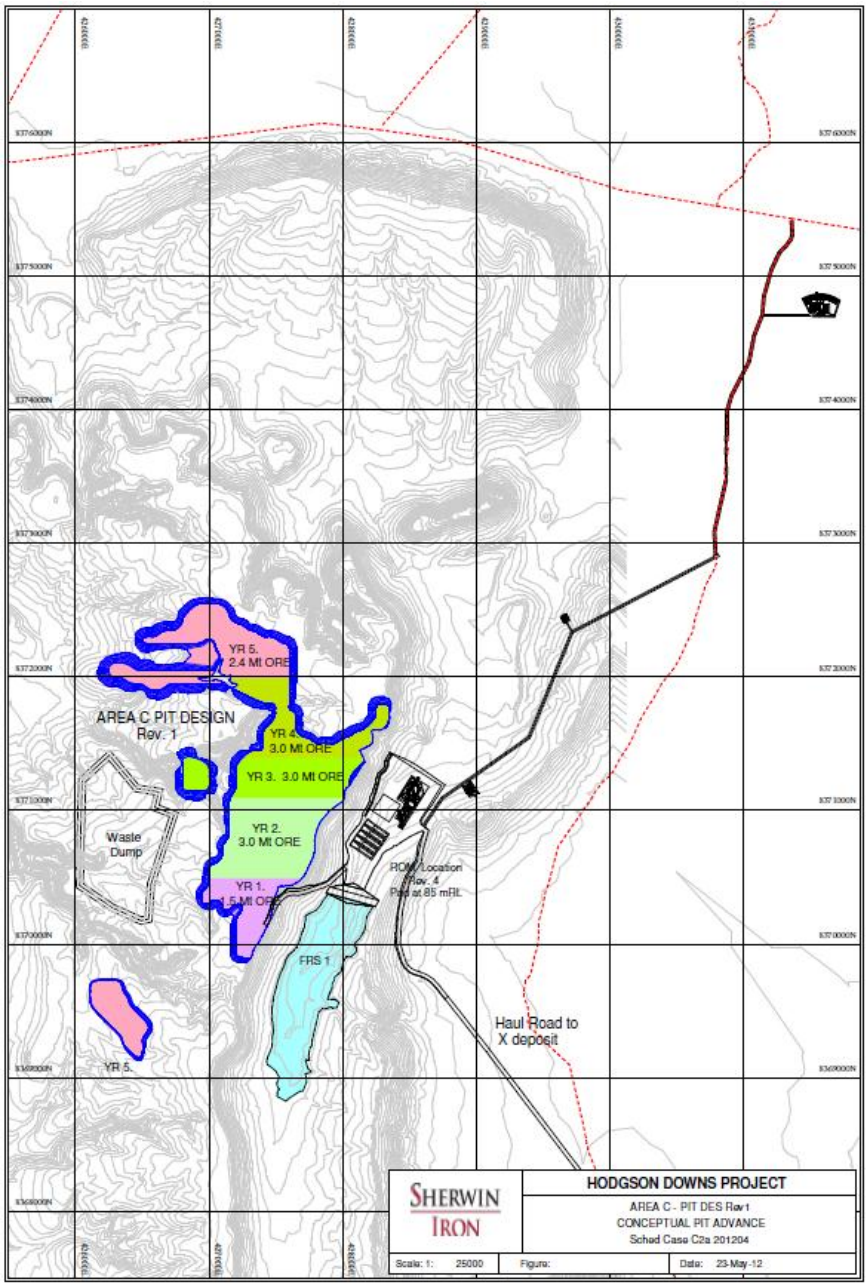

Figure 2-7. Deposit C Mining Sequence (3Mtpa DSO Mined)

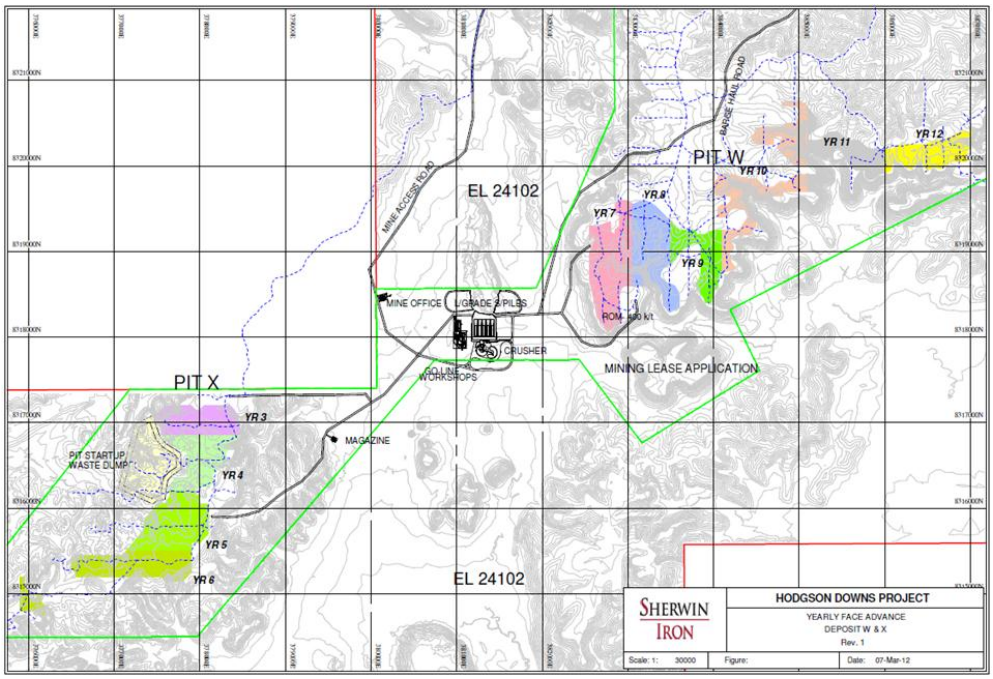

Figure 2-8. Deposit X and W Mining Sequence (3Mtpa DSO Mined)

2.3.5.4 Mine Waste

The mine waste material in Deposit C will initially be used to construct stockpile pad areas, road, and FRS berm wall construction. Later, the majority of remaining waste material will be in-pit dumped within the pit excavation. However, a waste dump of approximately 23 million LCM capacity is also planned on the western side of the LG stockpile.

A similar strategy will be applied in Deposit X and W for the early phase mining, with waste used for road, pad, laydown, and berm construction. A mine waste dump area of approximately 35ha is planned on the North Western side of the Deposit X with a capacity of 11.6 million LCM and another waste dump of about 47ha on the Northern side of Deposit W with a capacity of 12.4 million LCM.

2.3.5.5 Crushing

The ore in Deposit X and W is very friable and readily breaks down with minimal handling and crushing to a finer ore. During initial stages, a mobile crushing plant will be installed in the pit.

The ore in Deposit C is also very friable and readily breaks down with minimal handling and crushing to a finer ore. According result from Universal Rock Strength test for ore, MPa value vary between 5 to 15 MPa (soft <30, hard>100) During initial stages, a mobile crushing plant will be installed in the pit.

2.3.5.6 ROM Stockpile

A 400,000 tonne capacity Run of Mine (ROM) stockpile will be constructed on the eastern side of Deposit C pit (see Figure 2-7). The ROM stockpile is designed for five piles to allow a blending operation with capacity of 80,000 tonnes per pile. This ROM capacity will be sufficient for one month of mining operation. A similar sized ROM stockpile will be located between Deposit X and W once mining commences at these deposits.

2.3.5.7 Haul Roads

At Deposit C, a 30m width unsealed haul road and access will be constructed from the pit to the ROM pad. Cutting is considered most appropriate for this section of the haul road due to the steep topography. The road from the pit to the ROM is currently designed at a gradient of 1:10, which connects from the pit floor at 160mRL to the ROM level at 85mRL. A similar road from the ROM to a flat area to the east of the ROM is also required and designed at a maximum gradient of 1: 25 with two way traffic.

An additional sealed haul road of 135 kilometres connecting Deposit C to the Rail siding and loading facility will exit the mining lease from the Western side of Deposit C. Assuming a road width of 30m, it will require 405 ha of ground clearance to the Rail siding and loading facility area. Assuming the use of 300 tonnes roadtrains transporting 3 Mtpa from the ROM to Rail Side (130km) and Loading facility there will be a requirement for 33 road train trucks per day (assuming 300 day per year operation). The cycle time for each truck is estimated at five hours which equals to two cycles per 10 hour shift.

At Deposits X and W, a similar unsealed haul road width will be constructed from each pit to the ROM pad located between the deposits (Figure 2-8). The road length from Deposit X and Deposit W to the ROM pad is approximately 3 kilometres. It requires a total road clearance of 20ha. This road connects the pits to the LG and ROM stockpiles.

An additional sealed haul road of 125 kilometres connecting Deposit X to the Rail siding and loading facility will exit the mining lease from the Western side of Deposit X. Assuming a road width of 30m, it will require 450 ha of ground clearance to the Rail siding and loading facility area. Assuming the use of 300 tonnes roadtrains transporting 3 Mtpa from the ROM to Rail Side (125km) and Loading facility there will be a requirement for 33 road train trucks per day (assuming 300 day per year operation). The cycle time for each truck is estimated at five hours which equals to two cycles per 10 hour shift.

Transport route haul roads are shown in Figure 1-2.

2.3.6 Production Capacity

Table 2-5 shows Case C2a and Case X2a for DSO mining.

Case C2a and Case X2a is a plan of stage 1 for Deposit C, X and W to produce 3 to 6 million tonnes of DSO product starting in the second year. In the first year the company plans to produce 1.5 million tonnes of DSO product and ramp up to 6 million tonnes of DSO product for three years. The total DSO product in this scenario is 27.0 million tonnes over seven years. The average strip ratio (Waste/[HG+LG]) is 1.9.

Case C2a is a plan of stage 1 for Deposit C to produce 3 million tonnes of DSO product starting in the second year. In the first year the company plans to produce 1.5 million tonnes of DSO product and ramp up to 3 million tonnes of DSO product for four years. The total DSO product in this scenario is 13.0 million tonnes over five years. The average strip ratio (Waste/[HG+LG]) is 2.0.

Table 2-5. Plan Production Capacity Conceptual Study Case C2a and X2a – DSO

Total Mining Schedule		In pit Indicated Resource							
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
Schedule Period		13/14	14/15	15/16	16/17	17/18	19/19	19/20	
HG Tonnes	t	1,082,300	4,500,300	6,008,520	6,000,300	5,987,050	3,000,000	406,837	26,985,307
HG Grade - Fe	%	58.2	58.1	58.1	58.1	57.8	57.5	57.5	58.0
LG Tonnes	t	0	7,205,227	7,404,165	8,385,152	8,919,758	3,743,800	735,935	36,394,037
LG Grade - Fe	%	0.0	47.0	47.1	47.2	47.3	48.2	48.2	47.3
LG Grade - SiO2	%	0.0	23.7	28.5	28.6	28.0	24.4	22.7	26.9
Waste	t	10,767,700	24,839,410	25,292,309	27,513,988	21,527,435	8,707,955	832,969	119,481,766
Strip Ratio (Waste+LG)/HG)		9.9	7.1	5.4	6.0	5.1	4.2	3.9	5.8
Strip Ratio (Waste/(HG+LG)		9.9	2.1	1.9	1.9	1.4	1.3	0.7	1.9
Total Mined	t	11,850,000	36,544,937	38,704,994	41,899,440	36,434,243	15,451,755	1,975,741	182,861,111
Area C Schedule		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
Schedule Period		13/14	14/15	15/16	16/17	17/18	19/19	19/20	
HG Tonnes	t	1,082,300	3,000,300	3,008,520	3,000,300	2,980,805			13,072,225
HG Grade - Fe	%	58.2	58.2	58.2	58.2	58.2			58.2
LG Tonnes	t		6,000,235	6,016,674	6,000,235	5,444,082			23,461,226
LG Grade - Fe	%		46.8	46.8	46.8	46.8			46.8
Waste	t	10,767,700	17,279,465	17,326,806	17,279,465	9,433,188			72,086,624
Strip Ratio (Waste+LG)/HG)		9.9	7.8	7.8	7.8	5.0			7.3
Strip Ratio (Waste/(HG+LG)		9.9	1.9	1.9	1.9	1.1			2.0
Total Mined	t	11,850,000	26,280,000	26,352,000	26,280,000	17,858,075			108,620,076
Area X W Schedule		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
Schedule Period		13/14	14/15	15/16	16/17	17/18	19/19	19/20	
HG Tonnes	t		1,500,000	3,000,000	3,000,000	3,006,245	3,000,000	406,837	13,913,082
HG Grade - Fe	%		58.0	58.0	58.0	57.5	57.5	57.5	57.8
LG Tonnes	t		1,204,992	1,387,491	2,384,917	3,475,676	3,743,800	735,935	12,932,811
LG Grade - Fe	%		48.2	48.2	48.2	48.2	48.2	48.2	48.2
Waste	t		7,559,945	7,965,503	10,234,523	12,094,247	8,707,955	832,969	47,395,142
Strip Ratio (Waste+LG)/HG)			5.8	3.1	4.2	5.2	4.2	3.9	4.3
Strip Ratio (Waste/(HG+LG)			2.8	1.8	1.9	1.9	1.3	0.7	1.8
Total Mined	t		10,264,937	12,352,994	15,619,440	18,576,168	15,451,755	1,975,741	74,241,035

Case X2a is the plan for stage 1 of Deposit X and W, producing up to 3 million tonnes per annum of DSO product starting the third year In the first and second year the company assumes producing DSO from only Deposit C. The total DSO product in this scenario is 13.0 million tonnes over five years, with average stripping ratio of 1.8 (waste/[HG+LG]).

