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Document deemed uncontrolled when printed
1 Scope

The purpose of the Environmental Management Plan (EM Plan) as defined in S188 of the Environmental Protection Act 1984 (EP Act), for the Omya Bajool Marble Mine is to document environmental protection commitments to protect the environmental values affected by the sites mining activities and to help the administering authority (the Department of Environment and Heritage Protection) prepare the Environmental Authority (EA) for the application.

Omya Australia Pty Ltd (“the Company”) currently holds Environmental Authority EPML00657813.

The EM Plan presents relevant information on the Bajool Marble Mine (“the Mine”). It identifies and describes the sites environmental objectives, the potential environmental impacts caused by the mining activities, and defines the critical environmental values which are to be protected through the conditions of the EA and onsite controls.
2 Omya Corporate Sustainability Policy

2.1 Purpose

The purpose of the Omya Corporate Sustainability Policy is to demonstrate management commitment and set the direction and expectations of the whole business specific to Safety, Quality and the Environment (SEQ).

It describes the general values and objectives of the organisation, and sets the tone for the regional and local operations to establish their objectives and targets, and establishes the requirement for continuous improvement.
Corporate Policy No 11  
Issued July 9, 2008 / updated February 8, 2016

Corporate Sustainability Policy

The Omya Group operates with long term goals, shared values and strong principles. We strive to conduct business in a sustainable way including economic growth, ecological balance and social progress.

The Group’s primary role is to serve our customers’ and Society’s requirements over the long-term, and to continually improve our products and services, in a sustainable way. This policy incorporates Omya’s principles regarding occupational safety, environmental protection, quality management, regulatory affairs and corporate social responsibility.

We must ensure that our activities do not contribute to releasing harmful materials into the environment and that we avoid long-term physical degradation of the Earth. We ensure that our activities do not adversely affect the wellbeing of our employees or the communities in which we operate currently or in the future.

We focus on the following key points:

- At a minimum, we comply with applicable laws, rules and regulations. Omya’s safety and environmental standards are also directed toward continuous improvement and in anticipation of future needs.
- Quality management systematically ensures that all products, processes and services meet the specified standard. Continuous improvement is always a primary goal.
- Omya’s products and operations are safe and the Company is considerate of the communities in which it operates.
- Omya’s products supplied to the food, animal feed, pharma, cosmetics and food contact markets comply with specific internal directives and with applicable local laws, specified regulations and rules. All Directives are made available under the Sustainability Handbook.
- Activities are conducted in a manner that is sensitive, aware of environmental responsibility, and minimizes the use of scarce resources.
- Omya strives to reach a safe and incident-free operation wherever it operates in the world. Omya regards accidents, injuries, occupational health and safety issues or environmental harm as unacceptable, and continually works to prevent them from happening.

Omya pursues these goals with the following practical means:

- Safety, Environment, Quality Management and compliance with applicable laws and regulations are foremost in all business decisions, in all areas of activity and at all levels of managerial responsibility.
- Employees receive appropriate training. Management adopts a system approach that accounts for every step of the value chain from the quarry to the customer. Responsibility for achieving our Sustainability goals rests with the entire Omya workforce. Omya’s success relies on its employees’ capability and commitment. The Executive Board requires Omya employees to act responsibly, to be good local citizens and to respect people and the environment in line with our values.

Eric Schachenmann        Ernest Barceló  
Group CEO       Vice President Sustainability
3 Background

3.1 The Mine

Omya Australia Pty Ltd (the Company) has been operating the Mine since 1980, principally to produce white high purity crushed marble. The Mine is located 17km south of the village of Bajool, midway between Rockhampton and Gladstone in Central Queensland.

Marble blocks, cut from small dimension stone pits have previously been used locally for the production of cemetery monuments. Unfortunately, due to the coarse crystal and friable texture of the marble it does not produce a smooth polished surface, nor does it have the strength or durability suitable for architectural applications. The good looks of the Italian and Greek marbles are attributed to the fine grain size of these stones.

Fortunately white, high purity crushed marble can be used as a feedstock for the manufacture of high brightness industrial fillers at the company’s plant in Geelong, Victoria and Te Kuiti in New Zealand’s North Island. The specifications for industrial filler feedstocks are very exact. The marble must be made of white calcite, with a minimum of impurities and be relatively inexpensive to mine and transport to industrial centers. The Bajool marble deposit is very large, but more significantly, parts of the deposit are very high quality.

The mine site consists of two mining areas (only one of which is currently active), haul roads, waste rock emplacement areas, a crushing plant and a small stone dust mill. Annual production has increased from around 15 000 tonnes in 1980 to 220 000 tonnes in 2015.

The Company intends to continue its existing mining operations, maximise the recovery of high white marble and continue the progressive rehabilitation of the disturbed areas on the mining tenements of the Mine.

3.2 The Operating Company

Omya Australia Pty Ltd is the owner and operator of the Mine.

Omya Australia Pty Ltd (the Company), formerly Omya Southern Pty Ltd, was formed in Australia in 1979, principally to manufacture and market high quality calcium carbonate functional fillers for the paint, plastics, paper and general building industries. The Company is 100% owned by Omya AG of Switzerland (formerly Pluess-Stauffer AG) and through Omya AG, has access to the world’s most advanced technology relating to the manufacture and marketing of calcite products.

Since commencing operations, the Company has made Australia virtually self-sufficient in these important processed manufacturing materials as well as establishing significant export sales into South East Asia and New Zealand. Following the integration with the production and marketing facilities of Southern Limestone Pty Limited in 1988 the company extended its product range into almost every facet of calcium carbonate application, including glass making, coal mine stone dusting and agriculture.
The Company currently operates four processing plants in Australia in addition to that at Bajool; at Bathurst (NSW); at Moss Vale (NSW) Boyer (Tasmania) and at Geelong in Victoria, and operates mines at Cow Flat / Ponsonby (NSW) as well as at Bajool.


The Company’s head office is based in Bathurst, and its registered office is in Lindfield in Sydney’s north. Customers’ requirements are serviced through warehouses located in all mainland State capitals with sales offices in Brisbane, Sydney, Melbourne and Adelaide.

The Mine is registered as “Omya Australia Pty Ltd - Mountainside Mine” with the Department of Natural Resources and Mines.
4 Existing Mining Leases

The Mine incorporates five granted mining leases covering a total area of 232.94ha. Details of the individual mining leases as shown on Figure 1.0

Mining Lease Application (MLA) 80167 has been lodged to cover the extended footprint of the Wells Waste Rock Emplacement. The extension will enable more effective use of the local topography and provide for a final profile that conforms better with the surrounding landscape than the already approved Western Waste Rock Emplacement. The location of MLA 80167 is identified on Figure 1.0.

4.1 Relevant stakeholders

As stated, the Mine is owned and operated by Omya Australia Pty Ltd, under the conditions of its Environmental Authority EPML00657813 issued by the Department of Environmental and Heritage Protection (DEHP) in January 2017 and the respective Mining Leases issued by Queensland Department of Natural Resources and Mines (DNRM).

Other relevant stakeholders include the following:

• Rockhampton Regional Council.
• Gladstone Regional Council.
• Owners of the “Fern Hills”, “Prior Park” and “Sunny South” properties and other land owners of the surrounding region.
• Users of South Ulam Road to Bajool, which is shared by trucks from the Bajool Marble Mine.
• The local Aboriginal community Darumbal Nolar Murree Aboriginal Corporation for Land and Culture. Each of the relevant stakeholders has been, or continues to be consulted appropriately over the ongoing operations at the Mine.
Figure 1.0  Bajool Cadastral and Mining Leases

Legend
- Omya Mining Lease (ML)
- Cadastre
- Company Owned Land
- Disturbance (40.7 Ha, Dec '15)
- Proposed Waste Rock Extension (5.2 Ha)
5 EXISTING ENVIRONMENTAL APPROVALS AND PLANS

OMYA Australia Pty Ltd, owner/operator of the Bajool Marble Mine holds the following permits for the site:

- Registered Suitable Operator Number: 341494
- Non Standard Environmental Authority (Mining Activities): EPML00657813 (formerly MIM800074702)

5.1 EHP Environmental Authority

The current Environmental Authority is held for the sites Resource Activity, ie the operation of the mine. It also includes ancillary activities which are listed in schedule 2 of the EP Regs and are carried out as part of the resource activity. These include the operation of screening and sorting plants, the crushing plant and a grinding mill.

5.1.1 Current ERA / Thresholds

ERA 21: A mining activity that is an ineligible ERA, other than a mining activity mentioned in items ERA 9 to ERA 20.

5.1.2 Proposed ERA / Thresholds

ERA 33: Crushing, milling, grinding or screening. The crushing, milling, grinding or screening which consists of crushing, grinding, milling or screening more than 5000t of material in a year.

The addition of ERA 33 is currently part of a Major Amendment Application with the EHP for approval.

