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Project Name: Nolans Rare Earths





#### **REVISION HISTORY**

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#### 1.0 INTRODUCTION

#### 1.1 Background

The Nolans Rare Earths Project (the Project) is located approximately 135 km north west of Alice Springs, Northern Territory. The Project targets the Nolans Bore mineral deposit for rare earth elements. Activities will focus on construction, mining, processing, rehabilitation and decommissioning of an open-cut, rare earth mine, and its associated infrastructure.

### 1.2 Purpose

The Water Management Plan (WMP) for the Nolans Project (Project) provides a framework for the management of summary of sampling requirements at the site. The WMP has been designed to collect data throughout the construction and operations phase to assess the performance of water management onsite. In order to facilitate consistency in sampling, and comply with quality assurance and control methodologies, a series of sampling procedures have been established including:

- Surface Water Sampling Procedure;
- Mine Site Groundwater Sampling Procedure; and
- Sediment Sampling Procedure (this procedure).

### 1.3 Objectives

Sediment sampling will be undertaken as a proxy for water quality due to the limited flows experienced at and surrounding the Project.

The primary objective of the Sediment Sampling Procedure is to obtain a sample with minimal significant alteration in sediment chemistry during sample collection. The collected sample should represent the physical, chemical and biological characteristics of sediment in the targeted drainage system as closely as possible.

### 1.4 Planning and Equipment

A number of factors must be considered during the field planning phase, prior to sediment sampling. These include consideration of ground condition at targeted locations and safety requirements. A summary of equipment and associated suppliers are provided in Table 1—1. All equipment in relation to sediment sampling should be ordered a minimum of four weeks prior to sampling.



Table 1—1 Summary of Planning

Timing	Details	Supplier
At least 4 weeks prior to sampling	Order Lab Bottles Laboratory jars and large zip lock bags Eskies and Cool Bricks	tbc
	Hire / Maintenance Check Long arm sampler	Eco Environmental 6/509-511 South Rd, Ashford SA 5031 08 8293 3355 adelaide@ecoenvironmental.com. au
		Thermo Fisher Scientific 5 Caribbean Dv, Scoresby Vic 3179 03 9757 4377 RentalsAU@thermofisher.com
	Purchase Nitrile gloves Decon N	Eco Environmental 6/509-511 South Rd, Ashford SA 5031 08 8293 3355 adelaide@ecoenvironmental.com. au
		Thermo Fisher Scientific 5 Caribbean Dv, Scoresby Vic 3179 03 9757 4377 RentalsAU@thermofisher.com



#### 2.0 SEDIMENT WATER SAMPLING PROCEDURE

#### 2.1 Sampling Equipment

Sediment sampling requires the following:

- Chain of Custody (Appendix A);
- Stainless steel or plastic bucket and spade;
- 3 mm stainless steel sieve
- 80 mesh sieve
- Calico sample bags, zip lock bags paper soil sample bags (capable of storing 500 gms of fine sediments);
- Nitrile gloves;
- Permeant marker.

### 2.2 Sampling Locations

There are a number of sediment sampling locations across the Project. The sediment sampling locations coincide with surface water / stormwater sampling locations at the Mine Site. The sampling locations are positioned to assess upstream, onsite and downstream impacts from the Project

A summary of sampling locations, frequency and suites are provided in Table 2—1 and illustrated on Figure 2—1 and Figure 2—2.

### 2.2.1 Sediment Sample Assay Suite

The sampling suite for sediment includes photo point monitoring and laboratory measurements as follows:

- Photo point Monitoring; and
- Laboratory Analysis:
- Metals, U, Th, P and Sr
- Rare Earths element suite.

Note – the Nolans deposit has a unique geochemical signature and the above analytes will enable early detection within sediments.

### 2.3 Sampling Frequency

Sampling will be undertaken in accordance with the frequency identified in Table 2—1.