2.3.7 Metallurgical Test Work

The DSO resource category breakdown reported with cut-off grade above 55% is shown in Table 2.3.

A preliminary test work programme has been developed using the existing metallurgical core. Given a guidance of assessing a product specification of approximately +55% Fe, two interval selections within the Sherwin Formation and Sherwin Creek Lower Ironstone stratigraphic zone have been identified

The preliminary metallurgical test work programme for Deposit C was developed to provide comminution information and indication of potential silica rejection through simple beneficiation. The test work programme is shown in Figure 2-9. The test work programme commenced in July 2012 and will be completed in November 2012.

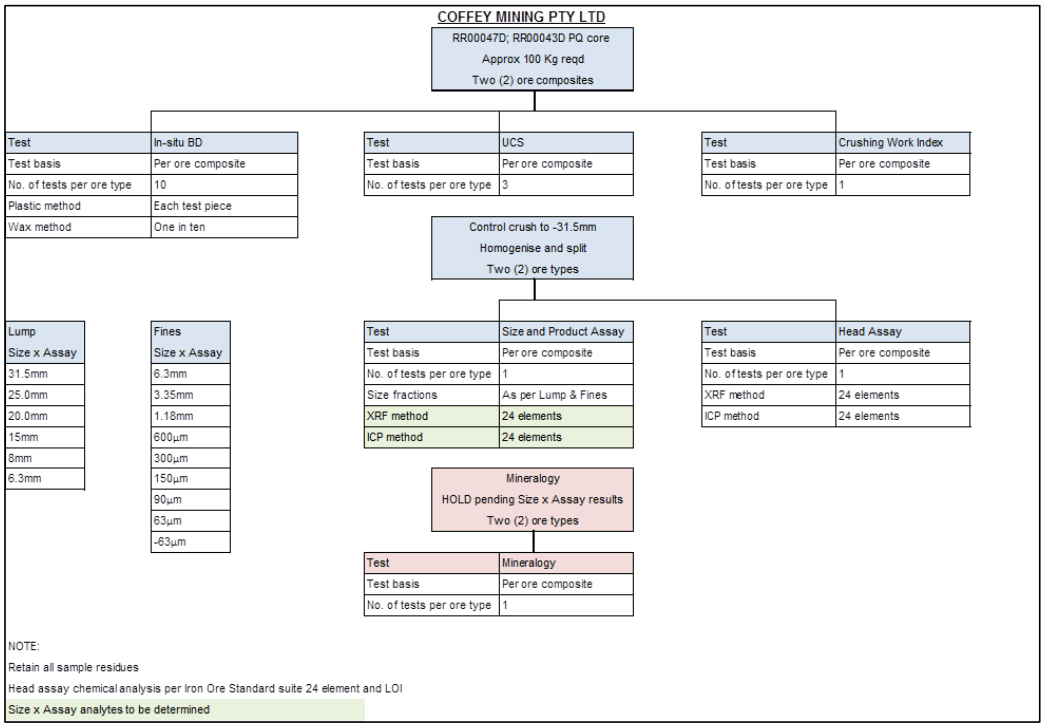

Figure 2-9. Preliminary Test Work Programme – Deposit C

2.4 Mine Infrastructure

At the beginning of operation, the infrastructure development will be related to facilities required for transporting DSO from mine to Darwin Port. This is related to haul road, stockpile areas, service access, rail siding and loading facility, and other supporting facilities such as magazine, laboratory, drainage system, offices, camps, mess hall, sewerage, drainage system, laydown area, dumping area, workshop, warehouse, power, water requirement, and mobile crusher facilities.

The capital expenditure required for the Project would be minimised through the provision of the onsite infrastructure by means of a contract mining operation. It will be expected that the mining contractor would provide mining fleet maintenance facilities, mining supervision offices, warehouse, and store facilities for the duration of the Project.

2.4.1 MOC

The proposed Mine Operation Centre (MOC) for Deposit C will be in the south west corner of the northern tenement, 16 km east of the Roper Valley Airfield. The proposed MOC for Deposit X and W will be located just north of Deposit W.

2.4.2 Power Supply

Given the lack of electrical power generation and transmission infrastructure with potential to economically supply the Project within reasonable distance of the site, self-generated power is required.

Power for mining, processing, offices and the accommodation camp would be supplied by on-site diesel generator sets and local power distribution networks. Two to three separate systems would be installed to service the mine site, MOC, and the accommodation camp services and facilities.

The power for the MOC (Sherwin Iron's and Contractor's administration offices, workshop and store, crib room, first aid room, ablution blocks, sample prep and laboratory, potable and waste water treatment plants, water tank pumps, fuel tank area and general area lighting) would be supplied from a distribution switchboard centrally located to these areas. The distance of the sub-mains run from the site/power station main switchboard would be designed to suit a medium voltage system.

Each building and facility would have individual sub-boards supplying power to all final sub-circuits. All light and power circuits would be RCD protected and all electrical installations would need to conform to AS/NZS 3000:2000.

All office and accommodation buildings would be transportable style, and as such would be pre-wired and tested, and would only require external connections to power and data junction boxes. Potable water treatment, sewerage system and wastewater treatment and the re-fuelling facility would be vendor supplied panels fed from the distribution switchboard.

Power requirements for the accommodation is estimated at 1MW with the processing plant being of the order of 7-8MW.

2.4.3 Access Roads and Plant Area Roads

2.4.3.1 Main Access Roads

Light vehicle access to the new accommodation camp would be via the Camp Access Road from the Roper Highway, approximately 42km north east of the MOC.

2.4.3.2 Site Access Roads

Access roads and tracks would be required. The mine site already has a variety of existing tracks which would be rehabilitated once the permanent site access roads were built. The exploration access roads are designed to be constructed as haulage roads, suitable for the mining fleet haulage trucks and service vehicles.

2.4.4 Warehouse Facilities

The general and process warehouse facilities would be provided by each contractor associated with the primary works and would comprise a suitably sized steel structure founded on a concrete slab. The warehouse would contain shelving and storage racking with sufficient room for a small fork-lift to operate. The building would be accessed by both a personnel door and roller door. A battery storage area, hydraulic hose store, tool store and gas bottle storage area would be located in close proximity to the warehouse facility for control purposes. A security fenced open area compound would be provided adjacent to the warehouse.

2.4.5 Mine Administration Offices

An administration office complex would be required to facilitate on-site management activities during the implementation and operational phases of the Project. The mine administration offices would accommodate the staff facilities required for the construction, commissioning and operational stages of the project. It is envisaged that the centre would comprise a number of transportable buildings, some interconnected, accommodating both Sherwin Iron and Contractors' personnel.

2.4.5.1 Overview

The facility would include:

- Administration office;
- Meeting rooms and crib room;
- First aid room;
- Male and female ablutions; and
- Light vehicle unsealed parking area.

2.4.5.2 Location

The facility would be located close to the contractor's workshops, and warehouse/storage facilities, with direct access from the main site access road outside of the mining area and any interface with the mining equipment. The orientation would be such that it is upwind of, and at a sufficient distance from, the processing plant.

2.4.5.3 Administration Facilities

The administration office complex is likely to comprise the following elements:

- Administration offices consisting of an 18m by 12m building;
- Meeting and crib room facilities consisting of a 9m by 12m building, containing both meeting room and basic kitchen facilities;
- First aid room staffed by a paramedic, consisting of 12m by 3m room with basic medical facilities and a recovery bed. A second room for use by security and emergency response personnel also 12 m by 3m with basic security and emergency response equipment; and
- Ablutions consisting of two12m by 3m rooms, one divided into male and female toilet facilities, the other divided into male and female showers.

2.4.6 Sample Preparation Facility and Laboratory

A sample preparation facility would be installed on-site for the collection and processing of ore samples for both on-site size and moisture content analysis, and off-site assay preparation. Sherwin Iron would own or lease and operate the laboratory facility, and it would be located adjacent to the sample preparation facility office, within the Sherwin Iron administration centre.

2.4.7 Refuelling Facility

Bulk-fuel storage facilities would be provided to supply the mining fleet, power station and other miscellaneous demands such as portable generators, compressors, and light vehicles. The largest source of demand would be the power station located within the MOC, which would lie at the eastern margin of the site. This location would be convenient for fuelling the haul trucks hauling from the pits, as well as the fuel and water tankers and the light vehicle fleet.

The facility at the MOC would consist of two 110,000 litre, double-skinned, self-bunded tanks, interconnected to provide a total capacity of 220,000 litres, approximately 7 days' supply without fuel deliveries based on a typical contractor mining operation.

Double-skinned tanks could be placed on the ground without any need for further containment (for example, lined bunds), provided they would be fitted with overfill alarms and visual indicators of an internal wall rupture (i.e. dip tube). This arrangement would satisfy environmental requirements, provided the tanks could be protected from vehicle strikes with windrows or bollards. One or more of the tanks would have an on-board bowser with a flow rate of at least 80 litres per minute for dispensing the fuel to light vehicles and a 450 litre per minute fast-fill for filling the tankers that are used to refuel remote plant and in-pit equipment, and mobile mining equipment.

All bulk fuel storage and re-fuelling areas will be constructed and bunded in accordance with Australian Standards and any relevant NT legislation.

Fuel supplies would be replenished on a regular basis by road tanker deliveries.

2.4.8 Vehicle Parking Area

A number of parking facilities would be required for light and heavy vehicles in one or more locations within the mine site and the MOC.

The washdown facility would also be located within the MOC adjacent to the heavy vehicle parking area. This facility would consist of a concrete slab and silt collection sump (which could be emptied by a small FEL) and oil water separator enabling the washing down of both light and heavy vehicles prior to maintenance or removal from site. High-pressure hoses would be installed to deliver water to all areas of the wash down slab.

2.4.8.1 Heavy Vehicle Parking

Heavy vehicles, including haul trucks and heavy water carts would typically park-up at the end of a shift and their operators would return to the camp by bus or light vehicle. In these instances there would be areas designated for parking at the pits and at the mine haulage contractor's yard. In the event of scheduled maintenance or the need to convey a load to tip, the heavy vehicles would complete their shift at the MOC where a designated parking area would be provided. For heavy vehicles, these areas would be forward facing, avoiding the need for reverse manoeuvres and the areas would be provided with windrows to check vehicle movements and delineate individual parking bays.

2.4.8.2 Light Vehicle Parking

Light vehicles would typically park at the administration centre in designated areas that would require reverse parking and windrows to check the rear tyres. This would also be the arrangement in any other areas of the MOC where light vehicles park. Elsewhere in the mine site, light vehicles could pull up in areas designated to be safe (i.e. away from heavy vehicle movements).

2.4.9 Water Supply and Management

2.4.9.1 Water Supply

MOC water supply would be drawn from the main water dam and pumped via pipeline to a raw water dam, with top up to a process water dam located near the MOC area. Accommodation water supply would be drawn from the dam and pumped via a pipeline to the accommodation camp.

2.4.9.2 Water Truck Filling

Water trucks would be required on site for dust suppression purposes. Typically a 60,000 litre tank would be used for this purpose. The trucks would be employed on a continual basis to traverse the unsealed haul and access roads applying water, and possibly binding-agents or other surfactants, to stabilise roads and minimise the incidence of dust which impacts on visibility, sighting distances, and safety. Water trucks could also be used to refill any raw water storage tanks to be located around the mine site.

The water truck would refill its tank by parking alongside a turkey-nest dam and pumping directly from it, or would be refilled by a high volume pump floating on a pontoon within the dam. Several water truck filling locations could be required to service the mining areas and the plant and infrastructure areas between them.

2.4.9.3 Water Quality Treatment

Where water is required for human consumption (drinking or washing) it would receive primary treatment in the form of ultra-violet treatment and reverse osmosis filtration. For all other uses (dust suppression, plant and equipment cleaning etc.) it would remain untreated.

2.4.9.4 Fire Water Systems

The MOC main fire water storage tank would be located on high ground adjacent to the ROM pad and alongside the raw water dam.

The accommodation camp would have its own dedicated pressurised fire water system, which would supply hydrants and hose reels throughout the facility. The fire water storage tank would be located at the services compound.

The fire water storage tank reserve capacity in each location would be located in the lower portion of the respective raw water tanks. All other water consumption would be drawn from above the fire water reserve capacity. The fire water pumps would be a conventional system utilising an electrically driven duty and standby pump, with a diesel driven pump back-up.

2.4.10 Mining Contractor's Workshop

The mining contractor would provide a workshop and maintenance area in a section of the MOC designated by Sherwin Iron. Buildings would be designed and constructed and fitted with appropriate tie-down facilities to withstand wind conditions designated for the locality/zone.

Appropriate measures would be taken to manage the collection and storage of hydrocarbons. It has been assumed that the mining contractor would provide all heavy mining equipment maintenance facilities required to maintain the contractor owned and operated mining equipment fleet.

2.4.11 Communications

Data and voice communications would be required for fax, telephone, and broadband internet connectivity with the outside world.

Fibre optic would be run to the camp, airport and MOC locations from the main fibre optic tie in point at Flying Fox Station.

2.4.12 Airfield

A new airfield would be constructed in the vicinity of the existing Roper Valley Airstrip on Numul Numul Station. The position of the airfield is moved from Roper Valley Airstrip in order to take advantage of better ground conditions and to avoid the following constraints:

- Numul Numul homestead;
- Numul Numul stockyards;
- Australian Ilmenite Resources mining lease;
- Regional topography; and
- Solar impacts on visibility.

