

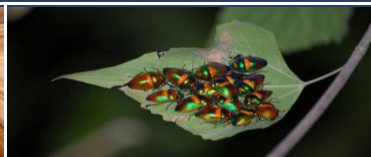


Appendix Q

Soil Survey Report



Sherwin Iron (NT) Pty Ltd
Sherwin Creek Iron Ore Project
Environmental Impact Statement



2013

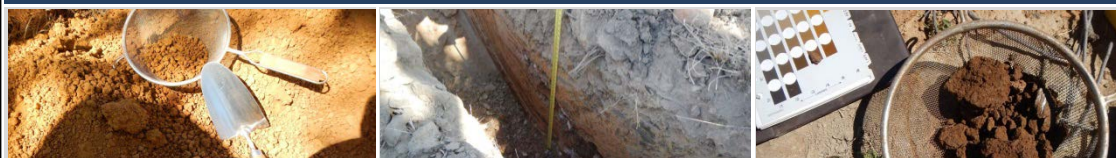




Soil Survey of the Sherwin Creek Iron Ore Project Area

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Executive Summary

A soil survey across the Sherwin Creek Iron Ore Project area was undertaken from 12-14 August 2013. Twelve soil test pits were excavated within the project area that targeted the different land systems in the vicinity of the proposed mining disturbance areas. Pits were excavated to a depth of at least 2m, or refusal, with field tests and laboratory analyses undertaken on the samples collected from each pit. One kg samples were taken from each observed horizon, with a total of 28 samples collected.

Testing undertaken on the soil samples included field measurements/observations of pH, EC, texture, colour, presence of coarse fragments, gravel and rock, and moisture content. Laboratory tests were undertaken to determine the soil particle size analysis, Emerson aggregate classes and dispersion potential, and Atterberg Limits of the soils.

The results of the survey indicate that the soils present within the project area are largely consistent with the land form and land system descriptions as described in published literature. The majority of soils are considered to be non-dispersive, while the liquid limit and plasticity indexes of soils were predominantly low. The exception to this was the ratings for some soil horizons in the Patterson land system, a low lying undulating land form in the Western section of the project area. With deposited fines material, Pits 1 and 3 from within this area had 'Medium' ratings for both the liquid limit and plasticity index. Linear shrinkage ratings for both of these samples were marginal, while all other samples were considered non-critical.

In general, those soils on the upper slopes of the project area (i.e. Munyi and Clifffdale land systems) had shallow soil profiles with higher content of gravel and bedrock between 1 m below ground level and the surface. Conversely, those soils on the lower slopes and valleys (i.e. Patterson, Bukulara and Coolibah land systems) had deep profiles with higher content of clay and fine material.

The results were interpreted in relation to erosion and sediment control, engineering considerations, and potential uses for soils. Those soils found on the upper ridges, within the Munyi and Clifffdale land systems, have higher potential for erosion and dispersion. While erosion rates will be limited according to availability of soils, some of the pits dug along the ridge line had profiles of up to 1 m deep. This area is also a key target area for mining development, so erosion and sediment control will be critical to reduce the risk of creating significant erosion issues.

Nearly all soils have low Atterberg Limits, with the exception of two samples taken along the access road. Notably, the subsoil below the camp site has medium Atterberg Limits, which may have implications for engineering and design of camp infrastructure.

The soil information collected indicates that topsoil and clay material is available within the Mining Lease. These resources may be useful in relation to rehabilitation and construction (e.g. capping) of waste rock dumps in future.

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Appendices

Appendix A – Soil Bore Logs

Appendix B – Lintin Geotechnical Laboratory Reports

1 Background

A soil survey was undertaken across the Sherwin Creek Iron Ore Project area from 12 - 14 August 2013 to assess the different soil characteristics present within the lease and disturbance areas. The survey covered an area of approximately 24 km² and involved excavation of twelve soil test pits to assess the soil profiles and undertake field and laboratory tests of soil properties.

The aim of the soil survey was to describe and assess the different soil types relevant to the Sherwin Creek Iron Ore Project area, in order to inform erosion and sediment control measures and assess the geotechnical conditions for engineering and construction planning.

2 Land Systems of the Sherwin Creek Area

2.1 Land Systems

Five land systems have been identified within the Sherwin Creek Iron Ore Project Area and immediate surrounds. These land systems were mapped and described by Aldrick and Wilson (1992) during a study of the Roper River catchment area.

Land systems categorise areas according to land form, soil types and vegetation communities. Summaries of land capability in relation to agricultural uses are also given. The land systems provide a broad land mapping tool and were used as a basis for siting of soil survey locations. The five land systems that were targeted are presented in Table 2-1 below.

Table 2-1. Land Systems subject to soil survey (Source: Aldrick and Wilson, 1992)

Land System	Brief Description	Soil Survey Sites
Patterson	Low rises and undulating hills with platy sandstone and siltstone geology. Lithosols, earthy sands and shallow and brown earths with open <i>Eucalyptus</i> woodland.	1, 2, 3
Munyi	Gentle to steep slopes with sandstone and ironstone rocks. Lithosols and shallow brown earths. Low open woodland to mid height open forest.	4, 5, 6, 9, 10
Cliffdale	Undulating and hilly rocky terrain with basalt, dolerite and volcanic rock outcrops. Highly erodible red earths and clays, with some lithosols. Predominantly shallow soils with rock outcrop. Open <i>Eucalyptus</i> woodland.	7, 8
Coolibah	Flat clay plains on unconsolidated transported materials; mostly grey and black clays. Open woodland.	11
Bukulara	Rugged rocky ridges and gorges with sandy lithosols and shallow sand soils. Open <i>Eucalyptus</i> woodland.	12

Land systems are grouped into geomorphic provinces that have similar land forms, soils and/or vegetation as a result of the geomorphological processes occurring (Aldrick and Wilson, 1992). Geomorphic provinces have different natural erosion rates and sediment removal rates; steep areas with erodible soils will have greater erosion and sediment removal rates than low lying flat areas or areas with stable soils. All five land systems within the survey area have areas classified as the geomorphic province G4, with Patterson and Munyi comprised of G4 exclusively. G4 is described as having 'slow' to 'moderate' erosion and sediment removal rates. Cliffdale and Bukulara both have areas of the province G3, which has a slow erosion rate due to erosion-resistant rocks but can have rapid sediment removal when sediment is available due to the high relief. Coolibah has sections of both provinces G2 and G5, with erosion and sediment removal rates that are classified as 'rapid' and 'moderate', respectively.

Based on the geomorphic province data, it is evident that G2 (i.e. in Coolibah) has the greatest erosion risk, noting that the specified erosion rates are based on *natural* conditions and disturbance of soils, vegetation clearing and other works associated with mine site development are likely to increase the potential erosion rate.

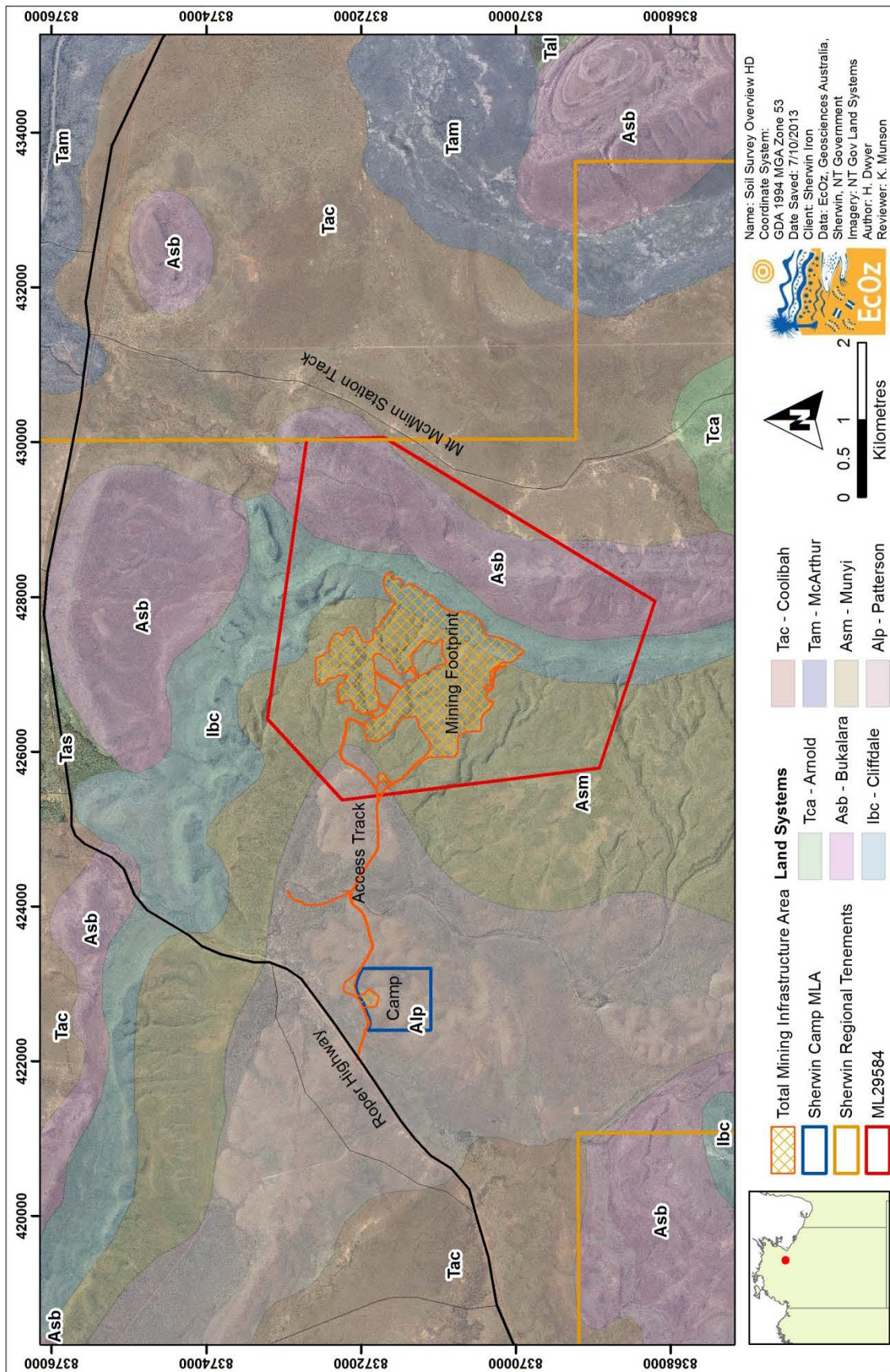


Figure 2-1. Map of Sherwin site overview and land systems

3 Soil Survey Methodology

3.1 Survey Locations

Soil survey site locations were selected based on desktop research, including an assessment of aerial imagery and land systems data. The survey was focused on areas within the mining footprint of the proposed Sherwin Creek Iron Ore Project, including locations of the future camp area, access road, pit and extraction sites and other infrastructure. The surveys were targeted towards investigation of soils for determining potential erodibility, engineering and structural support characteristics, and identification of potentially useful material (e.g. clays) for future rehabilitation of the site.

A total of 12 survey sites were selected to give a broad overview of soils within the project area (see Figure 3-1). Sites 1 to 3 were located along the main site access road within the Patterson land system. Sites 4 and 5 were both located within the existing bulk sample pit and administration area of the Munyi land system. Sites 6 to 10 were located along the escarpment east of the bulk sample pit, within future mining areas. These sites were accessed by exploration tracks traversing the ridge line. Sites 6, 9 and 10 were in the Munyi land system while 7 and 8 were within the Clifdale land system. Sites 11 and 12 were to the east and outside of the proposed mining footprint, although future expansion may target these areas. Both sites were accessed via Mt McMinn Station tracks, with Site 11 representing the Coolibah land system and Site 12 representing the Bukulara land system.

3.2 Survey and Sampling Methodology

Soil test pits were excavated using a back-hoe, either to refusal, or to a maximum depth of approximately 2 m (i.e. maximum practicable depth of back-hoe). Each bucket load was laid out in order of extraction to allow clear identification of the different soil horizons, with observation of exposed pit walls used to determine the relative depth of each horizon. Soil excavation details recorded included depth of pit, gravel and rock content, and level of refusal. None of the test pits intercepted groundwater and this was therefore not recorded. The sampling process is displayed in Figure 3-2 to Figure 3-7.

Each soil test site was described in the field according to land form, slope, vegetation, and percentage rock outcrop or surface gravel. GPS locations were recorded for all sites in addition to photographs of the area, soil profile and individual soil horizons for each pit. The horizons of each pit were described and measured, and each horizon was sampled for field and laboratory analysis.

Field tests undertaken included

- Field texture
- Wet colour
- Field pH and EC
- Coarse fragment percentage and size
- Moisture content.

1kg samples were collected for laboratory analysis of particle distribution, Emerson Aggregate Class (EAC) and dispersion index, and Atterberg limits. Soil horizons were described according to the Australian Soil and Land Survey Field Handbook (NCST, 2009), with colour descriptions determined from Munsell Soil Colour Chart (Munsell, 2009). Information collected in the field was recorded in soil bore logs.