The Site does not currently have any active Environmental Protection Orders, Temporary Emissions Licences (TEL), Transitional Environmental Plans (TEP) or EHP required Site Management Plans under Division 5 of the Environmental Protection Act 1994.

Location: //Environment/Licences and Approvals/EHP/

5.2 Plan of Operations 2014 to 2019

The site maintains an up to date Plan of Operations to manage the environmental impact of the mining leases and formalise the sites long term operational strategies and controls.

This document is a requirement of the Environment and Heritage Protection, is to be maintained up to date and a copy provided to the EHP.

Location: //Environment/Licences and Approvals/Mines Department/
5.3 Certified Environmental Management System


Location: AUBA server\Environment Management System

5.4 Site Rehabilitation Plan

The current Plan of Operations 2014 – 2019, outlines the sites Rehabilitation Management Plan. The site is in the process of updating this document and developing a stand alone Site Rehabilitation Plan. The original Site Rehabilitation Plan, titled, “Monitoring Rehabilitation Performance - Bajool Marble Quarry - November 2003” a CQU document by A. Melzer. was submitted to the Department in 2004 in line with the sites Environmental Authority Conditions.

The Mines policy is for the progressive rehabilitation of mined or otherwise disturbed areas, where such activities can be undertaken in a cost-efficient manner and not jeopardise the future utilisation of the resource. The purpose of the rehabilitation is to ensure that as far as practicable, the areas of disturbance are returned to a land use and land use capability classification similar to that prior to the commencement of mining activities with a self- sustaining vegetative cover appropriate to the land use and land capability.

Rehabilitation consists of re-profiling the area to create a geotechnical stable structure that blends with the surrounding landscape and provides for appropriate drainage, followed by re-spreading of stored topsoil and forest litter and seeding or planting with local species.

Dr. Alistair Melzer of Central Queensland Environmental Surveys continues to monitor the rehabilitation and weed management program for the Mine.

Ongoing monitoring of rehabilitation performance has been undertaken at the Mine and suggests current rehabilitation practices have been successful in recreating the elements of a functioning ecosystem.

The Rehabilitation Plan will be updated to include provision for the WREA Expansion area to ensure it is captured within the long term financial and resource planning for the site.

Location: //Environment/Licences and Approvals/Mines Department/

5.5 Weed Management Plan

The Mine currently maintains and implements a Weed Management Plan (BJ-WMP-001). The plan aims to provide a detailed methodology to mitigate and manage identified impacts associated with the establishment and spread of weed and pest species on site. The integral parts of the plan are:

- Control of weed transport through site management
• Collective management of weed issues with neighbors
• Control or eradication of priority weeds by an external contractor, and
• Visual inspections of the site.

The Weed Management Plan originated from an investigation into environmental weeds on the site and their management, completed by Alistair Melzer in 2003. The resultant “Weed Management Report” was submitted to the EPA in December 2003. The Weed Management Plan will be periodically updated to include the proposed future expansions on site.

**Location:** AUBA server \shared\quarry environment reports\Bajool\Rehab\weed management plan.

### 5.6 Cycas Management Plan

*Cycas megacarpa* occurs throughout the lands owned and leased by Omya Australia at the Bajool Marble Mine. The species is listed as *endangered* under the Commonwealth Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act) and the Queensland Nature Conservation Act 1992 (NCA). A Commonwealth recovery plan was prepared by the Queensland Herbarium in 2007 (Queensland Herbarium 2007).

Threats to the species are:

• Destruction due to land clearing,
• Legal harvesting and commercial salvage,
• Illegal harvesting,
• Loss of genetic variation and insect pollinators, and

Land management practices. Threats 1, 4 and 5 occur at Bajool as a consequence of routine quarry activities and land management practices. Threats 2 and 3 are highly unlikely as a consequence of access and visitor management at the quarry. The Bajool Marble Mine *Cycas Megacarpa* Recovery Plan prepared by Dr A Melzer plan seeks to ensure that there is no net loss or reduction in distribution of *Cycas megacarpa* as a consequence of Omya’s quarrying activities or of the management of surrounding lands controlled by Omya. It is consistent with and complements the national recovery plan. As implemented, the Bajool recovery plan will increase the knowledge of the local *Cycas megacarpa* population and result in a net benefit by increasing the understanding of this species.

**Location:** AUBA server\Environment\Revegetation\Cycas Management Plan
5.7 Fire Management Plan (DRAFT)

The sites fire management plan is being developed as a response to the Cycas Management Plan to document the controls in place to preserve revegetation and replanting works.

The plan also identifies the sites methods and controls in place to minimise the impact of fire on the site infrastructure and employees.

Location: AUBA server\ Environment/Fire Management Plan (draft)
6 IMPLEMENTATION / RESOURCES

To ensure the Environmental Management Plan is successfully implemented by Omya Australia Pty Ltd & Omya New Zealand Limited, The appropriate Officer shall monitor that the primary resources as detailed are provided.

Should monitoring during the course of work indicate that targets are not being achieved then the appropriate Officer shall determine and provide additional resources in an effort to achieve the objectives.

6.1 Responsibility and Accountability

6.1.1 Mine Manager / Plant Manager / Officer

The Officer is also responsible for:

- Provide adequate human, technical and financial resources for ensuring effective implementation of this Environmental Management Plan;
- Provide appropriate personal protective equipment for OMYA workers (employees and visitors);
- Approve and authorise the use of the Environmental Management Plan;
- Review environmental performance;
- Keep abreast of changes in legislation and regulations;
- Oversee and undertake the development and implementation of appropriate documented environmental management procedures;
- Assess service providers’ abilities to conform and their conformity with environmental management requirements;
- Ensure conformity with environmental management requirements;
- Ensure environmental legislation, regulations and licensing conditions are complied with.

6.1.2 Workers (Employees)

- The workers primary role on site is to facilitate the flow of information to subcontracts, documentation, invoices, quotations, variations, correspondence, etc.

6.1.3 Technical / SEQ Officers

The Technical / SEQ Officers specific responsibilities with relation to this plan include, but are not limited to:

- Provide input into the identification of Environmental Aspects, Impacts and subsequent controls
• Assisting the Officer in monitoring subcontractors prepare and submit SWMS’s for review.

• Implement controls (when responsible) as described in the Aspects, Impacts and Procedures Table in the Appendix of this document.

6.2 Subcontractors
Subcontractors play a key role in achieving the objectives set in this plan. For this reason the controls shall be applied to plan and communicate with and monitor the Subcontractors.

The Subcontractor’s specific responsibilities with relation to this plan include, but are not limited to:

• Attend interviews with Omya prior to scope of works awarded to explain their tender proposal including resources, workers and methodology or be on Omya preferred workers (contractors) spread sheet.

• Preparing SWMS’s that include the environmental risks and associated controls

• Conduct training in the application of the SWMS’s (Work Activity Training)

• Make workers available for Site Induction Training prior to starting works and for toolbox talks during the course of their Scope of Works.

• Provide the resources to implement the controls as described in their SWMS’s

• Identify additional opportunities for, and improvements to, Environmental Management on Omya premises.
7 Description of Mining Activities

7.1 WORK PROGRAM

Omya proposes to continue its mining and processing operations with the existing mining equipment and fixed crushing and processing plants in compliance with its current Plan of Operations (2014 to 2019).

The main activities are undertaken on the mining tenements on site, outlined in Figure 2.0 Bajool Operations Flow Diagram, and include:

- Exploration drilling;
- Mine Planning;
- Development of the mine and selective open cut mining of marble;
- Removal and management of waste rock;
- On-site processing of the mined marble;
- Maintaining on-site infrastructure;
- Road transportation of marble products from the mine; and
- Progressive rehabilitation of disturbed areas of the mine.

Figure 3.0 Approved and Proposed Onsite Activities illustrates the location of the approved activities. The following sections provide a description of each of these activities, along with the current and proposed scale of each.

7.1.1 Exploration Drilling

Limited exploration activities are undertaken within the Company’s leases to delineate the extent of the resource, assess resource quality and assist mine planning. Depending on the purpose of the exploration, activities undertaken comprise limited amounts of clearing for drill rig access and drilling.
Figure 3.0  Approved and Proposed Onsite Activities

Figure 2.1  APPROVED AND PROPOSED PROJECT ACTIVITIES
7.1.2 Mining Activities

Extraction activities are confined to Wells Mine and involves the following activities:

**Removal of topsoil** - stripped vegetation and topsoil, are directly placed on available rehabilitation areas where possible. If such areas are not available, the vegetation and topsoil are pushed up into windrows and temporarily stockpiled at the Wells Waste Rock Emplacement.

**Cap rock blasting** within the pre-striped area of the pit and inside the perimeter haul road removes the material overlaying the high quality marble (generally the upper 2m). Approximately 12,000m$^3$ will be blasted each year. All cap rock waste will be hauled to the Wells Waste Rock Emplacement.