2.4.13 Accommodation Camp Facilities

A 200 person camp would be required for this Project which would be progressively built to its maximum size.

The camp location would be selected to satisfy the following criteria:

- Lies reasonably close to an existing road or track;
- Located within reasonable proximity to the proposed MOC;
- Comprises a reasonably level area elevated above any areas of likely inundation; and
- Offers a pleasant aspect to the camp residents.

The accommodation camp would be initially equipped with airport bookings and check-in facilities, retail facilities and camp management offices. The permanent facilities, including the dry mess, power supply, potable water supply, sewerage and waste water treatment plants, fuel farm, maintenance shed, bus parking and light vehicle and services vehicles car parks, would be designed to cater for the peak construction requirements.

2.4.14 Borrow Pits

Borrow pits will be constructed as required on the mine haul road and the village access road for the initial construction and then the maintenance of the roads. Any borrow pits located outside of the Mineral Lease will require Extractive Mineral Permits from the Department of Mines and Energy.

2.5 Ancillary Infrastructure

The key ancillary infrastructure to be located on site are summarised below. The current proposed locations are indicative and can be revised based on potential environmental, cultural or other constraints.

2.5.1 Landfill

As a result of the Project's remote location, an on-site landfill area will be required. Domestic and putrescibles waste from the village and MOC is estimated at no more than 3kg per person per day. The landfill will be located in an approved area that will minimise impact to the surrounding environment. Waste suitable for recycling will be managed by a licensed contractor and removed from site for recycling in an approved facility. Oil waste will be managed by a licensed contractor and removed from site for processing in an approved facility.

2.5.2 Bulk Fuel Storage

Fuel facilities at the mine site will be adjacent to the ROM area and include a bunded storage area and two 110,000 litre diesel storage tanks for mining operations. All chemical, fuel and reagent storage areas will be constructed in accordance with relevant Australian Standards and legislation. This includes appropriate bunding and segregation of chemicals as required.

2.5.3 Explosives Storage

It is anticipated that limited explosives would be required for the mining operation. A suitable approved location will be nominated and an approved storage facility will be constructed. Storage, handling and use of explosives will be in accordance with the *Dangerous Goods Act 2012*.

2.5.4 Accommodation Village

The final accommodation village will be constructed to house an operational workforce of approximately 200 personnel. The village will include the construction of the following infrastructure:

- Offices;
- First aid room;
- Meeting room;
- Four man accommodation units for construction and mine operations;

- Ablutions;
- Sewerage storage and treatment;
- Raw water supply and storage;
- Water treatment and potable water storage;
- Power generation and fuel storage;
- Laundry;
- Kitchen;
- Dry mess;
- Wet mess;
- Access roads;
- Internal roads;
- Light vehicle car park;
- Communications;
- Heavy vehicle car park (for service delivery vehicles, semi-trailers, fuel tankers, water tankers, etc.); and
- Sporting and recreational facilities.

2.6 Services

2.6.1 Project Water Requirements

Project water requirements include the following:

- 250kL per day for dust suppression (water for dust suppression will not be utilized between November and March due to onset of the wet season);
- 4kL per day for moisture addition (water addition will not be required between November and March due to wet season conditions);
- 65kL per day for potable water; and
- 3kL per day for wash-down activities.

Projected water requirements for a 3Mtpa DSO operation are 1.2ML per day. This equates to 438ML per annum sourced from dam storage, on site waste water treatment plants and project borefields (these are subject to further investigation and approvals from the relevant NT government authority).

2.6.2 Wastewater

A Waste Water Treatment Plant with a capacity of 15,000kL will be installed at the accommodation village. The treated product will be reticulated throughout the accommodation village landscaping and the surplus will be stored in an evaporation pond. All products resulting from the wastewater treatment plant will be in accordance with relevant legislation and guidance material for minimum quality of water to be used in irrigation.

A Waste Water Treatment Plant with a capacity of 5,000kL will also be installed at the Administration/MOC area. The treated product (to be at least grade A) will be stored in an evaporation pond, and will be utilised in dust suppression activities.

All required approvals will be sought prior to the discharge of any wastewater to the surrounding environment.

2.6.3 Power

The accommodation village will have a power requirement of approximately 1 MW. Power requirements will be met by using generator sets. Generators will be diesel powered and be supplied with a 5,000 litre fuel storage tank, which will be supplied by a 30,000 litre storage tank.

The run of mine (ROM) area will have two 100,000 litre storage tanks with fast refuelling capability and an LV fuel dispenser.

The power requirements for the processing plant would be in the order of 7-8MW.

2.6.4 Communications

The mine site and accommodation village will be installed with satellite data, telephones, two-way radios and a television broadcasting system. The mine site, accommodation village and associated infrastructure may potentially be connected to the existing fibre-optic network from Telstra.

2.7 Sourcing of Materials and Equipment

Equipment will be sourced where possible from within Australia and will be transported to the construction corridor via existing road networks. The main construction items will include:

- Construction plant and equipment;
- Fuels (e.g. diesel);
- Construction camps and consumables;
- Workshops and equipment for maintaining camp facilities and plant; and
- Wooden skids, coating materials and fencing materials.

2.8 Workforce

The workforce will comprise approximately 200 personnel during peak construction and will mostly be accommodated in the Sherwin Iron camp. There may be smaller camps required if transit times are excessive.

The construction camps will include sleeping, catering, maintenance, first aid and administration facilities. Typically there would be a main camp comprising all facilities and a smaller camp.

The Minyerri airstrip would be utilised for Fly-In-Fly-Out (FIFO) access to the Sherwin Iron camp.

2.9 Schedule of Activities

Sherwin Iron would like to be in a position to instigate initial site preparations by Quarter 3, 2013 with construction of required facilities completed by end of Quarter 4, 2013. This would allow for the start of mining operations of DSO 3Mtpa from Quarter 1, 2014 ramping up to DSO 6Mtpa by Quarter 1, 2015.

3 Existing Environment

3.1 Climate

The Roper River Region experiences two distinct seasons, an almost dry rainless season from May to September and a wet season from November to March (BOM 2011). Rainfall is concentrated during the wet season, with May to October averaging zero rainfall. The wettest months are January and February with an average 184.7 and 205.9 mm rain respectively. Temperatures range from an average top of 38 degrees Celsius in November, to minimum temperatures of 13.3 and 12 degrees Celsius in June and July. Figure 3-1below summarises rainfall and temperature data collected from 1981 to 2010 from the Larrimah weather station located 82 km south-west of the Project area (BOM 2011).

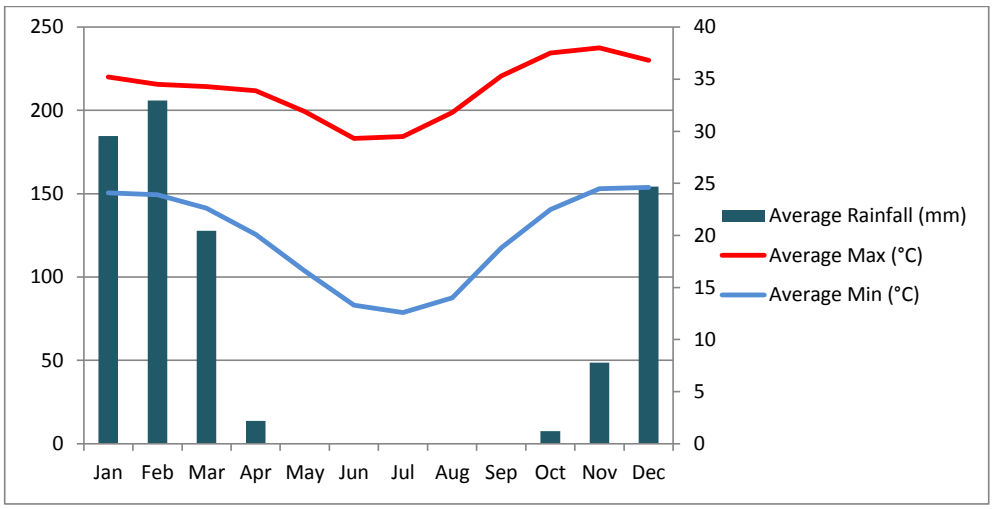

Figure 3-1. Rainfall and Temperature from Larrimah Weather Station 1981 – 2010.

The average yearly evaporation greatly exceeds the average rainfall, which is typical for the northern Australian climate. The Roper River Landcare Group (Kraatz 2004) reported that evaporation exceeds rainfall for nine months of the year at Mataranka and peaks at the start of the build-up season (October and November).

3.2 Land Systems, Land Use and Geology

3.2.1 Land Systems

A Land System is defined as 'an area or group of areas throughout which there is a recurring pattern of topography, vegetation and soils' (DLPE http://www.nt.gov.au/nreta/natres/soil/extent.html).

The proposed mining area is covered by the Roper River Land Systems study (Aldrick and Wilson 1992). Within the proposed mining area, 14 Land Systems are represented. The core area of Deposits X and W are dominated by just three of these Land Systems, the Patterson (moderate erosion risk), Favenc and Emmerugga (high erosion risk) land systems (Figure 3-2) all within the Gulf Fall and Uplands.

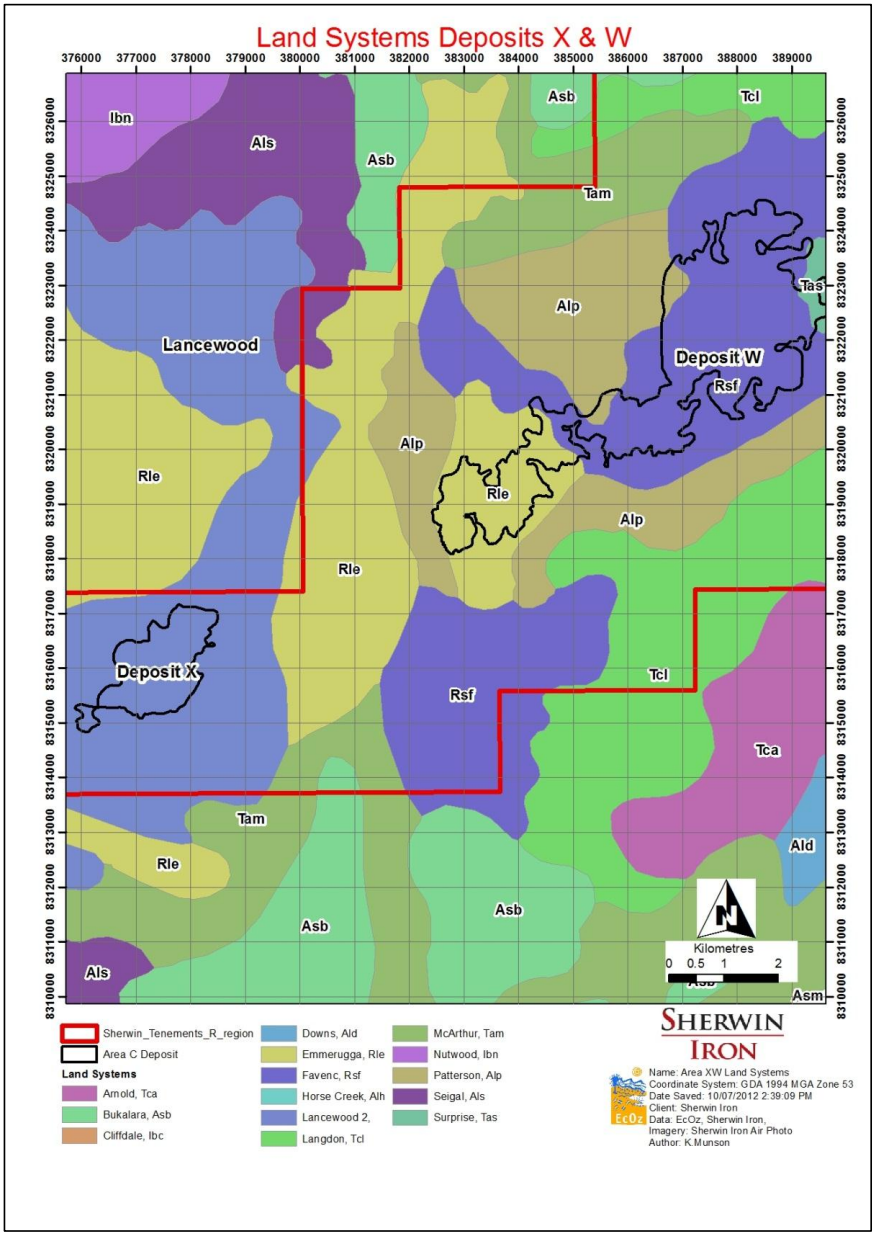

Figure 3-2. Land systems associated with Deposits W & X.

Land systems occurring at Deposit C are Munyi, Cliffdale and Patterson, as shown in Figure 3-3.