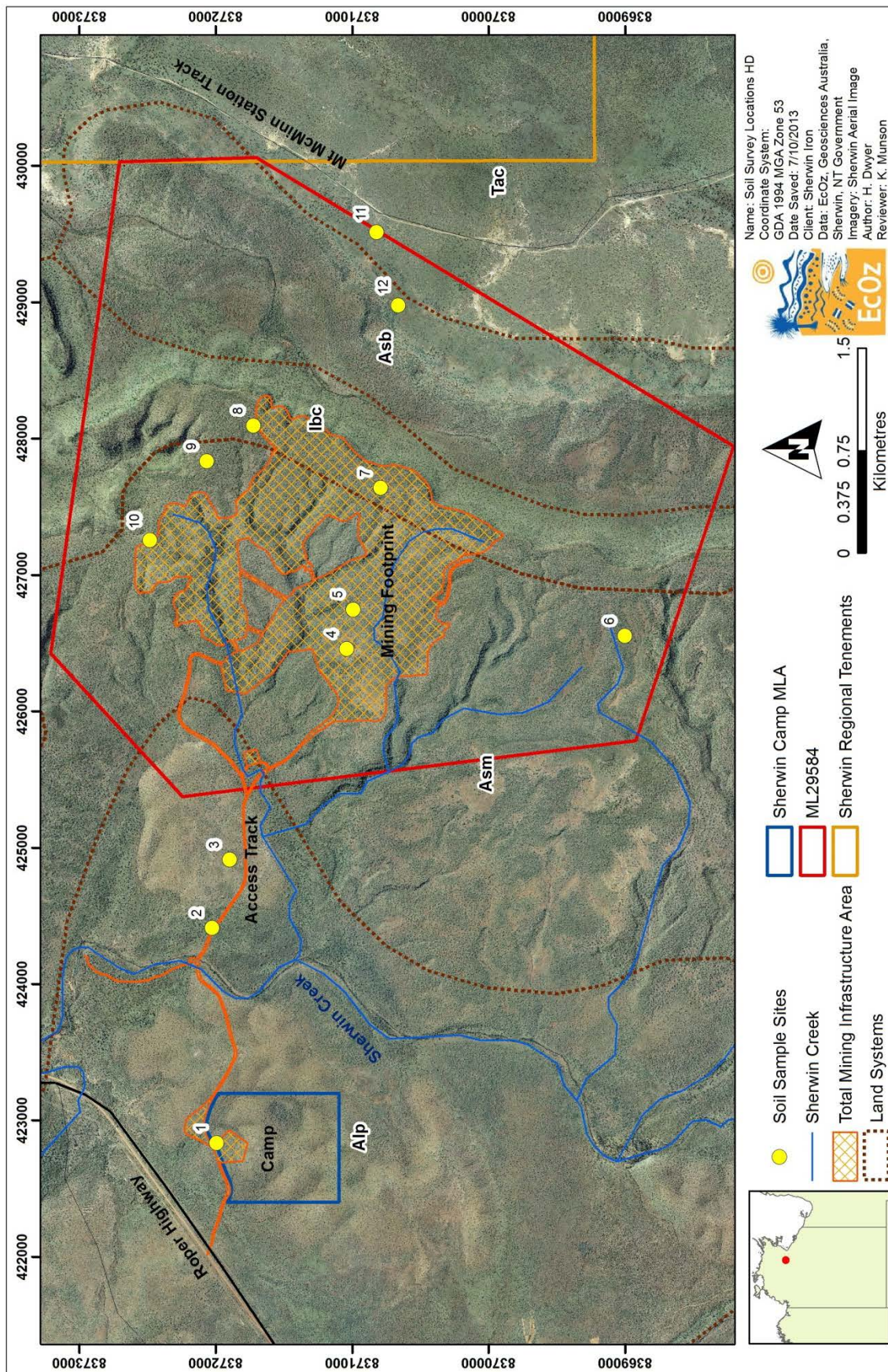


Figure 3-1. Map of soil survey locations



Figure 3-2. Photograph of soil pit excavation



Figure 3-3. Photograph of sequential profile excavations



Figure 3-4. Photograph of exposed soil profile at Site 11



Figure 3-5. Photograph of sampling of soil at Site 4



Figure 3-6. Photograph of field texture test at Site 1



Figure 3-7. Photograph of Munsell soil colour charts at Site 12

4 Results

4.1 Field Results

The soil bore logs for each test pit are presented in Appendix A. In general, sites within the lower lying areas of the survey area (i.e. land systems Patterson, Bukulara and Coolibah) had deeper soil profiles with greater amounts of depositional, finer particle soils. Pits 1 and 2 were the only pits that did not meet refusal and were dug to a depth of over 2 m. All other pits reached bedrock or refusal prior to this depth.

Pits dug within the Munyi land system were located on upper slopes and crests and profiles indicated skeletal soils with depths ranging from 30 - 100 cm. Both pits in the northern section of the survey area (i.e. Sites 9 and 10) contained higher sand content, with Pit 10 being predominantly sand.

Pits 11 and 12 exhibited substantially different soil profiles to all other sites, with deep brown clay profiles (grey when dry). Cracks were evident on the ground surface, indicating the presence of shrink/swell clays. Pit 12 aimed to represent the Bukulara land system; however access to the area was limited due to the steep, rocky terrain, so the pit was dug on the border of the land systems. The vegetation present differed from that on the lower slopes of the Coolibah land system, which indicated a transition between the different land units.

Field results collected during the survey are presented predominantly in the soil bore logs (Appendix A), while soil pH and Electrical Conductivity (EC) measurements are presented in Table 4-1 below.

Table 4-1. Soil pH and EC measurements

Pit	Horizon	pH	EC (μ S/cm)	EC _e (dS/m)	Pit	Horizon	pH	EC (μ S/cm)	EC _e (dS/m)
1	A1	6.64	28	0.266	7	A1	5.65	60	0.840
	A2	6.98	68	0.585		B	6.37	14	0.193
	B	7.37	886	7.62	8	A2	6.61	25	0.235
2	A1	5.80	42	0.399	9	A2	6.98	17	0.242
	A2	6.27	13	0.114		B	6.97	14	0.189
	B	6.39	24	0.206	10	A1	6.89	38	0.533
3	A1	4.93	26	0.247		A2	6.98	21	0.488
	B1	5.21	25	0.215		B	6.95	16	0.359
	B2	5.57	69	0.400	11	A1	5.09	37	0.352
4	A1	5.85	32	0.304		A2	5.28	41	0.353
	A2	5.68	15	0.207		B	5.38	80	0.464
5	A2	6.61	19	0.181	12	A1	5.67	200	2.80
6	A1	5.81	39	0.370		A2	6.32	23	0.174
	A2	5.67	26	0.250		B	6.80	116	0.673

In addition to assessing the acidity or alkalinity of soils, pH is an indication of nutrient availability as some nutrients are only bioavailable at certain pH levels (e.g. Phosphorus bioavailability reduced at pH < 5). Additionally, some metals and other elements can become toxic, or have greater impacts on plants, at certain pH levels. The majority of essential plant elements are most available at pH of 5 - 9 (Hazelton and

Murphy, 2007). The pH values displayed in Table 4-1 above indicate that the pH of most soils sampled are generally neutral to slightly acidic. Only one sample, from Pit 3, Horizon A1, had a pH result of just below 5.

EC is often used as an indication of salinity in soils. EC results can be converted into EC_e , which allows for incorporation of an estimate of water holding capacity of soils according to texture. The EC_e values of all samples were calculated with most samples below 2 dS/m, indicating that non-saline soils predominate (Hazelton and Murphy, 2007). Two exceptions were Pit 1, Horizon B and Pit 12, Horizon A1, with EC_e values of approximately 7 and 3 respectively. The former indicates moderate salinity and the latter slight salinity. Salinity is largely a concern for agricultural cropping purposes, and the salinity levels indicated across the site are unlikely to have any impact in terms of potential salt seepage or rehabilitation limitations.

4.2 Laboratory Results

A total of 28 samples were collected and submitted to the laboratory for testing. A NATA-accredited laboratory analysed the samples for particle size, Emerson Aggregate Classes (EAC's) and Atterberg Limits (see Appendix B for laboratory reports). A brief description of the tests and the background theory behind them is presented below.

4.2.1 Test descriptions

The three key tests undertaken on the samples were particle size analysis, EAC's and Atterberg Limits to describe the various physical components of soil samples. The key objective of these tests was to provide information into the potential dispersion, liquid limits, plasticity limits and linear shrinkage of the soils across the Sherwin Site. This information is useful for both determination of erosion potential and engineering and construction design.

EAC's were tested to a primary class only (i.e. subclasses are not available), although a determination of the potential dispersion and sodicity of soils can still be made. Dispersive soils have a soil structure that becomes unstable when wet as the clay particles disperse in water (Davies and Lacey, 2009). Disturbance of dispersive soils often results in significant gully and tunnel erosion, which can be difficult or impossible to rectify. Additionally, dispersive soils are often sodic which is a function of the sodium levels in the soil and the ability of particles to bind together. The EAC's and their respective dispersion and sodicity rankings are presented in Table 4-2 below.

Table 4-2. Emerson Aggregate Classes and Dispersion Potential (Source: Hazelton and Murphy 2007)

EAC	Aggregate Dispersibility	Indicative Sodidity (Likelihood)
1 and 2 (3)*	Very high	Almost certain
2 (2)	High	High
2 (1)	High to moderate	May
3 (4) and 3 (3)	Moderate	May
3 (2), 3 (1) and 5	Slight	Unlikely
4	Negligible/aggregated	May
6, 7, 8	Negligible/aggregated	Almost certainly not

* Subclasses (presented in parenthesis here) were not defined in the laboratory testing and are therefore not described below; however the subclasses aid in further soil classification according to milkiness of sample.

Aggregate tests provide an indication of the liquid limit, plastic limit, plasticity index and linear shrinkage of soil samples. The liquid limit is the level of moisture content that will result in soils changing from a plastic state to a liquid state, and is directly proportional to the compressibility of the soil. Plasticity is a measure of the moisture content required to change the state of the soil from solid into 'plastic' and gives an indication of potential soil movement and behaviour when moisture is added. For example, soils with low Plasticity Indexes may change state with little water added, and may therefore be considered unstable for engineering purposes. A summary of the test limits is presented in Table 4-3.

Table 4-3. Atterberg Test Limits and Rating

Liquid Limit (%)	Plasticity Index (%)	Rating
<45	<25	Low
45-55	25-35	Medium
55-75	35-45	High
>75	>45	Very High

Linear shrinkage indicates the shrinkage of soils likely to occur during drying. High linear shrinkage indicates large soil shrinkage, which can place limitations on use of soil for applications such as building foundations. Linear shrinkage under 12 % is considered 'non-critical', while over 12 % is considered 'marginal' and shrinkage of over 22 % is considered 'critical'.

Particle size analysis was also undertaken on all soil samples, with the results relevant for engineering purposes. The particle size classifications were assigned according to the Unified Soil Classification System (USCS) presented in Table 4-4.

Table 4-4. Particle Size Interpretation

Description	Size (mm)
Fines (silt and clay)	<0.074
Fine Sand	0.074 – 0.42
Medium Sand	0.42 – 2
Coarse Sand	2 – 4.76
Fine Gravel	4.76 – 20
Coarse Gravel	20 - 75

4.2.2 Results

A summary of the laboratory results is presented in Table 4-5 and Table 4-6. The Atterberg test data can be used to determine the cohesiveness of soils and their likely reaction under different moisture conditions. The liquid limits of the soils ranged from 16 to 51 % with an average of 27 %. Most soils tested had liquid limits that are considered as 'low' (i.e. <45 %) with the exception of the Pit 1 A2 and Pit 3 B2 samples. Similarly, all samples with the exception of Pit 1 A2 and Pit 3 B2, had plasticity indexes and linear shrinkage ratings considered low or non-critical. Plasticity indexes range from 0 to 33 %, with an average of 9 %, while linear shrinkage ratings range from 0 to 13.5 % with an average of 4 %, indicating that the majority of samples were on the low end of the spectrum.

The Emerson Aggregate Test results indicate that the Emerson Class Numbers of samples range from 3 to 5, with the majority of samples having a class number of 4. Only two samples have a class number of 5, and six samples have a class number of 3. The majority of soils sampled can be considered to have negligible dispersive potential, while some of the soils in the Munyi and Clifdale land systems can be considered to have slight to moderate dispersive potential. The majority of soils are unlikely to display sodic properties.

Table 4-5. Laboratory Results for Pits 1-6

Sample ID			Pit 1 - A1	Pit 1 - A2	Pit 1 - B	Pit 2 - A1	Pit 2 - A2	Pit 2 - B	Pit 3 - A1	Pit 3 - B1	Pit 3 - B2	Pit 4 - A1	Pit 4 - A2	Pit 5 - A2	Pit 6 - A1	Pit 6 - A2
Analytes	Test Method	Units	Sampled 13/08/2013													
Atterberg Test																
Liquid Limit	AS1289.3.1.2	%	18	51	33	20	30	31	18	41	47	22	20	20	18	19
Plastic Limit	AS1289.3.2.1	%	16	18	20	18	15	15	16	17	17	17	17	18	17	17
Plasticity Index	AS1289.3.3.1	%	2	33	13	2	15	16	2	24	30	5	3	2	1	2
Linear Shrinkage	AS1289.3.4.1	%	1	13.5	7	1	7.5	8	1	10	13	2.5	2	1	0.5	1
P.I. x % Passing 0.425mm			74	2937	728	182	975	1328	138	1344	2010	150	84	86	31	72
Emerson Aggregate Test																
EAC	AS1289.3.8.1		4	4	5	4	4	4	4	4	4	4	4	4	3	4
Particle Size (mm)	Soil Type	Unit														
<0.074	Fines	%	18	73	40	49	37	54	32	30	39	12	11	20	15	18
0.074–0.42	Fine Sand	%	37	89	56	91	65	83	69	56	67	30	28	43	31	36
0.42 – 2	Medium Sand	%	41	91	69	95	74	92	76	60	70	33	32	46	38	42
2 – 4.76	Coarse Sand	%	61	95	77	98	86	98	85	69	74	43	47	52	49	55
4.76 – 20	Fine Gravel	%	98	100	99	100	100	100	96	96	96	100	88	78	86	87
20 - 75	Coarse Gravel	%	100		100				100	100	100		100	100	100	100

Table 4-6. Laboratory Results for Pits 7-12

Sample ID			Pit 7 - A1	Pit 7 - B	Pit 8 - A2	Pit 9 - A2	Pit 9 - B	Pit 10 - A1	Pit 10 - A2	Pit 10 - B	Pit 11- A1	Pit 11 - A2	Pit 11 - B	Pit 12 - A1	Pit 12 - A2	Pit 12 - B
Analytes	Test Method	Units	13/08/2013								14/08/2013					
Atterberg Test																
Liquid Limit	AS1289.3.1.2	%	21	18	17	18	20	22	17	16	19	36	41	31	42	41
Plastic Limit	AS1289.3.2.1	%	21	16	16	18	19	22	17	16	13	16	18	18	19	17
Plasticity Index	AS1289.3.3.1	%	0	2	1	0	1	0	0	0	6	20	23	13	23	24
Linear Shrinkage	AS1289.3.4.1	%	0	1	0.5	0	1	0	0	0	3	9.5	11	6	11	11
P.I. x % Passing 0.425mm			0	70	27	0	40	0	0	0	516	1720	1403	975	1748	2232
Emerson Aggregate Test																
EAC	AS1289.3.8.1		3	4	3	3	5	4	3	3	4	4	4	4	4	4
Particle Size (mm)	Soil Type	Unit														
<0.074	Fines	%	11	16	16	10	19	11	16	18	50	67	31	64	68	85
0.074–0.42	Fine Sand	%	27	35	27	27	40	25	39	37	86	86	61	75	76	93
0.42 – 2	Medium Sand	%	33	44	30	33	52	32	48	45	99	93	85	84	83	98
2 – 4.76	Coarse Sand	%	50	58	50	49	67	57	67	62	100	94	91	88	87	99
4.76 – 20	Fine Gravel	%	92	93	95	83	93	98	96	91		98	97	99	91	100
20 - 75	Coarse Gravel	%	100	100	100	100	100	100	100	100		100	100	100	100	

5 Discussion

5.1 Erosion Risk

The location of the Sherwin Creek Iron Ore Project within the wet-dry tropics of Northern Australia inherently increases the risk of erosion and sediment issues. The majority of rain falls from November to March, when high intensity rainfall events are likely to result in high rain drop impact, surface flows and subsequent erosion risk in disturbed areas. The erodibility of soils will greatly influence the level of erosion in certain areas; however disturbance of soils and removal of cover such as vegetation is likely to greatly increase erosion potential, regardless of the soil characteristics. Additionally, the majority of Sherwin's activities are targeting areas considered upper slopes and ridges. These land forms have higher potential for erosion due to the steep slopes and high relief, increasing velocity of runoff and waters ability to carry sediment.

The EAC results for the samples indicate that soils found at Sites 6, 7, 8, 9 and 10 have moderate to slightly dispersive soils, which indicates that they may be subject to significant erosion when disturbed. These sites were located primarily along the ridge line of the escarpment and are covered with vegetation, rock outcrops and surface gravel. The current ground cover protects the soils from raindrop impact while it remains undisturbed, and disturbance resulting from mining operations therefore has the potential to increase erosion risk in these areas, particularly when land form and slopes are taken into account. All other soils surveyed indicate negligible dispersion potential.