**Production blasting** continued from ten metre benches in 2014 and has been developed down to the 110 AHD level in the centre of the pit. Blast Size Between 10,000m$^3$ and 15,000m$^3$ Blast Frequency Between 8 and 12 blasts per annum

**Future production marble extraction:** an average of approximately 300,000 tpa of production rock will be mined each year and future blast frequencies will increase in line with modified mine techniques. Of this, approximately:

- 170,000tpa will be high grade white product, 70,000tpa will be low grade product processed on-site into stone dust,
- 25,000tpa will constitute reject material from the crusher and photo-sorter used onsite for road sheeting, maintenance or ramp construction,
- 10,000tpa for landscape sales’ and
- 25,000tpa will constitute quarry waste visually selected by the excavator operator for placement in the Wells Waste Rock Emplacement.

7.1.3 Waste Rock Emplacement

Waste rock generated by cap rock blasting or selective mining within the Wells Mine comprises weathered and discoloured marble, calcite amphibole gneiss, black mafic dykes and limited amounts of clay and alluvium are deposited at the Wells Waste Rock Emplacement Area.

Blasted waste rock ranges in size from clay particles to boulder size, with a significant proportion less than 30mm that is suitable substrate for the propagation of local flora. Other waste materials include stone rejected by the photo sorter following crushing and screening.

No tailings waste is produced at the Mine. The waste rock is chemically stable. The rock types do not become a source of salt or acid mine drainage upon weathering, refer to Attachment 1.
The current operational Wells Rock Emplacement Area, has the following design parameters, which are not expected to change with the approved expansion.

- 1:3 (V:H) external batters, i.e 18°;
- 4m wide bench with contour bank at 10m vertical intervals; and
- A final height similar to the surrounding ridge lines.

Rock drainage has been installed along the drainage lines at the base of the waste rock emplacement disturbance area prior to waste placement to facilitate the drainage of surface water infiltration into the porous stored materials. The current and proposed design utilises the existing terrain to maximize storage volume and minimis impacts on air, water, noise and visual amenity of the area. The Wells Rock Emplacement Area has been rehabilitated between the toe at 110m AHD and 125m AHD.

7.2 On-site Processing

In 1999, the Company commissioned a crushing, screening and optical sorting plant, located on the 132m AHD floor of the Northern Mine. A comparatively smaller and rebuilt plant located near the site office is used to mill marble to a nominal particle size of 40 microns. The milled product is sold locally for coal mine stone dusting and agriculture.

The mined (Run-Of-Mine [ROM]) marble is transported from the Wells Mine either to the primary crusher or to a ROM stockpile. Stockpiled ROM marble is eventually loaded to the primary crusher by front-end-loader. The ROM marble passes through a primary and secondary crusher and then screened into three size fractions. The >20mm fraction reports to a photosorter. The <20 mm fraction is not amenable (with current technology) to optical sorting.

If the <8mm fraction has unacceptable colour, but is free of impurities, it is transferred to the stone dust plant for milling, as the stone dust market is not sensitive to colour. Generally, the 8-20mm fraction contains excessive amounts of black mafic rock and cannot be used to make a marketable marble product. Packaged processed marble products are stored in the small shed adjacent to the processing plant prior to dispatch from the mill. Bulk products are blown through a 100mm pipe to the silo above the weighbridge.

7.3 On-Site Infrastructure

With a combined length of approximately 4.0 km, haul roads are the biggest infrastructure item on-site. Each road typically has a running width of around 15 m, or three times the width of the quarry trucks and has a perimeter safety bund that extends a further 1m either side. Unless watered regularly, they are a source of dust.

A portable buildings are currently used as site offices.
7.4 Product Transportation

The marble products are loaded to road-registered trucks, super-dogs and semi-trailers capable of carrying 38 tonnes per load) for dispatch from the mine. Over 80% of the mine output is transported to the Company’s plant in Geelong (Victoria) and Boyer (Tasmania). The product is transported by road to a stockpile at the Auckland Point wharf in Gladstone and then transported by sea to Geelong and Boyer.

Contractors undertake all transportation with regular drivers. Typically, five trucks operate five days per week, with each truck completing four return trips per day from the wharf in Gladstone. On occasion, truck frequency may vary to comply with shipping schedules.

The remainder of the mine output is sold locally to coal mines in the Bowen Basin and agricultural suppliers. The product is transported in single and B-double semi-trailers along a variety of routes.

7.5 Intensity and Scale of Operation

The current Plan of Operations specifies the current Scale of the onsite operations at Bajool, these include the following:

7.5.1 Annual Mining and Processing Rates

In 2015, mine production consisted of 226,000 tonnes of crusher feed and 58,000 tonnes of pit waste, from the crusher feed, 159862 tonnes of white marble was produced and dispatched to plants in Geelong (Victoria), Boyer (Tasmania) and Te Kuiti (New Zealand) by ship, via the Port of Gladstone and 32983 tonnes of marble was milled on-site to produce stone dust for central Queensland coal mines. Approximately 24,974 tonnes of the crushed output was segregated by the photo-sorter and downgraded to waste.

Due to the large size of the deposit and the small annual rate of production, the mine life is considered to be indefinite.

7.5.2 Hours of Operation

The Company’s activities are currently undertaken within the following approved times:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time</th>
<th>Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quarrying</td>
<td>6:00 am - 6:00 pm</td>
<td>Monday to Sunday</td>
</tr>
<tr>
<td>Blasting</td>
<td>9:00 am - 3:00 pm</td>
<td>Monday to Friday</td>
</tr>
<tr>
<td></td>
<td>9:00 am - 1:00 pm</td>
<td>Saturday</td>
</tr>
<tr>
<td>Crushing</td>
<td>24 hours</td>
<td>Monday to Sunday</td>
</tr>
<tr>
<td>Milling</td>
<td>24 hours</td>
<td>Monday to Sunday</td>
</tr>
<tr>
<td>Loading &amp; Transport</td>
<td>24 hours</td>
<td>Monday to Sunday</td>
</tr>
</tbody>
</table>
7.5.3 Planned Mine Life

The marble deposit has been traced over 52ha by surface geological mapping and extends to at least 100m depth, the limit of the existing drill holes. The proportion or distribution of marketable marble within the deposit is not known with any certainty.

There has been a sufficient amount of drilling within the Mine perimeter to identify white marble reserves of 2.1 million tonnes down to a depth of 50m. This is equivalent to 8 years production with an annual production increase of 5%.

Recent drilling has defined lateral extensions of white marble to south of the pit. It is expected that further drilling will increase the known size of this and other ore blocks, and enable upgrades of Geological Resources to Proven Reserves.

Based on the large size of the geological resources and the small annual rate of production, the life of the Mine is considered to be indefinite.

The Mine is well established, with activities primarily associated with the operations phase of the mine.

Rehabilitation is an ongoing process and done in conjunction with the other mining activities.
8 Description of Surrounding Environment

8.1 Topography

The Bajool Mining Leases are located on the south facing timbered slopes of Mt McCamley and Mt Kelly; the elevation ranging between 92 m AHD and 319 m AHD. The gradients of the slopes are variable. In the north, they are steep and typically range between 23° and 33°, locally up to 40°. In the south, the gradient of the slopes range between 13° and 26°, the ridge lines around 7° and gullies around 4°. The Wells quarry and haul road are located in a broad valley with gentle gradients of 1° to 4°.

Mt McCamley and Mt Kelly form an isolated topographic high surrounded by grassed black-soil plains.

According to on the Bureau of Meteorology’s web site (www.bom.gov.au), the nearest meteorological station to Bajool with sufficient data is located at Rockhampton airport (about 50 km north of the quarry, but a similar distance from the coast).

Annual rainfall readings range between 517 mm and 1180 mm with an average of 800 mm, 80% of the annual rainfall is recorded in the summer months. Annual rainfall in recent decades has been below average and in the last three years there has been a severe deficiency. The highest recorded daily rainfall is 271 mm.

Highest mean monthly temperatures occur in January (31.8 C) and the lowest mean monthly temperatures occur in July (9.4 C).

8.2 Cultural and Heritage Significance

There are no known cultural heritage sites within the existing mining lease area.

The Darumbal-Noolar Murree Aboriginal Corporation for Land and Culture and Dr Luke Godwin from Central Queensland Cultural Heritage Management Pty Ltd undertook a Cultural Heritage survey of the site in 2002 in which it concluded:

“It is our view that there is a low likelihood of further Aboriginal cultural material being encountered on the quarry site. This is due to the high degree of disturbance that the area has suffered from past development activity, as well as the interpretation that the area was probably not the focus of intense use leading to high levels of discard of cultural material.