### Table 2—1 Sediment Monitoring Locations

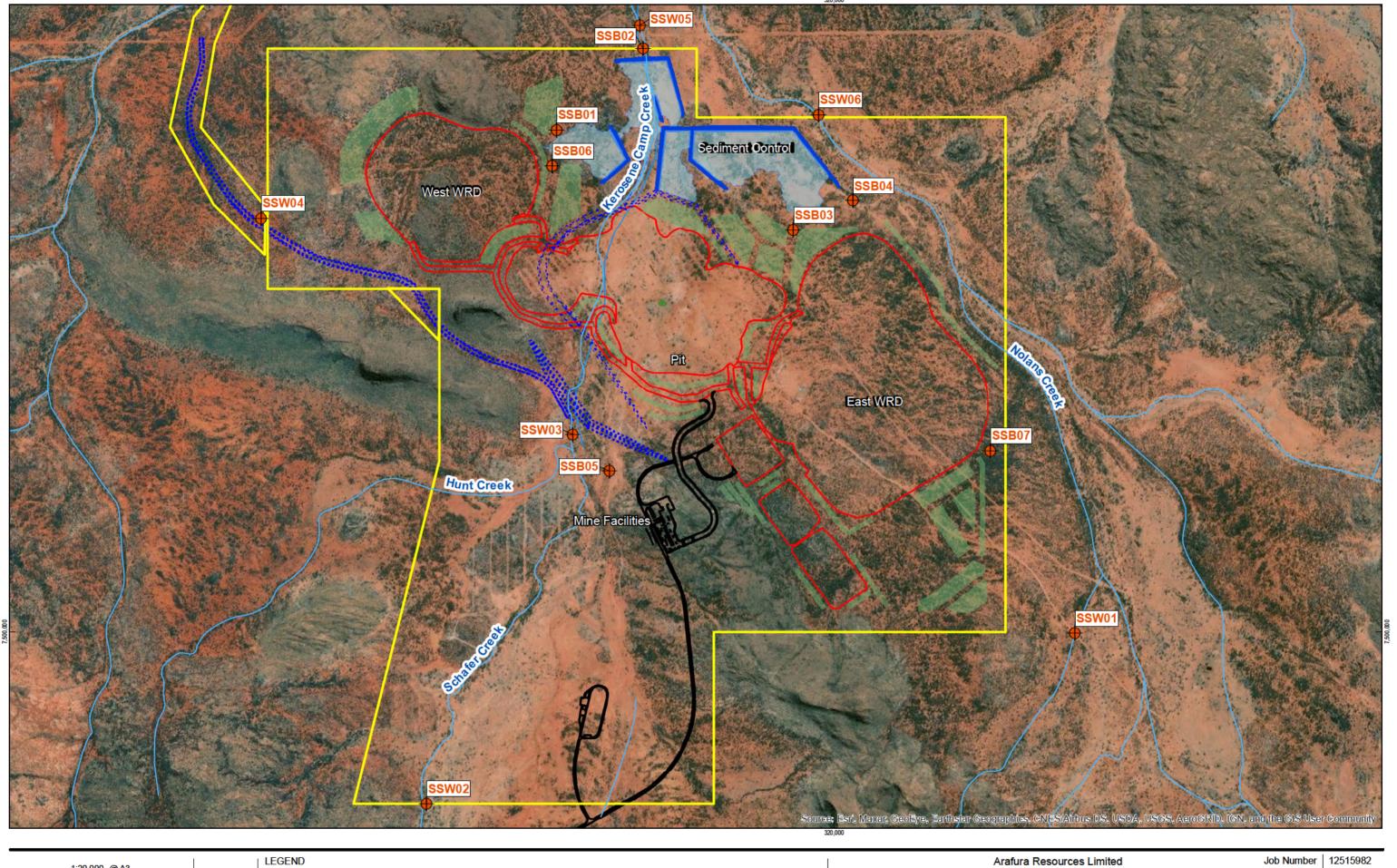
Site ID	Coordinates				Sample Frequency			
	Easting	Northing	Туре	Description	Baseline	Operation		
Surface Wat	er							
SSW01			Control	Nolans Creek: Eastern boundary inflow of the Mine Site, upstream of the South East WRD.	Biannually	Sediment sampling frequency should be undertaken so that the combined surface water / sediment sampling meets an overall quarterly frequency. (Note: A sediment sample should only be used to infill a surface water sample event post rainfall. consecutive sediment samples are not required to be taken.)		
SSW02				Schafer Creek, upstream tributary to Kerosene Camp Creek, southern border of the mine site area.				
SSW03			Control	Kerosene Creek, upstream of the LOM Pit and stage 1 and 2 diversion channels.				
SSW04			Impact	Kerosene Creek Realignment within the inlet to the creek realignment.				
SSW05			Impact	Kerosene Creek, downstream of Sediment Control				
SSW06				Nolans Creek Downstream of Sediment Control and East WRD				
Stormwater	Stormwater sediment retention ponds							
SSB01			Impact-	Adjacent to western sediment control	Biannually	As an alternative to when quarterly stormwater sampling cannot be undertaken.		
SSB02			Impact-	Down gradient of sediment control				
SSB03			Impact-	Topsoil stockpile, up gradient of sediment control				

