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Draft EIS - Appendix I Archaeological Report Haul Road

Western Desert Resources Limited
Roper Bar Iron Ore Project



2012



**WESTERN DESERT RESOURCES LIMITED –
ROPER BAR IRON ORE PROJECT:
SUPPLIMENTARY ARCHAEOLOGICAL SURVEY REPORT - HAUL ROAD**

A report for EcOz Environmental Services



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Cover photo: Art Site WDHRAS02

March 2012

EXECUTIVE SUMMARY

This report details an archaeological survey for Western Desert Resources Limited – Roper Bar, Northern Territory, of a proposed haul road between the proposed iron ore mine and existing port facilities at Bing Bong. The consultant was required to identify and record any archaeological sites or artefacts likely to be impacted by the proposed haul road and to suggest mitigation measures that would either avoid or minimise the impact the development would have on cultural heritage along the route.

Eight archaeological sites, including stone artefact scatters and rock art sites were found. A 100m corridor was surveyed at major waterways, minor creeks and drainage channels. Construction of the proposed haul road should not deviate more than this specified distance, as more sites are likely to be found at lagoons, billabongs and on riverbanks. The art sites discovered during this survey are unique to the haul road route and should be avoided.

Summary of recommendations:

	Centroid (all grid references in GDA94)		Comments	Significance	Recommendations
	Easting	Northing			
Artefact Scatter (AS)					
WDHRAS01	605869	8275587	<50 artefacts	Medium	Proceed with proposal
WDHRAS02	606787	8275719	<50 artefacts	Medium	Proceed with proposal
WDHRAS03	543078	8293183	>50 artefacts	High	Re-align 50m to the north
Background Scatter (BS)					
WDHRBS01	624385	8270804		Medium	Deviate 100m south from the lagoon
WDHRBS02	530346	8307935		Low	Destroy
WDHRBS03	583504	8278545		Low	Proceed with proposal
Rock Art Sites (RA)					
WDHRR01	583547	8278591	Unknown motif	Low	Proceed with proposal
WDHRR02	583398	8278491	Bird's feet motifs	High	Proceed with proposal
Stockyards					
Stockyard 1	645742	8270247	270x470m	Low	Proceed with proposal
Stockyard 2	645004	8269184	270x470m	Low	Proceed with proposal

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1.0. INTRODUCTION

1.1 Background and consultancy brief

Following on from the decision to build an iron ore slurry pipeline to Bing Bong Port, instead of Maria Island, Western Desert Resources Limited (WDR) required an archaeological survey for the proposed 165km pipeline. The pipeline will not be constructed for several years, but in the interim, iron ore will be trucked along a proposed haul road.

This supplementary report for the iron ore mine presents the cultural heritage data resulting from an aerial survey of the proposed haul road route from the exploration camp at WDR Roper Bar to Bing Bong Port. In addition to the haul road, two proposed stockyards at the port were also investigated. For an archaeological report of the mine site proper, see Jung (2011). The survey was conducted from 24 to 27 February 2012 using a Bell LongRanger and apart from the archaeologist, included an environmental scientist from EcOz Environmental Services, David van den Hoek. The consultancy brief was to:

- Identify any prescribed archaeological objects or places as defined under the *Northern Territory Heritage Conservation Act (1991)*, and any historic sites located along the proposed haul road that may be impacted upon during its construction.
- Assess the nature, distribution and significance of these materials and discuss possible constraints to the works posed by the presence of archaeological and historic sites and an indication of what sites are likely to be the most sensitive in this respect.
- Present a final report including a summary of survey results, determination of significance of sites and the likely impact of the proposed development, and recommendations regarding management strategies or mitigation procedures as appropriate under the *Northern Territory Heritage Conservation Act (1991)*.

1.2 Location of the proposed WDRL – Roper Bar Haul Road

The proposed haul road extends from the exploration camp in a southwesterly direction, roughly following parallel to the coast of the Gulf of Carpentaria to Bing Bong Port, which is the existing port facility for the McArthur River Mine (Fig. 1).

1.3 Environmental setting - brief description

The proposed haul road route traverses flat, open woodland with swamp areas. The route runs along a number of quartzite hematitic ridges, but only one major ridge system intersects the route and is approximately 70 metres high. The route crosses several small drainage channels and skirts around a number of billabongs. From west to east, the major river systems encountered are the Cox River, Limmen Bight River, Nathan River, Rosie Creek, Pine Creek and Bing Bong Creek. Figure 2 shows the overall track log route of the survey.