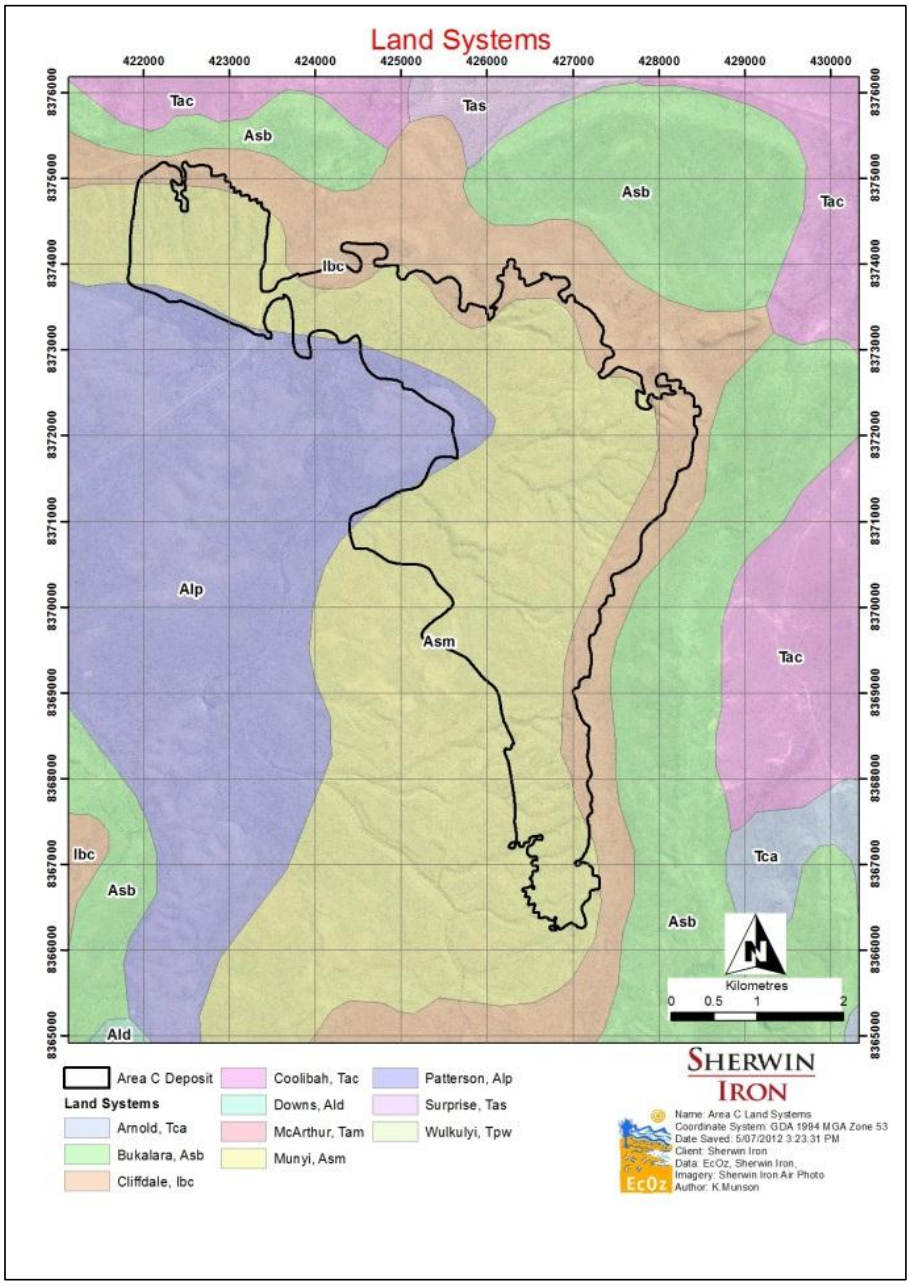

Figure 3-3. Land Systems Associated with Deposit C

The haul road from Deposit X to the Railway Facility intercepts several land systems within the Sturt Plateau and Gulf Fall and Uplands, as detailed in the following Table 3-1:

Table 3-1. Land Systems Associated with the Haul Road from Deposit X to Railway Facility

Landsystem	Zone	Class	Description	Erosion Risk
Lancewood 2	GFU	lateritic plateaux	plateaux, scarps and some rises on deeply weathered sediments; shallow soils with rock outcrop	high risk - moderate to steep slopes and gently inclined slopes with erodible soils
Abner	GFU	sandstone plains and rises	plains and rises mostly on sandstone and siltstone; commonly shallow soils with surface stone and rock outcrop	moderate risk - gently inclined slopes or level areas with erodible soils
Claravale	SP	lateritic plains	plains and rises associated with deeply weathered profiles (laterite) including sand sheets and other depositional products; sandy and earth soils	
Downs	GFU	sandstone plains and rises	plains and rises mostly on sandstone and siltstone; commonly shallow soils with surface stone and rock outcrop	
Horse Creek		lateritic plains	plains and rises associated with deeply weathered profiles (laterite) including sand sheets and other depositional products; sandy and earth soils	
October	SP	sandstone plains and rises	plains and rises mostly on sandstone and siltstone; commonly shallow soils with surface stone and rock outcrop	moderate risk - gently inclined slopes or level areas with erodible soils
Patterson	GFU			
Seigal				
Bukalara	GFU	rugged quartz sandstone plateaux and hills	steep rocky plateaux and hills on quartz sandstone and sandstone; shallow sandy soils and rock outcrop	high risk - moderate to steep slopes and gently inclined slopes with erodible soils
Weston	GFU	lateritic plateaux	plateaux, scarps and some rises on deeply weathered sediments; shallow soils with rock outcrop	
Banjo	SP	lateritic plains	plains and rises associated with deeply weathered profiles (laterite)including sand sheets and other depositional products; sandy and earth soils	low risk
Bulwaddy				
Elsey				moderate risk - gently inclined slopes or level areas with erodible soils

Cliffdale	GFU	basalt hills	low hills and hills on basalt, agglomerate and tuff, some dolerite; mostly rock rock outcrop with surface stone and pockets of clayey soils	high risk - moderate to steep slopes and gently inclined slopes with erodible soils
Larrimah	SP	alluvial floodplains	alluvial floodplains, swamps and drainage depressions; seasonally inundated; sandy, silty and clay soils on Quaternary alluvium	low risk
Cresswell	GFU	lateritic plains	plains and rises associated with deeply weathered profiles (laterite) including sand sheets and other depositional products; sandy and earth soils	low risk
Yungman	SP			moderate risk - gently inclined slopes or level areas with erodible soils
Mering				
Mais	SP	lateritic plateaux	plateaux, scarps and some rises on deeply weathered sediments; shallow soils with rock outcrop	moderate risk - gently inclined slopes or level areas with erodible soils
Emmerugga	GFU	sandstone plains and rises	plains and rises mostly on sandstone and siltstone; commonly shallow soils with surface stone and rock outcrop	high risk - moderate to steep slopes and gently inclined slopes with erodible soils
Favenc		sandstone hills	low hills and hills mostly on sandstone and siltstone; outcrop with shallow stony soils	
Coolibah	GFU	alluvial floodplains	alluvial floodplains, swamps and drainage depressions; seasonally inundated; sandy, silty and clay soils on Quaternary alluvium	high risk - flooding
McArthur				
Surprise				moderate risk - flooding
Arnold	GFU	sandstone plains and rises	plains and rises mostly on sandstone and siltstone; commonly shallow soils with surface stone and rock outcrop	moderate risk - gently inclined slopes or level areas with erodible soils
Warloch	SP	alluvial floodplains	alluvial floodplains, swamps and drainage depressions; seasonally inundated; sandy, silty and clay soils on Quaternary alluvium	high risk - flooding

Zones: The Australian land mass is divided into 89 bioregions and 419 subregions. Each region is a land area made up of a group of interacting ecosystems that are repeated in similar form across the landscape. GFU – Gulf Falls and Uplands

SP – Sturt Plateau

3.2.2 Land Use

Land use in the project area includes pastoral, conservation, tourism, aboriginal freehold and leasehold, fishing and horticulture. Major land use in the Roper River region is held under pastoral lease or Aboriginal land trusts as private freehold (Faulks 2001) with beef cattle farming on unimproved native pasture accounting for approximately half of the land use in this region (URS 2010). Currently Mining makes up a

very small percentage of land use in the region. Horticulture involving mangoes, citrus fruits and melons is a small but growing land use in the catchment, grown mainly around the town of Mataranka (Kraatz 2004).

Tourism is likely to become increasingly important to the region with Mataranka and nearby Elsey National Park close to the project area, and the proposed Limmen National Park and Bullwaddy Conservation Reserve slightly further afield.

3.2.3 Geology

The Project area is located within the Gulf Region of the semi-arid zone of the Northern Territory (Wilson et al. 1990). This Region is characterised by sandy soils associated with sandstone plateaux with isolated pockets of clay and red earths.

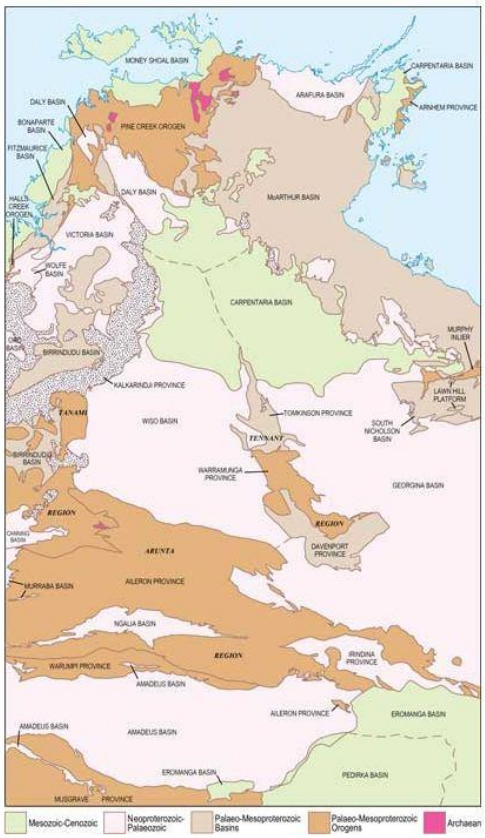

Figure 3-4. Geology associated with the Project Area (DME).

The geology in the southwest McArthur Basin comprises gently dipping quartz sandstone which forms long ridges and interbedded micaceous mudstone and shale, which form broad valleys (Ferenczi 2001). The basin is characterised by alternating mudstone-rich and cross-bedded sandstone formations, with minor lithologies consisting of calcareous siltstones, limestone, breccias, conglomerates and ironstones (URS 2010). The geology in the southeast Daly Basin is made up of sedimentary and volcanic rocks including limestone, dolostone, sandstone, siltstone, claystone, basalt and dolerite. The geology in the Georgina Basin consists primarily of limestone and mudstone with some sandstone, shale and basalt. Quaternary-age

unconsolidated alluvial deposits of gravel, sand, silt and clay are located along the drainage courses of the Strangways River, Hodgson River, Arnold River, the Roper River and their surrounding flood plains (URS 2010).

Iron ore is present within several stratigraphic levels of Mesoproterozoic Roper Group sediments however the main target is the Sherwin Formation. Within EL 24101 the Sherwin Formation iron deposits occur along a 25 km sinuous ridge, ironstone is often exposed at the top of cliff faces throughout the area.

The Australian Soil Resource Information System (CSIRO 2006) identifies the soils in the entire project area, including the proposed mine area and haul road, as having 'extremely low probability of occurrence' of Acid Sulfate Soils (ASS). ASS can occur in coastal (tidal) and inland or upland (freshwater) settings. These soils are harmless when left undisturbed, but once disturbed sulfides within the soil react with the oxygen in the air, forming sulfuric acid (CSIRO 2006).

3.3 Surface Water

Most rivers and associated tributaries in the region are intermittent, flowing only during the wet season, however some permanent pools or groundwater fed springs may exist along their length. The Roper, Hodgson and Wilton Rivers, however are larger perennial rivers which rarely cease to flow.

Flooding during the wet season is extensive in low-lying areas, with access by road generally restricted between January and March.

The project area falls within the Roper River Basin, with a small portion of the haul road and rail siding into the Daly River catchment.

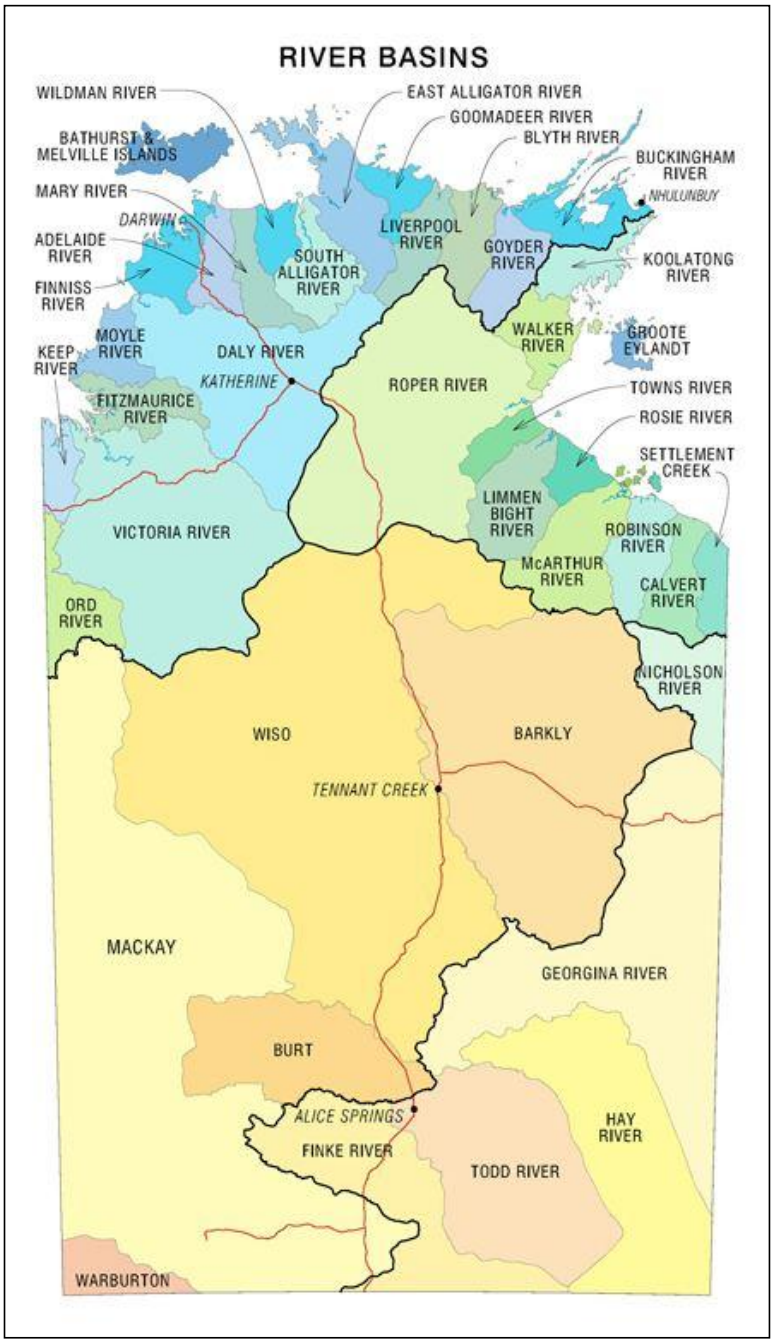

Figure 3-5. River Basins associated with the Project Area (DLPE).