The likelihood of encountering sub surface material, and notably human skeletal remains, is also seen as extremely low. There are few areas where there are substantial amounts of soil accumulation, and where cultural artifacts could therefore be buried. The area is not well suited for human interments, which are more usually encountered in places where there are significant alluvial deposits. As a precautionary measure, however, steps should be agreed between the parties in the unlikely event that such a discovery was made” (Goodwin 2002).
Marble has been intermittently quarried since 1917 at Bajool. Prior to 1974, several quarries within the Company’s Mining Leases were worked for monumental stone, interior cladding and terrazzo chips. Unfortunately, most of the marble was found to be too coarsely crystalline and soft for these products. Total production during 1917-1974 only amounted to around 6700 tonnes. Bajool marble has been used in the construction of several buildings. The State and Commonwealth Governments, and the Commonwealth War Graves Commission were the major users.

The 2002 report by Dr Goodwin, also concluded:

“It is unlikely that this place, or any of the elements that comprise it, would meet any of the criteria under the QLD Heritage Act, 1992 for inclusion on the Queensland Heritage Register - nor is it so listed.” (Goodwin 2002)

Although the previous reports have indicated a low likelihood of matters of Indigenous or European cultural heritage significance within the proposed new Mining Lease areas and the Cultural Heritage Duty of Care Guidelines are applied to new works undertaken on site in accordance with the sites Environmental Management System Manual (Rev 10).

8.3 Surrounding Waterways

Typical of most cattle grazing lands, crop cover varies with seasonal conditions, and stream turbidity is variable dependent on this cover, and intensity of rainfall events.

The Mine has two unmapped first order ephemeral streams which originate within the lease area, refer to Figure 4.0.

There are no naturally occurring springs onsite and no permanent surface water in the predominantly narrow drainage lines within the Mining Leases.

The Mine is located at the head of a localised watershed and the size of each catchment is between 10 and 50 ha. Surface run-off flows either west along drainage lines towards Eight Mile Creek or east, discharging onto broad alluvial flats.

Flows within Eight Mile Creek are ephemeral, but isolated waterholes remain in the water course for most months of the year. The creek flows north to the saline coastal flats of the Fitzroy River estuary.

Run-off from the areas of surface disturbance report to existing onsite sedimentation dams which provide sufficient area for settlement prior to seepage into existing vegetated discharge streams.
Figure 4.0  Bajool Marble Mine with EA Water Monitoring Locations

Offsite flows occur from the disused Northern Mine and the Wells Waste Emplacement areas and during high rainfall events discharge into onsite sediment ponds which capture any residual sediment from onsite activities prior to leaving the operational area to join Eight Mile Creek.

Water monitoring is undertaken in accordance with the existing EA conditions, refer to Section 12 - Water Quality
9 Environmental Aspects

9.1 Aspects and Impact Register

Under the sites ISO14001 Certified Environmental Management System, the company maintains a Process Plant Aspects and Impacts Register.

Within this document, the Mine has identified the relevant Aspects and impacts associated with its operations, and majority of this EM plan is based on documenting the actual and potential impacts and their controls.

**Location:** AUBJ_Files/Plant/Safety, Environment & Quality/BJ Aspects and Impacts Register.xls
10 Air Quality

The Bajool Marble Mine is located within a rural setting largely surrounded by cleared grazing lands where the most common air contaminant is dust from agricultural activities, local traffic on sealed and un-sealed roads, also smoke and other particulates associated with seasonal burning by landholders.

Omya commissioned an Air Quality Assessment in 2017 which have confirmed the following observations:

- Modeling of dust emissions from the existing operations (which includes the ERA 33 Activities) show that the predicted ground level TSP, PM\(_{10}\), PM\(_{2.5}\) and deposited dust levels at identified sensitive receptors are well below the relevant assessment criteria.

- Modeling of dust emissions from the proposed operations (i.e. existing operations with the expansion of the WREA) show that the predicted ground level TSP, PM\(_{10}\), PM\(_{2.5}\) and deposited dust levels at identified sensitive receptors are well below the relevant assessment criteria.

Through modeling the site demonstrates compliance with the assessment criteria for both existing and proposed operations.

The site has no recorded air or dust related complaints from neighbors.

Given the design of the facility, the current operational procedures onsite and the environmental performance history of the mine, the ongoing operation of the mine is not likely to result in significant change to offsite emissions or contravention of Omya’s existing Environmental Authority conditions relating to Air.

10.1 Omya Objectives

Omya shall undertake all practicable control measures to reduce air pollution and to prevent air borne contaminants from affecting the site’s workers and neighbours, including any adjacent bush land.

The Mining operations will be operated in a way that protects the environmental values of air in accordance with the Environmental Protection (Air) Policy 1997.

10.2 Identified Risk

Dust generated from site operations poses the key potential environmental risk to nearby residents, workers on site and the surrounding environment.

Potential sources include:

- Drilling and blasting;
- Loading operations;
- Onsite haulage and access roads;
- Operation of onsite Equipment:
• Crushing and screening operations; and  
• The stone dust mill.  
• Vehicle traffic to and from site;  
• Wind over bare ground; and  
• Emission of contaminants into the air from diesel usage.

The release of greenhouse gasses from the Mine is limited to the burning of fuels in mobile plant, and gasses released from blasting.

Note: The mine does not produce any nuisance odours from its site operations.

10.3 Onsite Controls

The following controls are implemented on site to manage these identified risks:

• Avoiding or minimising dust generating activities (ie. stripping, excavation, etc.) during high-risk times such as dry and windy conditions;  
• Baghouse on Stonedust Mill discharge vent and filters on storage silo air vents;  
• Bag leak detection on Stonedust Mill Baghouse alarmed back to control room;  
• Baghouse interlocked prevent operation of the mill without the use of baghouse;  
• Use of natural protection from existing topography from surrounding ridgelines to disrupt prevailing winds;  
• Restricting the movement of heavy vehicles to designated and restricted roads wherever practicable;  
• Onsite vehicle speed restricted to less than 25km/hr within the mine site to minimise dust generation;  
• Permanent onsite water truck used as required during high wind / low rain periods and routinely on haul roads and frequently trafficked areas on site;  
• Use of Chemical Sealers (Polo Citrus) on major haul roads;  
• The site maintains a buffer of remnant and/or undisturbed vegetation around the mine and infrastructure;  
• Enforcement of a covered load policy on all bulk product dispatches where by all product loads are in sealed trucks, packaged in bulk bags or covered by tarpaulins;  
• Re-vegetation works to be undertaken in a timely manner;  
• Topsoil stockpiles shall be stabilised by contouring to promote the regeneration of vegetation;
• All diesel used on site shall contain a sulphur content of no more than 500mg/kg;
• Wells Waste Rock Emplacement Area design maintains the height of the stockpile and final profiles to below that of surrounding protective ridgelines to minimise wind velocities and provide protection from prevailing Easterly winds;
• Using a cyclone on the drill rig;
• Fuel burn, and blasting powder factors are monitored routinely and mobile plant maintenance is closely monitored by Omya and the mining contractor.

10.4 Omya Operating Procedures
• Daily visual inspections of site process areas to verify that air borne contamination mitigation measures are appropriate to weather conditions and work being undertaken at the time;
• Monthly monitoring inspections of discharge vent filters and baghouse condition;
• Onsite Dust Deposition gauges monitored in accordance with AS 3580.10.1 Methods for sampling and analysis of ambient air – Determination of Particulates – Deposited Matter, Gravimetric method;
• Onsite Weather Station to track wind speed and direction in the event of a high dust event or public complaint; and
• Annual Personal Dust monitoring program for onsite employees;
• Stonedust Mill exhaust fitted with Sampling Port in exhaust vent stack in line with AS4323.1-1995 Stationary source emissions – selection of sampling positions.
• All complaints shall be logged in the Omya Incident Management System and addressed in consultation with the Director Operations.

Omya Standard Operating Procedures:
BJ-SOP-009 Dust Control.
BJ-SOP-006 Operation of Water Truck
BJ-SOP-009-1 Dust Deposition Gauge Monitoring
11 WATER QUALITY

The Mine is surrounded largely by rural primary production areas consisting of cleared cattle grazing lands. Typical of most cattle grazing lands, crop cover varies with seasonal conditions, and stream turbidity is variable dependent on this cover, and intensity of rainfall events.

The course and gravely texture of the landscape and wastes within the WREA stockpile is highly porous, resulting in water infiltrating quickly. The site sees little surface runoff during rain events and little erosion of waste materials.

11.1 Omya Objectives

Omya shall ensure adequate control measures are undertaken to prevent the mining operations from adversely impacting on the water quality of natural drainage systems and stormwater.

The mine will be operated in a way that protects environmental values of waters in accordance with the Environmental Protection (Water) Policy 1997.

11.2 Identified Risk

Surface water runoff and discharge waters from the site have the potential to enter the surrounding drainage systems.