2.0 PREVIOUS RESEARCH

2.1 Previous research outcomes

A study of the Northern Territory's heritage register indicated that two previously recorded sites occur on the haul road route. Table 2.1 lists two mythological sites at the Limmen Bight River. Figure 3 shows the distribution of previously recorded sites at the Limmen Bight River. No archaeological sites were previously recorded, but this is due to no previous surveys having been conducted, rather than a lack of archaeology.

Table 2.1 Previously recorded sites at Limmen Bight River (After Heritage Branch, NTG)

Site_Name	Easting	Northing	Zone	No#_Map_Sheet	Map_Sheet	Site_Type
Nandirrani	542900	8293000	53	5967	Towns	Unrestricted mythological site
Djowunda	544700	8293000	53	5967	Towns	Unrestricted mythological site



Figure 3. Limmen Bight area - archaeological sites – red dots (Courtesy Heritage Branch, NT Government).

3.0 METHODS

3.1 Aerial survey methods

The survey method utilised in the fieldwork consisted of a systematic survey of all major creeks and rivers along the route. Specific landing zones (LZs) were chosen from aerial imagery as well as opportunistically while in flight. Drainage channels and minor creeks, which are not readily identifiable in satellite photography, were investigated also. Landings were made as close to the haul road route as practicably as possible. Pedestrian transects were then conducted 100 metres from either side of the centre line of the haul road route at water crossings.

20 landings were made and these are presented in Appendix 1. The landing sites included the two stockyards at Bing Bong Port.

4.0 RESULTS

4.1 Archaeology

Three artefact scatters, three background scatters and two art sites were found during the survey. The background scatters ranged from between 1 and 10 artefacts, all of which represent low levels of past human activities in the area. Water is a critical factor in this environment and the distribution of finds indicates that is also a key indicator as to where archaeological sites are most likely to be found. The following lists the sites.

4.1.1 Western Desert Haul Road Rock Art 1 (WDHRR01)

An EcOz environmental study team were encamped several days prior to the survey at the base of the highest promontory along the route. They reported the discovery of two art sites in the area. These were inspected and although WDHRR01 was interpreted as having been one of the located sites, WDHRR02 showed distinct evidence of artwork. Further surveying of this high promontory will quite likely reveal more art. A map and aerial photograph of the two sites are shown in Figures 4 and 5 respectively. A small creek, where the EcOz camp was, is approximately 1km away from the art sites. The proposed haul road will be 500 metres from both located sites.

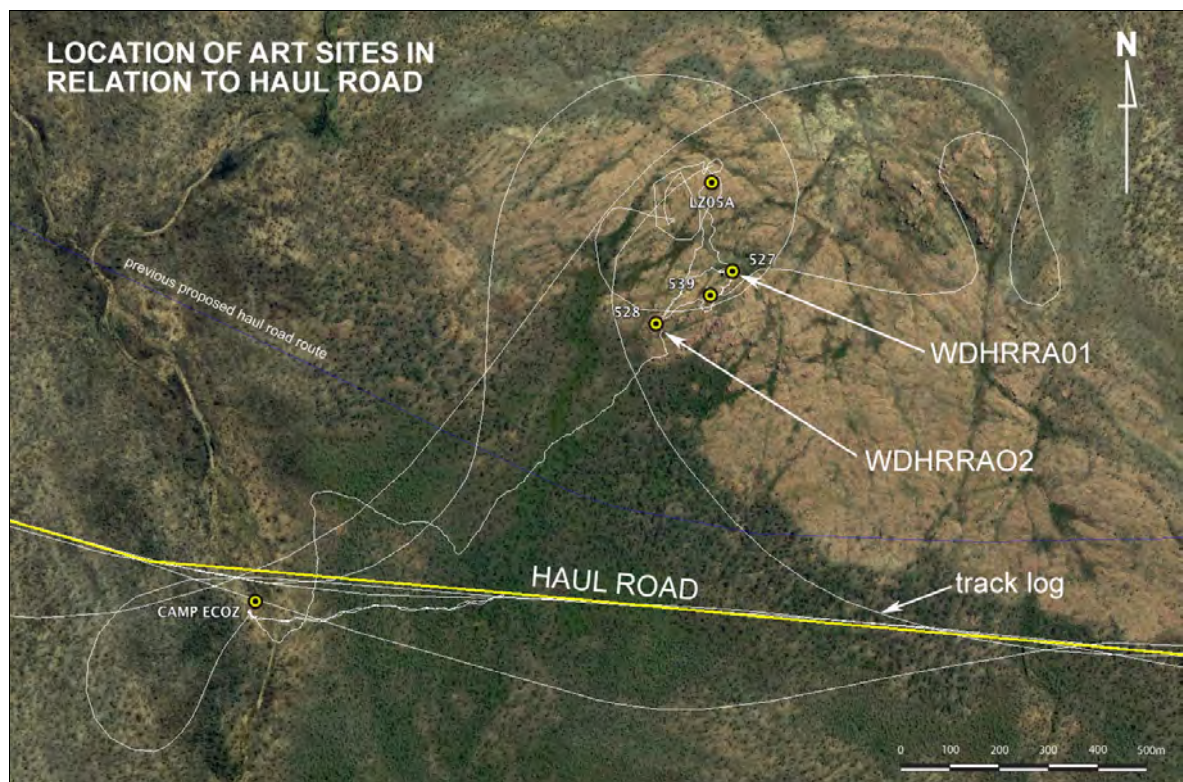


Figure 4. Haul road route proximity to art sites.



