



**JANDRA QUARRY**

**STATEMENT**

**OF**

**ENVIRONMENTAL EFFECTS**

**for**

**The Enlargement of an Overburden**  
**Emplacement Area**

**June 2002**



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## Chapter 1

# INTRODUCTION

### 1.1 BACKGROUND

CSR Limited trading as CSR Readymix (referred to below as CSR) purchased Jandra in 1996 and commenced full-scale production in early 1997. Following additional land acquisitions the existing site is now described as Lot 2, DP 255,621 and Lots 10, 11, 12, 13, 14, and 15 in DP 790,056. It is located approximately 18km south of Taree on the mid-north coast of New South Wales. The present operation crushes and screens quality hard rock and provides a pre-coating facility for sealing aggregates. Regional and locality maps of existing quarry operations are shown in *Figure 1.1* and *Figure 1.2* respectively.

CSR applied for an extension to the extraction area of the original quarry in an Environmental Impact Statement (EIS) submitted to the Department of Urban Affairs and Planning on 26 October 1999 (DA N° 231-10-99). The Minister of Urban Affairs and Planning granted approval to the quarry extension on 30 March 2000 (File N° G92/00678), see Appendix 10.

The 1999 application failed to address an area of 3.1 hectares required for the emplacement of overburden.

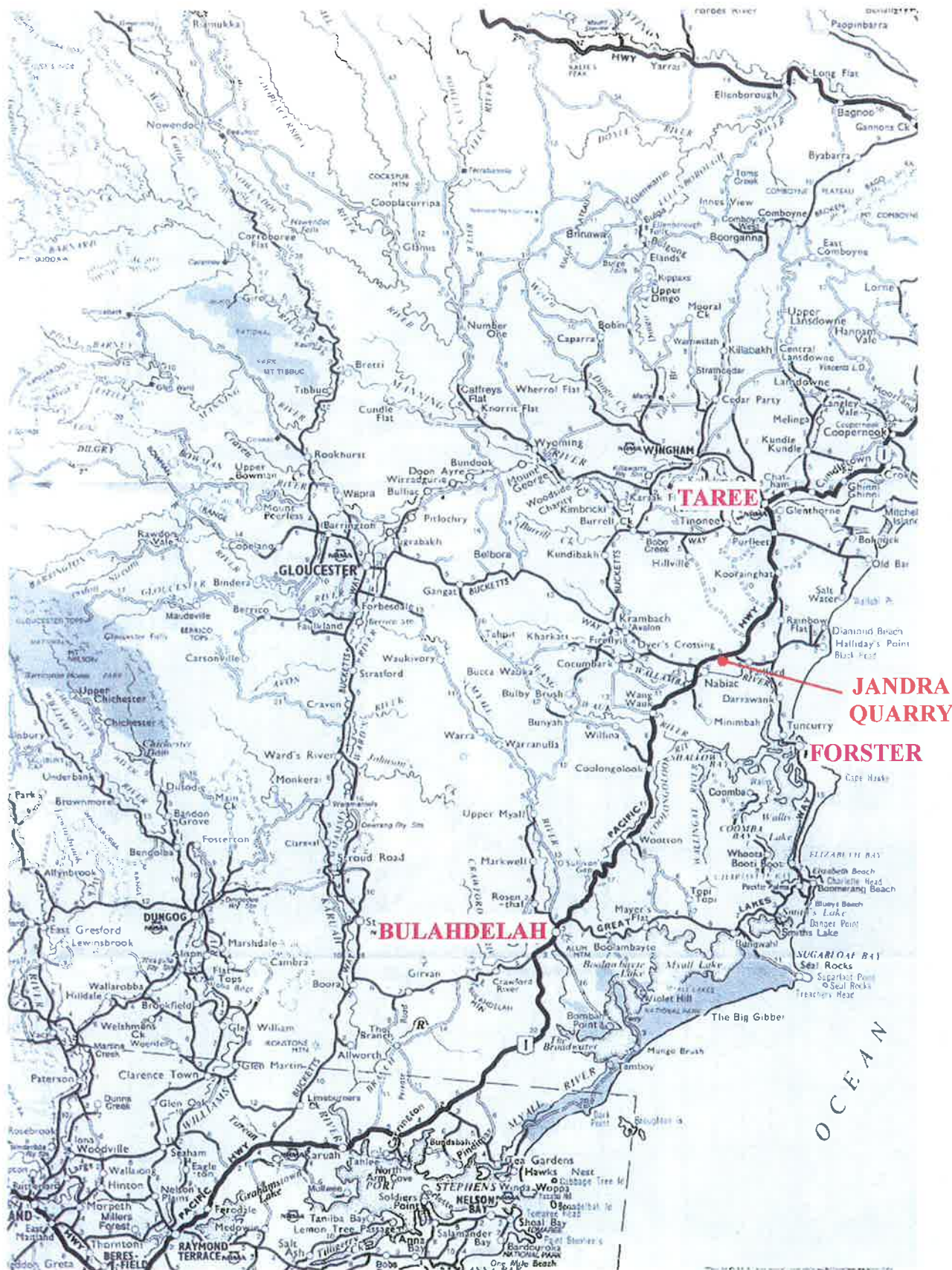
This application seeks to allow the quarry to continue the extraction of the available resource. This application proposes to modify CSR's current operating conditions by gaining approval to remove 2.2 hectares of vegetation for the construction of an overburden emplacement area, enlarging the existing area to 3.1 hectares.

This Statement of Environmental Effects (SEE) sets out CSR's proposed development and provides an assessment of potential impacts in terms of physical, biological and human interactions with the existing environment. Environmental management procedures and mitigation measures that would minimise potential impacts are provided.

### 1.2 THE NEED FOR AN OVERBURDEN EMPLACEMENT

Geological investigations have shown that there are some 16.5 million tonnes of fresh rock available for extraction, with an additional 3.6 million tonnes of weathered rock suitable for blending in road base products overlying the fresh rock.

Weathered rock must be removed to access the underlying fresh rock. Fresh rock is used in products such as concrete aggregate, asphalt and sealing aggregate as well as in specification road bases.