Potential sources of water contamination include:

• Runoff of stormwater carrying clays and topsoils from the mine site have the potential to increase surface water turbidity;
• Runoff of stormwater carrying mined product (marble) from process areas and haul roads if dispersed by surface water flows have the potential to increase surface water turbidity;
• Runoff of stormwater producing a slick or containing hydrocarbons from onsite maintenance and storage activities;
• Spills or leaks during fuelling and maintenance of vehicles and equipment;
• Leakage from hydrocarbon storage areas.
• Pesticides as overspray or spillage;
• Overflow or leakage from site septic tanks if poorly maintained;

11.3 Onsite Controls

The following controls are implemented on site to manage these identified risks:

• On-site water management practices include the use of natural drainage channels and a series of constructed sediment ponds to capture initial runoff from disturbed areas;
• Natural filtering properties of limestone assist in the reduction of sediment load within runoff waters and sediment ponds within the mine catchment;

• Design and construction of the Wells Rock Emplacement Area includes a series of gravel drains in the base of the facility to allow the existing drainage lines of the catchment to be followed by rainwaters captured within the surrounding catchment and seeping through the stockpile;

• Water collected in disused Northern Pit, and the active Wells Pit is reused on site for dust suppression;

• Maintenance of plant or equipment within designated areas on site;

• Storage of chemicals or oils within designated bunded areas on site;

• All mine vehicles carry spill kits for management of oil spills on site;

• Prestart checks undertaken on all vehicles each day prior to operation;

• Site drain system established to divert clean surface water flows upslope of mining related disturbance away from disturbed areas;

• The ore and waste rock (both marble and calcite amphibole gneiss) have little potential to adversely impact the chemistry of the waterways. These rock types do not weather to become a source of salt or acid mine drainage. Marble can have a beneficial impact on the quality of waterways. In some instances pulverised marble is used as a flocculent to reduce turbidity and to buffer acidic waters;

• The run-off from the catchment affected by the Mine water storages represents a very small fraction of the total catchment of Eight Mile Creek;

• The water demands of the Mine are relatively small and summarised as follows.
  - Dust suppression on haul roads and other exposed surfaces.
  - Dust suppression on the on site primary crushing plant.
  - Wetting as a processing aid on the optical sorter.
  - Vehicle wash down and staff amenities.
  - Watering of rehab sites.

11.4 Omya Operating Procedures

• In the event of rainfall events the Plant Manager shall inspect the performance of erosion and sediment control devices and the quality of water runoff leaving the site.

• Should it become necessary, runoff shall be contained within controlled detention basins to enable suspended particles to settle under low velocity conditions.
• Samples of Mine Pit discharge waters if released are to be tested and approved prior to release.

• Storage of fuel and other hazardous goods, shall be contained within a bunded area and comply with AS1950 “The Storage and Handling of Flammable and Combustible Liquids”.

• Fuelling and maintenance of vehicles and equipment shall comply with the relevant regulations and standards and it shall be undertaken at locations away from drainage systems.

• Water, which is contaminated by fuels, oil, chemicals or hazardous waste, shall not be discharged into stormwater or natural drainage systems. Such liquids shall where practicable be placed in drums and disposed of in accordance with EHP regulations.

• The EHP will be advised of any chemical, fuel or oil spills which impact off site;

• Adequate quantities of absorbent material shall be maintained on site.

**Omya Standard Operating Procedure:**


BJ-SOP-001  Water Sampling

BJ-Mgmt. Plan  Omya Water Management Plan (WRA 2017) DRAFT

BJ-SOP-002  Operation of the Pit Sump Pump

BJ-SOP-010  Refueling Mobile Equipment

BJ-SOP-011  Filling Site Diesel Fuel Tank
12 Noise And Vibration

The Mine is located within a rural area where background noise and vibration levels are low, and generally restricted to farm machinery, local traffic, stock, and wind.

The Omya Marble Mine is not historically a high noise generating activity on the Mine and there have been no recorded Noise Complaints to the site.

The location of the mine in the side of Mt McCamley with operational activities below surrounding ridgelines assists in the shielding of the surrounding properties and sensitive locations from potential noise impact.

The site operates under the conditions of its current Environmental Authority and a Noise Impact Assessment commissioned in 2017 have confirmed that the current operational activities from the quarry including the ERA 33 activities, would fully comply with the DEHP noise limit, our current Environmental Authority Limits and would be unlikely to cause a noise impact at the sites sensitive receivers.

12.1 Omya Objectives

The activity will be operated in a way that protects the environmental values of the acoustic environment.

As some activities will involve the use of heavy equipment and noise and vibration generating activities, Omya shall, as much as practicable, prevent noise and vibration from being a nuisance to the site’s workers and neighbours.

12.2 Identified Risk

The potential sources of noise from mining and related activities are as follows:

- Drilling and blasting;
- Operation of mobile equipment;
- Product loading and road haulage;
- Operation of onsite Equipment:
- Crushing and screening operations; and
- The stone dust mill.

12.3 Onsite controls

- Noise and vibration levels generated by Mine activities will be controlled by implementing the following control strategies:

- Noisy equipment will be enclosed or screened where environmental values may be impacted.
• Equipment with lower sound power levels will be used in preference to equipment with higher sound power levels where the above mentioned environmental value may be impacted.

• Maintenance on equipment, including mufflers, will be undertaken routinely to minimise noise.

• The Company’s activities are currently undertaken within EA Approved restricted times.

Omya are strategically purchasing surrounding properties as they become available to maximise its operational buffer for future expansion works.

There are 3 sensitive places (residential dwellings) that have the potential to be affected by Mine generated noise:

B.J. & H.F McCamley “Fern Hills” The Fern Hills residence is located 3.5km from the primary crusher (closest noise producing piece of plant).

A.E. & G.P. Stunzer “Prior Park” The Prior Park homestead is located 3.2km from the nearest mining operation, and the residence is acoustically shielded by an intervening ridge.

O. & J.L. Stunzer “Prior Park” Communication is maintained on an ongoing basis and no complaints have been reported regarding noise or vibrations from residence of Prior Park. Note: There are two residences located closer on Omya owned land which are vacant or used as mine staff housing.

12.4 Omya Operating Procedures

• The site operates under the conditions of its current Environmental Authority.

• All workers and advised at induction and at subsequent tool box meetings of requirements in regard to limiting use of audible signals, unnecessary revving of engines, unnecessary engine braking and generally exercising due courtesy to local residents.

• All equipment used on site will be fitted with appropriate noise suppression equipment and well maintained so as to minimise noise and vibration impact

• Daily visual checks are undertaken to monitor equipment is well maintained.

• Investigate and review noise and/or vibration levels during work activities upon receipt of complaints.

• All complaints shall be logged in the Environmental Incidents and Complaints Register.

Upon request from the EHP following a Noise Complaint from the public, monitoring will be undertaken in line the Environmental Authority Requirements and the current EHP Noise Measurement Manual.

Omya Standard Operating Procedure:
13 EROSION AND SEDIMENTATION CONTROL

The Bajool Marble Mine has been developed along the upper ridge line of Mt McCamley.

Natural valley depressions and creek lines facilitate the draining from the site, ultimately discharging to Eight Mile Creek.

The creek system and onsite drainage lines are dry for the majority of the year, with rainfall events resulting in high velocity flows for a limited period of time before evaporation and infiltration occur.

The site operated under the discharge conditions outlined in Environmental Authority EPML00657813 which has conditions relating to stormwater discharge and the pumping out from Wells Quarry following rainfall events, Refer to Section 12 Water Quality.

13.1 Omya Erosion and Sediment Control Objectives

Omya implements mining management practices to control erosion and minimise sedimentation.

The aim of these management practices is to minimise environmental harm caused by the effects of erosion and sedimentation, associated with the operation of the Bajool Marble Mine.

As per IECA (2008), Erosion and Sediment Control activities on the site should be managed to achieve the following key objectives:

• Drainage control – prevention or reduction of soil erosion by concentrated flows and appropriate management and separation of the movement of clean and dirty water through the area of concern.

• Erosion control – prevention or minimisation of soil erosion (from dispersive, non-dispersive or competent material) caused by rain drop impact and exacerbated overland flow on disturbed surfaces.

• Sediment control – trapping or retention of sediment either moving along the land surface, contained within runoff (e.g. from up-slope erosion) or from windborne particles.

13.2 Identified Risk

Erosion and sediment runoff from stockpiled material, cleared areas and waterways entering Eight Mile Creek or causing an exceedance of the sites Environmental Authority.
13.3 Site Management Principals

For onsite erosion and sediment control to be effective, the following fundamentals are required (IECA, 2008). These are implemented on site where required.