Figure 5. Art sites, oblique aerial photograph.



Figure 6. WDHRRA01. Figurative motif? Scale in 1cms.

4.1.2 Western Desert Haul Road Rock Art 2 (WDHRRRA02)

A distinctive birds feet motif panel was found at WDHRRRA02, approximately 200 metres from WDHRRRA01, at the top of the rocky ridge. The site is shown in Figures 7 and 8. The art occurs under small rocky ledges and is in association with a low-density background scatter (see below: WDHRBS03).



Figure 7. Context view of Art Site WDHRRRA02. Art is to the left of the overhang opening (centre).



Figure 8. Art Site WDHRRRA02, WPT:57, bird's feet motifs.

4.1.3 Western Desert Haul Road Artefact Scatter 1 (WDHRAS01)

The first medium density artefact scatter, WDHRAS01, was found on the western side of Rosie Creek, on high ground, overlooking the creek (Figs. 9 and 10). GSV was 50% and GI, 95% (Fig. 11). Stone artefacts are listed in Table 4.1. The proposed route will be approximately 150 metres from this site.

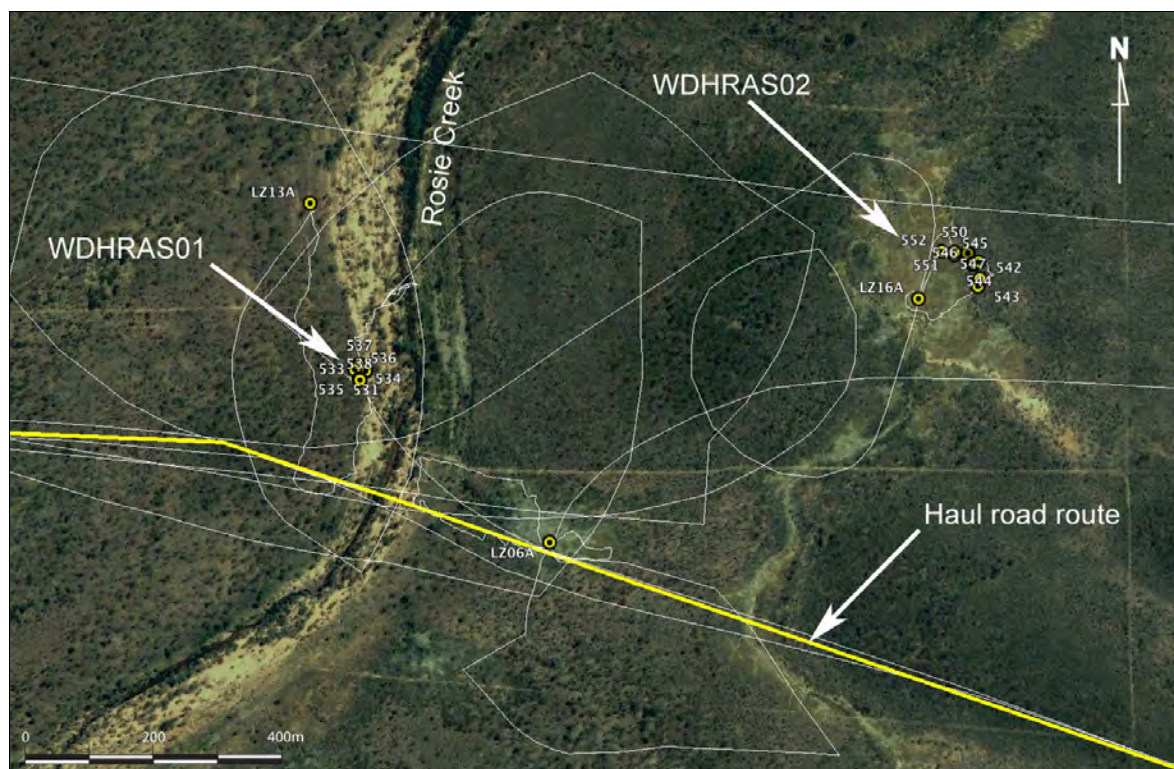


Figure 9. WDHRAS01 and WDHRAS02 near Rosie Creek.