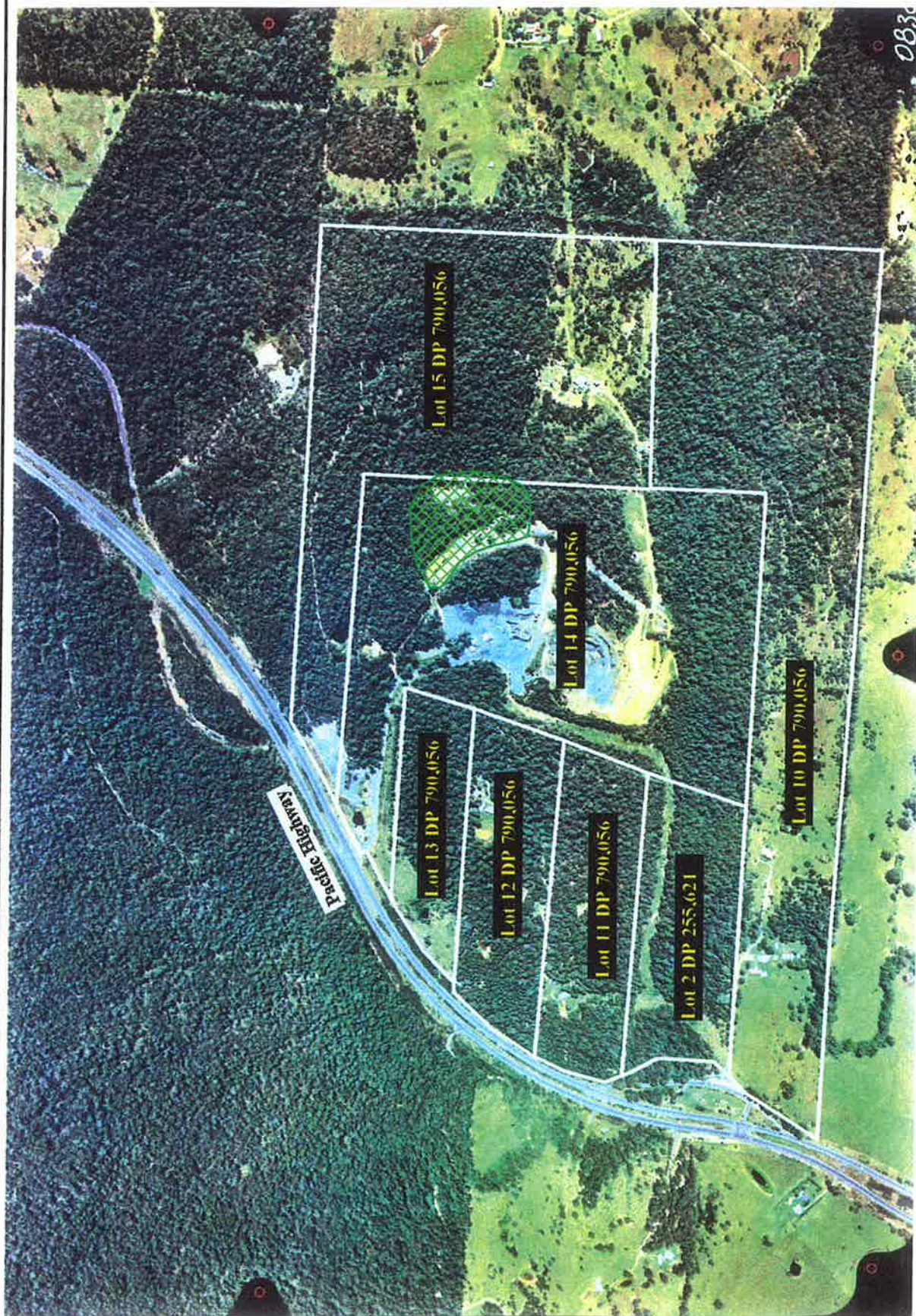
**CSR Readymix**

**Jandra Quarry  
Locality Map  
Figure 1.1**

Figure 1.1 - Locality Map.dsf

Not to Scale. Taken from NRMA Lower North Coast District Map July 1994.





Application Area



CSR Readymin  
Site Photo -- Jandra Quarry  
Property Details  
Figure 1.2



The overlying weathered rock must be removed to access the fresh rock. Quarry operators endeavour to sell all materials extracted from the site. Ideally sales for products containing weathered rock and fresh rock products balance with the requirements to remove the weathered rock overlying the fresh rock. However, from time to time additional weathered rock must be removed to expose fresh rock at rates that do not allow disposal of weathered rock into the market. When this occurs weathered rock must be disposed of on site and away from the hard rock resource.

This application seeks approval to dedicate 3.1 hectares of land to an overburden (weathered rock) emplacement site.

Jandra Quarry is *Regionally Significant* as defined by the Department of Mineral Resources due to its supply into more than one local government area. The quarry currently supplies aggregate south beyond Bulahdelah in the Great Lakes local government area (LGA) and north into the Hastings LGA. The quarry is also listed as *Regionally Significant*, by the North Coast Extractive Industries Standing Committee (DUAP, 1999).

Under a direction of the Minister of Urban Affairs and Planning (gazetted on 3 September 1999) the quarry is a *State Significant* development as the quarry is *Regionally Significant*, has reserves of over five million tonnes and its production level is over 200,000 tpa.

A modification to the consent to allow the proposed overburden disposal area will allow this regionally and state significant operation to maintain uninterrupted extraction of quality hard rock.

### **1.3 PURPOSE OF THIS SEE**

This SEE has been prepared by CSR to accompany an application to Planning New South Wales (PNSW) for a modification to the consent under Section 96(2) of the Environmental Planning and Assessment Act, 1979.

An application is being made under Section 96(2) of the Act because the development as modified will be substantially the same development as the approved development.

## **1.4 OBJECTIVES OF THE PROPOSAL**

The objectives of the proposal are:

- ❑ to gain approval for a 3.1 hectare overburden disposal area;
- ❑ to modify the current conditions of consent to accommodate the overburden emplacement area;
- ❑ to facilitate the uninterrupted supply of high quality hard rock material to local and regional market, and,
- ❑ to conform with the requirements of relevant statutory authorities in the development of the overburden emplacement area.

## **1.5 CONSULTATION WITH REGULATORY AUTHORITIES**

### ***1.5.1 Consultation with Planning New South Wales***

CSR consulted PNSW regarding the form of this application. Presented in Appendix 1 of this application is a copy PNSW's advice to CSR dated 22 June 2001. A modification to the consent as proposed requires the compilation of a Statement of Environmental Effects addressing PNSW's stated concerns.

\* \* \*

## Chapter 2

# PLANNING CONTEXT

### 2.1 OVERVIEW

This section details planning legislation and regulations applicable to the project.

The EP&A Act is the overriding planning legislation. Subordinate legislation derived from the EP&A Act includes:

- State Environmental Planning Policy No 44 – Koala Habitat Protection.

The Threatened Species Conservation Act 1995 (TSC Act) is relevant to this development.

The proposal has also been assessed against the Commonwealth Environment Protection and Biodiversity Conservation Act 2000.

### 2.2 STATE SIGNIFICANT DEVELOPMENT

The Minister determined the 1999 development consent because it was a “State Significant Development”. State Significant Development is defined by Section 76A(7) of the EP&A Act 1979.

State Significant Developments are defined as:

*“An extractive industry, if in the opinion of the consent authority:*

- 1. the resource has been identified as being of State or regional significance in a strategic plan adopted by the Director-General; or,*
- 2. the total resource (the subject of the development application) is greater than 5 million tonnes; or*
- 3. the proposed extraction rate is greater than 200,000 tonnes per annum; or*
- 4. the project is to be located in an “environmentally sensitive area of State significance.”*

This proposal, to establish an overburden emplacement area of 3.1 hectares (2.2 hectares of vegetation disturbance) will not change any aspect of the operation previously assessed and approved in 1999. The operation remains a State Significant Resource.

Pursuant to Section 76A(9) the Minister is the consent authority for this consent modification.

## **2.3 STATE ENVIRONMENTAL PLANNING POLICIES**

SEPP 44 (Koala Habitat Protection) came into force on 13 February 1995 and is required to be considered under section 79C of the EP&A Act. SEPP 44 aims to:

*“encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline.”*

SEPP44 applies to the development consent modification application because the land area to be disturbed is greater than one hectare. SEPP44 details a process to assess the value of the koala habitat. A further assessment is required to determine whether the land constitutes “core koala habitat”. If “core koala habitat” is deemed to occur then further procedures are required to determine whether development consent can be granted.

An assessment relevant to SEPP44 is contained in Appendix 2.

## **2.4 NATIVE VEGETATION CONSERVATION ACT 1997**

The Native Vegetation Conservation Act came into force on 1 January 1998.

Clause 12(f) of the NVC Act states that the Act does not apply to: *“any clearing that is, or that is part of, designated development within the meaning of the EP&A Act”*.

This proposal relates to the modification of a designated development and therefore the Native Vegetation Conservation Act does not apply.

## **2.5 GREATER TAREE LOCAL ENVIRONMENTAL PLAN 1995**

CSR own land described as Lot 2, DP 790,056 and Lots 10, 11, 12, 13, 14 and 15 in DP 790,056. The Site is zoned Rural 1(a) under the Greater Taree LEP 1995 – extractive industries and ancillary uses are permitted with development consent.

Under LEP 1995 it is relevant to assess land rehabilitation and protection of the amenity of the locality when assessing this modification to the existing consent.

\* \* \*



## Chapter 3

# THE PROPOSED DEVELOPMENT

### 3.1 GENERAL SITE OVERVIEW

CSR Ltd purchased the Jandra quarry site in May 1996 and, after establishing a crushing and screening plant, began production and sales during November 1996.