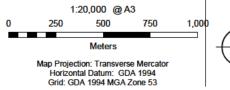


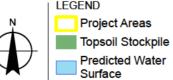
City ID		linates	Туре	Description	Sample Frequency	
Site ID	Easting	Northing			Baseline	Operation
SSB04			Impact-	Downgradient of Eastern WRD	-	(Note: A sediment sample should only be used to infill a surface water sample event post rainfall. consecutive sediment samples are not required to be taken.)
SSB05			Impact-	Mine Facilities		
SSB06			Impact-	West WRD		
SSB07			Impact	East WRD		
SSB08			Impact-	TSF/RSF Event Pond		
SSB09			Impact-	Accommodation		

#### Notes

- 1: Coordinates are the same as the surface water and stormwater sampling locations, actual locations should mirror the surface water / stormwater sampling locations as sediment is used as an alternative monitoring method.
- 2: Sediment site IDs should be noted on the survey points in brackets for reference during sampling.
- 4: If concentrations are noted at boundary monitoring locations, additional down gradient locations should be assessed and installed as appropriate.
- 5: During the operational period, the monitoring schedule should be reviewed annually to focus on any potential trends of operationally impacts.







- Mine Infrastructure Mine Access Roads

Stage 1

**Diversion Channel** Stage 2 Sediment Control **Diversion Channel** 

Waterways

Sediment Sampling Location

Note: Total number and locations TBD through the LOM