Figure 10. WDHRAS01 context view looking back towards LZ13A. Helicopter is in the creek bed.



Figure 11. WDHRAS01 on top of ridge above Rosie Creek.

Table 4.1 Stone artefacts and waypoint numbers WDHRAS01**Format: UTM M/D/Y H:M:S 9.50 hrs Datum[121]: GDA94****Photo scale in 1cms**

Wpt Name	Artefact description	Date	Zone	Zone	Easting	Northing
531	CP(S)	02/26/2012 12:33:01.000	53	L	605869	8275587
532	CP(S)	02/26/2012 12:33:05.000	53	L	605869	8275587
						
533	F(C)	02/26/2012 12:42:05.000	53	L	605861	8275573
						
534	FP(S)	02/26/2012	53	L	605860	8275575

		12:45:35.000				
No photograph						
535	FP(S)	02/26/2012 12:46:20.000	53	L	605860	8275575
No photograph						
536	C(QZ)	02/26/2012 12:50:02.000	53	L	605853	8275589
						
537	FP(C)	02/26/2012 12:55:03.000	53	L	605859	8275595
No photograph						
538	C(QZ) – river pebble	02/26/2012 12:56:05.000	53	L	605859	8275597

4.1.4 Western Desert Haul Road Artefact Scatter 2 (WDHRAS02)

On the eastern side of Rosie Creek, WDHRAS02 occurs on laterite ridges in a clearing, approximately 800 metres from the creek (Fig. 12; see also Fig. 9). Finds were characterised by chert flakes and cores. GSV was 80% and GI 50%. The low GI is indicative of extensive run-off and erosion of the laterite ridges. Finds are listed in Table 4.2. The proposed route will be approximately 600 metres from this site.



Figure 12. WDHRAS02 looking towards Rosie Creek.

Table 4.2 Stone artefacts and waypoint numbers WDHRAS02**Format: UTM M/D/Y H:M:S 9.50 hrs Datum[121]: GDA94****Photo scale in 1cms**

Wpt Name	Artefact description	Date	Zone	Zone	Easting	Northing
542	F(C)	02/27/2012 10:35:51.000	53	L	606787	8275719
						
543	F(C)	02/27/2012 10:38:14.000	53	L	606784	8275708
						
544	F(C)	02/27/2012 10:44:14.000	53	L	606785	8275744
						

545	C(C)	02/27/2012 10:46:01.000	53	L	606779	8275742
						
546	F(C)	02/27/2012 10:47:18.000	53	L	606777	8275741
						
547	F(C)	02/27/2012 10:48:32.000	53	L	606776	8275741
						
548	FP(C) – distal end, broken	02/27/2012 10:53:37.000	53	L	606769	8275757
						

549	C(C)	02/27/2012 10:53:55.000	53	L	606769	8275757
						
550	FP(C)	02/27/2012 10:55:33.000	53	L	606749	8275759
						
551	CF(C)	02/27/2012 10:57:16.000	53	L	606749	8275755
						
552	FP(C)	02/27/2012 11:00:25.000	53	L	606731	8275760
						

4.1.5 Western Desert Haul Road Artefact Scatter 3 (WDHRAS03)

The broadest water way found during the survey was the Limmen Bight River. The crossing on the eastern side had a GSV of <5% and GI of 30%. Thick vegetation and high energy water scouring on the eastern bank obscured visibility considerably. An alternative crossing, 1.8 km south of the initially proposed crossing was also inspected. WDHRAS03, however, was discovered in an erosion gully on the western bank of the 1st proposed crossing (Figs. 13 and 14). The site is 50 metres from the crossing. The site is on a river terrace about 7 metres high. Table 4.3 lists the finds, with some of the largest artefacts yet found, including primary flakes and large cores. The only blade (broken) found during the survey, was on top of the terrace. Erosion, it would seem, has been cutting through the site, revealing artefacts.