3.4 Groundwater

Groundwater reserves in the region are extensive and are responsible for surface water flows during the dry season (Kraatz 2004). The Project area within the Roper River Basin is situated in the Geological Province of the McArthur Basin, an extensive area dominated by fractured and weathered sedimentary rock supporting local scale aquifers, where discharge areas are typically less than 5 km from recharge areas (Tickell 1994). Groundwater is derived from a number of rock types including limestone, sandstone, siltstone, shale and basalt (URS 2010).

Potential groundwater yield per bore is thought to be less than five litres per second and salinity to be in the range of 500 – 1500 mg/L. The area has a low to moderate salinity hazard. The Project area is situated immediately to the east of a more intensive groundwater resource study (Yin Foo 2000), which confirms that the environment near the Project area is dominated by fractured and weathered rock with local aquifers and fractured and weathered rock with minor groundwater resources.

The carbonate aquifers in the region have seasonal recharge rates of between 0 and 300 mm with an average of 90 mm (Jolly 2002). The Tindall Limestone aquifer in the area to the south of the Roper River has a mean annual recharge rate estimated to be between 5 and 20 mm, with the most likely long term mean annual recharge rate being between 10 to 15 mm (Jolly *et al*. 2004). Recharge mechanisms in the McArthur Basin fractured rock aquifers have not been assessed; however, they are considered to be lower than that of the limestone aquifers (URS 2010).

3.5 Flora and Fauna

3.5.1 Flora

Field surveys conducted within EL24102 (Ecologia 2010 and EcOz 2011) recorded as many as 219 flora taxa from 46 families.

No flora taxa listed as Rare or Threatened, or Near Threatened in the Northern Territory were recorded during field surveys (Ecologia 2010). However, three taxa found during the Ecologia survey, *Acacia galioides* var. *glabriflora*, *Crotalaria novae-hollandiae* subsp. *novae-hollandiae* and *Cyperus oxycarpus* are listed as Data Deficient in the Northern Territory (Ecologia 2010). No threatened species are listed on web search databases; however 28 plants are listed as Data Deficient.

Recent flora surveys undertaken at deposit X have identified a yet unknown population of *Triodia* that has been observed in close association with the deposit geology. Further investigations have been initiated to determine if the grass in question is a new species. DNA testing is currently underway to compare the species in question against a number of closely related taxa within the *Triodia* genus. Results of this investigation will determine the requirement of future flora surveys to better understand the presence of the species within the surrounding area.

A total of 34 weed species are identified as occurring within the region, this includes three Weeds of National Significance (WONS) *Parkinsonia aculeata, Parthenium hysterophorus* and *Prosopis pallida.* Five of the 34 weeds are listed as Class A weeds for the NT, where a “reasonable effort must be made to eradicate the plant within the NT” and a further 12 are Class B weeds, where “reasonable attempts must be made to contain the growth and prevent the movement of the plant”.

It is expected that species type and diversity would be similar within the haul road corridor, however to date this area has not been surveyed. Results from future surveys will be reported through the environmental approvals process..

3.5.2 Fauna

The fauna species that have potential to occur in the Project area were determined through various database searches, distribution maps and data from recent surveys in the area.

Review of the Department of Environment, Water, Heritage and the Arts (SEWPaC) protected matters database searches indicate species that could occur in the region. They include 13 threatened species, which included one Critically Endangered species (Bare-rumped Sheathtail Bat), four Endangered and eight Vulnerable species. However, searches for species listed as threatened under the *Territory Park Wildlife Conservation Act 2011* found ten Critically Endangered species, 14 Endangered species and 43 Vulnerable species

Twelve species of Conservation Significant fauna were recorded during field survey work by Ecologia in 2010. The most notable records were the Crested Shrike-tit (northern subspecies), Emu, Australian Bustard and Merten's Water Monitor. This survey was conducted over Sherwin's Exploration Licence EL24102 including Deposits X and W. The survey extended outside the tenement with recordings along the access track to EL24102 between Hodgson Downs Road and LD Creek, as shown in Figure 3.6. The other eight conservation significant species considered certain to inhabit the Project area from that survey included: Northern Nailtail Wallaby, Western Chestnut Mouse, Star Finch, Hooded Parrot, White bellied Sea- Eagle, Rainboe Bee- Eater, Eastern Great Egret and Chameleon Dragon.

Field survey work was undertaken by EcOz Environmental Services in mid-2012, focusing on the Deposit areas. To date no species of conservation significance have been identified, however, should critical habitat be found during further vegetation mapping, more targeted fauna surveys will be undertaken. It is expected that species type and diversity would be similar within the haul road corridor, however to date this area has not been surveyed. Results from future surveys will be included within the EIS.

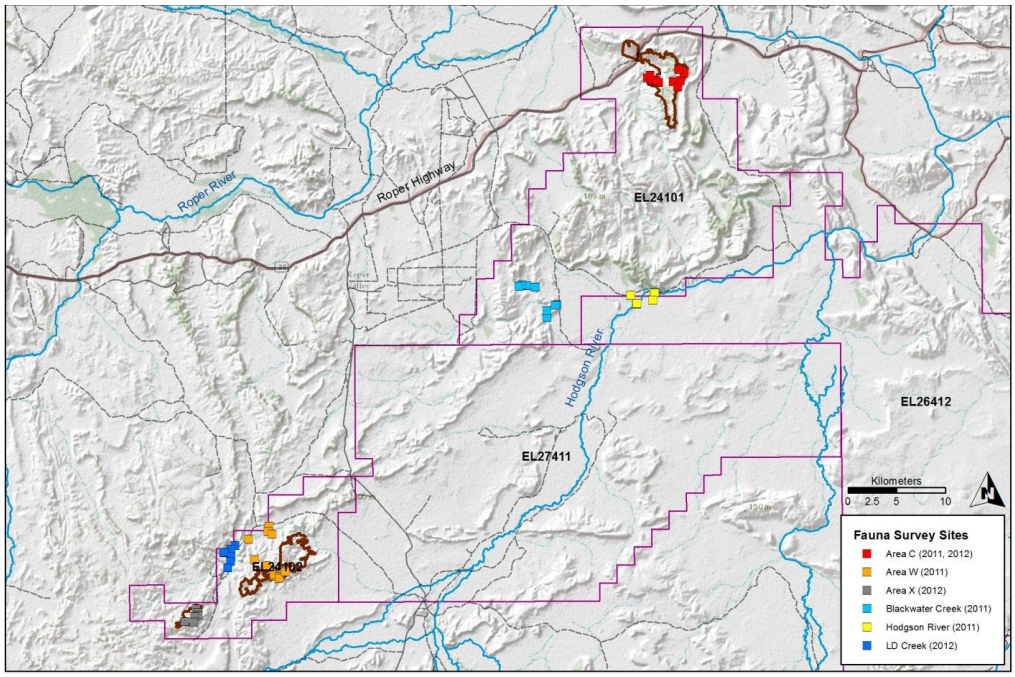

Figure 3-6. Completed Sherwin Iron Fauna Surveys Deposits C, W and X (as of May 2012).

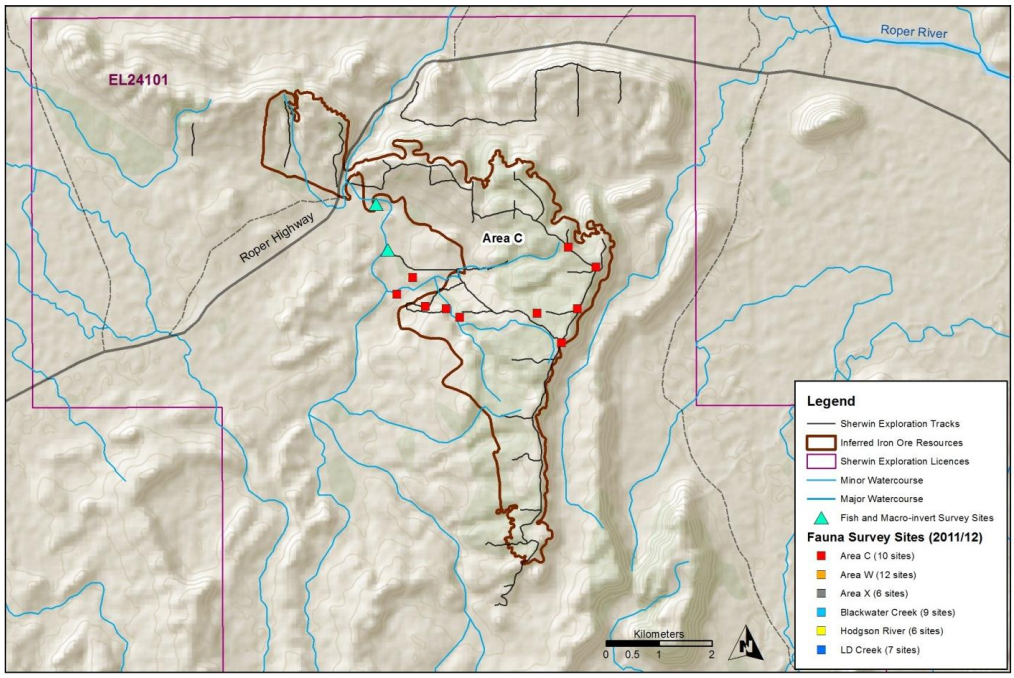

Figure 3-7. Completed Sherwin Iron Fauna Surveys Deposit C (as of May 2012).

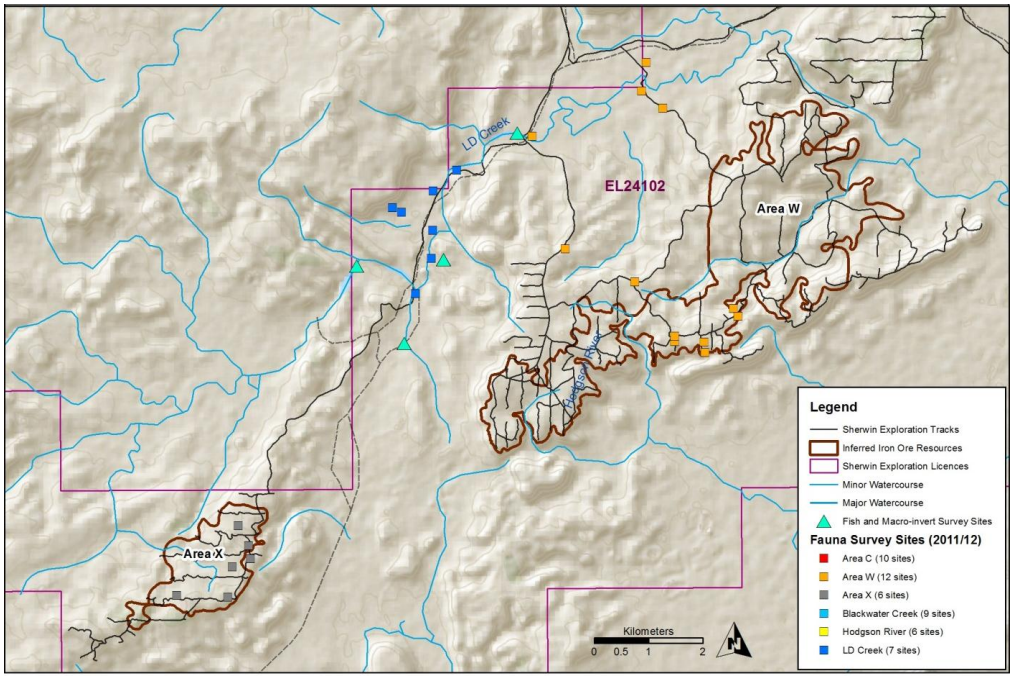

Figure 3-8. Completed Sherwin Iron Fauna Surveys Deposit W and X (as of May 2012).

3.6 Air and Noise

The project area is remote and far from the pollution sources often associated with larger population centres or industry. The only air pollutant likely present at significant concentrations is particulate matter from wind-blown dust and bushfire smoke during the dry season.