5.2 Engineering Considerations

Construction works will be required during establishment of the mine site, with earthworks and associated work required for ancillary infrastructure, particularly:

- Camp area
- Access roads, haul roads and internal roads
- Creek crossings (i.e. Sherwin Creek)
- Office areas, laydown areas, workshop and other service areas.

The properties of the soils present within the project area as identified through this survey can inform the choice of soil used for specific construction purposes. For example roads, stream crossings and building footings are likely to require different levels of stability and liquid limits.

Nearly all soils sampled have low liquid limits, plasticity limits and linear shrinkage ratings, with the exception of samples from Sites 1 and 3. Results from samples taken from Site 1 A2 and Site 3 B2 indicate medium ratings for the liquid limit and plasticity index. Both of these samples are from within the Patterson land system on relatively low lying undulating terrain. Notably, Site 1 at the proposed mining camp location, which may have implications for the construction of camp infrastructure. The Atterberg and particle size tests can inform engineering and design decisions during planning and sourcing of appropriate construction material.

5.3 Uses for Soils

5.3.1 Waste Rock Dump Construction

The particle size analysis confirms the high content of fine particles, particularly clay, at Sites 11 and 12. Sites 1 and 2 also exhibited high percentages of fine particles, while all soils on the upper slopes and ridges were predominantly comprised of sand and gravel particles. This is consistent with the landforms of the area, as fine particles are likely to be eroded from high landforms and deposited in low lying areas and gullies.

Clay material can be compacted and has low permeability, particularly when compared to other soil particles such as sand and gravel. It is therefore commonly sought during construction of waste rock dumps (WRD's) as it is able to be used as an impermeable inert barrier or cover (Murphy et al. 2009). This is particularly relevant in the context of managing sulphidic waste and minimising the risk of acid mine drainage from WRD's. The identification of clay materials within the lease boundary may therefore be beneficial in the planning and construction of WRD's and other mining infrastructure. Further sampling and field trials (e.g. infiltration trials) should be undertaken in future if there is a requirement for clay in WRD construction materials.

5.3.2 Rehabilitation

Rehabilitation of disturbed areas is a key consideration in mine planning. Stockpiling of topsoil can greatly improve rehabilitation outcomes. Topsoil contains a seed bank for natural revegetation, and is an important soil layer in the nutrient cycle. Several of the sites surveyed (i.e. 5, 8 and 9) had no topsoil and the majority of sites on the ridge line had minimal topsoil layers (i.e. less than 10 cm). Those sites that exhibited a relatively deep topsoil layer included Sites 2, 6 and 7, with topsoil ranging from 20 – 30 cm deep across these areas. In areas where disturbance is to occur, topsoil should be removed and stockpiled for rehabilitation purposes.

6 Conclusion

The results of this soil survey indicate that the soils present within the project area are largely consistent with the land form and land system descriptions. The majority of soils are considered non-dispersive, while the liquid limit and plasticity indexes of soils were predominantly low. The exception to this is the ratings for some soil horizons in the Patterson land system, a low lying undulating land form with deposited fines material, found in the western section of the project area. Sites 1 and 3 from within this area had 'Medium' ratings for both the liquid limit and plasticity index. Linear shrinkage ratings for both of these samples were marginal, while all other samples were considered non-critical.

In general, soils on the upper slopes of the project area (i.e. Munyi and Cliffdale land systems) had shallow soil profiles with higher content of gravel and bedrock between 1 m below ground level and the surface. Conversely, soils on the lower slopes and valleys (i.e. Patterson, Bukulara and Coolibah land systems) had deep profiles with higher content of clay and fine material.

The results were interpreted in relation to erosion and sediment control, engineering considerations, and potential uses for soils. Soils found on the upper ridges (i.e. Munyi and Cliffdale land systems) have a higher potential for erosion and dispersion. While erosion rates will be limited according to availability of soils, some of the pits dug along the ridge line had profiles of up to 1 m deep. This area is also a key target area for mining development, so appropriate erosion and sediment control measures will be critical to reduce the risk of creating significant erosion issues.

Nearly all soils have low Atterberg Limits, with the exception of two samples taken along the access road. Notably, the subsoil at the proposed camp site has medium Atterberg Limits, which may have implications for engineering and design of camp infrastructure.

The soil information collected indicates that topsoil and clay material is available within the Mining Lease. These resources may be useful in relation to rehabilitation and construction (e.g. capping) of waste rock dumps in future.

7 Acronyms and References

7.1 Acronyms

EAC	Emerson Aggregate Class
EC	Electrical Conductivity
NATA	National Association of Testing Authorities
WRD	Waste Rock Dumps

7.2 References

- Aldrick, J and Wilson, P 1992, *Land Systems of the Roper River Catchment, Northern Territory*, Technical Report Number 52, Conservation Commission of the Northern Territory, Darwin.
- Davies, S and Lacey, A 2009, *Identifying Dispersive Soils*, Department of Agriculture and Food, Government of Western Australia, Perth.
- Hazelton, P and Murphy, B 2007, *Interpreting Soil Test Results: What do all the numbers mean?*, CSIRO Publishing, Collingwood, Victoria.
- Munsell 2009, *Munsell Soil-Color Charts*, Munsell Color, Grand Rapids, Michigan.
- Murphy, N, Taylor, J and Leake, M 2009, *Coming to Terms with Acid Drainage*, Earth Systems Pty Ltd, Kew, Victoria.
- The National Committee on Soil and Terrain (NCST) 2009, *Australian Soil and Land Survey Field Handbook*, Third Edition, CSIRO Publishing, Collingwood, Victoria.

Appendix A – Soil Bore Logs

Soil Bore Log

Client:	Sherwin	Test Pit No:	Pit 1
Site:	Camp area off haul road	Excavated/logged by:	Mike and Helen
Date:	13/8/13	Excavation type:	Backhoe
Notes	At area cleared for camp- pit reached approximately 2.2m in depth		

Depth (m)	Graphic Log	Sample ID	Horizon	Texture	Colour	Field pH	Field EC (μ S)	Course Fragments Size	Moisture Condition	Photo Log
0.1		1	A1	SiL	7.5YR 4/6	6.64	28	10-15mm, >50% coarse fragments	Dry	Pic 25
0.2		2	A2	SC	2.5YR 5/6	6.98	68	R and >50% CG	Dry (clay sheen)	Pic 26
0.3										
0.4										
0.5										
0.6										
0.7										
0.8										
0.9										
1		3	B	CL	2.5YR 3/4	7.37	886	Dominant shale rocks throughout profile	Dry	Pic 27
1.1										
1.2										
1.3										
1.4										
1.5										
1.6										
1.7										
1.8										
1.9										
2										
2.1										
2.2										

Comments: Upper slope of open shrubland. Vegetation dominated by *Grevillia dryandri* and spinifex grass.



Soil diggings



Soil Profile

Soil Bore Log			
Client:	Sherwin	Test Pit No:	Pit 2
Site:	Off haul road	Excavated/logged by:	Mike and Helen
Date:	13/8/13	Excavation type:	Backhoe
Notes	Upslope from Sherwin Creek		

Depth (m)	Graphic Log	Sample ID	Horizon	Texture	Colour	Field pH	Field EC (μS)	Course Fragments Size	Moisture Condition	Photo Log
0.1		4	A1	SiL	5YR 3/3	5.8	42	20% FG	D	Pic 33
0.2										
0.3										
0.4		5	A2	SiCL	10YR 4/6	6.27	13.2	50% FG and CG	D	Pic 31
0.5										
0.6										
0.7										
0.8										
0.9										
1		6	B	SiC	2.5YR 4/6	6.39	24	40% C and R	D	
1.1										
1.2										
1.3										
1.4										
1.5										
1.6										
1.7										
1.8										
1.9										
2										
2.1										
2.2										
2.3										

Comments: Lower slope open woodland dominated by *Erythrophleum chlorostachys*, *Eucalyptus tetrodonta* and *Acacias* with *Heteropogon* grass understorey.

Photos: 28 excavation pit, 29+30 sample diggings.



Horizon A2



Soil Profile

Soil Bore Log			
Client:	Sherwin	Test Pit No:	Pit 3
Site:	Haul road	Excavated/logged by:	Mike and Helen
Date:	13/8/13	Excavation type:	Backhoe
Notes	Midslope location off haul road with some surface rock outcrops and gravel surface and clay subsoils.		

Depth (m)	Graphic Log	Sample ID	Horizon	Texture	Colour	Field pH	Field EC (μS)	Course Fragments Size	Moisture Condition	Photo Log
0.1		7	A1	SiL	2.5.YR 5/4	4.93	26	>50% CG and LP	D	
0.2		8	B1	SiCL	2.5YR 4/8	5.21	25	Rocky with large shale and boulders up to 1m diameter	D	
0.3										
0.4										
0.5		9	B2	C	2.5YR 4/8 (yellow when dry)	5.57	69	As B1	SM	
0.6										
0.7										
0.8										
0.9										
1										

Comments: Mid slope of sparse *Corymbia bella* trees and understorey of *Grevillia*, *Acacia* and Spinifex grass.
Photos: Pic 97- vegetation, Pic 98- excavation.



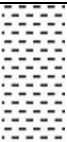
Undulating hills country (excavations in foreground)



Soil Profile

Soil Bore Log

Client:	Sherwin	Test Pit No:	Pit 4
Site:	Off main LV access	Excavated/logged by:	Mike and Helen
Date:	13/8/13	Excavation type:	Backhoe
Notes	Very rocky with fine soil amongst rocks through all horizons.		

Depth (m)	Graphic Log	Sample ID	Horizon	Texture	Colour	Field pH	Field EC (μS)	Course Fragments Size	Moisture Condition	Photo Log
0.1		10	A1	L	7.5YR 2.5/2	5.85	32	High percentage of CG and MG	D	
0.2		11	A2	SL	5YR 3/4	5.68	14.8	>50% SP, LP and R	D	Pic 67
0.3										

Comments: Lower to Mid slope of very open *Eucalyptus* woodland and Spinifex grass.

Photos: Pic 66-soil profile, Pic 68- vegetation. Pic 69-72 veg, Pic 73- surface.



Shallow soil profile



Significant coarse fragments and rock in excavations



Surface gravel



Vegetation in area

Soil Bore Log

Client:	Sherwin	Test Pit No:	Pit 5
Site:	Behind admin	Excavated/logged by:	Mike and Helen
Date:	13/8/13	Excavation type:	Backhoe
Notes	Very rocky- lots of refusal. Large, up to 50cm wide, rocks on surface, iron ore visible, outcrops of bedrock visible.		

Depth (m)	Graphic Log	Sample ID	Horizon	Texture	Colour	Field pH	Field EC (μS)	Course Fragments Size	Moisture Condition	Photo Log
0.1		12	A2	SiL	2.5YR 3/4	6.61	19.1	<50% R, S and B	D	Pic 64
0.2										
0.3										
0.4										

Comments: Upper slope of open *Eucalyptus* woodland and Spinifex grass.

Photos: Pic 62- surface, Pic 63- surface gravel, Pic 65 vegetation.



Surface rock



Shallow excavation



Significant rock and coarse fragments



Vegetation in area

Soil Bore Log			
Client:	Sherwin	Test Pit No:	Pit 6
Site:	South of bulk sample pit (old exploration area)	Excavated/logged by:	Mike and Helen
Date:	13/8/13	Excavation type:	Backhoe
Notes	Excavated on an old exploration drill pad, accessed by exploration tracks. Natural revegetation visible on tracks. High percentage of rock outcrops and large rocks.		

Depth (m)	Graphic Log	Sample ID	Horizon	Texture	Colour	Field pH	Field EC (μS)	Course Fragments Size	Moisture Condition	Photo Log
0.1		13	A1	SiL	7.5YR 3/3	5.81	38.9	50% FG to MG	D	
0.2										
0.3		14	A2	SiL	5YR 4/4	5.67	26.3	50% MG and S	D	
0.4										
0.5										
0.6										

Comments: Midslope open woodland dominated by *Eucalyptus phoenicea*, *E. tetradonta*, *Erythrophleum chlorostachys*, *Petalostigma quadriloculare*, and spinifex grass.

Photos: Pic 42-excavation, Pic 43-45 surface/vegetation, Pic 46-48 pit.



Vegetation



Surface rock



Large boulders uncovered in excavation



Soil and rock in sample

Soil Bore Log

Client:	Sherwin	Test Pit No:	Pit 7
Site:	North of bulk sample pit (old exploration area)	Excavated/logged by:	Mike and Helen
Date:	13/8/13	Excavation type:	Backhoe
Notes	Along ridge line. Shale rocks in B horizon.		

Depth (m)	Graphic Log	Sample ID	Horizon	Texture	Colour	Field pH	Field EC (μ S)	Course Fragments Size	Moisture Condition	Photo Log
0.1		15	A1	SL	7.5YR 4/3	5.65	60	50% FG to MG	D	95
0.2										
0.3										
0.4		16	B	SL	5YR 4/6	6.37	13.8	>50% R (shale in horizontal slabs)	D	69
0.5										
0.6										
0.7										
0.8										
0.9										

Comments: Low open Eucalyptus woodland dominated by *Eucalyptus phoenicea*, *Erythrophleum chlorostachys*, *Petalostigma quadriloculare*, and spinifex grass. Good habitat trees in surrounds, lots of hollows.
 Photos: Pic 52-vegetation, Pic 53-ridge area, Pic 54-soil profile, Pic 55-diggings, Pit 56-surface gravel.



Vegetation in area



Soil profile



Excavations with shale present



Surface gravel

Soil Bore Log

Client:	Sherwin	Test Pit No:	Pit 8
Site:	North of bulk sample pit (old exploration area)	Excavated/logged by:	Mike and Helen
Date:	13/8/13	Excavation type:	Backhoe
Notes	Along ridge line. Very rocky with some exposed bedrock and rock outcrop.		

Depth (m)	Graphic Log	Sample ID	Horizon	Texture	Colour	Field pH	Field EC (μS)	Course Fragments Size	Moisture Condition	Photo Log
0.1		17	A2	SiL	2.5YR 3/6	6.61	24.7	>50% MG and rocks up to 30cm.	D	91 and 92
0.2										
0.3										
0.4										
0.5										

Comments: Open Eucalyptus woodland with denser mid storey, dominated by *Eucalyptus phoenicea*, *E. tetradonta*, *Buchanania obovata*, *Grevillia*, *Calytrix exstipulata*, and spinifex grass.
 Photos: Pic 89-vegetation, Pic 90-soil profile, Pic 91-surface gravel.



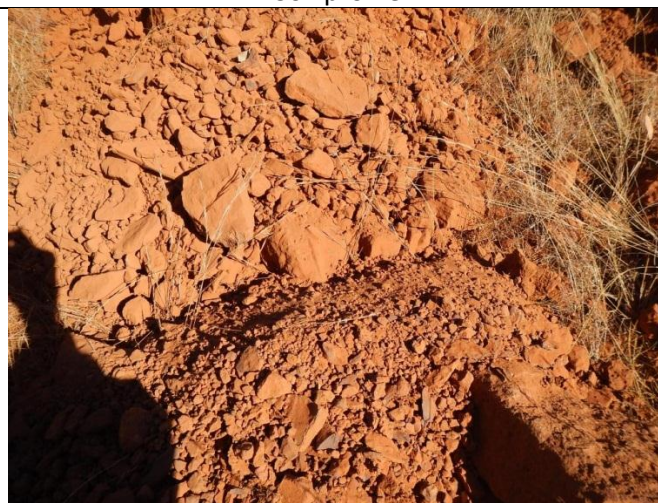
Vegetation in area



Soil profile



Surface gravel



Excavations with high rock content

Soil Bore Log

Client:	Sherwin	Test Pit No:	Pit 9
Site:	North of bulk sample pit (old exploration area)	Excavated/logged by:	Mike and Helen
Date:	13/8/13	Excavation type:	Backhoe
Notes	No organic layer, surface gravel dominant, horizon B appeared to contain a high amount of iron.		