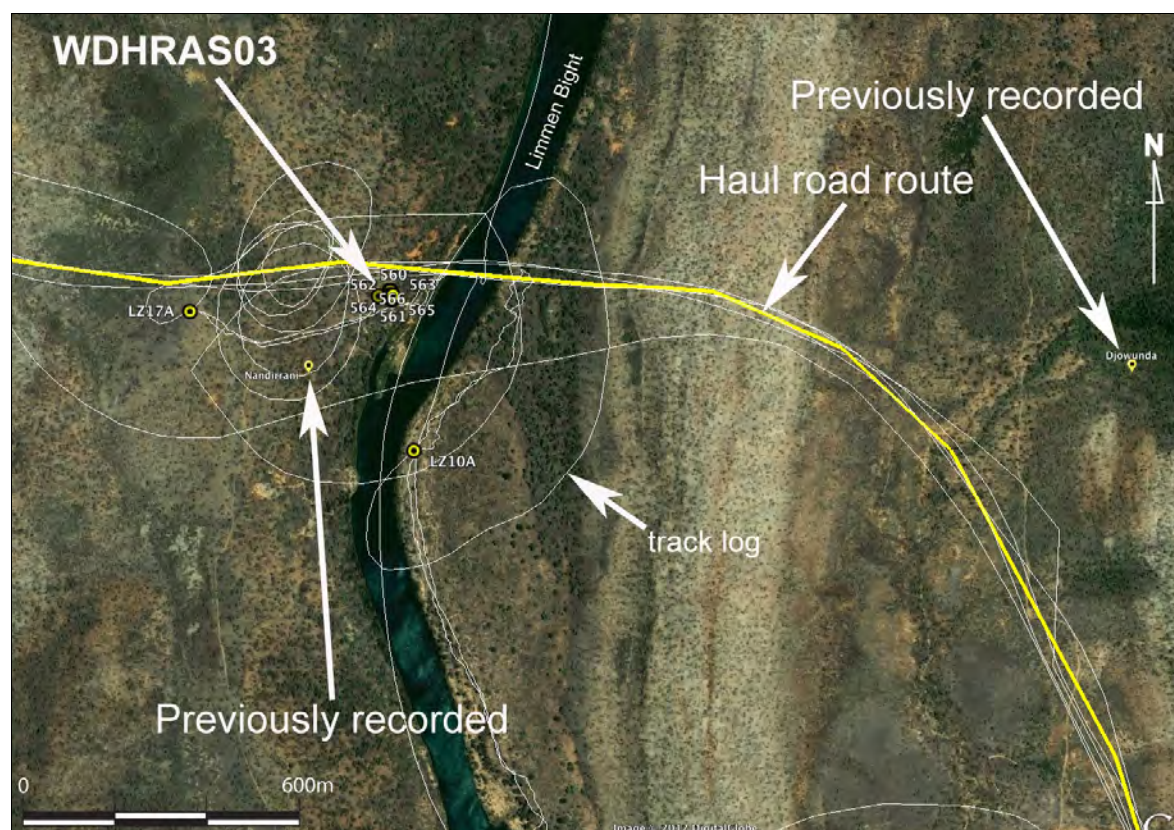
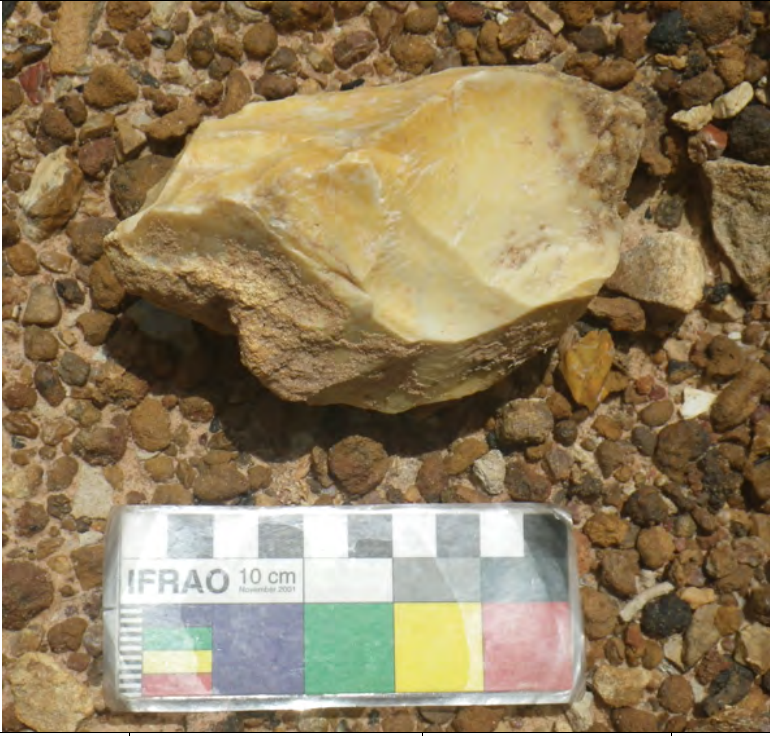


Figure 13. WDHRAS03 map, showing proximity to Limmen Bight and previously recorded mythological sites.



Figure 14. WDHRAS03 context view showing erosion gullies.