The existing noise levels of the project area are considered typical of a remote rural area with low ambient noise levels.

3.7 Greenhouse Gases

The Northern Territory emits approximately 2.8% of Australia's emissions (Department of Climate Change and Energy Efficiency, 2010). The Northern Territory greenhouse gas (GHG) emissions were 16.2 Mt in 2008, which is a 69.5% increase on levels in 1990 (Department of Climate Change and Energy Efficiency, 2010). The biggest source of emissions in the Northern Territory is agriculture.

Key sources of Northern Territory emissions are:

- Agriculture and land use change;
- Energy use;
- Transportation;
- Industry; and
- Waste.

Upon completion of pre-feasibility studies GHG emissions estimates for the Project will be conducted.

GHG emissions will be calculated based on the Northern Territories EIA Guide for Greenhouse Gas Emissions and Climate Change. The Guide includes the calculation of GHG emissions from direct and indirect emissions from construction and operational activities of the Project, including:

- Absolute and carbon dioxide equivalent figures;
- Gas by gas basis; and
- By source.

3.8 Cultural and Heritage Sites

There are four natural heritage sites recognised within the region, these are:

a) Mataranka Thermal Pools (100kms west of the Project);

b) Roper River Jungle; (80kms west of the Project)

c) Roper River and sections of its banks; and (Roper Bar area – 50kms east of the Project)

d) Strangways Crater(50kms west of the Project)

There is one Cultural Site within the region recognised on the Register of the National Estate, pursuant to the *Australian Heritage Commission Act 1975*. The site, known as the Nganawirdbird Site (Commonwealth of Australia 1998). The Nganawirdbird Site is a place of great significance consisting of a large sinkhole and limestone cave at the top of a hill. Inside, various limestone features have been painted, representing the internal organs of the plains kangaroo. Other sites occur close to the Roper Highway, particularly where a small (unnamed) creek intersects the Roper Highway (Ganybunyi Site) (Commonwealth of Australia 1998).

All of these locations are well outside the project area, defined as being within the areas of Sherwin's mining lease applications. A search through the NRETAS register indicates that there are no registered cultural or heritage sites of significance in the project area

Two Aboriginal communities, the Roper River and Minyerri communities are located within close proximity to the exploration lease. Tenement EL 24102 is on Aboriginal Land and under the *Aboriginal Land Rights Act 1976* an Exploration Agreement was reached with the Northern Land Council (NLC) and the lease was subsequently granted by the Northern Territory Government. EL24101 is over a Perpetual Pastoral Lease (Elsey Station) and the Haul Road corridor passes over both the above Aboriginal Land as well as two Perpetual Pastoral Leases.

AAPA Register searches have been completed for most sites with Certificates issued. Further applications will be made where necessary including haul roads. There has been TO liaison regarding these issues, with a predefined process with the NLC regular consultation with traditional land owners regarding heritage surveys. The company will ensure all appropriate site surveys are conducted on and around proposed areas of disturbance before any work commences.

3.9 Socio Economic Environment

The Roper River region is sparsely populated. Only about 3 500 people live in the catchment, of which 70% are Indigenous. The largest population centres are Ngukurr (population 1589), Mataranka (population 600), and Minyerri (population 340) (Bushtel 2007). It should be noted that Minyerri is also frequently referred to and spelt as Miniyeri. People of the Jawoyn, Mangarayi, Ngalakan, Ngandi, Nunggubuyu, Mara, Alawa and Yangman language groups live in the region (AIATSIS 2000). English is not the first language for the majority of the Indigenous population and Kriol is commonly spoken.

It is considered reasonable that the demographics have not changed significantly since the 2007 census as the Indigenous communities are stable and well domiciled in the area and there is no significant permanent population influx or reduction evident for the non- indigenous population (mainly pastoral industry associated) though somewhat transient and seasonal associated with recreational fishing and limited tourism(at least at Mataranka).

The remoteness of the region means that service provision is expensive and limited.

Pastoral activities, agriculture and fishing are currently the only major industries in the region. There is an extractive operation in the form of a limestone quarry at Mataranka (100km's West of the Project) and the nearest major mine is the McArthur River Mine (Zn, Pb, Ag) located 250km's to the South of the Project.

Sherwin is currently employing up to 2 to 4 traditional owners from Minyerri during its exploration drilling programmes.

4 Legislative Requirements

4.1 Commonwealth Legislation

4.1.1 Environmental Protection and Biodiversity Conservation Act

Assessment under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is required for actions that are likely to have a significant impact on a matter of national environmental significance, or on the environment in general by Commonwealth agencies, or on Commonwealth land.

The matters of national environmental significance are:

- World Heritage properties;
- National Heritage places;
- Wetlands of international importance (Ramsar wetlands);
- Threatened species and ecological communities;
- Migratory species;
- Commonwealth marine areas;
- The Great Barrier Reef Marine Park; and
- Nuclear actions (including uranium mines).

The Australian Government Department of Sustainability, Environment, Water, Population and Communities (SEWPC) administer the Act and have established a formal referral and assessment process. If SEWPC determines a project will likely significantly impact a matter of national significance it is declared a "controlled action" and is required to undergo assessment and approval under the *EPBC Act.* In the Northern Territory this will be through the bilateral agreement between the Northern Territory and Australian governments. If the project is not a controlled action, assessment will proceed under the Northern Territory legislative approvals process.

Desktop studies have revealed the potential for threatened species (under the *EPBC Act*) to occur within the region. Further field assessments are underway but it is likely that the Sherwin Iron proposal will be subject to assessment under the *EPBC Act* as a result of migratory species.

4.1.2 Native Title Act

The Native Title Act 1993 provides legal recognition of the rights and interests of the Aboriginal people over land and water possessed under their traditional laws and customs. The Act sets out basic principles regarding native title in Australia and establishes a regulating and governing body, the National Native Title Tribunal.

The Act also sets out processes by which native title rights are established, protected and compensation determined. Another important function of the Act is through facilitating Indigenous Land Use Agreements (ILUA's) between native title parties and other interest holders.

As at 13th November 2012 Sherwin Iron has a Mining Agreement that is ratified by the NLC.

4.1.3 Aboriginal Land Rights (Northern Territory) Act 1976

The Aboriginal Land Rights (Northern Territory) Act 1976 provides for the granting of inalienable freehold title to traditional Aboriginal owners of land in the Northern Territory, the establishment of Land Councils, and the establishment and management of Land Trusts to hold the Aboriginal land for the benefit of traditional owners of the land. The Act also regulates exploration and mining on Aboriginal land and sets out the

processes to be followed when negotiating with Traditional Owners (TO) for access to and leases over Aboriginal land. An exploration license cannot be granted in relation to Aboriginal land without the consent of the relevant Land Council (for the traditional owners) and the Minister. A mineral lease cannot be granted unless an agreement has been entered into under the Act.

Tenement EL 24102 is on Aboriginal Land and under the *Aboriginal Land Rights Act 1976* an Exploration Agreement was reached with the Northern Land Council (NLC) and the lease was subsequently granted by the Northern Territory Government. EL24101 is over a Perpetual Pastoral Lease (Elsey Station) and the Haul Road corridor passes over both the above Aboriginal Land as well as two Perpetual Pastoral Leases.

The company is currently in negotiation and consultation with the NLC over the granting of mineral leases for these tenements.

4.1.4 Other Relevant Legislation

Other Commonwealth legislation relevant to the project includes the following acts and their associated amendments and regulations:

- Aboriginal and Torres Strait Islander Heritage Protection Act 1984; and
- Environment and Heritage Amendment Act No. 1 2003, No 88 2003.

4.2 Northern Territory Legislation

Environmental permitting of mining activities is regulated in the NT by both the *Mining Management Act* and the *Environmental Assessment Act.*

A decision on the appropriate permitting route for new mining proposals in the NT is initiated by the proponent's submission of a NOI (i.e. this document) to the NT Government through the Department of Mines and Energy (DME). If assessment under the *Environmental Assessment Act* is thought to be required, the NOI is referred to the Minister for Lands, Planning and the Environment through DLPE for determination of the appropriate level of assessment.

Following completion of the assessment and approval process under the *Environmental Assessment Act* the Minister for Environment provides a recommendation to the Minister for Mines and Energy who then takes that information into consideration when determining any approvals for the project under the Mining Management Act.

4.2.1 Environmental Assessment Act

The Environmental Assessment Act and the Environmental Assessment Administrative Procedures establish the framework for the assessment of potential or anticipated environmental impacts of development, and provide for protection of the environment. The NT Minister for Lands, Planning and Environment is responsible for administering the Act. The Minister also determines the appropriate level of assessment for new developments or material changes to existing operations, based on the sensitivity of the local environment, the scale of the proposal and its potential impact upon the environment.

This NOI is informing the administrators of the Environmental Assessment Act of the proposed activity so that a determination as to the level of assessment required to properly assess the potential impacts of the project can be addressed and therefore the project can be appropriately assessed.

4.2.2 Northern Territory Aboriginal Sacred Sites Act

The *Northern Territory Aboriginal Sacred Sites Act 1989* recognises the need to preserve and enhance Aboriginal cultural tradition in relation to certain land in the NT and Aboriginal self-determination. The Act provides for the protection and registration of sacred sites by the traditional owners of the sacred sites or the custodians who have the responsibility for protecting a sacred site in accordance with Aboriginal tradition.

The Aboriginal Areas Protection Authority (AAPA) is responsible for administering the Act and records and maintains a sacred sites register. Custodians may apply to the AAPA to have a sacred site included in the Register and may also include, amongst other things, restrictions on activities that may be carried out on or in the vicinity of the sacred site.

Unauthorised entry on to a sacred site is an offence under the Act and penalties are prescribed accordingly. A person or entity may apply to the Authority to issue an Authority Certificate to allow a person or entity to undertake work on or in the vicinity of a sacred site.

The Minister may issue a Minister's Certificate for work to be undertaken on or near a sacred site when an Authority Certificate has not been issued. Whilst a Minister's Certificate has the same effect as an Authority Certificate, in the event of variance the Authority Certificate will have no force or effect.

The Act provides for the preservation of proprietary rights of owners of land comprised in a sacred site. Proprietary owners may enter and remain on that land and do anything on that land for the normal enjoyment of that owner's proprietary interest in the land.

Sherwin Iron now holds Aboriginal Area Protection Authority (AAPA) Certificates for the Project area.

4.2.3 The Minerals Titles Act and Mining Management Act

The *Mineral Titles Act* and the *Mining Management Act* are the principal legislation for the regulation of mining proposals in the Northern Territory, both of which are administered by DME.

The *Mineral Titles Act* establishes the framework within which activities to explore for and mine mineral resources can occur. The Act sets out the administrative processes for authorising these activities through the granting of a title.

Prior to any activities taking place on a granted Mineral Lease, an authorisation to carry out mining activities under the *Mining Management Act* must be obtained. The objectives of the *Mining Management Act* are to ensure that the development of mineral resources is in accordance with the best practice health, safety and environmental standards and to protect the environment and health and safety of all persons on mining sites.

Under the *Mining Management Act*, an application for an authorisation to carry out mining activities must be accompanied by a Mine Management Plan (MMP). A MMP includes information relating to the description of mining activities, the management system to be implemented for the management of health, safety and environmental aspects, costing of closure activities and particulars of organisational structure. Plans of any existing or proposed mine workings and infrastructure must also be included. The MMP is required to be reviewed at intervals specified in the authorisation to carry out mining activities.

Sherwin Iron currently have authorisation under the Mining Management Act for the operation of four Explorations Licences (EL 24101, EL24102, EL 26412 & EL28497) over the Project area. Sherwin Iron have submitted Mineral Lease Applications for the purpose of mining and infrastructure. Sherwin Iron will operate under an approved Mining Management Plan.

4.2.4 Territory Parks and Wildlife Act

The Act is administered by the Parks and Wildlife Commission and makes provision for and in relation to the establishment of Territory Parks and other Parks and Reserves and the study, protection, conservation and sustainable utilisation of wildlife.

Reserved Area status does not generally preclude mining and exploration activity, however mining proposals within various parks or reserves is only permitted under strict conditions and where the proposed activity does not significantly impact on the purpose for which the park or reserve was created. A permit system is in place to assist the Northern Territory Parks and Wildlife Service to monitor and manage our native flora and fauna and to protect them against potential damage. Permits are required for conducting, camping, filming, driving off road, scuba-diving, fishing and much more. All commercial activities and disturbance to natural features and use of certain substances are some of the activities that required to be permitted if they are

being conducted within a Protected Area. These permits are known as By-Laws and are governed under the *Territory Parks and Wildlife Conservation Act 2006* and the *Territory Parks and Wildlife Conservation By-Laws.*

4.2.5 The Water Act

The *Water Act 1992* is administered by the Department of Land Resource Management and provides for the investigation, allocation, use, control, protection and management of surface water and groundwater resources, as well as the administrative process for licensing these activities. The Act allows the enforceable allocation of water to various declared beneficial uses including; agriculture, aquaculture, public water supply, riparian and industry, while ensuring that adequate provisions are made to maintain cultural and environmental requirements.

Water Control Districts are declared in areas where it is recognised that increasing development and demand for water have the potential to cause degradation to water quality and reduce flows required to maintain water dependent ecosystems in the region. The Mining Project Area is located within the Daly Roper Water Control District (DRWCD).

Beneficial Uses (water values) is a legislated process to assist in the protection and management of water resources. The community decides how a particular water body can be used by identifying what values they place on that water body such as public water supply, industry or agriculture. Once a Beneficial Use has been legislated water allocation plans may be implemented. The proposed mining area is not within a Beneficial Use Declaration (BUD). As a result it is likely that Waste Discharge Licences (WDL) will not currently be able to be issued for any release of mine waters to surface waters outside of mining lease areas. If it can be demonstrated that adverse effects from release of mine waters to surface waters can be avoided or adequately managed, it is possible that approval may be granted for discharge outside of the Sherwin Iron process area.

4.2.6 Other Relevant Legislation

Northern Territory legislation relevant to the project includes the following acts and their associated amendments and regulations:

- *Aboriginal Land Act 2004;*
- *Bushfires Act 1980;*
- *Control of Roads Act 2011;*
- *Crown Lands Act NT 2009;*
- *Dangerous Goods Act 1998;*
- *Dangerous Goods (Road and Rail Transport) Act 2011;*
- *Environmental Offences and Penalties Act 1996;*
- *Heritage Conservation Act 2008;*
- *Miscellaneous Acts Amendment (Aboriginal Community Living Areas) Act 2000;*
- *Planning Act 1989;*
- *Public Health Act 1952;*
- *Soil Conservation and Land Utilisation Act 2009;*
- *Traffic Act 2011;*
- *Waste Management and Pollution Control Act 1998;*
- *Water Act 1992;*
- *Water Supply and Sewage Act 1983;*

- *Weeds Management Act 2001;* and
- *Work Health and Safety (National Uniform Legislation) Act 2011*.

5 Potential Impacts and Management Measures

5.1 Surface Water

5.1.1 Potential Impacts

Local surface water may be affected by:

- Contaminants in surface runoff;
- Eroded sediment from disturbed areas, the fines storage facility and temporary waste rock stockpiles;
- Changes in surface water quantity, downstream of the dam site;
- Leachate from waste rock and ore, particularly that with acid generating potential; and
- Altered surface water flow patterns due to incorrect surface water management on site.

5.1.2 Management

Surface water impacts will be managed through the following:

- Obtain a Permit to Construct or Alter Works for all activities that will interfere with water courses;
- Drainage structures will be designed and constructed to ensure minimal alteration to existing surface drainage patterns;
- Pre-existing access tracks will be used to minimise interference to natural drainage;
- Drainage areas and settling basins will be suitably designed to minimise contamination of surface water;
- Any new disturbance areas will be located to avoid drainage lines and designed for minimal impact on surface drainage as far as practicable;
- Develop and implement a Surface Water Management Plan and Surface Water Sampling Procedure consistent with requirements of the DME (in consultation with Department of Land Resource Management – DLRM)";
- Design, install and manage surface water diversion structures that enable non-contaminated water to be directed around disturbance areas;
- Install erosion and sediment control structures downstream of disturbance areas;
- Where surface water is present, vegetation removal on adjacent areas of relief will be delayed as long as possible to avoid erosion and sedimentation;
- Cleared vegetation and topsoil will be stockpiled away from watercourses and in discrete stockpiles to avoid any interference to surface flows;
- Contaminated water from work areas will be kept separate from clean storm water;
- Water interfacing with workshop and machinery maintenance areas will be directed to oil/water separators;
- Potentially acid forming material or material that has the potential to leach other contaminates will be managed in accordance with the Waste Rock Management Plan to be developed; and

- Chemicals and hydrocarbons will be stored in accordance with relevant legislation and standards and the Hydrocarbon and Chemical Management Plan to be developed.

5.1.3 Further Investigations

A desktop surface water assessment will be undertaken prior to commencement of Project works to assess potential impacts on surface water sources and the above mentioned management plans will be developed.

5.2 Groundwater

5.2.1 Potential Impacts

Potential impacts to groundwater as a result of the construction and operation of the Project could include:

- Disturbance to natural groundwater flow patterns from the mine pits;
- Degradation and contamination of groundwater sources from hydrocarbon or chemical spills; anf
- Degradation and contamination of groundwater sources from inappropriately constructed and managed waste rock stockpiles.

5.2.2 Management

Groundwater impacts will be managed through:

- Groundwater Extraction Licences administered under the relevant NT Government authority will be sought prior to any groundwater extraction activities;
- Groundwater abstraction rates will be recorded to ensure compliance with groundwater licenses;
- Groundwater will be used for construction and operation activities and where required will be disposed of in an approved manner;
- The mine will be designed to ensure the safe storage and handling of hazardous materials to prevent contamination;
- Monitoring will be carried out as per any Groundwater Extraction Licence conditions;
- If new bores are required to be installed in any area of the Project, the required approvals and licenses will be sought from the relevant NT Government authority prior to construction and commissioning; and
- As pits progress in-pit dumping will occur. It is intended that in these areas the in-pit dumps final height will be above the groundwater level. If perched water tables become evident this practice may need to be reviewed.

5.2.3 Further Investigations

Current investigations include a hydrological study completed by URS and titled *Final Report – Desktop Hydrological Study – Hodgson Downs Iron Ore Project*. This study was aimed at determining quality and quantity of groundwater sources in the area and how the project water requirements will be met.

5.3 Flora and Fauna

5.3.1 Potential Impacts

Impacts to flora and vegetation will be primarily caused through land clearing. Potential impacts to flora and vegetation as a result of Project activities are summarised below:

- Loss of threatened fauna, flora and ecological communities;
- Habitat fragmentation and reduced connectivity;
- Impacts on vegetation communities and flora due to changes in surface water hydrology;
- Decline or loss of vegetation as a result of dust emissions and saline dust suppressants;
- Clearing of vegetation in excess of permitted allocation (non-compliance);
- Mortality of small and sedentary fauna that are unable to move out of the area prior to clearing;
- Loss of biodiversity and ecological function;
- Change in community structure due to the negative response of wildlife to new stimuli;
- Increase in feral predator numbers leading to increased predation rates on native animals;
- Increased weed species may contribute to a decline in overall species richness, canopy cover or frequency of native species;
- Increased likelihood of vehicle strikes to native fauna;
- Open voids such as steep sided mine pits, uncapped drill holes and steep sided bunded areas can trap fauna species; and
- Localised reduction in ecological function is possible as a result of habitat loss, fragmentation, traffic, noise, and pollution.

5.3.2 Management

Management of impacts to flora and fauna will be through the following:

- Vegetation clearing will be minimised throughout the mining process;
- Parks and Wildlife Commission (PWC) will be consulted regarding the management of any potential rare, priority and significant fauna species;
- Where practicable, project design will incorporate the principles of avoiding and minimising impacts to fauna habitats;
- Disturbed areas will be progressively rehabilitated with local species that provide suitable habitat for native fauna;
- Foundation holes, drill holes and trenches will be covered, fenced, bunded or otherwise capped to prevent fauna entrapment. Where appropriate fauna egress techniques may be installed;
- Native fauna will not be captured, taken or fed without the appropriate permits;
- Vehicle speed limits on site will be set and enforced;
- Any injuries or fatalities to fauna will be reported to the Site Environmental Manager and recorded;
- Fires will not be permitted on site without appropriate approvals and safety precautions;
- Vehicle inspections will be carried out particularly when leaving areas with a high occurrence of weed species and into areas with low weed numbers or significant species/habitat;
- Site personnel will be provided with training to raise awareness, particularly with regard to identification of Weeds of National Significance; and
- Barb wire fencing should be provided around security areas such as magazines.

- Pre-clearance surveys of the haul road route will identify habitat trees, conservation areas and locations where weed management measures will be required. Where possible, habitat trees will be retained and the ROW reduced in conservation areas to reduce the impact in these areas.

5.4 Air and Noise

5.4.1 Potential Impacts

The main air quality issues that may arise during the construction and operation of the project include an increase in dust levels with potential to have adverse effects on human health, vegetation and visual amenity. The main sources of dust include:

- Excavations and clearing activities;
- Loading and unloading of ore and waste rock;
- Truck and vehicle movements over unsealed roads; and
- Wind erosion from exposed surfaces (e.g. stockpiles).

Vehicle and processing plant emissions of fuel combustion products such as carbon monoxide (CO), sulphur dioxide (SO_2), nitrogen dioxide (NO_2) and particulate matter will occur and also have the potential for minor adverse impacts to local air quality.

Noise impacts include:

- Excessive noise may cause fauna species to move away or alter their behaviour; and
- Noise can attract feral predators to areas as they associate human activity with food resources. An increase in feral predator numbers will result in a corresponding increase in predation rates on native animals.

5.4.2 Management

Air quality issues will be managed through comprehensive community and stakeholder engagement. A Consultation Plan will facilitate opportunities for residents to have any issues heard and dealt with in relation to any potential impacts from mining operations including dust and noise.

Management will be continuously refined and strengthened in response to any community or other stakeholder concerns:

- A dust monitoring program will be established as part of Sherwin Iron's environmental management system.
- All vehicles will be required to stay on defined tracks and roads unless otherwise authorised
- Dust suppression measures will be used such as water trucks, spray bars and cannons;
- Speed limits will be set and enforced;
- The extent of exposed areas susceptible to wind erosion will be minimised;
- Rehabilitation will be undertaken progressively to minimise exposed soil;
- High dust-generating activities will be limited during adverse weather conditions;
- Design of construction and operations to incorporate methods to minimise vehicle movements and duplication of activities to reduce cost, greenhouse gas emissions and increase efficiency;
- Energy consumption will be considered as a criterion in equipment selection;

- design of power infrastructure will consider the incorporation of energy efficiency and innovative methods for reducing the carbon footprint of the site;
- Vegetation clearing will be minimised where practicable;
- Progressive rehabilitation of open areas will result in partial offsets of emissions over the life of the Project;
- Alternative fuels will be investigated for use for onsite power;
- A Greenhouse Reduction Program will be implemented onsite to identify and reduce greenhouse emissions on an ongoing basis;
- All vehicles and plant will be maintained in accordance with manufacturer's instructions and the site maintenance schedule.

5.4.3 Further Investigations

Noise and air emission assessments will be conducted to gain an understanding of the degree of potential impacts and management plans developed.

5.5 Greenhouse Gases

5.5.1 Potential Impacts

Construction and operation of the Project will directly release carbon dioxide into the atmosphere. As the Project will not be connected to the electricity grid, emissions will result from the burning of diesel fuel for power generation, and combustion engines in diesel vehicles. Vehicle and processing plant emissions of fuel combustion products such as carbon monoxide (CO), sulphur dioxide (SO_2), nitrogen dioxide (NO_2) and particulate matter will occur and have the potential to impact on local air quality. Reporting may be required under the *National Greenhouse and Energy Reporting Act 2007*.

Emissions will be generated by:

- diesel generators;
- machinery and light vehicle exhausts;
- Haulage vehicles; and
- the clearing of native vegetation.

5.5.2 Management

Emissions of greenhouse gases will be managed through:

- Design of construction and operations to incorporate methods to minimise vehicle movements and duplication of activities to reduce cost, greenhouse gas emissions and increase efficiency;
- Energy consumption will be considered as a criterion in equipment selection;
- Design of power infrastructure will consider the incorporation of energy efficiency and innovative methods for reducing the carbon footprint of the site;
- The construction and permanent camp will be located as close as reasonably possible to the site to reduce the number of vehicles used in association with the Project;
- Vegetation clearing will be minimised where practicable;

- Progressive rehabilitation of open areas will result in partial offsets of emissions over the life of the Project;
- Alternative fuels will be investigated for use for on-site power;
- A Greenhouse Reduction Program will be implemented on-site to identify and reduce greenhouse emissions on an ongoing basis;
- Regular inspection and maintenance of mobile and stationary equipment will be carried out to maximise energy and fuel efficiency; and

5.5.3 Further Investigations

Further studies will be undertaken to determine greenhouse gas emission impacts and appropriate management in addition to that identified above. Results of these studies will be included in management plans for the Sherwin Iron Project.

5.6 Cultural and Heritage Sites

5.6.1 Potential impacts

Sites of indigenous or cultural heritage significance may exist in the area. Potential impacts include:

- Direct destruction or damage through mining activities; and
- Mining infrastructure preventing access by traditional owners / interested parties.

5.6.2 Management

Sherwin Iron is seeking Aboriginal Areas Protection Authority (AAPA) sacred sites or other sensitive areas clearance within the province. Any potential risks or emerging concerns will be minimised during the course of operations through Sherwin Iron maintaining good working relationships with those who hold value to the area. In addition all personnel will be made aware of the management actions which will uphold the identified values in the proposed development area and its surrounds.

Good working relations can be fostered through developing and maintaining open communication between Sherwin Iron and the Native Title Holders. Sherwin Iron will seek input from these stakeholders regarding access to areas and where appropriate their involvement or employment in future activities.

5.7 Socio Economic Environment

5.7.1 Potential Impacts

Small to medium scale mining operations are less likely to have any significant negative impacts on the social environment of the region, particularly in a remote location. Mining is likely to provide employment and other potential benefits to the region. The activities will also increase the amount of local purchasing of suitable locally supplied goods.

5.7.2 Management

Sherwin Iron will undertake continuous community consultation based on open sharing of information with all stakeholders and communities. Sherwin Iron has commenced consultations with key stakeholders such as Australian and Northern Territory Government departments, land councils, land managers, land owners and traditional owners.

5.8 Rehabilitation and Mine Closure

A strategic mine closure plan will be set out in the MMP. This plan will be refined to take into account the detailed project design, stakeholder consultation, and investigations and studies as they become available.

The primary objectives of the plan will be to leave the site in a safe condition that is physically and geo-chemically stable, and to ensure that the area is re-vegetated and does not become a source of wind or water-borne erosion or sediment.

Sherwin Iron will undertake rehabilitation in a progressive manner, where areas not required for ongoing operations will be progressively rehabilitated. Upon mine closure the Project infrastructure will be decommissioned and rehabilitated. Sherwin Iron will develop a conceptual closure plan for the Project prior to the commencement of construction as part of the environmental impact assessment process. There are several guidelines and codes of practice that are relevant to mine closure that will guide both the structure and content of the closure plan, these include:

- Department of Mines and Energy Mine Close Out Objectives (February 2008);
- ANZMEC/MCA (2000), Strategic Framework for Mine Closure;
- Association of Mining and Exploration Companies Mine Closure Guidelines (AMEC, 2000);
- Australian Mining Industry Council (1989), Mine Rehabilitation Handbook;
- The Commonwealth Guidelines for Mine Closure and Completion (March 2009); and
- The Commonwealth Guidelines for Mine Rehabilitation (October 2006).

Sherwin Iron rehabilitation and closure objectives for the Project are to:

- Minimise erosion and sedimentation effects related to vegetation clearing and topsoil removal;
- Maximise the re-use of topsoil for rehabilitation; and
- Comply with all applicable legislation form the Northern Territory.

The conceptual closure plan will include management strategies for the implementation of progressive rehabilitation and closure for the Project, including:

- Closure consultation;
- Closure criteria;
- Rehabilitation strategies and methods;
- Closure strategies;
- Closure cost estimates; and
- Post-closure monitoring.

Mine pits will be progressively rehabilitated in the following manner:

- Construct a bund wall around the completed mining area. The bund will be compacted such that it will form a dam wall to contain the fines rejects which will be deposited into the completed area;
- Fines rejects will be stored at Fine Reject Storage (FRS) and allowed to dry;
- Once fines are dried (and prior to the Wet Season), overburden material will be placed as a cover;
- Topsoil will be spread over the final landform and the surface ripped;
- Cleared vegetation will be placed over the landform to provide habitat for fauna; and

• Initial revegetation of the landform will rely on seed stored in the topsoil. An assessment of the success of revegetation will be made following the Wet Season. If required, additional seed may be spread over the landform. Plantings of raised seedlings may also be undertaken if required.

Overburden material will be managed in accordance with the findings from the mine waste geochemical study (Graeme Campbell and Associates 2011) and the Characterisation of the Overburden and Footwall Materials (Outback Ecology 2011). The entire deposit lies well above the regional and local groundwater table. In summary, mine waste is considered to be Non Acid Forming (NAF). Very minor occurrences of Potentially Acid Forming (PAF) material were discovered and will be further studied.

Waste material has been classified according to its physical properties. Overburden has been classified in three distinct Management Units. Overburden Management Unit Three (OMU3; see Figure 2 9) consists of Clay, Colluvium and Mudstone materials. These materials will be used as growth medium/topsoil layer. Overburden Management Unit Two (OMU2) consists of Ferruginous siltstone/sandstone, Ironstone, Porcellanite, Sandstone and Siltstone. These materials will form the main structural material for landform construction and will also be blended with OMU3 to reduce the erosion potential of OMU3. Overburden Management Unit One (OMU1) consists of the Quartz Sandstone lithology, which is particularly susceptible to erosion, hardsetting and structural decline. These materials will be buried within the final landform.

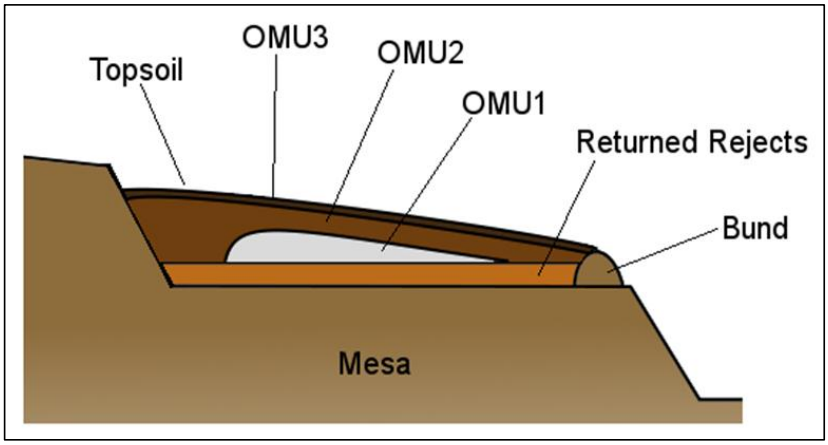

Figure 5-1. In-pit Waste Landform Conceptual Schematic

A temporary waste rock stockpile will be required in order to store the initial topsoil and overburden mined at the beginning of the project. This waste will be utilised during the project's life and will be used to complete the rehabilitation of FRS completed sections. The temporary stockpile shall be constructed to take into consideration the types of waste mined and the recommendations from the mine waste geochemical study (Campbell and Associates 2011) and the Characterisation of the Overburden and Footwall Materials (Outback Ecology 2011).

Once fully rehabilitated, the site will represent a modified natural ecosystem that is largely self-sustaining and has value both as flora and fauna habitat. The area will have low maintenance requirements and the character and aesthetics of the site will be similar to the surrounding areas.

6 Environmental Management

6.1 Environmental Management Plans

Management commitments will be developed and finalised throughout Project planning and through the development of the Project EMP and Mining Management Plan (MMP). The Project EMP will be developed within the framework of an Environmental Management System (EMS) based on ISO14001 criteria. Sherwin Iron has undertaken a number of baseline environmental studies of the proposed site; including vegetation and flora surveys, vegetation mapping and vertebrate fauna assessments. Further studies will be undertaken as project planning progresses and project scope is finalised, studies may include; surface water, groundwater, dust modelling, noise modelling, geotechnical studies, aboriginal and European heritage surveys and greenhouse gas emission assessments.

A central component of the Project EMP is to identify those activities that may have a significant risk to the natural environment and develop management strategies to:

- Completely avoid the impact if possible;
- Substitute with a lesser impact;
- Design rehabilitation and engineering solutions to reduce the degree and risk of impact; and
- Design operational controls and emergency response around reduction of impact.

In assessing the significance of environmental impacts potentially resulting from this proposal, Sherwin Iron will consider relevant legislation, standards and guidelines; biological assessments of the Project area and input from government and stakeholders.

A risk-based Project EMP will be developed for the project to:

- Document project commitments;
- Document potential impacts, management measures, and key performance indicators, monitoring and reporting requirements;
- Document conditions of approval resulting from the environmental approval process; and
- Provide the basis for the development of environmental guidelines and work procedures to be prepared by the construction contractor.

The Project EMP will include objectives and management strategies that address:

- Surface Water Management;
- Groundwater Management;
- Vegetation and Flora Management;
- Fauna Management;
- Dust Management;
- Greenhouse Gas Emissions Management;
- Weed Management;
- Fire Management;
- Hydrocarbon and Chemical Management;
- Aboriginal Heritage Management;

- Rehabilitation Planning and Management;
- Topsoil Management; and
- Closure Planning.

6.2 EMP Implementation

Information contained within the EMP will be dispersed to personnel to ensure that each employee understands their role in ensuring that Sherwin Iron conducts construction activities and operations in an environmentally sound manner.

The objectives of communicating environmental issues include:

- Provides access to information for all Sherwin Iron employees;
- Ensures that employees are aware of, and understand, their accountabilities for environmental management;
- Facilitates internal auditing and reporting;
- Enables regulatory reporting;
- Encouraging employee involvement in continuously improving environmental systems and procedures;
- Providing information on Sherwin Iron's environmental performance to the broader community; and
- Addressing environmental concerns of local communities.

Communication on environmental issues can take on many forms with a variety of audiences. Various methods of communication with be pursued both internally and externally. In addition to this, new employees will undergo an induction which will include detail on the Sherwin Iron's environmental systems and procedures. Management plans will be made available to the public.

Elements of the EMP will be continuously updated to incorporate further information, new techniques and relevant legislative requirements and adaptations resulting from monitoring results. Implementation strategies will be directed to achieving the performance criteria set out in the EMP and any statutory requirements.

6.3 Environmental Assessment and Corrective Actions

Sherwin Iron will promote the use of systems and procedures that encourage continual improvement. This will include robust monitoring systems which will provide information to assist in assessing the environmental performance and the effectiveness of its procedures. Should inadequacies be detected then appropriate measures can be implemented to mitigate risk to the environment.

Audits and inspections are another method which will be employed to monitor the effectiveness of management systems at Sherwin iron. Both internal and external avenues will be used for audits and inspections. Outcomes of these audits will be documented and action plans implemented to address any issues that may have been raised.

Reviews of the management system and its effectiveness will be conducted annually. This review will identify any gaps in the system to allow management to allocate necessary resources to facilitate any improvements to the management system. Management systems will be reviewed, monitored and evaluated against key environmental performance standards to ensure environmental compliance.

6.4 Other Environmental Monitoring

Monitoring of environmental changes is a crucial part of an environmental management system. Monitoring should focus on threats, pressures and opportunities. Sherwin Iron will develop an environmental monitoring program, as part of the EMP, and will include:

- Identification and monitoring of trends and threats;
- Identification and monitoring of potential long term impacts/patterns;
- Identification and exploration of emerging opportunities;
- Monitoring of both direct and indirect impacts;
- Strategies for assessing and measuring effectiveness of policies and/or projects; and
- Provision for updating policies, plans, strategies and projects.

If monitoring indicates that the desired level of protection is not being met, improved techniques or management methods will be initiated to guarantee the standard of protection expected by NT regulatory authorities.

7 Stakeholder Consultation

Stakeholders are parties with an interest in the project who can potentially influence, or are influenced by its development. The currently identified stakeholders of the Sherwin Iron project are listed in Table 7-1.

Potential unfavourable responses to the Project may arise from stakeholders including community groups, individuals, landholders, government bodies, indigenous groups and traditional owners, decision-making authorities (DMA's) and non-government agencies (NGO's).

Concerns raised by local communities/landholders might include:

- Availability of resources e.g. water, infrastructure;
- Noise and traffic levels;
- Population changes;
- Employment opportunities;
- Infrastructure capability and suitability;
- Local economic issues;
- Cultural impacts including disturbance to unidentified heritage areas;
- Greenhouse gas emissions;
- Changes to biodiversity;
- Habitat destruction and clearing of native vegetation;
- Waste dumps and tailings dams;
- Groundwater impacts; and
- Weed/disease introduction/spread.

Community consultation and outcomes will focus on raising awareness of the project, employment and future employment opportunities that might exist, and developing an engagement and participation strategy.

A Community Impact Assessment may be undertaken and conducted on behalf of Sherwin Iron in relation to this Project. The purpose and objective of any Community Impact Assessment will be to allow Sherwin Iron to better understand the region and the communities in which it operates in order to:

- Make informed decisions regarding models of community engagement that will enhance community consent and support for continued exploration, development, construction and the ongoing operation of the Roper River Iron Ore Project;
- Ensure that commitments and community investments (financial and non-financial) are achievable and have maximum impact; and
- Ensure business and employment opportunities in the communities of interest can be maximized.

Indigenous groups, local residents, local community members and local businesses will be a key focus of a Community Impact Assessment to assist Sherwin Iron in meeting its corporate and operational objectives in community relations.

Consultation will be ongoing throughout the construction phase and the life of the project. The following table (Table 7-1) is an indicative list of stakeholders for the Sherwin Iron project.

Table 7-1. Stakeholder List.

Interest Group	Stakeholder Name
Northern Territory Government	Minister for Natural Resources, Environment and the Arts
	Minister for Resources
	Roper Gulf Shire Council
	Department of Lands and Planning
	Department of Construction and Infrastructure
	Power and Water Corporation
	Aboriginal Areas and Protection Authority
	Environmental Protection Authority
Australian Government	Department of Sustainability, Environment, Water, Population and Community
	Federal Environment Minister
	Department of Families, Housing, Community Services and Indigenous Affairs
Indigenous Groups	Northern Land Council
	Traditional Owners
Local Community	Pastoral Property Owners or operators
	Other Landholders
	Residents of the Roper Gulf Shire
	Roper River Landcare Group
	Recreational fishermen
Non-government Organisations	Environment Centre NT
	AFANT
Media	Local, regional, NT and national
Industry	Western Desert Resources
	Minerals Council of Australia
	AusIndustry
	The Australian Institute of Mining and Metallurgy
	Northern Territory Industry Capability Network
	NT Chamber of Commerce

8 Acronyms

AAPA	**Aboriginal Areas Protection Authority**
DLPE	**Department of Lands, Planning and Environment**
DLRM	**Department of Land Resource Management**
DMA	**Decision making authorities**
DME	**Department of Mines and Energy**
DSO	**Direct shipping ore**
EIS	**Environmental Impact Statement**
EMP	**Environmental Management Plan**
EMS	**Environmental Management System**
FIFO	**Fly In Fly Out**
FRS	**Fines reject storage**
MOC	**Mine operations centre**
MMP	**Mining Management Plan**
NAF	**Non-acid forming**
NGO	**Non-government agency**
NOI	**Notice of Intent**
NRETAS	**Department of Natural Resources, Environment, the Arts and Sport**
PAF	**Potential acid forming**
PWC	**Parks and Wildlife Commission**
RoW	**Right of Way**
TO	**Traditional owners**

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Comment [AM1]: Is this correct of should it be NLPEDA??

Northern Territory Government.