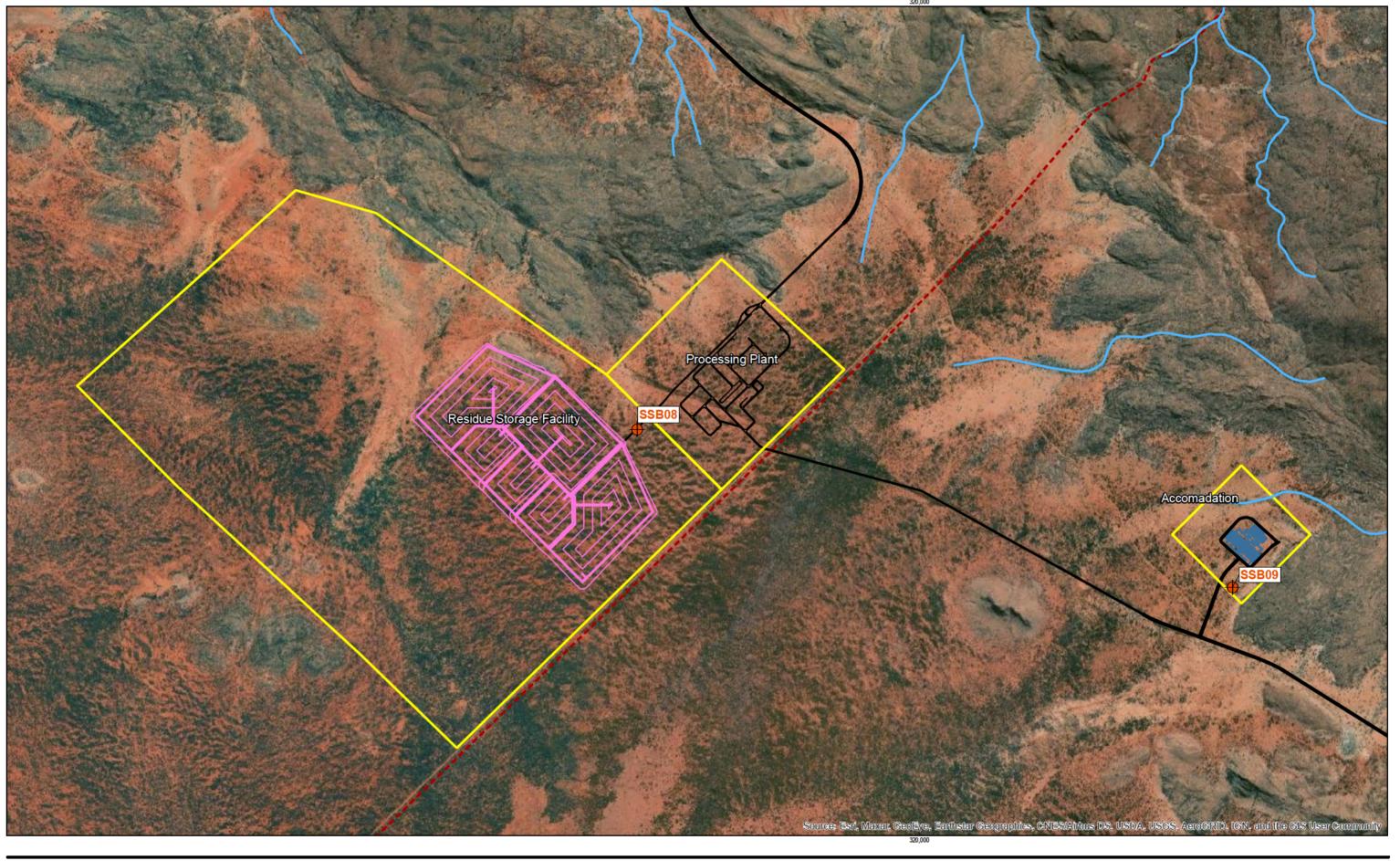
Mine Management Plan

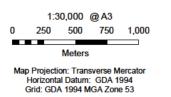
Revision Date

22 Jul 2021

Proposed Mine Site **Sediment Monitoring Locations** 

Figure 2-1







LEGEND

Project Areas —— Processing Plant Roads —— Mine Access Roads — Accommodation Village — Major Roads Residue Storage Facility --- Gas Pipeline

Sediment Sampling Location Note:

Total number and locations TBD through the LOM



Arafura Resources Limited Mine Management Plan

Revision Date

Job Number | 12515982 22 Jul 2021

Proposed Processing Site and Accommodation **Sediment Monitoring Locations** 

Figure 2-2





#### 3.0 SEDIMENT SAMPLING PROCEDURE

#### 3.1 Field Measurements

Sediment sampling is to be undertaken in accordance with the following:

- Photographs
  - Photographs of the sample location, upstream and downstream should be taken.
     Photographs to be logged into a filing system indicating site location and date.
- Ground Conditions
  - Summarise all ground conditions at the sampling location including the presence or absence of water, direction and volume of flow.
  - Areas of discoloured sediments, polluted water, affected plant growth and animal populations (aquatic) and odours should be identified and mapped.
  - Undertake a qualitative assessment of sediment loss or deposition that has occurred since the previous sampling event.

#### 3.2 Sample Collection

Sediment samples are composite samples including five sub samples across the primary drainage channel. The collection of sediment samples will be undertaken in accordance with the following:

- Rinse spade and mixing bucket with Decon N to decontaminate;
- Scrap away any organic surface matter
- Sample Collection
  - Apply nitrile gloves and collect five 2 kg subsamples across the primary drainage channel. The sample should be collected from surface to a maximum depth of 150 mm.
  - Combine and mix the subsamples thoroughly within the decontaminated bucket and sieve through a 3 mm stainless steel sieve into a second bucket.
  - If sample is dry, sieve through a -80 mesh (180µ) sieve and collect about 200-500 gms of fine material. If sample is damp it may need to go to site laboratory for drying prior to final -80 mesh sieve.
  - Place sieved sediment into sample bag, record details on bag etc. for dispatch.
- Waste Disposal
  - Excess sediment will be returned to ground at the side of the creek and all used disposable sampling equipment should be stored for disposal at the Processing Site; and
- Electronic Transfer
  - All sediment quality results, duplicate locations and Chain of Custody (CoC) are to be scanned and kept on file.



#### 3.3 Sample Dispatch

Sediment samples have potential to deteriorate following collection. Samples are to be placed into onsite fridge pending dispatch to laboratory. At completion of the sampling round, samples are to be packaged and transferred to Alice Springs haulage depot. Samplers are to contact the haulage companies and laboratory to inform them of sample delivery.

The sampler is to inform the laboratory of sample postage and provide a completed Chain of Custody (CoC). A blank CoC is provided in Appendix A.



**CHAIN OF CUSTODY FORM** 

**APPENDIX A** 

#### CHAIN OF DIRELBOURNE 2-4 Westall Road Springvalls VIC 5171 Ph: 03-8549 9600 E: semples melbourne@aligibbal.com □BRISBANE 32 Shand Street Stafford QLD 4063 Pit: 07 3243 7222 E: samples brisbane@alegiobal.com CUSTODY DNOWRA 4/13 Gaary Place North Novee NSW 2541 Pt: 024423 2083 E: nove@pileplobal.com DTOWNSVILLE 14-15 Deama Court Boble QLD 4818 Ptr: 07 4796 0500 E: townssville environmental-galagiobal.com ALS Laboratory: DGLADSTONE 48 Callemondah Drive Clinton QLD 4880 Ph: 07 7471 5600 E: gladstone@alegiolosi.com DMUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee mail@alegiobal.com EPERTH 10 Hod Way Malaga: WA 6000 Ph: 08 9209 7656 E: samples perth@alagiobal.com EWOLLONG ONG 99 Kenny Steet Wollangong NSW 2500 Ph: 02 4225 3125 E: sorlventile@alliglobal.com Environmental please tick FOR LABORATORY USE ONLY (Circle) CLIENT: TURNAROUND REQUIREMENTS: ☐ Standard TAT (List due date): Standard TAT may be longer for some tests OFFICE: □ Non Standard or urgent TAT (List due date): e.g.. Ultra Trace Organics) Free lice / frozen lice bricks present upon Yes PROJECT: ALS QUOTE NO .: COC SEQUENCE NUMBER (Cirole) No N/A ORDER NUMBER: COC: 1 2 3 4 6 8 7 Random Sample Temperature on Receipt PROJECT MANAGER: CONTACT PH: Or: 1 2 3 4 6 8 7 Other comment: SAMPLER: SAMPLER MOBILE: RELINQUISHED BY: RECEIVED BY: RELINQUISHED BY: RECEIVED BY: EDD FORMAT (or default): COC emailed to ALS? (YES / NO) Email Reports to (will default to PM if no other addresses are listed): DATE/TIME: DATE/TIME: DATE/TIME: DATE/TIME: Email Invoice to (will default to PM if no other addresses are listed): COMMENT \$/\$PECIAL HANDLING/\$TORAGE OR DISPOSAL: ANALY 818 REQUIRED Including SUITES (NB. Suite Codes must be listed to attract suite price) CONTAINER INFORMATION Additional Information Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle MATRIX: SOLID (S) WATER (W) USE TYPE & PRESERVATIVE comments on likely contaminant levels. (refer LAB ID SAMPLE ID DATE / TIME diutions, or samples requiring specific QC nalysis etc.

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORG = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Artireight Unpreserved Plastic; F = Formaldehyde Preserved AV = SG = Sulfuric Preserved AV = SG = Sulfuric Preserved AV = Formaldehyde AV = Formaldehyd