Table 4.3 Stone artefacts and waypoint numbers WDHRAS03**Format: UTM M/D/Y H:M:S 9.50 hrs Datum[121]: GDA94****Photo scale in 1cms**

Wpt Name	Artefact description	Date	Zone	Zone	Easting	Northing
553	C(S)	02/27/2012 13:13:20.000	53	L	543078	8293183
						
554	F(QZ)	02/27/2012 13:14:00.000	53	L	543079	8293184
						

555	Not recorded	02/27/2012 13:16:39.000	53	L	543079	8293193
556	Not recorded	02/27/2012 13:16:42.000	53	L	543079	8293193
557	Not recorded	02/27/2012 13:16:44.000	53	L	543079	8293193
558	Not recorded	02/27/2012 13:16:46.000	53	L	543079	8293193
559	Not recorded	02/27/2012 13:16:48.000	53	L	543079	8293193
560	C(S)	02/27/2012 13:20:11.000	53	L	543085	8293183



561	Not recorded	02/27/2012 13:22:14.000	53	L	543084	8293181
562	Not recorded	02/27/2012 13:22:16.000	53	L	543084	8293181
563	Not recorded	02/27/2012 13:22:19.000	53	L	543084	8293181

564	F(C)	02/27/2012 13:22:50.000	53	L	543084	8293180
						
565	Not recorded	02/27/2012 13:24:28.000	53	L	543082	8293175
566	Not recorded	02/27/2012 13:24:50.000	53	L	543082	8293175
567	Not recorded	02/27/2012 13:25:53.000	53	L	543082	8293176
568	Not recorded	02/27/2012 13:25:58.000	53	L	543082	8293176
569	Not recorded	02/27/2012 13:26:11.000	53	L	543082	8293176
570	B(C) - blade	02/27/2012 13:32:23.000	53	L	543054	8293181



Left: dorsal, right: ventral view.

4.1.6 Western Desert Haul Road Background Scatter 1 (WDHRBS01)

Adjacent to the Pine Creek crossing lies a small lagoon, fringed by small laterite ridges (Fig. 15). No major finds were made there, but several artefacts were recorded, suggesting that people in the past were utilising the lagoon's resources, rather than camping on the creek's banks (Fig. 16 and Table 4.4). Only the creek's eastern bank was surveyed, which indicated that extensive water action had been scouring its banks, perhaps accounting for the lack of finds; the archaeology was not preserved. The haul road passes through WDHRBS01.

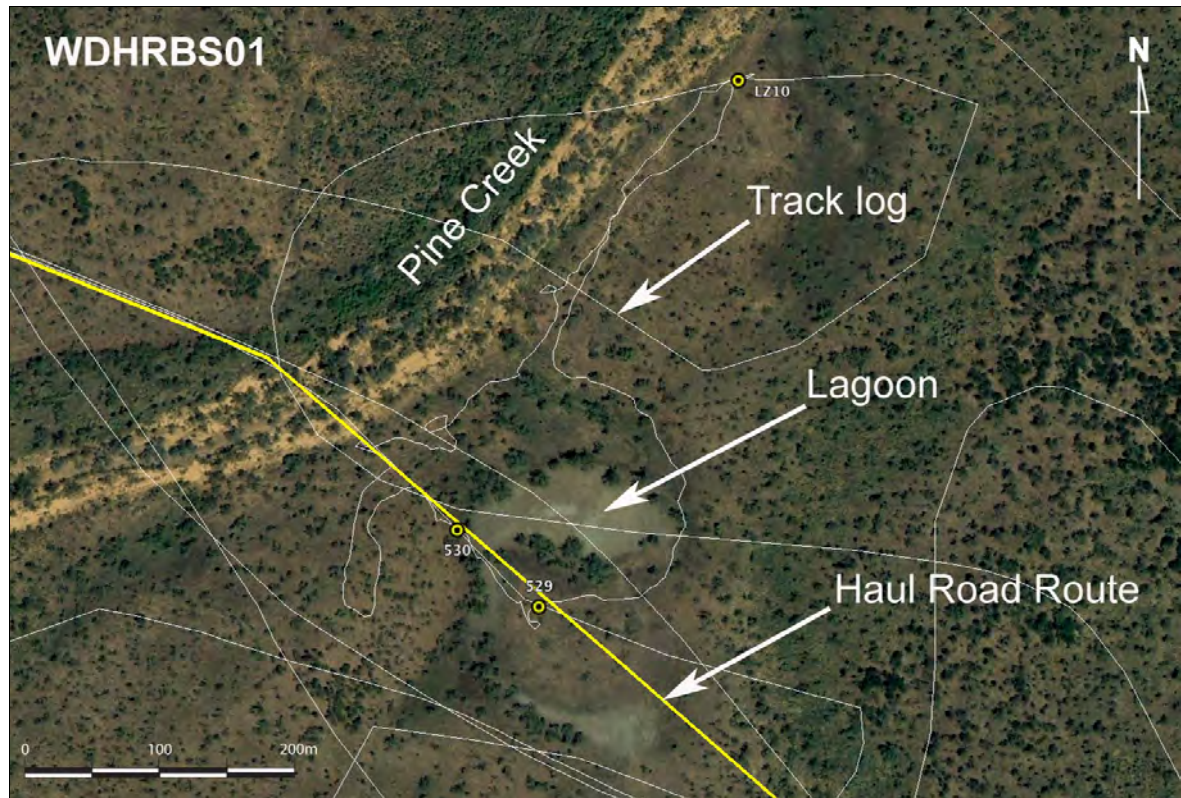


Figure 15. Map of WDHRBS01 showing relationship of finds to nearby lagoon and Pine Creek.



Figure 16. Context view of WDHRBS01 looking north towards lagoon.

Table 4.4 Stone artefacts and waypoint numbers WDHRBS01**Format: UTM M/D/Y H:M:S 9.50 hrs Datum[121]: GDA94****Photo scale in 1cms**

Wpt Name	Artefact description	Date/Time	Zone	Zone	Easting	Northing
529	F(S)	02/26/2012 10:03:11.000	53	L	624385	8270804
						
530	FP(C)	02/26/2012 10:13:00.000	53	L	624324	8270862
						

4.1.7 Western Desert Haul Road Background Scatter 2 (WDHRBS02)

A landing was made at LZ14A to evaluate a narrow corridor between a high rocky ridge and a swamp, which looked likely to contain archaeological material. Only two artefacts were found, 50 metres to the east of the route. These finds are listed in Table 4.5. Owing to the constraints of the environment, the haul road construction may go through these finds.

Table 4.5 Stone artefacts and waypoint numbers WDHRBS02

Format: UTM M/D/Y H:M:S 9.50 hrs Datum[121]: GDA94						
Photo scale in 1cms						
Wpt Name	Artefact description	Date	Zone	Zone	Easting	Northing
540	F(C)	02/27/2012 07:49:55.000	53	L	530346	8307935
Not photographed						
541	F(C)	02/27/2012 07:50:57.000	53	L	530346	8307934
Not photographed						

4.1.8 Western Desert Haul Road Background Scatter 3 (WDHRBS03)

Two flakes were found in association with the rock art sites (Table 4.6). No other finds made. The quartzite flake may be an adze slug ie., a formal tool type.

Table 4.6 Stone artefacts and waypoint numbers WDHRBS03

539	F(C), F(QZ)	02/26/2012 15:07:57.000	53	L	583504	8278545
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4.2 *Western Desert Haul Road Stockyards*

The two proposed stockyards at Bing Bong Port are adjacent to the existing McArthur River haul road (Robinson Road). Stockyard 1 is an existing cattle yard with GSV of <5% and GI of also <5% (Fig. 17 and Fig. 18). Stockyard 2 had similar GSV, but with a GI of 90%. No finds were made at either location.

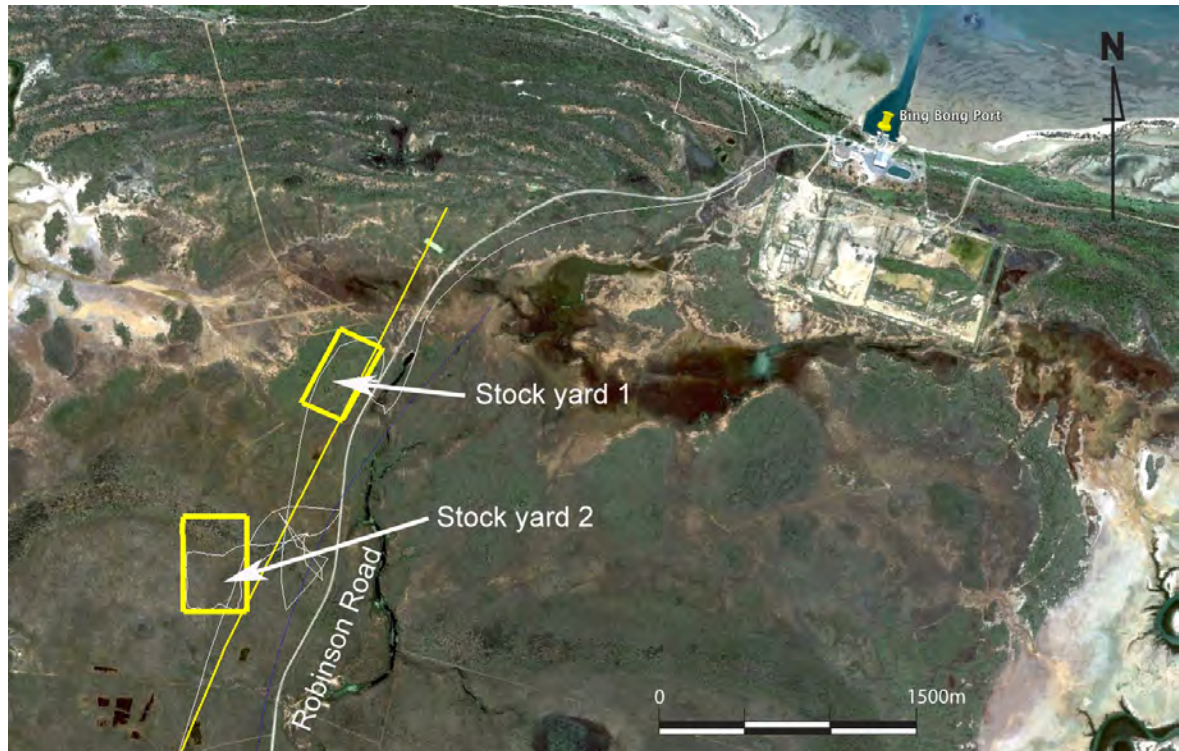


Figure 17. Map of proposed Stockyards.



Figure 18. Stockyard 1, showing poor GSV.



Figure 19. Stockyard 2, general vegetation coverage.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The aerial survey of the proposed 165km long haul road from Western Desert Resources mine near Roper Bar to the Bing Bong Port entailed 20 landing sites. The survey focused on waterways, as it was predicted in the initial report that that is where archaeological sites would be located. Owing to the narrow width of the corridor (100m), only a few sites and background scatters were found; the major stone artefact site was found along the bank of one of the major waterways of the route – Limmen Bight River. Other less significant waterways, such as Rosie Creek however, also showed evidence of past human occupation. The following recommendations arise from this report:

5.2 Recommendations

5.2.1 Recommendation 1 – waterways

- The construction of the proposed haul road should not deviate more than 100m from the existing centre line at major river and creek crossings as detailed in this report.
- Lagoons and other water bodies are quite likely to contain archaeological material on their banks. Haul road construction should avoid these features by at least 50 metres.

5.2.2 Recommendation 2 – rock art sites

- The occurrence of rock art on the haul road route is limited to a specific outcrop. The outcrop should be avoided, as more motifs are likely to be found.

REFERENCES

Jung, S. 2011. Western Desert Resources Limited – Roper Bar Iron Ore Project, archaeological survey report. VDM/EcOz Environmental Services, Darwin.

APPENDIX 1: Table of Landing Zones (LZs) conducted

Wpt Name	Date Time	Zone	Zone	Easting	Northing	Comment
LZ01A	02/24/2012 12:58:03.000	53	L	529806	8306247	Cox River



LZ02A	02/24/2012 13:32:40.000	53	L	544073	8291742	Limmen Bight River - East
						
LZ03A	02/24/2012 14:23:48.000	53	L	559396	8291177	Nathan River - West

LZ04A	02/24/2012 15:35:05.000	53	L	564528	8290129	Water body
						
LZ05A	02/25/2012 08:39:10.000	53	L	583507	8278762	Art site
LZ06A	02/25/2012 10:20:11.000	53	L	606143	8275331	Rosie Creek - East
LZ07A						Stockyard1
LZ08A						Stockyard2
LZ09A	02/25/2012 13:36:07.000	53	L	639372	8263818	Bing Bong Creek - West
LZ10A	02/25/2012 14:21:15.000	53	L	543130	8292843	Limen Bight River - East
LZ10	02/26/2012 09:45:39.000	53	L	624537	8271198	Pine Creek - East

LZ11A	02/26/2012 11:19:43.000	53	L	628063	8267668	Unknown drainage channel
						
LZ12A	02/26/2012 11:47:28.000	53	L	618696	8273192	Unknown drainage channel

LZ13A	02/26/2012 12:11:47.000	53	L	605786	8275837	Rosie Creek - West
						
LZ14	02/26/2012 16:22:05.000	53	L	520735	8322276	Unknown drainage channel
LZ14A	02/27/2012 08:27:44.000	53	L	530367	8307745	Water body at base of rocky ridge
LZ15A	02/27/2012 08:45:23.000	53	L	537267	8296066	Unknown drainage channel
LZ16A	02/27/2012 11:14:20.000	53	L	606696	8275690	Rosie Creek - East
LZ17A	02/27/2012 12:13:03.000	53	L	542643	8293147	Limmen Bight River - West

LZ18A	02/27/2012 14:16:11.000	53	L	529913	8304740	Unknown drainage channel
						