Depth (m)	Graphic Log	Sample ID	Horizon	Texture	Colour	Field pH	Field EC (μS)	Course Fragments Size	Moisture Condition	Photo Log
0.1		18	A2	SL	5YR 3/2	6.98	17.3	<50% MG, S and R	D	87
0.2										
0.3										
0.4		19	B	SL	2.5YR 3/6	6.97	13.5	As with A2 horizon	D	88
0.5										
0.6										
0.7										
0.8										
0.9										

Comments: Low open Eucalyptus woodland dominated by *Eucalyptus phoenicea*, *E. tetrodonta*, *Erythrophleum chlorostachys*, *Calytrix exstipulata*, *Hakea arborescens*, *Petalostigma quadriloculare* and spinifex grass.

Photos: Pic 84-surface gravel, Pic 85-vegetation, Pic 86-soil profile.



Vegetation in area



Soil profile



A2 Horizon



B Horizon

Soil Bore Log			
Client:	Sherwin	Test Pit No:	Pit 10
Site:	North of bulk sample pit (old exploration area)	Excavated/logged by:	Mike and Helen
Date:	13/8/13	Excavation type:	Backhoe
Notes			

Depth (m)	Graphic Log	Sample ID	Horizon	Texture	Colour	Field pH	Field EC (μS)	Course Fragments Size	Moisture Condition	Photo Log
0.1		20	A1	SL	10YR 2/1	6.89	38.1	<50% P and MG	D	81
0.2		21	A2	S	7.5YR 5/4 (white when dry)	6.98	21.2	>50% CG to MG	D	80
0.3										
0.4										
0.5		22	B	S	5YR 5/6	6.95	15.6	>50% R, ochre rocks	D	82
0.6										

Photos: Pic 79-soil profile, Pic 83-surface gravel.



Soil profile (bleached A2 horizon visible)



Surface gravel



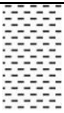
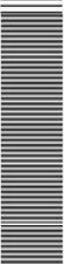
A1 soil (with A2 visible underneath)



B Horizon (sandy)

Soil Bore Log

Client:	Sherwin	Test Pit No:	Pit 11
Site:	On Mt McMinn Station	Excavated/logged by:	Mike and Helen
Date:	14/8/13	Excavation type:	Backhoe
Notes	Open savannah on eastern side of ridgeline.		

Depth (m)	Graphic Log	Sample ID	Horizon	Texture	Colour	Field pH	Field EC (μS)	Course Fragments Size	Moisture Condition	Photo Log
0.1		23	A1	L	5YR2.5/1	5.09	37	15% FG	D	125
0.2										
0.3										
0.4		24	A2	SC	7.5YR 3/4	5.28	41	40% MG	D	126
0.5										
0.6										
0.7		25	B	C	5YR 3/4	5.38	80	20% R	D	127
0.8										
0.9										
1										
1.1										
1.2										

Comments: Mid slope open savannah with no upper storey, sparse mid storey dominated by *Eucalyptus pruinosa*, *Erythrophleum chlorostachys*, *Acacias*. Termite mounds common, deep clay soils, very little grass due to evidence of grazing.

Photos: Pic 119- excavation, Pic 120-landscape, Pic 121-surface, 122-127-pit.



Vegetation and landform (low plain)



Soil profile



Excavations



Clayey B Horizon soils

Soil Bore Log			
Client:	Sherwin	Test Pit No:	Pit 12
Site:	On Mt McMinn Station	Excavated/logged by:	Mike and Helen
Date:	14/8/13	Excavation type:	Backhoe
Notes	Open savannah on eastern side of ridgeline, pit dug on edge of land system as access difficult further uphill. Site dug on lower slope in area, sparse vegetation. Deep, cracking clays.		

Depth (m)	Graphic Log	Sample ID	Horizon	Texture	Colour	Field pH	Field EC (μS)	Course Fragments Size	Moisture Condition	Photo Log
0.1		26	A1	SL	7.5YR 3/3	5.67	200	Lots of surface P and R, 10% CG	D	132
0.2		27	A2	C	7.5YR 3/4	6.32	23.2	20% CG and MG	D	133
0.3		28	B	C	7.5YR 3/4	6.8	116	None- deep clay	SM	134-136
0.4										
0.5										
0.6										
0.7										
0.8										
0.9										
1										
1.1										
1.2										
1.3										
1.4										
1.5										
1.6										
1.7										

Comments: Lower slope sparse vegetation of *Cochlospermum fraseri*, *Acacias* and spinifex grass. Surface rocks up to 50cm but less throughout the profile.

Photos: Pic 128- excavation, Pic 129-130-vegetation and landform, Pic 131-surface, 135- soil profile.



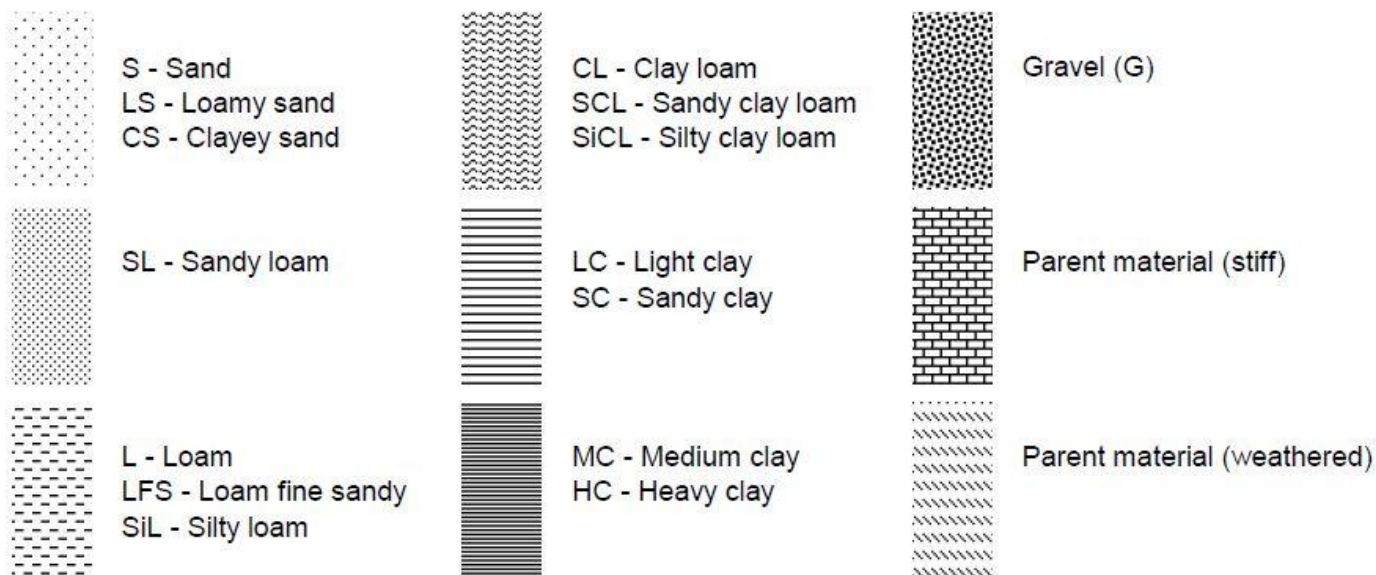
Vegetation and landform – lower slope



Dark clays of the B Horizon

Key			
Textures	Moisture Content	Coarse Fragment Sizes	Bore Base
L- Loam SL- Sandy Loam SiCL- Silty Clay Loam CL- Clay Loam C- Clay	D- Dry SM- Slightly Moist M- Moist	SP- Small pebbles LP- Large pebbles C- Cobbles FG- Fine gravel CG- Coarse gravel MG- Medium gravel S- Stones R – rocks B - boulders	- Non-refusal but full reach of excavator - Refusal (bedrock)

Graphic Log and Textures



Graphic Log images obtained from NT LCA Guidelines (2010)

Appendix B – Lintin Geotechnical Laboratory Reports

Quality of Materials Report

Client:	EcOz Environmental Services	Report Number:	JN1250 - 28
Client Address:	GPO Box 381 Darwin NT 801	Report Date:	18/09/2013
Job Number:	JN1250	Order Number:	HDwyer
Project:	Quality Control	Page 1 of 1	
Location		Sample Location	
Lab No:	TN 79636	Sample History : Air Dried	
Date Sampled:	14/08/2013	Sample Preparation : Wet	
Date Tested:	14/09/2013	LS Comments : Non Curling	
Sampled By:	Client	Sherwin Iron Ore Project	
Sample Method:	As Received	EZ13503-E0102-0088	
Material Source:	Natural	Pit 12 - B	
For Use As:	Insitu	Lab ID 28	
Remarks:	-	Spec Description: -	
		Lot Number: -	
		Spec Number: -	

Test Method:	A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
	150mm			
	75.00 mm			
	53.00 mm			
	37.50 mm			
	26.50 mm			
	19.00 mm		100	
	13.2 mm		100	
	9.50 mm		100	
	6.7 mm		99	
	4.75 mm		99	
	2.36 mm		98	
	1.18 mm		96	
	0.600 mm		94	
	0.425 mm		93	
	0.300 mm		92	
	0.150 mm		89	
	0.075 mm		85	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)	AS1289.3.1.2		41	
Plastic Limit (%)	AS1289.3.2.1		17	
Plasticity Index	AS1289.3.3.1		24	
Linear Shrinkage (%)	AS1289.3.4.1		11.0	
P.I. x % Passing 0.425 mm			2232	



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Approved Signatory

Tony Lindsey
NATA Accred No:11869

Form Number

REP ASQUAL-1-58

LINTIN GEOTECHNICAL PTY LTD

ABN 31 077 518 168

Unit 1/10 Butler Place
BERRIMAH NT 0828

P.O. Box 289
BERRIMAH NT 0828

Phone: (08) 8932 4022
Fax: (08) 8932 4243
Email: lintin@lintingeo.com

Quality of Materials Report

Client:	EcOz Environmental Services	Report Number:	JN1250 - 27
Client Address:	GPO Box 381 Darwin NT 801	Report Date:	18/09/2013
Job Number:	JN1250	Order Number:	HDwyer
Project:	Quality Control	Page 1 of 1	
Location		Sample Location	
Lab No:	TN 79635	Sample History :	Air Dried
Date Sampled:	14/08/2013	Sample Preparation :	Wet
Date Tested:	16/09/2013	LS Comments :	Non Curling
Sampled By:	Client	Sherwin Iron Ore Project	
Sample Method:	As Received	EZ13503-E0102-0088	
Material Source:	Natural	Pit 12 - A2	
For Use As:	Insitu	Lab ID 27	
Remarks:	-	Spec Description:	-
		Lot Number:	-
		Spec Number:	-

Test Method:	A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
	150mm			
	75.00 mm			
	53.00 mm			
	37.50 mm		100	
	26.50 mm		94	
	19.00 mm		91	
	13.2 mm		90	
	9.50 mm		89	
	6.7 mm		88	
	4.75 mm		87	
	2.36 mm		83	
	1.18 mm		80	
	0.600 mm		78	
	0.425 mm		76	
	0.300 mm		75	
	0.150 mm		72	
	0.075 mm		68	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)	AS1289.3.1.2		42	
Plastic Limit (%)	AS1289.3.2.1		19	
Plasticity Index	AS1289.3.3.1		23	
Linear Shrinkage (%)	AS1289.3.4.1		11.0	
P.I. x % Passing 0.425 mm			1748	



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Quality of Materials Report

Client:	EcOz Environmental Services	Report Number:	JN1250 - 26
Client Address:	GPO Box 381 Darwin NT 801	Report Date:	18/09/2013
Job Number:	JN1250	Order Number:	HDwyer
Project:	Quality Control	Page 1 of 1	
Location		Sample Location	
Lab No:	TN 79634	Sample History :	Air Dried
Date Sampled:	14/08/2013	Sample Preparation :	Wet
Date Tested:	16/09/2013	LS Comments :	Non Curling
Sampled By:	Client	Sherwin Iron Ore Project	
Sample Method:	As Received	EZ13503-E0102-0088	
Material Source:	Natural	Pit 12 - A1	
For Use As:	Insitu	Lab ID 26	
Remarks:	-	Spec Description:	-
		Lot Number:	-
		Spec Number:	-

Test Method:	A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
	150mm			
	75.00 mm			
	53.00 mm			
	37.50 mm			
	26.50 mm		100	
	19.00 mm		99	
	13.2 mm		96	
	9.50 mm		94	
	6.7 mm		91	
	4.75 mm		88	
	2.36 mm		84	
	1.18 mm		81	
	0.600 mm		77	
	0.425 mm		75	
	0.300 mm		74	
	0.150 mm		69	
	0.075 mm		64	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)	AS1289.3.1.2		31	
Plastic Limit (%)	AS1289.3.2.1		18	
Plasticity Index	AS1289.3.3.1		13	
Linear Shrinkage (%)	AS1289.3.4.1		6.0	
P.I. x % Passing 0.425 mm			975	



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Tony Lindsey

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Email: lintin@lintingeo.com

Quality of Materials Report

Client:	EcOz Environmental Services	Report Number:	JN1250 - 25
Client Address:	GPO Box 381 Darwin NT 801	Report Date:	18/09/2013
Job Number:	JN1250	Order Number:	HDwyer
Project:	Quality Control	Page 1 of 1	
Location		Sample Location	
Lab No:	TN 79633	Sample History :	Air Dried
Date Sampled:	14/08/2013	Sample Preparation :	Wet
Date Tested:	13/09/2013	LS Comments :	Non Curling
Sampled By:	Client	Sherwin Iron Ore Project	
Sample Method:	As Received	EZ13503-E0102-0088	
Material Source:	Natural	Pit 11 - B	
For Use As:	Insitu	Lab ID 25	
Remarks:	-	Spec Description:	-
		Lot Number:	-
		Spec Number:	-

Test Method:	A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
	150mm			
	75.00 mm			
	53.00 mm			
	37.50 mm			
	26.50 mm		100	
	19.00 mm		97	
	13.2 mm		97	
	9.50 mm		95	
	6.7 mm		92	
	4.75 mm		91	
	2.36 mm		85	
	1.18 mm		77	
	0.600 mm		67	
	0.425 mm		61	
	0.300 mm		56	
	0.150 mm		42	
	0.075 mm		31	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)	AS1289.3.1.2		41	
Plastic Limit (%)	AS1289.3.2.1		18	
Plasticity Index	AS1289.3.3.1		23	
Linear Shrinkage (%)	AS1289.3.4.1		11.0	
P.I. x % Passing 0.425 mm			1403	