- Ensure ESC measures are designed and constructed effectively;
- Minimise the duration and extent of soil exposure;
- Promptly stabilise disturbed areas;
- Maximise sediment retention on the site;
- Control water movement through the site;
- Minimise soil erosion wherever possible rather than applying down slope sediment controls;
- Utilise existing topography and adopt construction practices that minimise soil erosion and sediment discharge from area;
- Integrate erosion and sediment control issues / measures into the planning phases of mine operations;
- Choose the ESC technique to account for site conditions such as soil, weather and construction conditions;
- Maintain all ESC measures in proper working order at all times; and
- Monitor the site and adjust ESC practices to maintain the required performance standard.

13.4 Site Controls

The Bajool site has been mapped into its various catchment zones and the direction of flow within each zone identified within Figure 5, as part of the 2017 Water Management Plan.

Each Catchment Zone encompasses one or more of the onsite activities:

- Mine Pits
- Waste dumps (Historic and WREA)
- Haul roads
- Crusher / loading area
- Stone dust plant / bagging area
- Natural vegetation areas
Each identified zone has a sediment pond in place to capture the runoff from the area and reduce the velocity of the discharge waters to facilitate settlement prior to off site discharge.

The aim of the ponds is to provide a catchment area to slow the velocity of the runoff waters and allow entrained sediment to settle.
The catchment ponds are not lined and not designed as permanent detention basins, rather water infiltrates through walls further reducing sediment loading.

Sediment collected within the Catchment Ponds is periodically cleaned out to provide adequate freeboard.

Omya actively divert waters from non Mine affected areas away from any given soil disturbance using Flow Diversion Banks (made from out of spec marble or topsoil).

The 2017 Omya Water Management plan outlines the existing catchment areas on site and formalises the drainage channels, check dams and sediment ponds in place to manage flows from these areas.

The site has identified a series of controls to achieve the identified site Erosion and Sediment Control Objectives, as follows:

13.4.1 Objective 1 - Drainage control

Drainage channels, whether permanent or temporary, have been designed and constructed at a gradient that limits the maximum flow velocity for the adopted design event standard to a value not exceeding the maximum allowable flow velocity for the given surface material.

The flow velocity has been reduced by either:
- Reducing the depth of flow (increasing the width of the channel);
- Reducing the bed slope;
- Reducing the peak discharge (reducing catchment area); or
- Increasing channel roughness.

Where the channel width, depth or gradient could not be altered, then there are two options implemented for controlling erosion:
- Reducing the flow velocity through the placement of rock check dams;
- Increasing the effective scour resistance in the channel through the placement of an effective channel liner such as rock.

The following additional controls outlined in Table 1 are to be used for new works or site modifications:

Table 1 – Summary of Drainage control techniques

<table>
<thead>
<tr>
<th>Technique</th>
<th>Typical use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onsite Drainage</td>
<td>• On-site drainage shall be constructed to ensure that run-off is directed to sediment control devices.</td>
</tr>
<tr>
<td>Runoff velocities</td>
<td>• Runoff velocities shall be reduced by minimising the length of flow paths and by constructing channels with low</td>
</tr>
</tbody>
</table>
Minimise Clearing

- Minimising as far as practicable the area of land which is bare of vegetation at any one time. Planning the stages of various works to minimise erosion

Surface Runoff

- Surface runoff shall not be directed through exposed areas and stockpiled material shall be stored or bunded away from overland flow paths.

### 13.4.2 Objective 2 - Erosion control

The control of soil erosion from occurring is the best way of minimising suspended sediments in surface run-off. However, as all quarry activities inevitably disturb soil material, sediment trap-sites constitute an important component of soil and water management plans.

The disturbance of site vegetation will be minimised and where disturbance has occurred, control techniques as identified in Table 2 will be implemented as soon as practical.

**Table 2 – Summary of erosion control techniques**

<table>
<thead>
<tr>
<th>Technique</th>
<th>Typical use</th>
</tr>
</thead>
</table>
| Cellular confinement systems | • Containment of topsoil or rock mulch on medium to steep slopes.  
• Control erosion on non-vegetated medium to steep slopes such as bridge abutments. |
| Compost blanket          | • Used during the revegetation of steep slopes either incorporating grasses or other plants.  
• Particularly useful when the slope is too steep for the placement of topsoil, or when sufficient topsoil is absent from the slope. |
| Gravelling               | • Protection of non-vegetated soils from raindrop impact erosion.  
• Stabilisation of site office area, car parks and access roads. |
| Heavy mulching           | • Stabilisation of soil surfaces that are expected to remain non-vegetated for medium to long periods. |
### 13.4.3 Objective 3 - Sediment control

Sediment dams are used on the site to trap sediment from disturbed area runoff. The sizes and locations of sediment dams are described in 2017 Water Management Plan.

Due to the nature of the site geology, sediment generated by in-pit operations readily settles out of suspension. As demonstrated by the Omya Water Quality Data for pit discharges.

The current sediment control system for pit discharges is highly effective in limiting suspended sediment to very low values.

The sediment control system at the mine has evolved over the period of historic operations. Any future modifications to site sediment controls should be undertaken to contemporary standards.

Supplementary sediment controls should be implemented where the sediment producing catchment is small or the potential for producing sediment laden runoff is low.

A list of appropriate supplementary sediment control techniques is given in Table 3.

#### Table 3 – Summary of supplementary sediment control techniques

<table>
<thead>
<tr>
<th>Technique</th>
<th>Typical use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rock filter dam</td>
<td>• Locations where there is sufficient room to construct a relatively large rock embankment.</td>
</tr>
</tbody>
</table>
### Technique | Typical use
--- | ---
• The incorporation of a filter cloth is the preferred construction technique if the removal of fine grained sediment is critical (high maintenance).

| Check dam sediment trap | • Supplementary sediment trap in minor concentrated flow areas.  
| | • Trapping sediments in table drains and minor drainage lines  
| | • Check dams may be constructed of rock, sand bags or compost filled socks |

| Buffer zones/grass filter strips | • Mostly suited to sandy soils  
| | • Can provide some degree of turbidity control while the buffer zone remains unsaturated. |

| Sediment fence | • Supplementary device for sheet flow from minor catchment areas  
| | • Suitable for all soil types  
| | • Require maintenance after every runoff event. |

### 13.4.4 Wells Waste Rock Emplacement Area Expansion

Wells waste rock emplacement is designed to have a final slope of $33^0$ and maximum vertical distance of 10 m wide bench/erosion control structures (Omya, 2016). It is profiled to provide erosion control. The waste rock emplacement area will be progressively revegetated as necessary.

The facility has been designed for rainwater to permeate through the stored material down to subsurface drainage channels which direct the waters to the dedicated Sediment Pond. The generation of suspended sediments in water from waste dumps will be managed as part of the overall water management strategy of maximising water infiltration into the dumps.

This strategy reduces the amount of surface water on disturbed areas and will effectively filter substantial amounts of the coarser suspended sediments. The finer sediments will be reduced by the reduction in water velocity. Sediment traps will be maintained downslope of the dumps to provide secondary capture and final settling capacity prior to final release.
13.4.5 Haul Road Management

Haul roads will continue to be managed via good house keeping by maintaining drainage windrows and diversion features. Suspended sediments will be directed into either adjacent waste rock dumps, the open pit or dedicated sediment traps. At present, the south-flowing run-off from the haul roads is directed into a marginal area of Wells quarry for settling, before dispersal via evaporation or siphoning.

There is a significant potential to generate suspended sediments in water reporting to the western flowing drainage lines from the crusher / loading area which has lead to recent upgrades in the capacity of the lower sediment ponds on site.

13.4.6 Sediment Basin

Recently installed Sediment Basin is designed to capture and contain wastewaters from the optical sorting plant.

The Sediment Basin is fully lined with a poly liner and sprayed concrete guard layer for protection during clean out. Water is gravity fed to the pond from the sorter where it is allowed to settle. The clear water is then pumped to a holding tank and then pumped back to the optical sorter for reuse in the washing process.

Overflow from the Sediment Basin during extreme weather events joins the site discharge channel and is captured in the downstream Sediment Ponds.

Daily visual inspection shall be undertaken to ensure adequate sedimentation and erosion control.

All incidents and complaints shall be logged in the Environmental Incidents and Complaints Register.

Omya Standard Operating Procedure:

BJ-SOP-001  Water Sampling
14 LAND CONTAMINATION

14.1 Omya Objectives
The mining operations will be operated to prevent contamination of land on or around the site.

Given the nature of onsite activities, it is unlikely that they are listed on the Queensland Environmental Management Register or Contaminated Lands Register.

14.2 Identified Risk
No hazardous waste rock or tailings are produced by the Mine, therefore there are only contaminated land issues associated with the mine would be from the maintenance and operation of mining plant and equipment.

Potential sources of water contamination include:

• Fuel, chemicals and other hazardous materials leak or be spilled contaminating surrounding land.

14.3 Onsite controls
Fuels, chemicals and other hazardous materials will be stored in designated areas in accordance with the relevant standards. This may include bunding, concrete slabs, lockable enclosures etc.