The site was granted approval for the operation of a hard rock quarry in 1991. In 1995 another development application was lodged to increase production from 50,000 tpa to 150,000 tpa. Approximately 5 hectares was available for extraction.

During 1999 approval was granted to increase production to an annual average of 250,000 tpa over an area of extraction of approximately 16 hectares. The 1999 approval also allowed for the extension of the product stockpile storage areas, the installation of a pug-mill and asphalt plant, the relocation of the weighbridge and the location of road transport vehicles to the site.

At the time of purchase the company acquired approximately 109 ha. Further land acquisitions have taken place to provide a buffer around the quarry. The most recent being Lot 10, DP 790,056 (the YALA property) on the southern side of the quarry. This property was purchased in March 2002. Some site plans in the Appendices were completed prior to acquiring this property and will therefore not show Lot 10 as CSR property. The land holding is now in the order of 157.8 hectares (see *Table 3.1* and *Figure 1.2*).

<i>Table 3.1</i>		PROPERTY DETAILS	
Lot	DP	Parish	Size in Hectares
Lot 2	DP 255,621	Parish of Beryan	9.734
Lot 10	DP 790,056	Parish of Beryan	40.43
Lot 11	DP 790,056	Parish of Beryan	11.62
Lot 12	DP 790,056	Parish of Beryan	9.516
Lot 13	DP 790,056	Parish of Beryan	6.292
Lot 14	DP 790,056	Parish of Beryan	40.05
Lot 15	DP 790,056	Parish of Beryan	40.21
<b>Total</b>			<b>157.852</b>

All land is within the County of Gloucester and the Greater Taree City Council area.

### 3.2 PROPOSED DEVELOPMENT

The approval granted during 1999 did not account for the need to dispose of overburden during the life of the development.

The overlying weathered rock must be removed to access the fresh rock. Quarry operators try to sell all materials extracted from the site. Ideally sales of product containing weathered rock should allow weathered rock to be removed and sold at such a rate that the underlying fresh rock can be accessed.

From time to time additional weathered rock must be removed to expose fresh rock at rates that do not allow disposal of weathered rock into the market. When this occurs weathered rock must be disposed within the quarry site. Good quarrying practice demands that this material is not dumped on top of the hard rock resource. A site off the rock resource must be found.

CSR proposed to clear 2.2 hectares of trees in order to expand an existing overburden emplacement area. The existing overburden emplacement area covers 0.9 hectares of land.

This application is seeking to modify the existing development consent to:

- Permit clearing of 2.2 hectares of trees in order to enlarge an existing overburden emplacement area thus enlarging the existing overburden emplacement area to 3.1 hectares (currently 0.9 ha).

The proposal does not alter any aspect of the existing quarrying operation addressed in the previous EIS – production levels and environmental management strategies all remain the same. Essentially the removal of 2.2 hectares of vegetation and the emplacement of overburden in this expanded area is the only change to the operation.

Much of the information provided in this SEE is directly referenced from, and in accordance with, the information presented in the EIS for the site entitled, “*Jandra Quarry Extension – Environmental Impact Statement – Main Report*”, dated October 1999 prepared by ERM Australia Pty Limited.

### 3.3 PROPOSED DEVELOPMENT METHODOLOGY

The overburden emplacement area, the subject of this application and referred to as “*The Site*” comprises 2.2 hectares of vegetation and 0.9 hectares of disturbed ground (already utilised for overburden emplacement). It is proposed to progressively remove the 2.2 hectares of vegetation and commence overburden placement from the base of the hill. Vegetation will be removed using a D8 or equivalent bulldozer.

Overburden material will be transported from the upper benches of the quarry using the existing off-road dump trucks and placed within the *Site*. Material will be dumped and pushed into place using a Caterpillar 988 loader or equivalent. The placement area will be constructed in 5 metre “lifts” and provide for a 5 metre wide berm separating each lift to allow access of tree planting and maintenance. The angle of batter between benches will be no steeper than 1 in 2. Water will not be allowed to pond on the structure but will be drained around the structure’s contour (see Figure 3.1).

CSR may return to the overburden emplacement and remove material from time to time for use in road gravel products, sale as fill or for rehabilitation use.

### ***Phase 1 – Vegetation Removal***

Vegetation will be cleared progressively using a D8 or equivalent bulldozer. Loggable timber will be sold to a mill. Wherever possible, selected foliage and branches from cleared vegetation will be placed immediately on rehabilitation areas. When no rehabilitation areas are available, removed vegetation will be windrowed at the periphery of the disturbed area, adjacent to future rehabilitation areas.

### ***Phase 2 – Topsoil Removal***

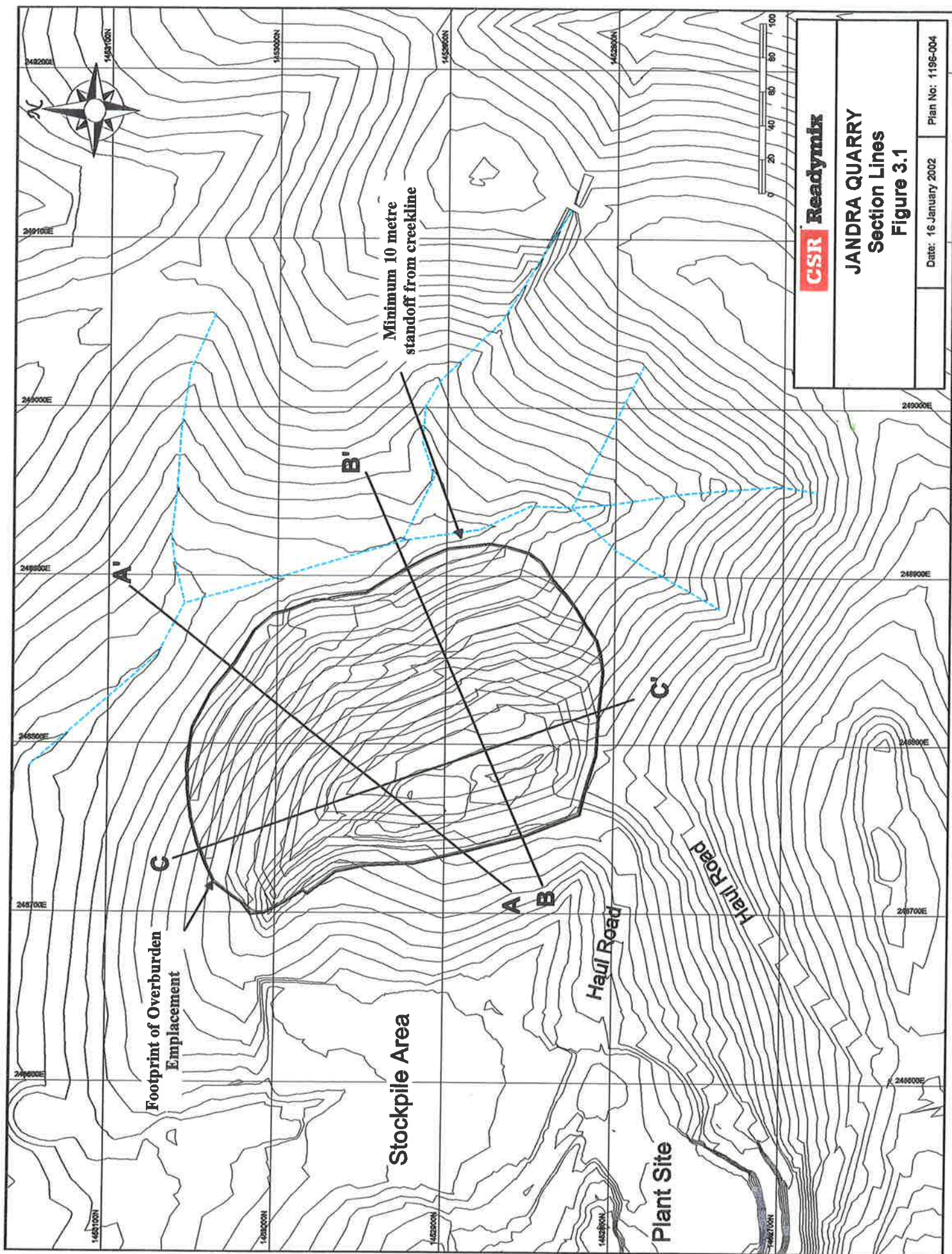
Topsoil will be stripped using a D8 dozer (or equivalent). Where possible, stripped topsoil will be immediately re-spread on rehabilitation areas to optimise regeneration of naturally occurring seed stock.

Where immediate re-spreading is not possible, topsoil will be stockpiled in the overburden stockpile area. Topsoil stockpiles will be constructed 1.5 metres high with 1 (vertical): 3 (horizontal) batters and will be vegetated to protect the material which will be used in subsequent rehabilitation. When possible, topsoil stockpiles will also be protected by windrowed vegetation.

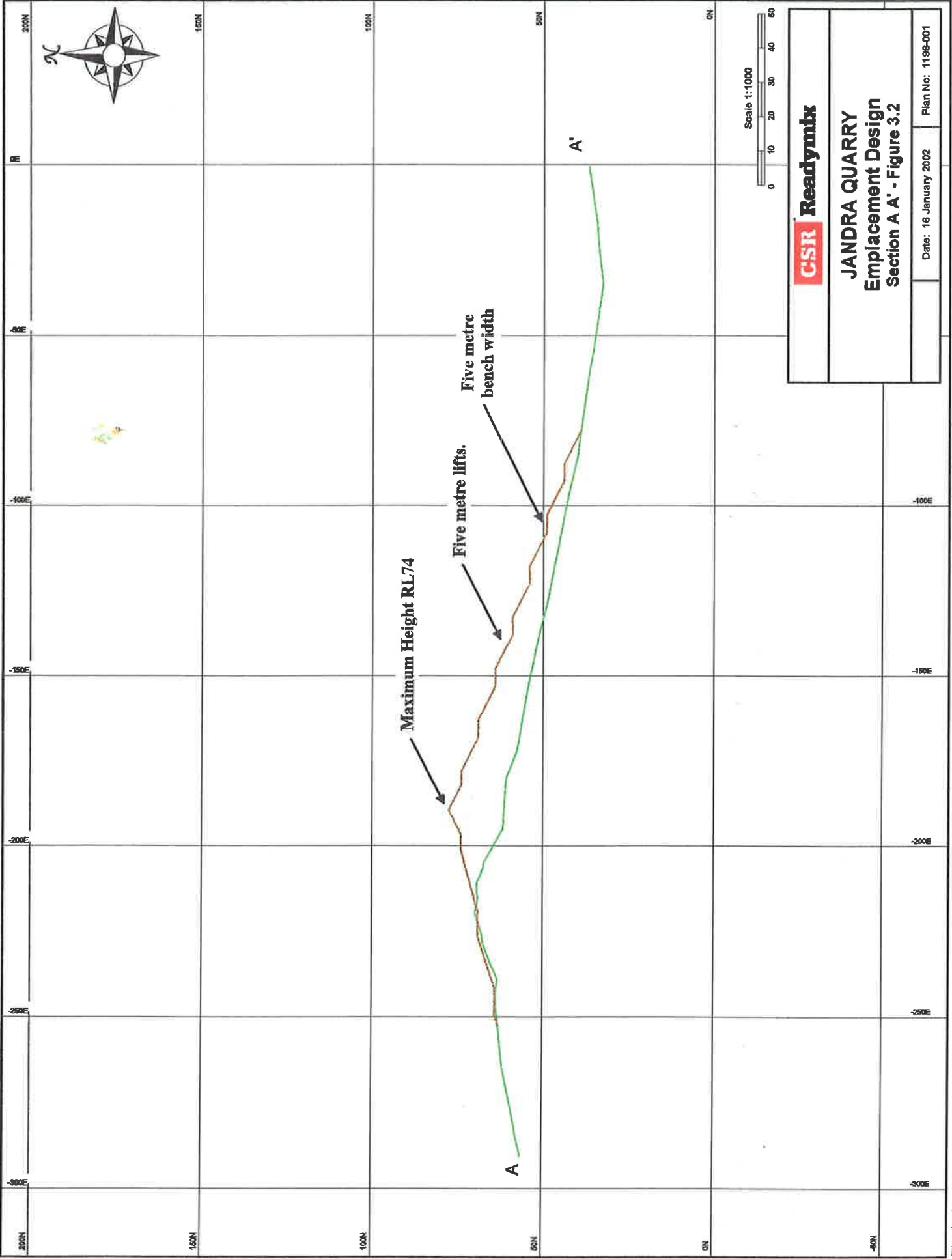
Sediment control for the overburden stockpile area will include the use of geofabric filter fences and be undertaken in accordance with existing environmental protection procedures in place at the site (see Appendix 4).

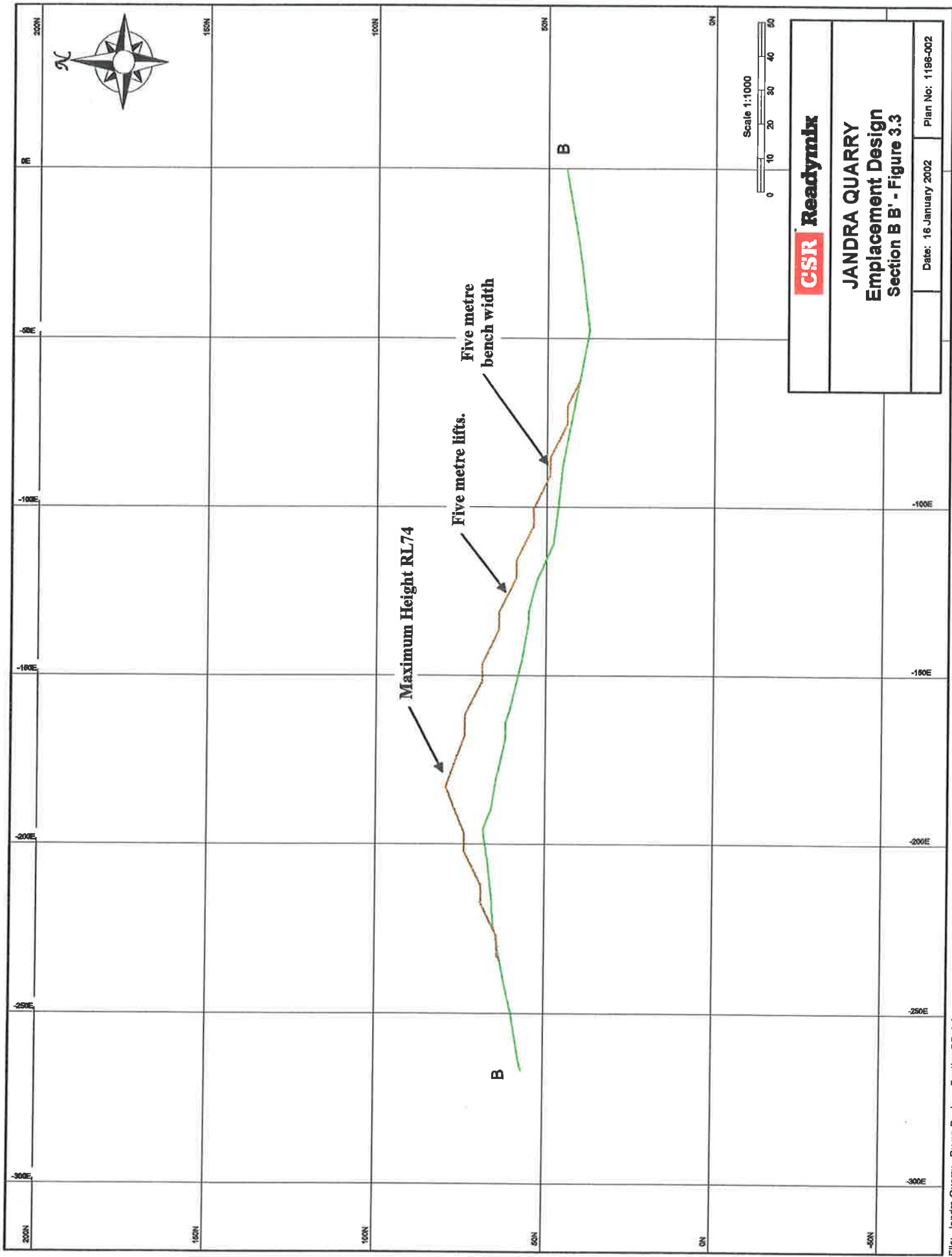
## **3.4 HOURS OF OPERATION**

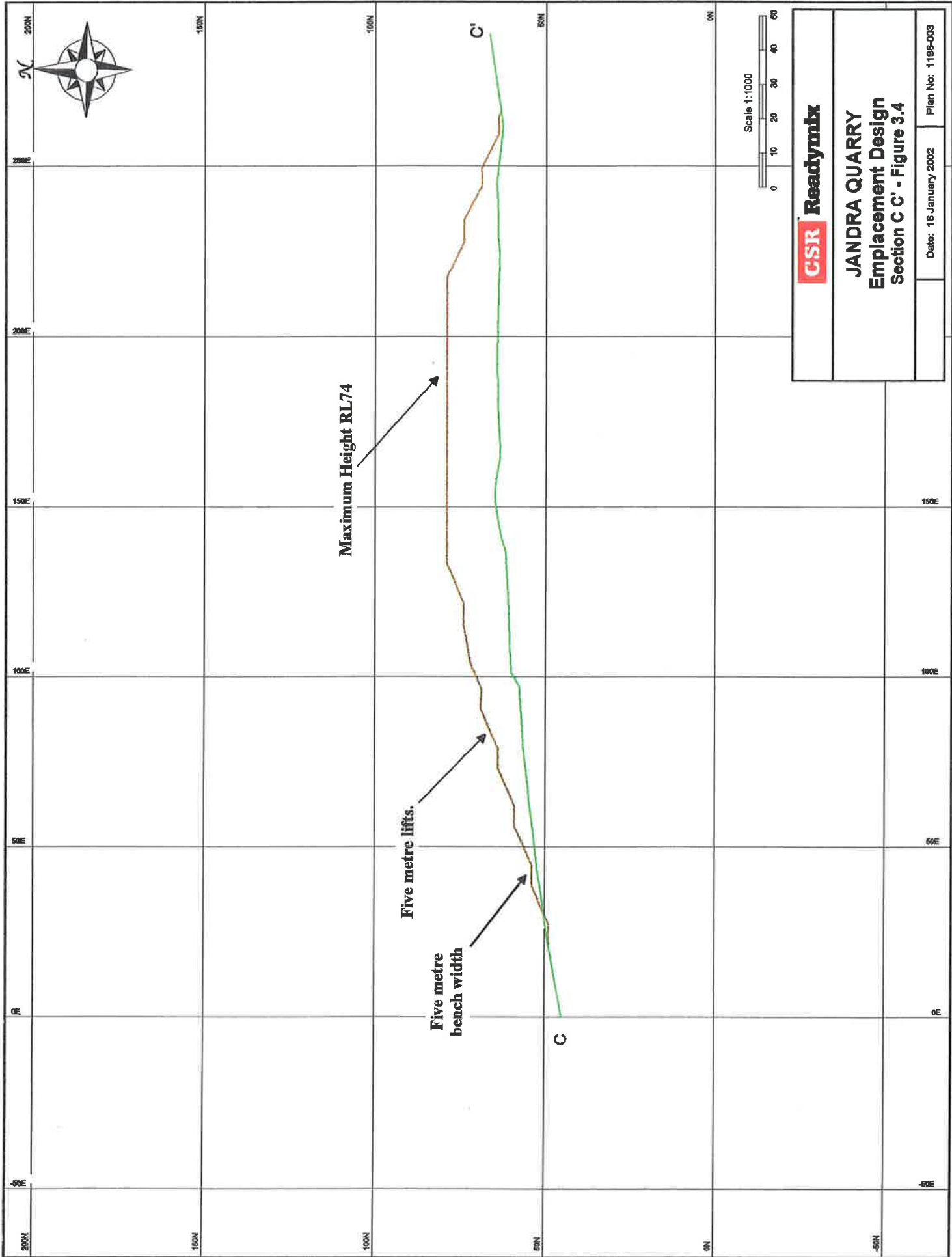
Stockpiling will only occur during the approved hours of quarry operation, that is, Monday to Friday 6.00 am and 6.00 pm and Saturdays 6.00 am to 3.00 pm.











Scale 1:1000

**CSR** Readymix

**JANDRA QUARRY  
Emplacement Design  
Section C C' - Figure 3.4**

Date: 16 January 2002      Plan No: 1196-003

### 3.5 EROSION AND SEDIMENT CONTROL

Erosion and sediment control will be achieved in four ways:

- Diversion of clean water runoff from the *Site*,
- Collection and treatment of stormwater flows from disturbed areas;
- Temporary and permanent rehabilitation of disturbed areas of high erosion potential, and,
- Control of soil erosion at source using suitable control measures.

The potential for erosion and sediment movement will be moderate for the duration of the development with an ongoing potential for sediment movement from working overburden berms.

To control erosion and sediment movement and protect the off-site environment the following measures will be used:

- Utilisation of the existing Soil and Water Management Plan for the site included in the Environment Management Plan (see Appendix 3) and will be carried out in accordance with Section 1 of the Site's Environmental Protection Procedures (EPP's), see Appendix 4;
- Use of a sedimentation control dam (Dam 2 on Figure 4.3);
- Diversion of clean water from undisturbed areas around working areas;
- The installation of temporary erosion and sediment controls, such as geo-fabric filter devices, prior to commencement of vegetation and topsoil removal;
- The regular maintenance of erosion and sediment control structures, particularly after rainfall, to ensure their efficiency (see Section 1 of Appendix 4).

The location of the permanent sediment control dam is shown on *Figure 4.3*.

### 3.6 REHABILITATION

The overburden landform will be progressively rehabilitated. Construction of the disposal area will commence at the base of the hill and progress upwards.

Stockpiled topsoil will be progressively placed on completed areas with a revegetation program to establish endemic plant species.



This will be done in accordance with the principles detailed in the Landscape and Rehabilitation Plan included Section 5 of Jandra Quarry Environmental Management Plan (see Appendix 3) and Section 3 of the EPP's in Appendix 4.

\* \* \*

## Chapter 4

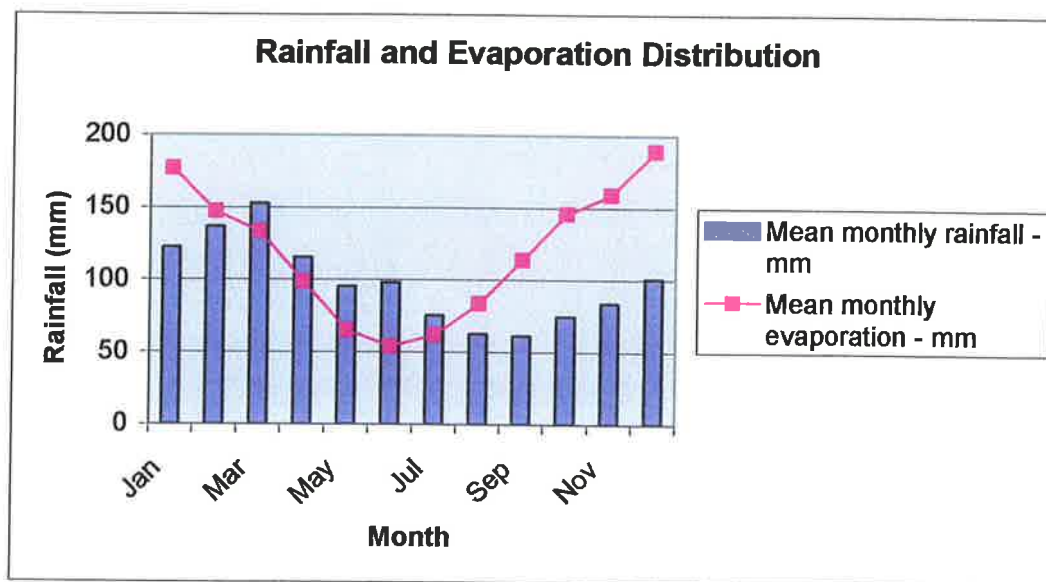
# INTERACTIONS WITH THE PHYSICAL ENVIRONMENT

### 4.1 CLIMATE<sup>1</sup>

#### 4.1.1 Rainfall

Meteorological data was gathered from the Bureau of Meteorology's internet site and is current as of 5 February 2002 (see Appendix 5). The nearest official meteorological station is Taree and is defined as Station 060030 "TAREE (RADIO STATION 2RE)". Readings commenced in 1881 and the information is current. Latitude (deg S) 31.8986 and Longitude (deg E) 152.4834 – the site is approximately 18 kilometres of the study area. Wind data was gathered at Taree Airport.

Figure 4.1 below shows the mean monthly rainfall distribution and mean monthly evaporation.

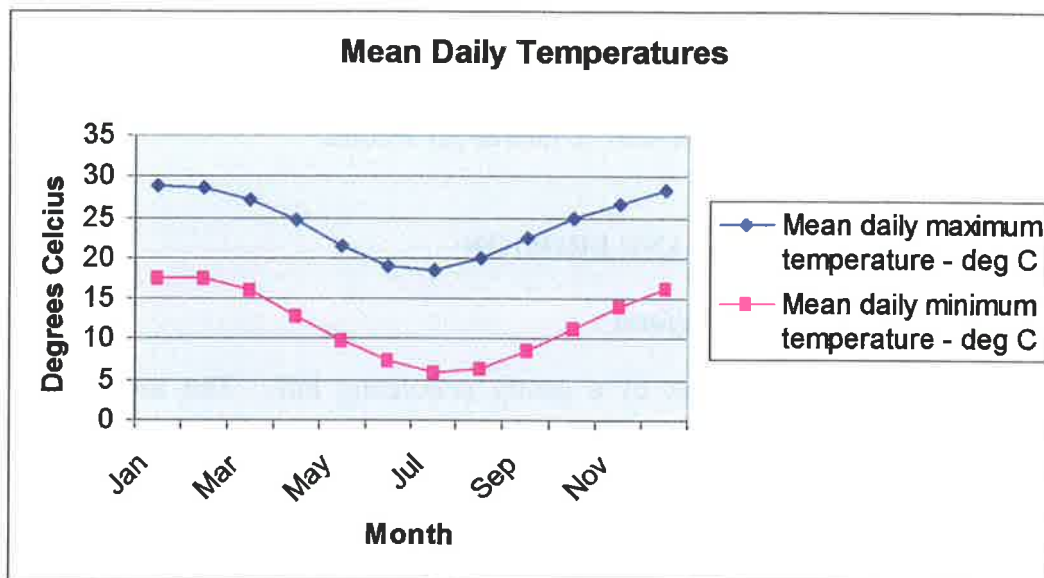


#### 4.1.2 Temperature

Figure 4.2 shows the mean daily temperatures recorded at Taree. The highest temperatures are reached during the summer months and average 28.6°C respectively, while the average minimum temperatures during summer is 17.1°C.

<sup>1</sup> Sourced from the Bureau of Meteorology internet site.

The coolest month is July with an average maximum temperature of 18.4°C and an average minimum temperature of 5.9°C.



#### 4.1.3 Wind<sup>2</sup>

Wind roses are presented in Appendix 5. The information was gained from the Bureau of Meteorology and is based on readings taken at the nearest official meteorological station at the 2RE Taree weather monitoring station.

These records show that prevailing morning winds in the area are from the west and southwest throughout the year, and average less than ten (10) kilometres per hour.

Prevailing afternoon winds are from the northeast to southeast throughout Spring, Summer and Autumn with west to south-west winds prevailing during Winter afternoons.

During summer, morning winds are erratic, however they generally originate in the west, with the wind speed typically being less than 10 metres per second, as well as sea breezes from the north-east, again being less than 10 metres per second. In the afternoon, the winds are predominantly sea breezes from the southeast and are typically less than 10 metres per second.

During autumn, morning offshore winds are typically less than 15 metres per second from the west. In the afternoon, south-westerly winds prevail and rarely exceed 15 metres per second.

<sup>2</sup> Sourced from the Bureau of Meteorology February 2002.

In winter, offshore westerly winds predominate in the morning. Wind speed generally reaches a maximum of 18 metres per second. In the afternoon, the winds are predominately offshore and are generally less than 18 metres per second.

In spring, morning offshore winds are typically less than 10 metres per second from the west. In the afternoon the winds are predominately sea breezes from the southeast and are typically less than 10 metres per second.

## **4.2 SOILS, LANDFORM AND EROSION**

### ***4.2.1 Topography and Landform***

The *Site* comprises the flank of a gently undulating hill. The hill slopes at approximately 12° and rises from 38 metres AHD to 68 metres AHD.

Within the quarry site, elevations range from 20 metres AHD to 115 metres AHD. The slopes range from 4° on the lower elevations up to 45° degrees on the upper slopes.

### ***4.2.2 Soils<sup>2</sup>***

Soil parameters that are relevant to the proposal include:

- Suitability for rehabilitation – not all soil material is suitable for rehabilitating disturbed areas. The suitability of the available soils for this purpose has been assessed by both field and laboratory analysis, and,
- Erosion potential – the implications of exposing the soil to erosive forces have been examined. This has been determined from observations in the field and following laboratory analysis.

During the preparation of the EIS a site assessment was undertaken during which existing cuttings were inspected and the profiles from three soil bores were examined. Soil sample from two soil horizons in each borehole were collected and taken for analysis (total of six samples). The soil overlying the Jandra property was found to have moderate erosion potential, being mildly to moderately dispersive. Generally, consideration must be given to erosion control over the site. The analysis also indicates the soils have good rehabilitation potential. The results of the laboratory analysis are contained in *Appendix 6*.

Generally, the topsoil layers were found to be suitable for rehabilitation. The topsoil can be used for revegetation purposes subject to the following factors:

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<sup>2</sup> Taken from the Jandra Quarry EIS, 1999.



- ❑ *Depth of stripping:* generally only the surface soil to a maximum depth of 60 centimetres is suitable for direct transfer to rehabilitation area. Soil below this depth is less suitable due to high rock content and may require additional treatment to increase its organic matter content and nutrient status prior to supplementing the topsoil stocks; and
- ❑ *Stockpiling:* the structure of strippable topsoil material, while good in a natural state, is often dependent on the existing root mass holding the mass together. Therefore, it will be necessary for this organic matter to be retained within the soil during the stripping operation and for stockpiled materials to be sown with suitable cover crops to reduce the leaching of nutrients, and to enhance the retention of organic matter and the subsequent binding effect of the root mass.

### **4.3 SURFACE AND GROUNDWATER**

#### **4.3.1 Catchment Description**

The *Site* is located at the head of a minor creek line that flows northward crossing the Pacific Highway before joining a creek that flows southwest to Talawahl Creek. Talawahl Creek flows to Bungwahl Creek, which in turn flows into the Wallamba River.

The proposed overburden stockpile area will occupy a footprint of 3.1 hectares of which approximately 0.9 hectares is already disturbed. The proposed disposal area increases the disturbed areas primarily within the same creek catchment currently affected by the operation.

Downstream of the creek comprising the catchment area of the proposed overburden disposal site is a small in-stream dam.

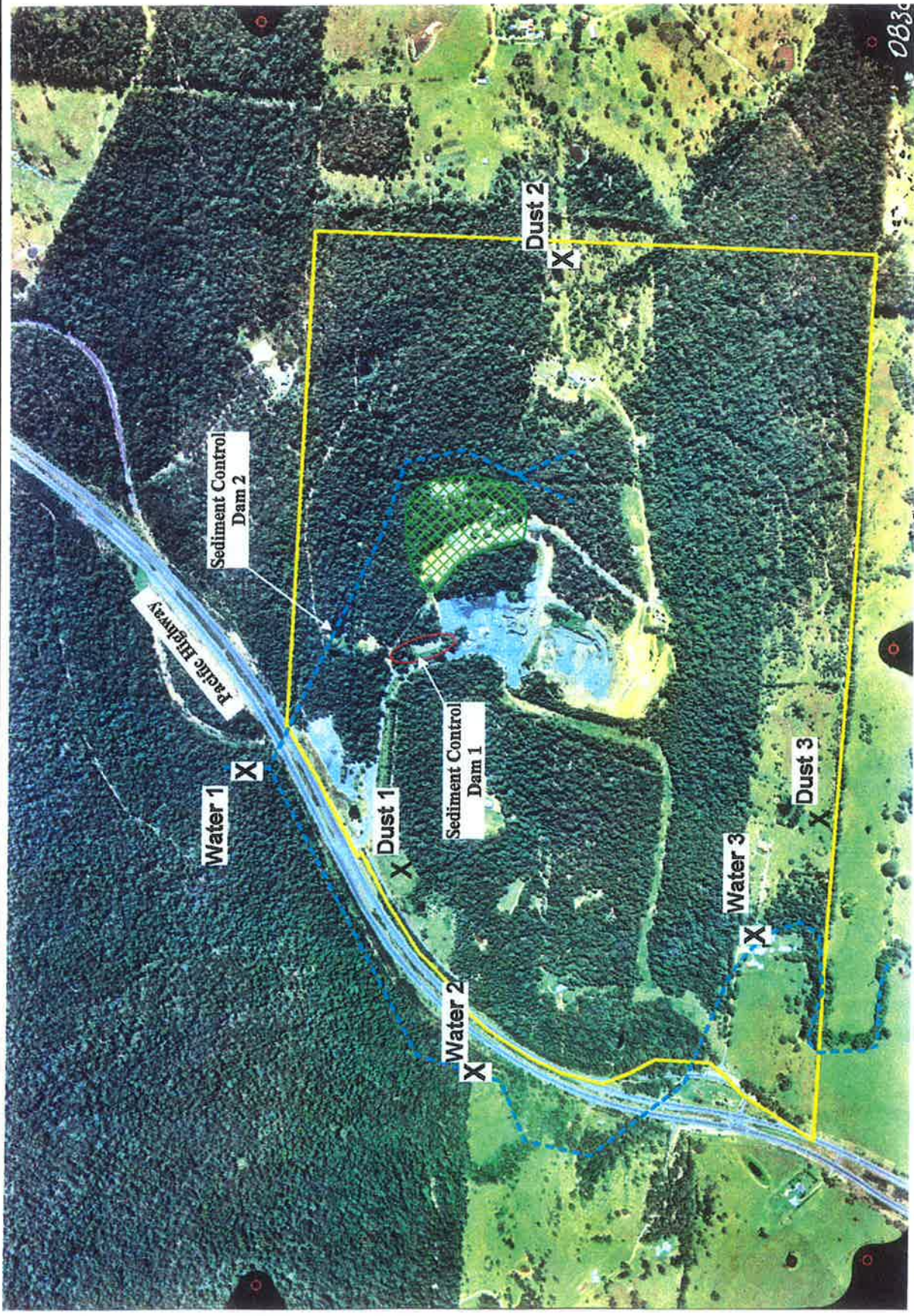
The drainage system is shown in Figure 4.3.

#### **4.3.2 Surface Water Quality**

During the EIS investigations carried out by ERM Mitchell M<sup>c</sup>Cotter water samples were obtained at three locations in the surrounding local creeks. The sample locations are shown on Figure 4.3 and described below:

- ❑ Minor creek west of the Pacific Highway, upstream of its confluence with the quarry sourced creek line (Site A);
- ❑ Minor creek west of the Pacific Highway downstream of its confluence with the quarry sourced creek line (Site B), and ,
- ❑ At the confluence of Talawahl Creek and Bungwahl Creek (Site C).





**CSR Readymix**  
 Site Photo -- Jandra Quarry  
 Drainage Lines and  
 Monitoring Locations  
 Figure 4.3

-  Application Area
-  Property Boundary
-  Drainage Line
-  Monitoring Location

Figure 4.3 def



Two sample sets were collected by ERM representing the catchment in a wet and dry state. Their samples were collected in relatively high and moderate to low flow conditions respectively. The results of the water quality analysis is summarised in *Table 4.1*. A third set of samples was obtained during this study during low flow conditions. The results of this third set of samples are also presented in the table below.

<b>Table 4.1</b>	<b>RESULTS OF WATER QUALITY ANALYSIS</b>								
	<b>Wet Catchment 1998</b>			<b>Dry Catchment 1998</b>			<b>Dry Catchment 26-2-2002</b>		
<b>Sample</b>	<b>Site A</b>	<b>Site B</b>	<b>Site C</b>	<b>Site A</b>	<b>Site B</b>	<b>Site C</b>	<b>Site A</b>	<b>Site B</b>	<b>Site C</b>
PH	6.9	6.9	6.9	6.6	6.4	6.7	6.7	6.8	6.7
Dissolved Oxygen (mg/L) <sup>2</sup>	3.0	5.4	5.9	5.8	5.0	8.4	-	-	-
Salinity <sup>1</sup> (µS/cm)	266	375	303	1,275	1,859	873	275	351	278
Suspended Solids (mg/L)	5.0	8.0	2.0	14.0	3.0	5.0	19.0	28.0	28.0
Oils/Grease (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	1.2	1.6

Notes: 1. Salinity is measured as electrical conductivity in units of micro-siemens per centimetre  
2. Probe failure resulted in the loss of dissolved oxygen information on 26-2-2002.

Water quality results indicate the creek water sampled was of good quality and that there was no real effect of the quarry on the external creek water quality. Water samples were taken from what appeared to be clear water. Although NFR is slightly higher than would be expected based on a visual assessment of the creek water, the results are within acceptable limits set by the EPA (ie: below 50mg/l). The higher results may be attributed to differences and flaws within sampling techniques between the previous data and the recent data.

Water quality analysis has also been carried out at various locations around the existing quarry. Samples were collected during various catchment conditions over the period 1996 – 2002. A summary of the results is given in Table 4.2 below.

<b>Table 4.2</b>	<b>QUARRY WATER MONITORING RESULTS</b>					
<b>Measurement Locations</b>	<b>pH</b>			<b>Non-Filterable Residue (mg/L)</b>		
	Min	Max	Average	Min	Max	Average
Site Facilities Dam	6.4	8.2	7.5	20.8	144	52.7
Downstream Creek at Property Boundary	6.4	7.4	7.0	2.4	59.0	28.3

The results show that the average of the pH readings over 32 samples is within the range recommended for fresh waters (6.5 to 9.0), based on the ANZECC (1992) *Water Quality Guidelines for Fresh and Marine Aquatic Ecosystems*. The non-filterable residue (NFR or suspended solids) values average between 37 and 81 mg/L, compared with the ANZECC (1992) criteria of 50 mg/L for suspended solids in fresh aquatic ecosystems. The results indicate that significant peaks in the NFR values are experienced in the site facilities sediment control dam and that specific sedimentation management measures such as hand casting of flocculent will be required. Nevertheless, the results for the creek at the property boundary downstream of the sediment dams indicate that generally the NFR levels are within the ANZECC criteria.

#### **4.3.3 *Surface Water Impacts***

The potential impact of the proposed overburden disposal area on surface waters is the degradation of water quality in downstream watercourses through the generation of sediment.

Sediment has the potential to increase turbidity in downstream waters, thereby increasing sedimentation.

Existing sediment and erosion control measures at the quarry have shown to be effective in controlling sediment movement. Runoff from the proposed overburden disposal area will be directed to the existing sediment control pond number 2 shown on Figure 4.3.

#### **4.3.4 *Surface Water Mitigation Measures***

Sediment mitigation will be carried out at the source. In order to control sedimentation, a sediment fence will be constructed along the down hill side of the disturbed area. Construction and maintenance of this fence will be in accordance with Section 3.3.3 of the existing Environmental Management Plan (see Appendix 3) and the EPP's (see Appendix 4).

To control and minimise erosion, stripping and construction of the stockpile area will be undertaken in stages. The lower most area is to be stripped and overburden deposited to a maximum height of 5 metres. Once complete this area will be progressively rehabilitated with grasses and trees while construction of the next five metre "lift" takes place. This progressive rehabilitation initiative will stabilise exposed areas while ensuring that minimum area is exposed at any one time.

The proposed overburden disposal area will not result in any change to the volume of runoff leaving the site.

## 4.4 AIR QUALITY

### 4.4.1 Air Quality Criteria

A comprehensive air quality assessment was undertaken as part of the 1999 EIS process. This assessment provided in Appendix 11 of this report assessed dust impact resultant from the existing and proposed quarrying operations. This report presented a “*comparison of dust concentrations from all sources except drilling and blasting*”. Drilling and blasting was not included as sources in the modelling of the dust deposition due to their episodic impacts.<sup>3</sup>

Given that this application is for the continuation (and minor enlargement but not an intensification) of an existing overburden stockpile present and active onsite during the course of the previous Air Quality Assessment (see Appendix 11), it was considered that the ongoing episodic use of this area at existing rates would have no incremental impact on previous air quality assessments.

Results of the previous survey taken from the EIS are given below. This discussion includes the cumulative effects of all activities within the existing operation inclusive of all onsite operations. The current application seeks an enlargement of an area but no intensification, hence impacts are considered to remain the same as previously modelled. Verification of these results with ongoing monitoring since 1999 confirms CSR is still operating within EPA guidelines. This monitoring will continue.

### 4.4.2 Dust Deposition

Dust deposition criteria developed by the NSW Environment Protection Authority (NSW EPA) are given in *Table 4.3*. This table details maximum increases above existing levels. For example, in residential areas with existing annual average deposition of between zero and two g/m<sup>2</sup>/month an increase of up to two g/m<sup>2</sup>/month would be permitted.

ASSESSMENT CRITERIA FOR DUST DEPOSITION		
Existing Deposition (g/m <sup>2</sup> /month)	Maximum Acceptable Increase (g/m <sup>2</sup> /month annual average)	
	Residential Suburban Land Use	Rural, Semi-Rural Urban, Commercial & Industrial Land Uses
2	2	2
3	1	2
4	0	1

<sup>3</sup> Taken from Appendix 7 page 3.6.



Based on these criteria and average deposition rates recorded at three locations around the quarry property boundary the permissible increase at properties and around the quarry will be as shown in *Table 4.4*.

<b>Site</b>	<b>Annual Average Deposition for 1996 – 2002 (g/m<sup>2</sup>/month)</b>	<b>Permissible increase in deposition (g/m<sup>2</sup>/month)</b>
1	2.47	2.0
2	3.25	1.0
3	3.12	1.0

#### **4.4.3 Dust Concentration**

Concentration criteria for long-term annual averages and short-term 24 hour periods were considered. Two size ranges were also addressed: total solid particulate matter (TSP) or particles less than 50 microns (one millionth of a metre) and particles smaller than 10 microns (PM<sub>10</sub>).

PM<sub>10</sub> particle concentrations are of interest because they can reach the lower parts of the respiratory system and may have health as well as amenity impacts. Most PM<sub>10</sub> particles are caused by combustion from motor vehicles, bushfires and industrial process. Some PM<sub>10</sub> particles are generated by evaporation of sea spray and from vegetation. Most quarrying dust consists of coarser particles which have amenity rather than health effects.

#### **4.4.4 Dust Impact Assessment**

A comprehensive dust impact assessment was undertaken during the 1999 EIS process.

All regular quarry activities were included in the model. Emissions relating to blasting and drilling have not been included due to the short duration of impacts and their episodic nature.

Contours of the highest 24-hour PM<sub>10</sub> dust concentrations due to quarry operations (excluding drilling and blasting) are shown in Appendix 11. Contours of averaging periods longer than this are not supplied due to the relatively lower impacts over the longer term (ie. annual averaging periods). TSP 24-hour contours are not provided, as there are no applicable criteria for TSP over short-term averaging periods.

#### **4.4.5 Discussion**

##### **i. Dust Deposition**

The concentrations of dust deposition predicted by the model in Appendix 11 show that concentrations will not significantly change. Dust deposition will not exceed EPA criteria. All discrete receptors will have a maximum increase of less than 1.1 kg/m<sup>2</sup>/month well below guideline criteria for air quality amenity of 2 g/m<sup>2</sup>/month.

##### **ii. Dust Concentration Due to Normal Quarry Operations**

###### **a. PM<sub>10</sub>**

###### **□ 24 hour Average**

Modelled PM<sub>10</sub> concentrations are predicted to be at their highest (69.76 µg/m<sup>3</sup>) at the nearest residence to the south (now owned by CSR) and still well below the NSW EPA adopted USEPA guideline level of 150 µg/m<sup>3</sup> for a 24 hour concentration.

The concentrations predicted at discrete receptors for all stages are primarily due to area emissions which do not emanate from the actual quarry pit.

- Modelled PM<sub>10</sub> concentrations taken as an annual average are also well below the NSW EPA adopted USEPA criteria of 50 µg/m<sup>3</sup>. The highest concentrations calculated at the nearest residence to the south were below 2 µg/m<sup>3</sup>. It is not expected that impacts from the proposed increase in quarry area will have a significant effect on amenity or health relating to PM<sub>10</sub> to PM<sub>10</sub> dust concentrations.

###### **b Total Suspended Particulate**

For total suspended particulate (TSP) the NSW EPA adopt only an annual criteria being the National Health and Medical Research Council's recommended maximum annual concentration of 90 µg/m<sup>3</sup>. CSR measured TSP at the Jones, YALA 2 (residence to the south) and Joe's residence during October 2001 (refer to Appendix 7). Table 4.5 shows the readings:

Table 4.5	TSP Dust Monitoring Results		
TSP	Jones	Joe's	YALA 2
	35	73	39

Joe's and YALA are now on CSR owned property. All results were within the NSW EPA guidelines of 90  $\mu\text{g}/\text{m}^3$ .

It is not expected that impacts from the proposed increase in the stockpile area will have a significant effect on amenity or health relating TSP dust concentrations.

#### 4.4.6 Mitigation Measures

As part of CSR's standard quarrying practices mitigation measures are conducted during daily activities. Measures to control air quality at the quarry during overburden emplacement include:

- ☐ Regular watering of the haul road;
- ☐ Regular dampening of overburden material if it appears dry and dusty;
- ☐ Limiting speeds of vehicles on unsealed surfaces to 40 kph, and,
- ☐ Rehabilitating disturbed areas.

Stockpiling episodes will be short lived and periodic. With the controls detailed above, monitoring results to date and those predicted in the Air Quality Assessment 1999, the impact of the proposed 2.1 expansion of area with no intensification in the overall frequency of dumping will result in minimal impact. All existing dust monitoring will continue in order to monitor the ongoing environmental amenity.

\* \* \*