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Quality of Materials Report

Client:	EcOz Environmental Services	Report Number:	JN1250 - 24
Client Address:	GPO Box 381 Darwin NT 801	Report Date:	18/09/2013
Job Number:	JN1250	Order Number:	HDwyer
Project:	Quality Control	Page 1 of 1	
Location		Sample Location	
Lab No:	TN 79632	Sample History :	Air Dried
Date Sampled:	14/08/2013	Sample Preparation :	Wet
Date Tested:	16/09/2013	LS Comments :	Non Curling
Sampled By:	Client	Sherwin Iron Ore Project	
Sample Method:	As Received	EZ13503-E0102-0088	
Material Source:	Natural	Pit 11 - A2	
For Use As:	Insitu	Lab ID 24	
Remarks:	-	Spec Description:	-
		Lot Number:	-
		Spec Number:	-

Test Method:	A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
	150mm			
	75.00 mm			
	53.00 mm			
	37.50 mm			
	26.50 mm		100	
	19.00 mm		98	
	13.2 mm		96	
	9.50 mm		96	
	6.7 mm		95	
	4.75 mm		94	
	2.36 mm		93	
	1.18 mm		90	
	0.600 mm		88	
	0.425 mm		86	
	0.300 mm		84	
	0.150 mm		76	
	0.075 mm		67	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)	AS1289.3.1.2		36	
Plastic Limit (%)	AS1289.3.2.1		16	
Plasticity Index	AS1289.3.3.1		20	
Linear Shrinkage (%)	AS1289.3.4.1		9.5	
P.I. x % Passing 0.425 mm			1720	



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LINTIN GEOTECHNICAL PTY LTD

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Quality of Materials Report

Client:	EcOz Environmental Services	Report Number:	JN1250 - 23
Client Address:	GPO Box 381 Darwin NT 801	Report Date:	18/09/2013
Job Number:	JN1250	Order Number:	HDwyer
Project:	Quality Control	Page 1 of 1	
Location		Sample Location	
Lab No:	TN 79631	Sample History :	Air Dried
Date Sampled:	14/08/2013	Sample Preparation :	Wet
Date Tested:	13/09/2013	LS Comments :	Non Curling
Sampled By:	Client	Sherwin Iron Ore Project	
Sample Method:	As Received	EZ13503-E0102-0088	
Material Source:	Natural	Pit 11 - A1	
For Use As:	Insitu	Lab ID 23	
Remarks:	-	Spec Description:	-
		Lot Number:	-
		Spec Number:	-

Test Method:	A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
	150mm			
	75.00 mm			
	53.00 mm			
	37.50 mm			
	26.50 mm			
	19.00 mm		100	
	13.2 mm		100	
	9.50 mm		100	
	6.7 mm		100	
	4.75 mm		100	
	2.36 mm		99	
	1.18 mm		97	
	0.600 mm		91	
	0.425 mm		86	
	0.300 mm		82	
	0.150 mm		67	
	0.075 mm		50	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)	AS1289.3.1.2		19	
Plastic Limit (%)	AS1289.3.2.1		13	
Plasticity Index	AS1289.3.3.1		6	
Linear Shrinkage (%)	AS1289.3.4.1		3.0	
P.I. x % Passing 0.425 mm			516	



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Quality of Materials Report

Client:	EcOz Environmental Services	Report Number:	JN1250 - 22
Client Address:	GPO Box 381 Darwin NT 801	Report Date:	18/09/2013
Job Number:	JN1250	Order Number:	HDwyer
Project:	Quality Control	Page 1 of 1	
Location		Sample Location	
Lab No:	TN 79630	Sample History : Air Dried	
Date Sampled:	13/08/2013	Sample Preparation : Wet	
Date Tested:	12/09/2013	LS Comments : Non Curling	
Sampled By:	Client	Sherwin Iron Ore Project	
Sample Method:	As Received	EZ13503-E0102-0088	
Material Source:	Natural	Pit 10 - B	
For Use As:	Insitu	Lab ID 22	
Remarks:	-	Spec Description:	-
		Lot Number:	-
		Spec Number:	-

Test Method:	AS1289.3.6.1	A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
		150mm			
		75.00 mm			
		53.00 mm			
		37.50 mm			
		26.50 mm		100	
		19.00 mm		91	
		13.2 mm		86	
		9.50 mm		77	
		6.7 mm		71	
		4.75 mm		62	
		2.36 mm		45	
		1.18 mm		40	
		0.600 mm		38	
		0.425 mm		37	
		0.300 mm		36	
		0.150 mm		29	
		0.075 mm		18	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)	AS1289.3.1.2		16	
Plastic Limit (%)	AS1289.3.2.1		16	
Plasticity Index	AS1289.3.3.1		0	
Linear Shrinkage (%)	AS1289.3.4.1		0.0	
P.I. x % Passing 0.425 mm			0	



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Quality of Materials Report

Client:	EcOz Environmental Services	Report Number:	JN1250 - 21
Client Address:	GPO Box 381 Darwin NT 801	Report Date:	18/09/2013
Job Number:	JN1250	Order Number:	HDwyer
Project:	Quality Control	Page 1 of 1	
Location		Sample Location	
Lab No:	TN 79629	Sample History :	Air Dried
Date Sampled:	13/08/2013	Sample Preparation :	Wet
Date Tested:	12/09/2013	LS Comments :	Non Curling
Sampled By:	Client	Sherwin Iron Ore Project	
Sample Method:	As Received	EZ13503-E0102-0088	
Material Source:	Natural	Pit 10 - A2	
For Use As:	Insitu	Lab ID 21	
Remarks:	-	Spec Description:	-
		Lot Number:	-
		Spec Number:	-

Test Method:	A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
	150mm			
	75.00 mm			
	53.00 mm			
	37.50 mm			
	26.50 mm		100	
	19.00 mm		96	
	13.2 mm		88	
	9.50 mm		84	
	6.7 mm		76	
	4.75 mm		67	
	2.36 mm		48	
	1.18 mm		42	
	0.600 mm		40	
	0.425 mm		39	
	0.300 mm		37	
	0.150 mm		29	
	0.075 mm		16	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)	AS1289.3.1.2		17	
Plastic Limit (%)	AS1289.3.2.1		17	
Plasticity Index	AS1289.3.3.1		0	
Linear Shrinkage (%)	AS1289.3.4.1		0.0	
P.I. x % Passing 0.425 mm			0	



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Quality of Materials Report

Client:	EcOz Environmental Services	Report Number:	JN1250 - 20
Client Address:	GPO Box 381 Darwin NT 801	Report Date:	18/09/2013
Job Number:	JN1250	Order Number:	HDwyer
Project:	Quality Control	Page 1 of 1	
Location		Sample Location	
Lab No:	TN 79628	Sample History :	Air Dried
Date Sampled:	13/08/2013	Sample Preparation :	Wet
Date Tested:	12/09/2013	LS Comments :	Non Curling
Sampled By:	Client	Sherwin Iron Ore Project	
Sample Method:	As Received	EZ13503-E0102-0088	
Material Source:	Natural	Pit 10 - A1	
For Use As:	Insitu	Lab ID 20	
Remarks:	-	Spec Description:	-
		Lot Number:	-
		Spec Number:	-

Test Method:	A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
	150mm			
	75.00 mm			
	53.00 mm			
	37.50 mm			
	26.50 mm			
	19.00 mm			
	13.2 mm			
	9.50 mm			
	6.7 mm			
	4.75 mm			
	2.36 mm			
	1.18 mm			
	0.600 mm			
	0.425 mm			
	0.300 mm			
	0.150 mm			
	0.075 mm			

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)	AS1289.3.1.2		22	
Plastic Limit (%)	AS1289.3.2.1		22	
Plasticity Index	AS1289.3.3.1		0	
Linear Shrinkage (%)	AS1289.3.4.1		0.0	
P.I. x % Passing 0.425 mm			0	



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Quality of Materials Report

Client:	EcOz Environmental Services	Report Number:	JN1250 - 19
Client Address:	GPO Box 381 Darwin NT 801	Report Date:	18/09/2013
Job Number:	JN1250	Order Number:	HDwyer
Project:	Quality Control	Page 1 of 1	
Location		Sample Location	
Lab No:	TN 79627	Sample History :	Air Dried
Date Sampled:	13/08/2013	Sample Preparation :	Wet
Date Tested:	12/09/2013	LS Comments :	Non Curling
Sampled By:	Client	Sherwin Iron Ore Project	
Sample Method:	As Received	EZ13503-E0102-0088	
Material Source:	Natural	Pit 9 - B	
For Use As:	Insitu	Lab ID 19	
Remarks:	-	Spec Description:	-
		Lot Number:	-
		Spec Number:	-

Test Method:	A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
	150mm			
	75.00 mm			
	53.00 mm			
	37.50 mm			
	26.50 mm		100	
	19.00 mm		93	
	13.2 mm		83	
	9.50 mm		79	
	6.7 mm		74	
	4.75 mm		67	
	2.36 mm		52	
	1.18 mm		47	
	0.600 mm		43	
	0.425 mm		40	
	0.300 mm		35	
	0.150 mm		27	
	0.075 mm		19	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)	AS1289.3.1.2		20	
Plastic Limit (%)	AS1289.3.2.1		19	
Plasticity Index	AS1289.3.3.1		1	
Linear Shrinkage (%)	AS1289.3.4.1		1.0	
P.I. x % Passing 0.425 mm			40	



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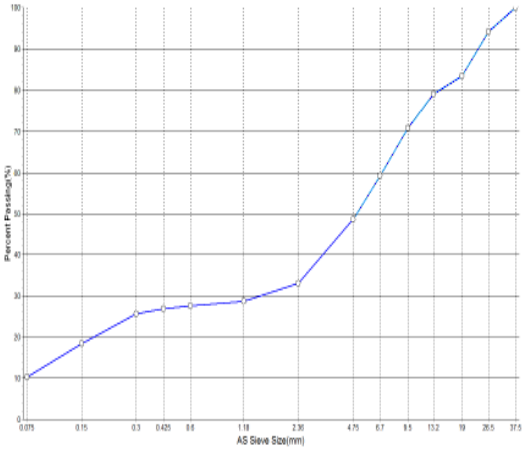
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Quality of Materials Report

Client:	EcOz Environmental Services	Report Number:	JN1250 - 18
Client Address:	GPO Box 381 Darwin NT 801	Report Date:	18/09/2013
Job Number:	JN1250	Order Number:	HDwyer
Project:	Quality Control	Page 1 of 1	
Location		Sample Location	
Lab No:	TN 79626	Sample History :	Air Dried
Date Sampled:	13/08/2013	Sample Preparation :	Wet
Date Tested:	12/09/2013	LS Comments :	Non Curling
Sampled By:	Client	Sherwin Iron Ore Project	
Sample Method:	As Received	EZ13503-E0102-0088	
Material Source:	Natural	Pit 9 - A2	
For Use As:	Insitu	Lab ID 18	
Remarks:	-	Spec Description:	-
		Lot Number:	-
		Spec Number:	-

Remarks:	A.S. Sieve Sizes		Specification Minimum	Spec Number:	Percent Passing	Specification Maximum
Test Method: AS1289.3.6.1						
	150mm					
	75.00 mm					
	53.00 mm					
	37.50 mm				100	
	26.50 mm				94	
	19.00 mm				83	
	13.2 mm				79	
	9.50 mm				71	
	6.7 mm				59	
	4.75 mm				49	
	2.36 mm				33	
	1.18 mm				29	
	0.600 mm				28	
	0.425 mm				27	
	0.300 mm				26	
	0.150 mm				18	
	0.075 mm				10	
Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum		
Liquid Limit (%)	AS1289.3.1.2		18			
Plastic Limit (%)	AS1289.3.2.1		18			
Plasticity Index	AS1289.3.3.1		0			
Linear Shrinkage (%)	AS1289.3.4.1		0.0			
P.I. x % Passing 0.425 mm			0			



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Quality of Materials Report

Client:	EcOz Environmental Services	Report Number:	JN1250 - 17
Client Address:	GPO Box 381 Darwin NT 801	Report Date:	18/09/2013
Job Number:	JN1250	Order Number:	HDwyer
Project:	Quality Control	Page 1 of 1	
Location		Sample Location	
Lab No:	TN 79625	Sample History :	Air Dried
Date Sampled:	13/08/2013	Sample Preparation :	Wet
Date Tested:	12/09/2013	LS Comments :	Non Curling
Sampled By:	Client	Sherwin Iron Ore Project	
Sample Method:	As Received	EZ13503-E0102-0088	
Material Source:	Natural	Pit 8 - A2	
For Use As:	Insitu	Lab ID 17	
Remarks:	-	Spec Description:	-
		Lot Number:	-
		Spec Number:	-

Test Method:	A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
	150mm			
	75.00 mm			
	53.00 mm			
	37.50 mm			
	26.50 mm		100	
	19.00 mm		95	
	13.2 mm		86	
	9.50 mm		75	
	6.7 mm		63	
	4.75 mm		50	
	2.36 mm		30	
	1.18 mm		28	
	0.600 mm		27	
	0.425 mm		27	
	0.300 mm		26	
	0.150 mm		22	
	0.075 mm		16	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)	AS1289.3.1.2		17	
Plastic Limit (%)	AS1289.3.2.1		16	
Plasticity Index	AS1289.3.3.1		1	
Linear Shrinkage (%)	AS1289.3.4.1		0.5	
P.I. x % Passing 0.425 mm			27	



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Quality of Materials Report

Client:	EcOz Environmental Services	Report Number:	JN1250 - 16
Client Address:	GPO Box 381 Darwin NT 801	Report Date:	18/09/2013
Job Number:	JN1250	Order Number:	HDwyer
Project:	Quality Control	Page 1 of 1	
Location		Sample Location	
Lab No:	TN 79624	Sample History :	Air Dried
Date Sampled:	13/08/2013	Sample Preparation :	Wet
Date Tested:	12/09/2013	LS Comments :	Non Curling
Sampled By:	Client	Sherwin Iron Ore Project	
Sample Method:	As Received	EZ13503-E0102-0088	
Material Source:	Natural	Pit 7 - B	
For Use As:	Insitu	Lab ID 16	
Remarks:	-	Spec Description:	-
		Lot Number:	-
		Spec Number:	-

Test Method:	A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
	150mm			
	75.00 mm			
	53.00 mm			
	37.50 mm			
	26.50 mm		100	
	19.00 mm		93	
	13.2 mm		82	
	9.50 mm		74	
	6.7 mm		66	
	4.75 mm		58	
	2.36 mm		44	
	1.18 mm		38	
	0.600 mm		36	
	0.425 mm		35	
	0.300 mm		34	
	0.150 mm		27	
	0.075 mm		16	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)	AS1289.3.1.2		18	
Plastic Limit (%)	AS1289.3.2.1		16	
Plasticity Index	AS1289.3.3.1		2	
Linear Shrinkage (%)	AS1289.3.4.1		1.0	
P.I. x % Passing 0.425 mm			70	



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Quality of Materials Report

Client:	EcOz Environmental Services	Report Number:	JN1250 - 15
Client Address:	GPO Box 381 Darwin NT 801	Report Date:	18/09/2013
Job Number:	JN1250	Order Number:	HDwyer
Project:	Quality Control	Page 1 of 1	
Location		Sample Location	
Lab No:	TN 79623	Sample History : Air Dried	
Date Sampled:	13/08/2013	Sample Preparation : Wet	
Date Tested:	12/09/2013	LS Comments : Non Curling	
Sampled By:	Client	Sherwin Iron Ore Project	
Sample Method:	As Received	EZ13503-E0102-0088	
Material Source:	Natural	Pit 7 - A1	
For Use As:	Insitu	Lab ID 15	
Remarks:	-	Spec Description:	-
		Lot Number:	-
		Spec Number:	-

Test Method:	AS1289.3.6.1	A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
		150mm			
		75.00 mm			
		53.00 mm			
		37.50 mm		100	
		26.50 mm		96	
		19.00 mm		92	
		13.2 mm		78	
		9.50 mm		68	
		6.7 mm		60	
		4.75 mm		50	
		2.36 mm		33	
		1.18 mm		28	
		0.600 mm		27	
		0.425 mm		27	
		0.300 mm		26	
		0.150 mm		20	
		0.075 mm		11	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)	AS1289.3.1.2		21	
Plastic Limit (%)	AS1289.3.2.1		21	
Plasticity Index	AS1289.3.3.1		0	
Linear Shrinkage (%)	AS1289.3.4.1		0.0	
P.I. x % Passing 0.425 mm			0	



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(Signature)

Tony Lindsey

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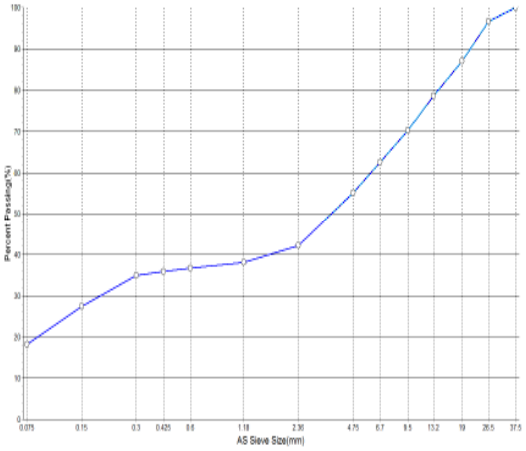
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Email: lintin@lintingeo.com

Quality of Materials Report

Client:	EcOz Environmental Services	Report Number:	JN1250 - 14
Client Address:	GPO Box 381 Darwin NT 801	Report Date:	18/09/2013
Job Number:	JN1250	Order Number:	HDwyer
Project:	Quality Control	Page 1 of 1	
Location		Sample Location	
Lab No:	TN 79622	Sample History : Air Dried	
Date Sampled:	13/08/2013	Sample Preparation : Wet	
Date Tested:	12/09/2013	LS Comments : Non Curling	
Sampled By:	Client	Sherwin Iron Ore Project	
Sample Method:	As Received	EZ13503-E0102-0088	
Material Source:	Natural	Pit 6 - A2	
For Use As:	Insitu	Lab ID 14	
Remarks:	-	Spec Description: -	
		Lot Number: -	
		Spec Number: -	

Remarks:	Spec Number:			
Test Method: AS1289.3.6.1	A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
	150mm			
	75.00 mm			
	53.00 mm			
	37.50 mm		100	
	26.50 mm		97	
	19.00 mm		87	
	13.2 mm		79	
	9.50 mm		70	
	6.7 mm		63	
	4.75 mm		55	
	2.36 mm		42	
	1.18 mm		38	
	0.600 mm		37	
	0.425 mm		36	
	0.300 mm		35	
	0.150 mm		27	
	0.075 mm		18	
Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)	AS1289.3.1.2		19	
Plastic Limit (%)	AS1289.3.2.1		17	
Plasticity Index	AS1289.3.3.1		2	
Linear Shrinkage (%)	AS1289.3.4.1		1.0	
P.I. x % Passing 0.425 mm			72	



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Quality of Materials Report

Client:	EcOz Environmental Services	Report Number:	JN1250 - 13
Client Address:	GPO Box 381 Darwin NT 801	Report Date:	18/09/2013
Job Number:	JN1250	Order Number:	HDwyer
Project:	Quality Control	Page 1 of 1	
Location		Sample Location	
Lab No:	TN 79621	Sample History : Air Dried	
Date Sampled:	13/08/2013	Sample Preparation : Wet	
Date Tested:	12/09/2013	LS Comments : Non Curling	
Sampled By:	Client	Sherwin Iron Ore Project	
Sample Method:	As Received	EZ13503-E0102-0088	
Material Source:	Natural	Pit 6 - A1	
For Use As:	Insitu	Lab ID 13	
Remarks:	-	Spec Description: -	
		Lot Number: -	
		Spec Number: -	

Test Method:	A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
	150mm			
	75.00 mm			
	53.00 mm			
	37.50 mm			
	26.50 mm		100	
	19.00 mm		86	
	13.2 mm		77	
	9.50 mm		65	
	6.7 mm		56	
	4.75 mm		49	
	2.36 mm		38	
	1.18 mm		33	
	0.600 mm		32	
	0.425 mm		31	
	0.300 mm		30	
	0.150 mm		23	
	0.075 mm		15	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)	AS1289.3.1.2		18	
Plastic Limit (%)	AS1289.3.2.1		17	
Plasticity Index	AS1289.3.3.1		1	
Linear Shrinkage (%)	AS1289.3.4.1		0.5	
P.I. x % Passing 0.425 mm			31	



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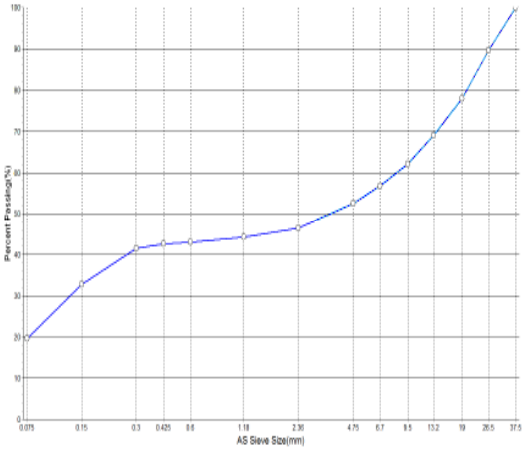
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Quality of Materials Report

Client:	EcOz Environmental Services	Report Number:	JN1250 - 12
Client Address:	GPO Box 381 Darwin NT 801	Report Date:	18/09/2013
Job Number:	JN1250	Order Number:	HDwyer
Project:	Quality Control	Page 1 of 1	
Location		Sample Location	
Lab No:	TN 79620	Sample History : Air Dried	
Date Sampled:	13/08/2013	Sample Preparation : Wet	
Date Tested:	12/09/2013	LS Comments : Non Curling	
Sampled By:	Client	Sherwin Iron Ore Project	
Sample Method:	As Received	EZ13503-E0102-0088	
Material Source:	Natural	Pit 5 - A2	
For Use As:	Insitu	Lab ID 12	
Remarks:	-	Spec Description: -	
		Lot Number: -	
		Spec Number: -	

Remarks:	Spec Number:			
Test Method: AS1289.3.6.1	A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
	150mm			
	75.00 mm			
	53.00 mm			
	37.50 mm		100	
	26.50 mm		90	
	19.00 mm		78	
	13.2 mm		69	
	9.50 mm		62	
	6.7 mm		57	
	4.75 mm		52	
	2.36 mm		46	
	1.18 mm		44	
	0.600 mm		43	
	0.425 mm		43	
	0.300 mm		42	
	0.150 mm		33	
	0.075 mm		20	
Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)	AS1289.3.1.2		20	
Plastic Limit (%)	AS1289.3.2.1		18	
Plasticity Index	AS1289.3.3.1		2	
Linear Shrinkage (%)	AS1289.3.4.1		1.0	
P.I. x % Passing 0.425 mm			86	



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Quality of Materials Report

Client:	EcOz Environmental Services	Report Number:	JN1250 - 11
Client Address:	GPO Box 381 Darwin NT 801	Report Date:	18/09/2013
Job Number:	JN1250	Order Number:	HDwyer
Project:	Quality Control	Page 1 of 1	
Location		Sample Location	
Lab No:	TN 79619	Sample History : Air Dried	
Date Sampled:	13/08/2013	Sample Preparation : Wet	
Date Tested:	12/09/2013	LS Comments : Non Curling	
Sampled By:	Client	Sherwin Iron Ore Project	
Sample Method:	As Received	EZ13503-E0102-0088	
Material Source:	Natural	Pit 4 - A2	
For Use As:	Insitu	Lab ID 11	
Remarks:	-	Spec Description: -	
		Lot Number: -	
		Spec Number: -	

Test Method:	AS1289.3.6.1	A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
		150mm			
		75.00 mm			
		53.00 mm			
		37.50 mm			
		26.50 mm		100	
		19.00 mm		88	
		13.2 mm		81	
		9.50 mm		71	
		6.7 mm		59	
		4.75 mm		47	
		2.36 mm		32	
		1.18 mm		29	
		0.600 mm		28	
		0.425 mm		28	
		0.300 mm		26	
		0.150 mm		17	
		0.075 mm		11	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)	AS1289.3.1.2		20	
Plastic Limit (%)	AS1289.3.2.1		17	
Plasticity Index	AS1289.3.3.1		3	
Linear Shrinkage (%)	AS1289.3.4.1		2.0	
P.I. x % Passing 0.425 mm			84	



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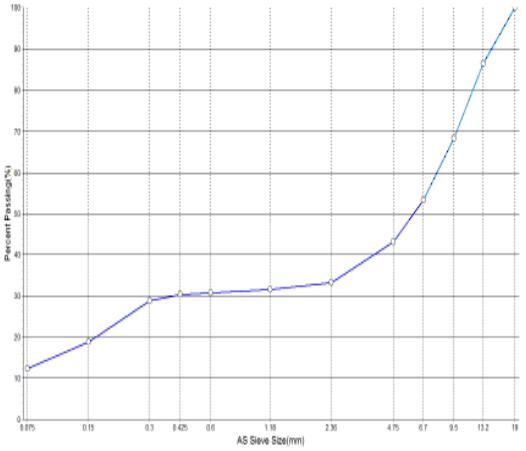
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Quality of Materials Report

Client:	EcOz Environmental Services	Report Number:	JN1250 - 10
Client Address:	GPO Box 381 Darwin NT 801	Report Date:	18/09/2013
Job Number:	JN1250	Order Number:	HDwyer
Project:	Quality Control	Page 1 of 1	
Location		Sample Location	
Lab No:	TN 79618	Sample History : Air Dried	
Date Sampled:	13/08/2013	Sample Preparation : Wet	
Date Tested:	12/09/2013	LS Comments : Non Curling	
Sampled By:	Client	Sherwin Iron Ore Project	
Sample Method:	As Received	EZ13503-E0102-0088	
Material Source:	Natural	Pit 4 - A1	
For Use As:	Insitu	Lab ID 10	
Remarks:	-	Spec Description: -	
		Lot Number: -	
		Spec Number: -	

Remarks:	Spec Number:			
Test Method: AS1289.3.6.1	A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
	150mm			
	75.00 mm			
	53.00 mm			
	37.50 mm			
	26.50 mm			
	19.00 mm		100	
	13.2 mm		86	
	9.50 mm		68	
	6.7 mm		53	
	4.75 mm		43	
	2.36 mm		33	
	1.18 mm		32	
	0.600 mm		31	
	0.425 mm		30	
	0.300 mm		29	
	0.150 mm		19	
	0.075 mm		12	
Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)	AS1289.3.1.2		22	
Plastic Limit (%)	AS1289.3.2.1		17	
Plasticity Index	AS1289.3.3.1		5	
Linear Shrinkage (%)	AS1289.3.4.1		2.5	
P.I. x % Passing 0.425 mm			150	



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Quality of Materials Report

Client:	EcOz Environmental Services	Report Number:	JN1250 - 9
Client Address:	GPO Box 381 Darwin NT 801	Report Date:	18/09/2013
Job Number:	JN1250	Order Number:	HDwyer
Project:	Quality Control	Page 1 of 1	
Location		Sample Location	
Lab No:	TN 79617	Sample History : Air Dried	
Date Sampled:	13/08/2013	Sample Preparation : Wet	
Date Tested:	12/09/2013	LS Comments : Non Curling	
Sampled By:	Client	Sherwin Iron Ore Project	
Sample Method:	As Received	EZ13503-E0102-0088	
Material Source:	Natural	Pit 3 - B2	
For Use As:	Insitu	Lab ID 9	
Remarks:	-	Spec Description: -	
		Lot Number: -	
		Spec Number: -	

Test Method:	A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
	150mm			
	75.00 mm			
	53.00 mm			
	37.50 mm			
	26.50 mm		100	
	19.00 mm		96	
	13.2 mm		85	
	9.50 mm		81	
	6.7 mm		77	
	4.75 mm		74	
	2.36 mm		70	
	1.18 mm		68	
	0.600 mm		68	
	0.425 mm		67	
	0.300 mm		66	
	0.150 mm		54	
	0.075 mm		39	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)	AS1289.3.1.2		47	
Plastic Limit (%)	AS1289.3.2.1		17	
Plasticity Index	AS1289.3.3.1		30	
Linear Shrinkage (%)	AS1289.3.4.1		13.0	
P.I. x % Passing 0.425 mm			2010	



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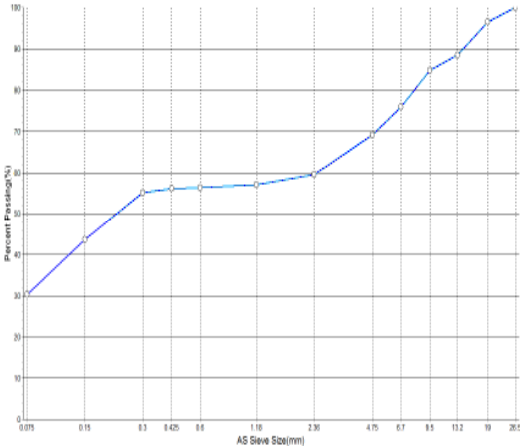
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Quality of Materials Report

Client:	EcOz Environmental Services	Report Number:	JN1250 - 8
Client Address:	GPO Box 381 Darwin NT 801	Report Date:	18/09/2013
Job Number:	JN1250	Order Number:	HDwyer
Project:	Quality Control	Page 1 of 1	
Location		Sample Location	
Lab No:	TN 79616	Sample History :	Air Dried
Date Sampled:	13/08/2013	Sample Preparation :	Wet
Date Tested:	12/09/2013	LS Comments :	Non Curling
Sampled By:	Client	Sherwin Iron Ore Project	
Sample Method:	As Received	EZ13503-E0102-0088	
Material Source:	Natural	Pit 3 - B1	
For Use As:	Insitu	Lab ID 8	
Remarks:	-	Spec Description:	-
		Lot Number:	-
		Spec Number:	-

Test Method:	A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
	150mm			
	75.00 mm			
	53.00 mm			
	37.50 mm			
	26.50 mm		100	
	19.00 mm		96	
	13.2 mm		89	
	9.50 mm		85	
	6.7 mm		76	
	4.75 mm		69	
	2.36 mm		60	
	1.18 mm		57	
	0.600 mm		56	
	0.425 mm		56	
	0.300 mm		55	
	0.150 mm		44	
	0.075 mm		30	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)	AS1289.3.1.2		41	
Plastic Limit (%)	AS1289.3.2.1		17	
Plasticity Index	AS1289.3.3.1		24	
Linear Shrinkage (%)	AS1289.3.4.1		10.0	
P.I. x % Passing 0.425 mm			1344	



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Quality of Materials Report

Client:	EcOz Environmental Services	Report Number:	JN1250 - 7
Client Address:	GPO Box 381 Darwin NT 801	Report Date:	18/09/2013
Job Number:	JN1250	Order Number:	HDwyer
Project:	Quality Control	Page 1 of 1	
Location		Sample Location	
Lab No:	TN 79615	Sample History :	Air Dried
Date Sampled:	13/08/2013	Sample Preparation :	Wet
Date Tested:	12/09/2013	LS Comments :	Non Curling
Sampled By:	Client	Sherwin Iron Ore Project	
Sample Method:	As Received	EZ13503-E0102-0088	
Material Source:	Natural	Pit 3 - A1	
For Use As:	Insitu	Lab ID 7	
Remarks:	-	Spec Description:	-
		Lot Number:	-
		Spec Number:	-

Test Method:	A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
	150mm			
	75.00 mm			
	53.00 mm			
	37.50 mm			
	26.50 mm			
	19.00 mm			
	13.2 mm			
	9.50 mm			
	6.7 mm			
	4.75 mm			
	2.36 mm			
	1.18 mm			
	0.600 mm			
	0.425 mm			
	0.300 mm			
	0.150 mm			
	0.075 mm			

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)	AS1289.3.1.2		18	
Plastic Limit (%)	AS1289.3.2.1		16	
Plasticity Index	AS1289.3.3.1		2	
Linear Shrinkage (%)	AS1289.3.4.1		1.0	
P.I. x % Passing 0.425 mm			138	



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Quality of Materials Report

Client:	EcOz Environmental Services	Report Number:	JN1250 - 6
Client Address:	GPO Box 381 Darwin NT 801	Report Date:	18/09/2013
Job Number:	JN1250	Order Number:	HDwyer
Project:	Quality Control	Page 1 of 1	
Location		Sample Location	
Lab No:	TN 79614	Sample History : Air Dried	
Date Sampled:	13/08/2013	Sample Preparation : Wet	
Date Tested:	12/09/2013	LS Comments : Non Curling	
Sampled By:	Client	Sherwin Iron Ore Project	
Sample Method:	As Received	EZ13503-E0102-0088	
Material Source:	Natural	Pit 2 - B	
For Use As:	Insitu	Lab ID 6	
Remarks:	-	Spec Description: -	
		Lot Number: -	
		Spec Number: -	

Test Method:	A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
	150mm			
	75.00 mm			
	53.00 mm			
	37.50 mm			
	26.50 mm			
	19.00 mm		100	
	13.2 mm		100	
	9.50 mm		100	
	6.7 mm		99	
	4.75 mm		98	
	2.36 mm		92	
	1.18 mm		87	
	0.600 mm		84	
	0.425 mm		83	
	0.300 mm		81	
	0.150 mm		71	
	0.075 mm		54	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)	AS1289.3.1.2		31	
Plastic Limit (%)	AS1289.3.2.1		15	
Plasticity Index	AS1289.3.3.1		16	
Linear Shrinkage (%)	AS1289.3.4.1		8.0	
P.I. x % Passing 0.425 mm			1328	



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Quality of Materials Report

Client:	EcOz Environmental Services	Report Number:	JN1250 - 5
Client Address:	GPO Box 381 Darwin NT 801	Report Date:	18/09/2013
Job Number:	JN1250	Order Number:	HDwyer
Project:	Quality Control	Page 1 of 1	
Location		Sample Location	
Lab No:	TN 79613	Sample History : Air Dried	
Date Sampled:	13/08/2013	Sample Preparation : Wet	
Date Tested:	12/09/2013	LS Comments : Non Curling	
Sampled By:	Client	Sherwin Iron Ore Project	
Sample Method:	As Received	EZ13503-E0102-0088	
Material Source:	Natural	Pit 2 - A2	
For Use As:	Insitu	Lab ID 5	
Remarks:	-	Spec Description: -	
		Lot Number: -	
		Spec Number: -	

Test Method:	A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
	150mm			
	75.00 mm			
	53.00 mm			
	37.50 mm			
	26.50 mm			
	19.00 mm		100	
	13.2 mm		100	
	9.50 mm		99	
	6.7 mm		94	
	4.75 mm		86	
	2.36 mm		74	
	1.18 mm		68	
	0.600 mm		66	
	0.425 mm		65	
	0.300 mm		62	
	0.150 mm		52	
	0.075 mm		37	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)	AS1289.3.1.2		30	
Plastic Limit (%)	AS1289.3.2.1		15	
Plasticity Index	AS1289.3.3.1		15	
Linear Shrinkage (%)	AS1289.3.4.1		7.5	
P.I. x % Passing 0.425 mm			975	



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Quality of Materials Report

Client:	EcOz Environmental Services	Report Number:	JN1250 - 4
Client Address:	GPO Box 381 Darwin NT 801	Report Date:	18/09/2013
Job Number:	JN1250	Order Number:	HDwyer
Project:	Quality Control	Page 1 of 1	
Location		Sample Location	
Lab No:	TN 79612	Sample History :	
Date Sampled:	13/08/2013	Sample Preparation :	
Date Tested:	12/09/2013	LS Comments :	
Sampled By:	Client	Sherwin Iron Ore Project	
Sample Method:	As Received	EZ13503-E0102-0088	
Material Source:	Natural	Pit 2 - A1	
For Use As:	Insitu	Lab ID 4	
Remarks:	-	Spec Description: -	
		Lot Number: -	
		Spec Number: -	

Test Method:	A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
	150mm			
	75.00 mm			
	53.00 mm			
	37.50 mm			
	26.50 mm			
	19.00 mm			
	13.2 mm			
	9.50 mm			
	6.7 mm			
	4.75 mm			
	2.36 mm			
	1.18 mm			
	0.600 mm			
	0.425 mm			
	0.300 mm			
	0.150 mm			
	0.075 mm			

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)	AS1289.3.1.2		20	
Plastic Limit (%)	AS1289.3.2.1		18	
Plasticity Index	AS1289.3.3.1		2	
Linear Shrinkage (%)	AS1289.3.4.1		1.0	
P.I. x % Passing 0.425 mm			182	



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Quality of Materials Report

Client:	EcOz Environmental Services	Report Number:	JN1250 - 3
Client Address:	GPO Box 381 Darwin NT 801	Report Date:	18/09/2013
Job Number:	JN1250	Order Number:	HDwyer
Project:	Quality Control	Page 1 of 1	
Location		Sample Location	
Lab No:	TN 79611	Sample History :	Air Dried
Date Sampled:	13/08/2013	Sample Preparation :	Wet
Date Tested:	12/09/2013	LS Comments :	Non Curling
Sampled By:	Client	Sherwin Iron Ore Project	
Sample Method:	As Received	EZ13503-E0102-0088	
Material Source:	Natural	Pit 1 - B	
For Use As:	Insitu	Lab ID 3	
Remarks:	-	Spec Description:	-
		Lot Number:	-
		Spec Number:	-

Test Method:	A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
	150mm			
	75.00 mm			
	53.00 mm			
	37.50 mm			
	26.50 mm		100	
	19.00 mm		99	
	13.2 mm		94	
	9.50 mm		89	
	6.7 mm		82	
	4.75 mm		77	
	2.36 mm		69	
	1.18 mm		62	
	0.600 mm		58	
	0.425 mm		56	
	0.300 mm		54	
	0.150 mm		48	
	0.075 mm		40	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)	AS1289.3.1.2		33	
Plastic Limit (%)	AS1289.3.2.1		20	
Plasticity Index	AS1289.3.3.1		13	
Linear Shrinkage (%)	AS1289.3.4.1		7.0	
P.I. x % Passing 0.425 mm			728	



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Quality of Materials Report

Client:	EcOz Environmental Services	Report Number:	JN1250 - 2
Client Address:	GPO Box 381 Darwin NT 801	Report Date:	18/09/2013
Job Number:	JN1250	Order Number:	HDwyer
Project:	Quality Control	Page 1 of 1	
Location		Sample Location	
Lab No:	TN 79610	Sample History : Air Dried	
Date Sampled:	13/08/2013	Sample Preparation : Wet	
Date Tested:	12/09/2013	LS Comments : Non Curling	
Sampled By:	Client	Sherwin Iron Ore Project	
Sample Method:	As Received	EZ13503-E0102-0088	
Material Source:	Natural	Pit 1 - A2	
For Use As:	Insitu	Lab ID 2	
Remarks:	-	Spec Description: -	
		Lot Number: -	
		Spec Number: -	

Test Method:	A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
	150mm			
	75.00 mm			
	53.00 mm			
	37.50 mm			
	26.50 mm			
	19.00 mm		100	
	13.2 mm		100	
	9.50 mm		99	
	6.7 mm		97	
	4.75 mm		95	
	2.36 mm		91	
	1.18 mm		89	
	0.600 mm		89	
	0.425 mm		89	
	0.300 mm		88	
	0.150 mm		81	
	0.075 mm		73	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)	AS1289.3.1.2		51	
Plastic Limit (%)	AS1289.3.2.1		18	
Plasticity Index	AS1289.3.3.1		33	
Linear Shrinkage (%)	AS1289.3.4.1		13.5	
P.I. x % Passing 0.425 mm			2937	



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Approved Signatory

Tony Lindsey

NATA Accred No:11869

Form Number

REP ASQUAL-1-58

LINTIN GEOTECHNICAL PTY LTD

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Quality of Materials Report

Client:	EcOz Environmental Services	Report Number:	JN1250 - 1
Client Address:	GPO Box 381 Darwin NT 801	Report Date:	18/09/2013
Job Number:	JN1250	Order Number:	HDwyer
Project:	Quality Control	Page 1 of 1	
Location		Sample Location	
Lab No:	TN 79609	Sample History : Air Dried	
Date Sampled:	13/08/2013	Sample Preparation : Wet	
Date Tested:	13/09/2013	LS Comments : Non Curling	
Sampled By:	Client	Sherwin Iron Ore Project	
Sample Method:	As Received	EZ13503-E0102-0088	
Material Source:	Natural	Pit 1 - A1	
For Use As:	Insitu	Lab ID 1	
Remarks:	-	Spec Description: -	
		Lot Number: -	
		Spec Number: -	

Test Method:	A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
	150mm			
	75.00 mm			
	53.00 mm			
	37.50 mm			
	26.50 mm		100	
	19.00 mm		98	
	13.2 mm		93	
	9.50 mm		85	
	6.7 mm		75	
	4.75 mm		61	
	2.36 mm		41	
	1.18 mm		38	
	0.600 mm		37	
	0.425 mm		37	
	0.300 mm		36	
	0.150 mm		29	
	0.075 mm		18	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)	AS1289.3.1.2		18	
Plastic Limit (%)	AS1289.3.2.1		16	
Plasticity Index	AS1289.3.3.1		2	
Linear Shrinkage (%)	AS1289.3.4.1		1.0	
P.I. x % Passing 0.425 mm			74	



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Approved Signatory

Tony Lindsey

NATA Accred No:11869

Form Number

REP ASQUAL-1-58

EMERSON CLASS NUMBER TEST REPORT

CLIENT: EcOz ENVIRONMENTAL SERVICES JOB: JN1250
PROJECT: SHERWIN IRON ORE PROJECT REPORT#: LG13/188
LOCATION: PIT 12-B TEST METHODS: AS 1289.3.8.1
TESTED BY ZP DATE OF TEST 16/09/13 REQUEST# EZ13503-E0102-0088 ORDER# N/A

LAB REF NUMBER: TN79636

LOCATION: PIT 12-B

MATERIAL: In-Situ

WATER: Potable

TEMPERATURE: 30°C

EMERSON CLASS NUMBER: 4



A. Lindsey

Approved Signatory

Date 17/9/13

EMERSON CLASS NUMBER TEST REPORT

CLIENT: EcOz ENVIRONMENTAL SERVICES JOB: JN1250
PROJECT: SHERWIN IRON ORE PROJECT REPORT#: LG13/187
LOCATION: PIT 12-A2 TEST METHODS: AS 1289.3.8.1
TESTED BY ZP DATE OF TEST 16/09/13 REQUEST# EZ13503-E0102-0088 ORDER# N/A

LAB REF NUMBER: TN79635

LOCATION: PIT 12-A2

MATERIAL: In-Situ

WATER: Potable

TEMPERATURE: 30°C

EMERSON CLASS NUMBER: 4



A. Lindsey

Approved Signatory

Date 17/9/13

EMERSON CLASS NUMBER TEST REPORT

CLIENT: EcOz ENVIRONMENTAL SERVICES JOB: JN1250
PROJECT: SHERWIN IRON ORE PROJECT REPORT#: LG13/186
LOCATION: PIT 12-A1 TEST METHODS: AS 1289.3.8.1
TESTED BY ZP DATE OF TEST 16/09/13 REQUEST# EZ13503-E0102-0088 ORDER# N/A

LAB REF NUMBER: TN79634

LOCATION: PIT 12-A1

MATERIAL: In-Situ

WATER: Potable

TEMPERATURE: 30°C

EMERSON CLASS NUMBER: 4



A. Lindsey

Approved Signatory

Date 17/9/13

EMERSON CLASS NUMBER TEST REPORT

CLIENT: EcOz ENVIRONMENTAL SERVICES JOB: JN1250
PROJECT: SHERWIN IRON ORE PROJECT REPORT#: LG13/185
LOCATION: PIT 11-B TEST METHODS: AS 1289.3.8.1
TESTED BY ZP DATE OF TEST 16/09/13 REQUEST# EZ13503-E0102-0088 ORDER# N/A

LAB REF NUMBER: TN79633

LOCATION: PIT 11-B

MATERIAL: In-Situ

WATER: Potable

TEMPERATURE: 30°C

EMERSON CLASS NUMBER: 4



A. Lindsey

Approved Signatory

Date 17/9/13

EMERSON CLASS NUMBER TEST REPORT

CLIENT: EcOz ENVIRONMENTAL SERVICES JOB: JN1250
PROJECT: SHERWIN IRON ORE PROJECT REPORT#: LG13/184
LOCATION: PIT 11-A2 TEST METHODS: AS 1289.3.8.1
TESTED BY ZP DATE OF TEST 16/09/13 REQUEST# EZ13503-E0102-0088 ORDER# N/A

LAB REF NUMBER: TN79632

LOCATION: PIT 11-A2

MATERIAL: In-Situ

WATER: Potable

TEMPERATURE: 30°C

EMERSON CLASS NUMBER: 4



A. Lindsey

Approved Signatory

Date 17/9/13

EMERSON CLASS NUMBER TEST REPORT

CLIENT: EcOz ENVIRONMENTAL SERVICES JOB: JN1250
PROJECT: SHERWIN IRON ORE PROJECT REPORT#: LG13/183
LOCATION: PIT 11-A1 TEST METHODS: AS 1289.3.8.1
TESTED BY ZP DATE OF TEST 16/09/13 REQUEST# EZ13503-E0102-0088 ORDER# N/A

LAB REF NUMBER: TN79631

LOCATION: PIT 11-A1

MATERIAL: In-Situ

WATER: Potable

TEMPERATURE: 30°C

EMERSON CLASS NUMBER: 4



A. Lindsey

Approved Signatory

Date 17/9/13

EMERSON CLASS NUMBER TEST REPORT

CLIENT: EcOz ENVIRONMENTAL SERVICES JOB: JN1250
PROJECT: SHERWIN IRON ORE PROJECT REPORT#: LG13/182
LOCATION: PIT 10-B TEST METHODS: AS 1289.3.8.1
TESTED BY ZP DATE OF TEST 16/09/13 REQUEST# EZ13503-E0102-0088 ORDER# N/A

LAB REF NUMBER: TN79630

LOCATION: PIT 10-B

MATERIAL: In-Situ

WATER: Potable

TEMPERATURE: 30°C

EMERSON CLASS NUMBER: 3



A. Lindsey

Approved Signatory

Date 17/9/13

EMERSON CLASS NUMBER TEST REPORT

CLIENT: EcOz ENVIRONMENTAL SERVICES JOB: JN1250
PROJECT: SHERWIN IRON ORE PROJECT REPORT#: LG13/181
LOCATION: PIT 10-A2 TEST METHODS: AS 1289.3.8.1
TESTED BY ZP DATE OF TEST 16/09/13 REQUEST# EZ13503-E0102-0088 ORDER# N/A

LAB REF NUMBER: TN79629

LOCATION: PIT 10-A2

MATERIAL: In-Situ

WATER: Potable

TEMPERATURE: 30°C

EMERSON CLASS NUMBER: 3



A. Lindsey

Approved Signatory

Date 17/9/13

EMERSON CLASS NUMBER TEST REPORT

CLIENT:	EcOz ENVIRONMENTAL SERVICES	JOB:	JN1250				
PROJECT:	SHERWIN IRON ORE PROJECT	REPORT#	LG13/180				
LOCATION:	PIT 10-A1	TEST METHODS:	AS 1289.3.8.1				
TESTED BY	ZP	DATE OF TEST	16/09/13	REQUEST#	EZ13503-E0102-0088	ORDER#	N/A

LAB REF NUMBER: TN79628

LOCATION: PIT 10-A1

MATERIAL: In-Situ

WATER: Potable

TEMPERATURE: 30°C

EMERSON CLASS NUMBER: 4



A. Lindsey
Approved Signatory

Date 17/9/13

EMERSON CLASS NUMBER TEST REPORT

CLIENT:	EcOz ENVIRONMENTAL SERVICES	JOB:	JN1250				
PROJECT:	SHERWIN IRON ORE PROJECT	REPORT#	LG13/179				
LOCATION:	PIT 9-B	TEST METHODS:	AS 1289.3.8.1				
TESTED BY	ZP	DATE OF TEST	16/09/13	REQUEST#	EZ13503-E0102-0088	ORDER#	N/A

LAB REF NUMBER: TN79627

LOCATION: PIT 9-B

MATERIAL: In-Situ

WATER: Potable

TEMPERATURE: 30°C

EMERSON CLASS NUMBER: 5



A. Lindsey

Approved Signatory

Date 17/9/13

EMERSON CLASS NUMBER TEST REPORT

CLIENT: EcOz ENVIRONMENTAL SERVICES JOB: JN1250
PROJECT: SHERWIN IRON ORE PROJECT REPORT#: LG13/178
LOCATION: PIT 9-A2 TEST METHODS: AS 1289.3.8.1
TESTED BY ZP DATE OF TEST 16/09/13 REQUEST# EZ13503-E0102-0088 ORDER# N/A

LAB REF NUMBER: TN79626

LOCATION: PIT 9-A2

MATERIAL: In-Situ

WATER: Potable

TEMPERATURE: 30°C

EMERSON CLASS NUMBER: 3



A. Lindsey

Approved Signatory

Date 17/9/13

EMERSON CLASS NUMBER TEST REPORT

CLIENT: EcOz ENVIRONMENTAL SERVICES JOB: JN1250
PROJECT: SHERWIN IRON ORE PROJECT REPORT#: LG13/177
LOCATION: PIT 8-A2 TEST METHODS: AS 1289.3.8.1
TESTED BY ZP DATE OF TEST 16/09/13 REQUEST# EZ13503-E0102-0088 ORDER# N/A

LAB REF NUMBER: TN79625

LOCATION: PIT 8-A2

MATERIAL: In-Situ

WATER: Potable

TEMPERATURE: 30°C

EMERSON CLASS NUMBER: 3



A. Lindsey

Approved Signatory

Date 17/9/13

EMERSON CLASS NUMBER TEST REPORT

CLIENT:	EcOz ENVIRONMENTAL SERVICES	JOB:	JN1250				
PROJECT:	SHERWIN IRON ORE PROJECT	REPORT#	LG13/176				
LOCATION:	PIT 7-B	TEST METHODS:	AS 1289.3.8.1				
TESTED BY	ZP	DATE OF TEST	16/09/13	REQUEST#	EZ13503-E0102-0088	ORDER#	N/A

LAB REF NUMBER: TN79624

LOCATION: PIT 7-B

MATERIAL: In-Situ

WATER: Potable

TEMPERATURE: 30°C

EMERSON CLASS NUMBER: 4



A. Lindsey

Approved Signatory

Date 17/9/13

EMERSON CLASS NUMBER TEST REPORT

CLIENT: EcOz ENVIRONMENTAL SERVICES JOB: JN1250
PROJECT: SHERWIN IRON ORE PROJECT REPORT#: LG13/175
LOCATION: PIT 7-A1 TEST METHODS: AS 1289.3.8.1
TESTED BY ZP DATE OF TEST 16/09/13 REQUEST# EZ13503-E0102-0088 ORDER# N/A

LAB REF NUMBER: TN79623

LOCATION: PIT 7-A1

MATERIAL: In-Situ

WATER: Potable

TEMPERATURE: 30°C

EMERSON CLASS NUMBER: 3



A. Lindsey

Approved Signatory

Date 17/9/13

EMERSON CLASS NUMBER TEST REPORT

CLIENT: EcOz ENVIRONMENTAL SERVICES JOB: JN1250
PROJECT: SHERWIN IRON ORE PROJECT REPORT#: LG13/174
LOCATION: PIT 6-A2 TEST METHODS: AS 1289.3.8.1
TESTED BY ZP DATE OF TEST 16/09/13 REQUEST# EZ13503-E0102-0088 ORDER# N/A

LAB REF NUMBER: TN79622

LOCATION: PIT 6-A2

MATERIAL: In-Situ

WATER: Potable

TEMPERATURE: 30°C

EMERSON CLASS NUMBER: 4



A. Lindsey

Approved Signatory

Date 17/9/13

EMERSON CLASS NUMBER TEST REPORT

CLIENT: EcOz ENVIRONMENTAL SERVICES JOB: JN1250
PROJECT: SHERWIN IRON ORE PROJECT REPORT#: LG13/173
LOCATION: PIT 6-A1 TEST METHODS: AS 1289.3.8.1
TESTED BY ZP DATE OF TEST 16/09/13 REQUEST# EZ13503-E0102-0088 ORDER# N/A

LAB REF NUMBER: TN79621

LOCATION: PIT 6-A1

MATERIAL: In-Situ

WATER: Potable

TEMPERATURE: 30°C

EMERSON CLASS NUMBER: 3



A. Lindsey

Approved Signatory

Date 17/9/13

EMERSON CLASS NUMBER TEST REPORT

CLIENT:	EcOz ENVIRONMENTAL SERVICES	JOB:	JN1250				
PROJECT:	SHERWIN IRON ORE PROJECT	REPORT#	LG13/172				
LOCATION:	PIT 5-A2	TEST METHODS:	AS 1289.3.8.1				
TESTED BY	ZP	DATE OF TEST	16/09/13	REQUEST#	EZ13503-E0102-0088	ORDER#	N/A

LAB REF NUMBER: TN79620

LOCATION: PIT 5-A2

MATERIAL: In-Situ

WATER: Potable

TEMPERATURE: 30°C

EMERSON CLASS NUMBER: 4



A. Lindsey

Approved Signatory

Date 17/9/13

EMERSON CLASS NUMBER TEST REPORT

CLIENT: EcOz ENVIRONMENTAL SERVICES JOB: JN1250
PROJECT: SHERWIN IRON ORE PROJECT REPORT#: LG13/171
LOCATION: PIT 4-A2 TEST METHODS: AS 1289.3.8.1
TESTED BY ZP DATE OF TEST 16/09/13 REQUEST# EZ13503-E0102-0088 ORDER# N/A

LAB REF NUMBER: TN79619

LOCATION: PIT 4-A2

MATERIAL: In-Situ

WATER: Potable

TEMPERATURE: 30°C

EMERSON CLASS NUMBER: 4



A. Lindsey

Approved Signatory

Date 17/9/13

EMERSON CLASS NUMBER TEST REPORT

CLIENT: EcOz ENVIRONMENTAL SERVICES JOB: JN1250
PROJECT: SHERWIN IRON ORE PROJECT REPORT#: LG13/170
LOCATION: PIT 4-A1 TEST METHODS: AS 1289.3.8.1
TESTED BY ZP DATE OF TEST 16/09/13 REQUEST# EZ13503-E0102-0088 ORDER# N/A

LAB REF NUMBER: TN79618

LOCATION: PIT 4-A1

MATERIAL: In-Situ

WATER: Potable

TEMPERATURE: 30°C

EMERSON CLASS NUMBER: 4



A. Lindsey

Approved Signatory

Date 17/9/13

EMERSON CLASS NUMBER TEST REPORT

CLIENT: EcOz ENVIRONMENTAL SERVICES JOB: JN1250
PROJECT: SHERWIN IRON ORE PROJECT REPORT#: LG13/169
LOCATION: PIT 3-B2 TEST METHODS: AS 1289.3.8.1
TESTED BY ZP DATE OF TEST 16/09/13 REQUEST# EZ13503-E0102-0088 ORDER# N/A

LAB REF NUMBER: TN79617

LOCATION: PIT 3-B2

MATERIAL: In-Situ

WATER: Potable

TEMPERATURE: 30°C

EMERSON CLASS NUMBER: 4



A. Lindsey

Approved Signatory

Date 17/9/13

EMERSON CLASS NUMBER TEST REPORT

CLIENT:	EcOz ENVIRONMENTAL SERVICES	JOB:	JN1250				
PROJECT:	SHERWIN IRON ORE PROJECT	REPORT#	LG13/168				
LOCATION:	PIT 3-B1	TEST METHODS:	AS 1289.3.8.1				
TESTED BY	ZP	DATE OF TEST	16/09/13	REQUEST#	EZ13503-E0102-0088	ORDER#	N/A

LAB REF NUMBER: TN79616

LOCATION: PIT 3-B1

MATERIAL: In-Situ

WATER: Potable

TEMPERATURE: 30°C

EMERSON CLASS NUMBER: 4



A. Lindsey

Approved Signatory

Date 17/9/13

EMERSON CLASS NUMBER TEST REPORT

CLIENT: EcOz ENVIRONMENTAL SERVICES JOB: JN1250
PROJECT: SHERWIN IRON ORE PROJECT REPORT#: LG13/167
LOCATION: PIT 3-A1 TEST METHODS: AS 1289.3.8.1
TESTED BY ZP DATE OF TEST 16/09/13 REQUEST# EZ13503-E0102-0088 ORDER# N/A

LAB REF NUMBER: TN79615

LOCATION: PIT 3-A1

MATERIAL: In-Situ

WATER: Potable

TEMPERATURE: 30°C

EMERSON CLASS NUMBER: 4



A. Lindsey

Approved Signatory

Date 17/9/13

EMERSON CLASS NUMBER TEST REPORT

CLIENT: EcOz ENVIRONMENTAL SERVICES JOB: JN1250
PROJECT: SHERWIN IRON ORE PROJECT REPORT#: LG13/166
LOCATION: PIT 2-B TEST METHODS: AS 1289.3.8.1
TESTED BY ZP DATE OF TEST 16/09/13 REQUEST# EZ13503-E0102-0088 ORDER# N/A

LAB REF NUMBER: TN79614

LOCATION: PIT 2-B

MATERIAL: In-Situ

WATER: Potable

TEMPERATURE: 30°C

EMERSON CLASS NUMBER: 4



A. Lindsey

Approved Signatory

Date 17/9/13

EMERSON CLASS NUMBER TEST REPORT

CLIENT: EcOz ENVIRONMENTAL SERVICES JOB: JN1250
PROJECT: SHERWIN IRON ORE PROJECT REPORT#: LG13/165
LOCATION: PIT 2-A2 TEST METHODS: AS 1289.3.8.1
TESTED BY ZP DATE OF TEST 16/09/13 REQUEST# EZ13503-E0102-0088 ORDER# N/A

LAB REF NUMBER: TN79613

LOCATION: PIT 2-A2

MATERIAL: In-Situ

WATER: Potable

TEMPERATURE: 30°C

EMERSON CLASS NUMBER: 4



A. Lindsey

Approved Signatory

Date 17/9/13

EMERSON CLASS NUMBER TEST REPORT

CLIENT: EcOz ENVIRONMENTAL SERVICES JOB: JN1250
PROJECT: SHERWIN IRON ORE PROJECT REPORT#: LG13/164
LOCATION: PIT 2-A1 TEST METHODS: AS 1289.3.8.1
TESTED BY ZP DATE OF TEST 16/09/13 REQUEST# EZ13503-E0102-0088 ORDER# N/A

LAB REF NUMBER: TN79612

LOCATION: PIT 2-A1

MATERIAL: In-Situ

WATER: Potable

TEMPERATURE: 30°C

EMERSON CLASS NUMBER: 4



A. Lindsey

Approved Signatory

Date 17/9/13

EMERSON CLASS NUMBER TEST REPORT

CLIENT: EcOz ENVIRONMENTAL SERVICES JOB: JN1250
PROJECT: SHERWIN IRON ORE PROJECT REPORT#: LG13/163
LOCATION: PIT 1-B TEST METHODS: AS 1289.3.8.1
TESTED BY ZP DATE OF TEST 16/09/13 REQUEST# EZ13503-E0102-0088 ORDER# N/A

LAB REF NUMBER: TN79611

LOCATION: PIT 1-B

MATERIAL: In-Situ

WATER: Potable

TEMPERATURE: 30°C

EMERSON CLASS NUMBER: 5



A. Lindsey

Approved Signatory

Date 17/9/13

EMERSON CLASS NUMBER TEST REPORT

CLIENT: EcOz ENVIRONMENTAL SERVICES JOB: JN1250
PROJECT: SHERWIN IRON ORE PROJECT REPORT#: LG13/162
LOCATION: PIT 1-A2 TEST METHODS: AS 1289.3.8.1
TESTED BY ZP DATE OF TEST 16/09/13 REQUEST# EZ13503-E0102-0088 ORDER# N/A

LAB REF NUMBER: TN79610

LOCATION: PIT 1-A2

MATERIAL: In-Situ

WATER: Potable

TEMPERATURE: 30°C

EMERSON CLASS NUMBER: 4



A. Lindsey

Approved Signatory

Date 17/9/13

EMERSON CLASS NUMBER TEST REPORT

CLIENT: EcOz ENVIRONMENTAL SERVICES JOB: JN1250
PROJECT: SHERWIN IRON ORE PROJECT REPORT#: LG13/161
LOCATION: PIT 1-A1 TEST METHODS: AS 1289.3.8.1
TESTED BY ZP DATE OF TEST 16/09/13 REQUEST# EZ13503-E0102-0088 ORDER# N/A

LAB REF NUMBER: TN79609

LOCATION: PIT 1-A1

MATERIAL: In-Situ

WATER: Potable

TEMPERATURE: 30°C

EMERSON CLASS NUMBER: 4



A. Lindsey

Approved Signatory

Date 17/9/13