Servicing of plant will be performed where practicable in designated areas, away from natural drainage systems.

In the event of a major fuel or oil spill, workers will be trained to take the following action:

• Check that the area is safe before entering.
• Call for emergency services, if required.
• Take measures to minimise the extent of the spill and prevent it entering water and drainage systems. This may include such things as temporary bunding, covering it with absorbent material, soaking it up with dry soil etc.
• Where practicable, take measures to reduce the volume of the spill. This may include such things as temporary plugging source of spill, returning overturned containers to an upright position etc.

14.4 Omya Operating Procedures
• Contaminated soils are considered “Regulated” under the EP Act.
• Visual inspections as part of Housekeeping Inspections of site and storage facilities.
• All incidents and complaints shall be logged in the Environmental Incidents and Complaints Register.

• Contaminated soil shall be removed from the spill site and transported for bioremediation or disposal in accordance with local government regulations.

Omya Standard Operating Procedure:

BJ-SOP-007 Waste Management
BJ–SOP–010 Refueling Mobile Equipment
BJ–SOP–011 Filling Site Diesel Fuel Tank
15 FLORA AND FAUNA

Omya has a mature site rehabilitation program on site and a long term commitment to the marble deposit to ensure the management of the site and its restoration will be ongoing. Omya will ensure all required permits and approvals will be obtained prior to undertaken any works and that offset required requirements will be met.

15.1 Omya Objectives

To minimise disturbance to native flora, fauna and surrounding ecosystems in order to maintain the environmental quality and the visual amenity of the surrounding areas.

To reinforce species numbers in areas free from construction works in order to regain some lost habitat value.

Minimise the increase of existing weeds and prevent introduction of additional noxious weeds to the works or adjoining areas.

15.2 Identified Risk

Potential risks to onsite flora and fauna include:

- Unauthorised clearing of fauna;
- Degradation of existing flora and fauna though mining activities;
- Areas immediately around the periphery of the mining works may suffer from degradation and native flora and fauna may be dispossessed.

15.3 Onsite controls

- The sites impact on flora and fauna is managed via the following strategies:
  - The clearing of native vegetation is restricted to the disposal area only with all associated infrastructure, haul roads, catchment expansion etc to be undertaken within the disturbed area where possible;
  - Clearing for mine expansion or infrastructure is to be progressive as the additional area is required rather than clearing the entire surface in one project to minimise exposure of soils and sub soils, disruption of fauna and risk of sediment runoff;
  - Topsoil from the area is to be stored within the area in wind rows until required as part of the sites Rehabilitation Strategy;

15.4 Omya Operating Procedures

- The removal of vegetation shall be restricted to the minimum area required for mining works and haul roads.
• Cleared timber shall be milled, chipped or mulched and where possible incorporated into the landscape features of the project.

• Clearing permits will be obtained for all new Mining Lease Applications. No open burning is permitted on site.

• Advise will be issued to all workers at induction and at subsequent tool box meetings of requirements in regard to protection of flora and fauna.

• Minimise disturbance to areas where revegetation or landscaping works have been completed.

• All earthmoving machinery and light vehicles brought to site from areas known to be infected with noxious weed shall be washed free of accumulations of dirt and organic matter before mobilisation to site.

• If any wildlife requires relocation, clearance shall be obtained from EHP.

• Periodic visual assessment of site shall be undertaken to verify vegetation is still healthy, no injured or nesting fauna exists and noxious weeds have not flourished.

• Identify method of introduction of noxious species or spread of local weeds and modify work methods to minimise a re-occurrence.

• Weed infestations shall be treated on a as needs basis. The works, adjoining areas, any previously infected areas within the works corridor shall be re-inspected at the completion of the maintenance period and new infestations treated.

• An identification program will be established where required, and inspections of the site and areas intended for use as borrow pits, storage etc., will be undertaken and sightings reported to the Mine Manager;

• All incidents and complaints shall be logged in the Environmental Incidents and Complaints Register

**Omya Standard Operating Procedure:**

BJ-SOP-00X  Weed Management Plan
Omya Plan of Operations (2014 to 2019)
16 CULTURAL HERITAGE

The Darumbal- Noolar Murree Aboriginal Corporation for Land and Culture and Dr Luke Godwin from Central Queensland Cultural Heritage Management Pty Ltd undertook a Cultural Heritage survey of the site in 2002 in which it concluded There are no known cultural heritage sites within the existing mining lease area. and it is unlikely that the mining operations would meet any of the criteria under the Queensland Heritage Act, 1992 for inclusion on the Queensland Heritage Register - nor is it so listed.

16.1 Omya Objectives
Prevent or minimise damage to potential cultural heritage sites and artifacts on site.

16.2 Identified Risk
No significant cultural heritage values (either Aboriginal or non-Aboriginal) have been identified within the project area, however there is always the possibility that cultural artifacts will be unearthed during the mining and may be damaged or destroyed.

16.3 Onsite controls
Cultural Heritage Duty of Care Guidelines are applied to new works undertaken on site in accordance with the sites Environmental Management System Manual (Rev 10).

16.4 Omya Operating Procedures
All workers will be advised at induction and at subsequent toolbox meetings of requirements in regard to cultural heritage issues.

If, during mining, items of cultural heritage are discovered, mining activity at the particular location shall cease immediately and the items will be left and kept in a safe condition and the EHP will be notified.

Omya shall carry out any instructions received from the Environmental Heritage Protection Agency (Cultural Heritage) representative.

If, during mining, skeletal remains are exposed, mining activity at and within 50 metres of the particular location shall cease immediately and the Police will be notified immediately of the find. The Environmental Protection Agency shall be notified at the earliest practicable time of the discovery.

No work shall be resumed within 50 metres of any such find, until the EHP has granted approval.

All incidents and complaints shall be logged in the Environmental Incidents and Complaints Register.

17 WASTE MANAGEMENT

Waste from the mining operation is generated from a range of sources, including the mining process, processing/sorting, maintenance and administration.

Omya are investing resources into each of these processes to ensure they are undertaken more efficiently to minimise wastage and maximise yield from mining operations.

The Current volume of waste rock sent to the WREA is approximately 60,000m$^3$ per annum, with the implementation of its current upgrade plans, the Mine aims to reduce the waste rock to between 25,000m$^3$ and 40,000m$^3$ per year.

The plan and program to achieve these reductions include:

- Installing the new optical sorter:
- Replacing the on-site ball mill with a roller mill;
- Better, selective blasting and mining practices, thereby minimising contamination of ore with waste rock.
- Rescreening campaigns to recover some of the quarry rock already on the WREA.
- Total Waste Management Contract to improve recycling opportunities on site.
- Finding alternative markets for the quarry rock not suitable for Omya’s mills (and currently being hauled to the WREA)

17.1 Omya Objectives

Any waste generated, stored or transported, as part of the mining operation is managed in a way that protects all environmental values.

Omya will continue to strive to ensure that the following waste management hierarchy is adopted on site.

Omya will maintain the aesthetic appeal of the area and the habitat of the surrounding environment and identify and correctly dispose of those waste products identified as “Regulated Wastes” under Schedule 7 of the Environmental Protection Regulation 2008.

17.2 Identified Risk

Potential sources risk in the management of onsite wastes include:

- Incorrect disposal of waste (fuel, oil, chemicals and sewage etc.)
- Storage and handling of mining waste may have the potential to contaminate land and waterways.

17.3 Onsite controls

Waste onsite is managed in accordance with the Waste Management Hierarchy
The mine operates its activities to ensure the following management options are adopted on site:

**AVOID / REDUCE** unnecessary resource consumption waste generation and disposal through:

- Selective mining, drilling and blasting to avoid contaminated seams within the pit;
- Upgrading sorting equipment to minimise contamination of the waste streams with good quality stone to reduce the volume of waste to the WREA.
- Upgraded roller mill able to process wider grade of stone, reducing the amount of wastage to the WREA.

**RE-USE** waste resources without further manufacturing through:

- Out of spec material is used onsite for road and batter construction and in the establishment of rehabilitation areas.

**RECYCLE** waste resources to make the same or different products:

- Creation of new markets through the segregation of large ornamental or dark reject stone which do not meet the specification for current customers and
would have traditionally been disposed of to Wells Rock Waste Emplacement, however have value in the landscape architecture industry.

**RECOVER** waste resources, including the recovery of energy;

- With the installation of the new photo sorter, Omya plan to undertake the selective recovery and re-sorting of material on the Wells Rock Waste Emplacement which had been historically disposed of to extract viable product;

**TREAT** waste before disposal, including reducing the hazardous nature of waste;

- No treatment of waste required prior to disposal.

**DISPOSE** of waste only if there is no viable alternative through:

It is in the companies best financial interest to minimise the volume of wastes to the Emplacement area and internal targets are set to reduce the volume of waste to Wells Rock Waste Emplacement by 10% by 2017.

### 17.4 Omya Operating Procedures

- Daily visual housekeeping inspection to ensure spills are cleaned promptly and sedimentation prevention measures appear effective and are not damaged.

- Waste collection containers shall be signed and appropriate for the retention of waste material.

- All incidents and complaints shall be logged in the Environmental Incidents and Complaints Register.

  - Regulated and Trackable Wastes will be managed in accordance with regulations and all waste Tracking completed and retained in line with Table 4

**Omya Standard Operating Procedure:**


- BJ-SOP-007  Waste Management
<table>
<thead>
<tr>
<th>Waste Product</th>
<th>Regulated Waste</th>
<th>Trackable Waste</th>
<th>Disposal Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil</td>
<td>Yes</td>
<td>Yes *</td>
<td>Collected in labeled drums, where it shall be collected by a licensed recycling contractor.</td>
</tr>
<tr>
<td>Oil Filters</td>
<td>Yes</td>
<td>Yes *</td>
<td>Collected in labeled drums, where it shall be collected by a licensed recycling contractor.</td>
</tr>
<tr>
<td>Oily Rags</td>
<td>Yes</td>
<td>Yes *</td>
<td>Collected in labeled drums, where it shall be collected by a licensed recycling contractor.</td>
</tr>
<tr>
<td>Soils Contaminated by Hydrocarbons</td>
<td>Yes</td>
<td>Yes *</td>
<td>Absorbed with Enviro Drysorb. Contaminated soil and Enviro Drysorb shall be stored in adequate containers before disposal in maximum 100kg lots at an approved Waste Management Facility.</td>
</tr>
<tr>
<td>Tyres</td>
<td>Yes</td>
<td>Yes *</td>
<td>Where feasible tyres will be retreaded and reused. Where it is not feasible, tyres will be removed from site and disposed of in an approved recycling or landfill facility.</td>
</tr>
<tr>
<td>Lead Acid Batteries</td>
<td>Yes</td>
<td>Yes</td>
<td>Collected in a designated Waste Battery container for collection by a licensed recycling contractor.</td>
</tr>
<tr>
<td>Waste Grease</td>
<td>Yes</td>
<td>Yes *</td>
<td>It shall be collected in labeled containers Final disposal will be to an approved Waste Management Facility.</td>
</tr>
<tr>
<td>Degreasers, Detergents, Solvents</td>
<td>Yes</td>
<td>Yes *</td>
<td>Where feasible they shall be collected in labeled drums and transported off site to an approved Waste Management Facility Care will be taken to ensure that water does not enter these drums.</td>
</tr>
<tr>
<td>Waste Product</td>
<td>Regulated Waste</td>
<td>Trackable Waste</td>
<td>Disposal Method</td>
</tr>
<tr>
<td>--------------------</td>
<td>----------------</td>
<td>-----------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Spent Welding Rods</td>
<td>No</td>
<td>No</td>
<td>Collected in labeled containers and disposed of off site in accordance with Local Authority requirements</td>
</tr>
<tr>
<td>Empty Drums</td>
<td>Yes</td>
<td>No</td>
<td>As many of their contents are considered “Regulated” care must be taken to empty them properly. If they have no Regulated residue or shall be reused for waste collection on site or transported off site for recycling.</td>
</tr>
<tr>
<td>Engine Coolant</td>
<td>No</td>
<td>No</td>
<td>It shall be collected and reused where possible.</td>
</tr>
<tr>
<td>General Rubbish</td>
<td>No</td>
<td>No</td>
<td>Disposed of in accordance with Local Authority requirements.</td>
</tr>
<tr>
<td>Scrap Metal</td>
<td>No</td>
<td>No</td>
<td>Collected in labeled bins before being transported off site for recycling.</td>
</tr>
</tbody>
</table>

Notes: * Only applies if transported in >250kg lots or by a commercial operator.
18 COMMUNITY LIAISON

18.1 Omya Objectives
Minimise disturbance to the quality of lifestyle and livelihood of nearby residents.

18.2 Identified Risk
Residents exist within close proximity to the mine and there is a risk that they may be adversely effected by mining activity

Grazing and agricultural lands adjoin the works and there is a risk that they may be adversely affected by mining activity.

18.3 Onsite controls
• Mine Manger shall be designated as the Community Liaison Officer (CLO) for the duration of the works.
• At all times, Omya will plan our activities to have minimal impact on the community. Where practical Omya will implement alternative work methods to avoid impact on the community.
• Omya will not take timber, water, gravel or any other resource from adjoining land without the written consent of the landowner.
• All efforts shall be made to ensure that gates and fences bounding the site and access roads through the site are maintained in good repair.
• Workers will be advised at induction not to trespass on neighbouring properties and observe all speed limits.
• The CLO shall personally investigate; record and report on complaints received and keep the Director Operations advised of all complaints and actions.

18.4 Omya Operating Procedures
• Visual inspection of neighbouring boundaries.
• All complaints shall be recorded in the Environmental Incidents and Complaints Register.
• Where feasible implement barriers and/or signs to reduce the disturbance to the resident’s lifestyle or livelihood.
• Provide additional training to workers where appropriate.

Omya Standard Operating Procedure:
Attachment 1

Acid Mine Drainage and Carbonate Buffering

Acid Mine Drainage (AMD)

AMD occurs due to the oxidation of Fe sulfides (most common being pyrite), in silicate-rich rocks. The acid is produced via the oxidation of the ferrous Fe (Fe$^{2+}$) to ferric Fe (Fe$^{3+}$) and S from S$^{-}$ to S$^{6+}$. This results in the formation of ferric hydroxides (such as goethite) and sulfuric acid. Goethite is very stable at the earth’s surface while the sulfuric acid is very corrosive and toxic. The silicate-rich rocks that ordinarily host the Fe sulfides are very inert in even extremely acidic conditions and as such have little to no role in buffering the acidity produced via the Fe sulfide oxidation. This acidity results in a more oxidising environment that causes the Fe sulfides to oxidise even more quickly, developing a chain reaction that results in the extreme acidification of the ground and surface waters commonly observed at sites of AMD.

Carbonate Buffering

Carbonate buffering via minerals such as calcite prevent AMD on two fronts. Carbonates are readily soluble in ground and surface waters (Equation 1) and create reducing conditions in these waters, significantly slowing (if not completely preventing) the oxidation of Fe sulfides to begin with. The second front on which carbonates prevent AMD is that any acid that may be produced via Fe sulfide oxidation are quickly neutralised by the reactive carbonates as shown in Equations 2 and 3. Figure 1 shows a table to determine the quantities of calcite required to neutralise pyrite oxidation within a waste dump which shows that a 3:5 ration of pyrite:calcite is required, (Omya waste dumps being as much as ~1% pyrite and commonly up to 97% calcite giving close to a 1:100 ratio, greatly exceeding this requirement).

\[
\text{CaCO}_3 + \text{H}_2\text{O} \rightarrow \text{Ca}^{2+} + 2\text{OH}^- + \text{CO}_2 \quad (1)
\]

\[
\begin{align*}
\text{FeS}_2 \quad \text{pyrite} & + \quad 15/4 \text{O}_2 \quad + \quad 7/2 \text{H}_2\text{O} \quad \Rightarrow \quad \text{Fe(OH)}_3 \quad \text{ferric hydroxide} \quad + \quad 2 \text{H}_2\text{SO}_4 \quad \text{sulfuric acid} \\
\text{H}_2\text{SO}_4 \quad \text{sulfuric acid} & + \quad \text{CaCO}_3 \quad \text{calcite} \quad + \quad \text{H}_2\text{O} \quad \Rightarrow \quad \text{CaSO}_4 + 2\text{H}_2\text{O} \quad \text{gypsum} \quad + \quad \text{CO}_2 
\end{align*}
\] (2) (3)

| Waste  | FeS$_2$ | FeS$_2$ | FeS$_2$ | FeS$_2$ | S | H$_2$SO$_4$ | CaCO$_3$ | CaCO$_3$ | CaCO$_3$
<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt</td>
<td>%</td>
<td>Mt</td>
<td>MW (g)</td>
<td>Million moles</td>
<td>Million moles</td>
<td>Million moles</td>
<td>Million moles</td>
<td>MW (g)</td>
<td>Mt</td>
</tr>
<tr>
<td>30</td>
<td>2</td>
<td>0.5</td>
<td>120</td>
<td>5,000</td>
<td>10,000</td>
<td>10,000</td>
<td>10,000</td>
<td>100</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Figure 1: Calculations required to determine CaCO3 required to prevent 2% pyrite in 30 Mt waste dump with equations to demonstrate molar ratios and harmless by-products of goethite and gypsum. Omya waste dumps being as much as to ~1% pyrite and commonly up to 97% calcite giving close to a 1:100, pyrite:calcite ratio.
Further References:

