Linwood Quarry Information Fact Sheet

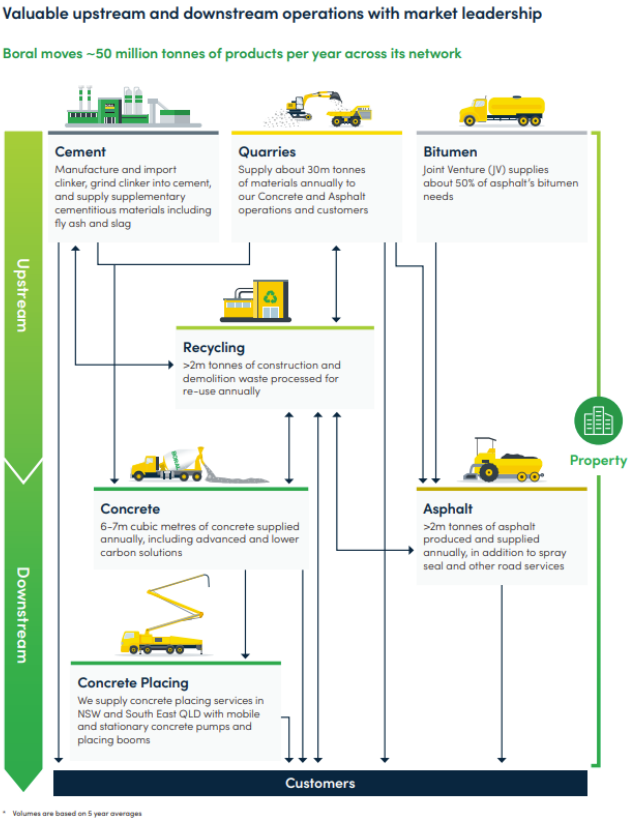
The Boral Linwood Quarry, positioned within one of Adelaide and South Australia's most important sources of hard rock, has been providing aggregates since 1883.

The Boral Linwood Quarry is located between Marino and Hallett Cove, not far from the shore of the Gulf of St Vincent, in Adelaide's southern suburbs.

The quarry is bordered by the City of Marion Golf Club to the northeast, itself having been formed on the original South Australian Portland Cement Company workings.

Vacant 'hills face zone' land exists to the east and southeast of the quarry as bounded by Ocean Boulevard and Perry Barr Road.

Today the Boral Linwood Quarry employs 26 full time staff and provides work for up to 80 contractors and transport workers.



Who are we?

Boral is the largest vertically integrated construction materials company in Australia. Our network includes prized quarry and cement infrastructure, bitumen, construction materials recycling, asphalt and concrete batching operations. We have built a reputation of being a responsible and respected operator.

We employ about 7,500 employees and contractors across our operations that span more than 360 sites nation-wide.

For more almost 80 years we've been building something great in Australia - rarely a day goes by that you wouldn't pass one of our sites or trucks, enter a building, use a road, bridge, tunnel, footpath or other critical infrastructure that our people and products have helped enable.

What is quarrying and why do we need it?

Quarry products are often collectively referred to as aggregates. Aggregates are used in composite materials such as concrete, asphalt, masonry products, bricks and bituminous road surfacing, or on their own such as road base.

Aggregates are essential to our economic prosperity and are the foundation of our built environment. They are crucial in the building of our homes, roads, railways, schools, hospitals, and other types of other essential urban infrastructure.

The quarrying industry is a significant part of South Australia's resources sector, which collectively contributed over $9.5 billion in direct and indirect spending to the state's economy in the 2023-24 financial year. This sector supports vital jobs, local suppliers, and public infrastructure projects, and has shown a 61.4% economic uplift over the past five years.

Each year, the building and construction industry needs more than 200 million tonnes of quarry materials.

- Every Australian requires 8 tonnes of stone, sand and gravel every year to build the roads, houses and other infrastructure we all need.
- To build an average new house we use about 110 tonnes of construction aggregates and 53 cubic metres of concrete.
- To build one kilometre of two-lane highway requires about 140,000 tonnes (or 400 truckloads) of construction aggregates.

Aggregates are also used for rail ballast, drainage media, landscaping purposes, and larger sized rock such as gabion and revetment stone for erosion, scour protection and construction of retaining walls.

Ideally quarrying needs to be carried out close to where these materials will be used. This keeps transportation costs low, reduces environmental emissions, reduces traffic congestion and helps keep building costs down in local communities. Road transport distance and cost represents around 35% of the delivered costs of aggregates.

Quarries usually coexist with local communities and are bound by stringent planning and operating conditions to minimise their impact.

The Quarrying Process

The quarrying process begins with clearing vegetation and stripping topsoil/ overburden. Once the site is cleared, drilling and blasting will be carried out to break the underlying rock, creating the required quarry benches.

After blasting, the raw material is extracted and loaded from the pit floor onto haul trucks. These trucks will transport the material to the permanent plant and stockpile area located in the eastern section of the site.

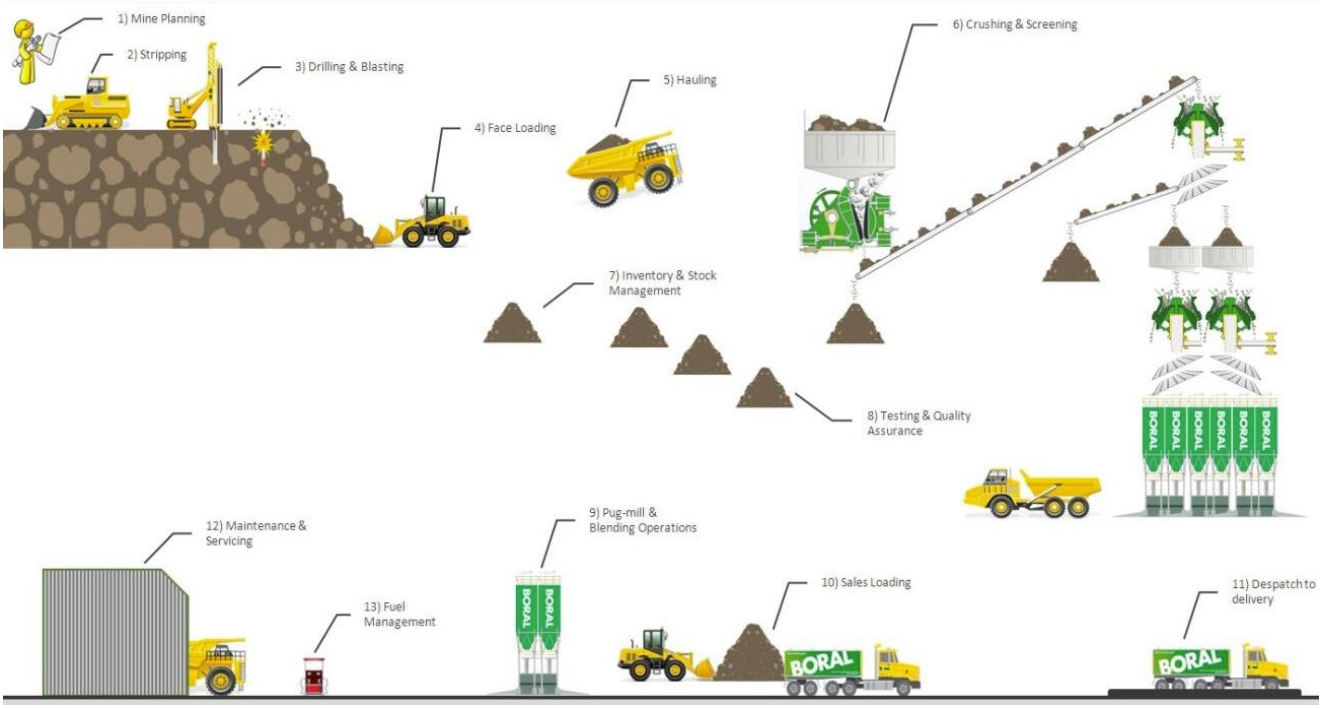
Any larger rock fragments will typically be broken down using a rock breaker before being loaded onto trucks. The load and haul fleet will generally operate continuously during quarry working hours to ensure a steady supply of material for processing.

Crushing and Processing

The crushing stage involves multiple crushers, including a jaw crusher, secondary, tertiary, and quaternary crushers, along with vibratory screens. The crushed material is then stockpiled for further handling.

Material Loading and Transport

Once stockpiled, quarry materials are loaded by front-end loaders onto road haulage trucks. These trucks proceed across the weighbridge, pass through the wheel wash to remove dust and debris and then exit the site for dispatch.



Blasting, Vibration and Air-blast overpressure

Blasting is done weekly at Linwood Quarry, usually on a Wednesday.

Linwood Quarry maintains a blast register and notifies interested people when blasting activities occur. If you would like to join the register, please send an email to community@boral.com.au with your name and contact details (email and mobile) and specify it is for Linwood Quarry.

What is Blasting?

There are a number of ways to extract 'hard' rock, but the most common and effective method is 'controlled blasting'. As blasting is very precise practice, each blast is designed and carried out by an independent third-party blast expert. A blast design is generated and is a carefully planned operation that involves drilling into the rock in a specified pattern, then placing a very precise amount of explosive in the holes. The explosives are then detonated in a precise sequence, designed to maximise the efficiency of rock breakage while minimising noise, vibration and dust. One of the advantages of blasting is that it reduces the need to operate large heavy equipment to extract the rock, in turn reducing noise and greenhouse gas emissions. Depending on how close you live to a quarry, you may notice some vibration or noise associated with blasting, however all blasts as mentioned are precisely designed to prevent and minimise impacts to surrounding neighbours.

What safeguards are in place during blasting?

Strict national safety regulations apply to protect neighbouring homes, buildings and public places from the potential effects of blasting. Blasting operations must adhere to prescribed limits stipulated by the relevant regulatory authority that are well below the vibration levels which could cause structural or cosmetic damage. Blasts are monitored at different locations with sensitive ground and air vibration equipment to ensure they remain within regulations

What else should I know about blasting?

Apart from vibration, the energy used in blasting to move and break rocks may also result in some noise and dust. The further you are away from the quarry, the less you will notice these effects. A quarry's strict operating conditions require that every action be taken to reduce these effects.

Driver and Community Road Safety

At Boral we take safe driving extremely seriously and have a number of control measures in place to maintain a positive road safety culture for all road users. These include:

- Boral management regularly reminds our drivers to be vigilant and respectful while driving on any roads, regardless of vehicle type.
- All of our Boral vehicles have telematics installed which allows management to monitor truck movements and real time speed.
- Boral's logistics team works diligently with our contractors when conducting site inductions to ensure that trucks engaged by us are operated safely and responsibly.
- Truck behavioural audits take place by our Fleet Supervisor on a regular basis, to verify that all drivers are indeed demonstrating safe driving behaviours. If we identify a driver or contractor who is not upholding these conditions, we record the registration, communicate it to the relevant company and if necessary - ban the truck from our sites.
- Boral is currently implementing training for a Human Error Behaviour Program 'SafeStart' which will be undertaken by all our employees. This program aims to achieve a step-change improvement in safety performance by engaging with workers, so they understand how mistakes are made and what can be done to rectify behaviour in the future. It is a highly successful program that helps drivers understand states such as 'Rushing, Frustration, Fatigue and Complacency', which are the key causes in 95% of incidents that occur.
- All vehicles must use a wheel wash after being loaded before exiting our site to ensure that quarry debris is not put onto public roads.

Reporting and compliance

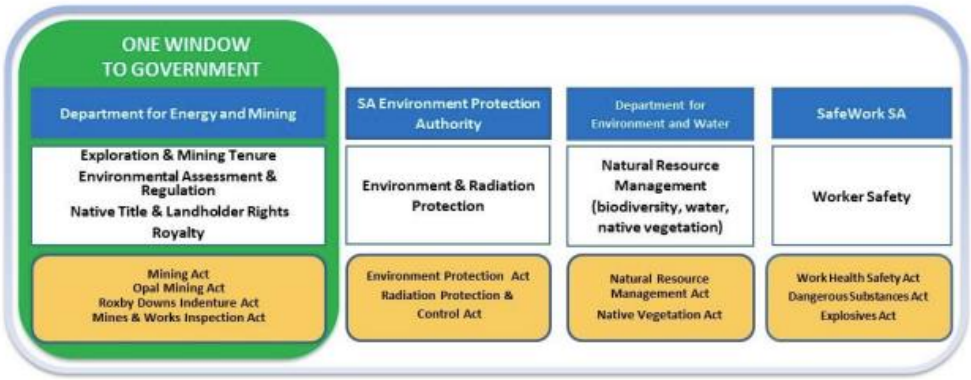
All activities at Linwood quarry are conducted in accordance with current planning and environmental approvals and in line with our operating licence.

Boral is obligated at all times to meet various government approvals and conditions; these are strictly monitored by the regulator to ensure compliance.

The Department for Energy and Mining (DEM) is responsible for the administration and management of mineral resources and is the lead agency for the regulation of South Australia's (SA) mineral exploration and mining sectors. The department website is www.energymining.sa.gov.au.

The framework below shows the responsibilities held by DEM and other agencies that regulate aspects of quarry approvals and operations in South Australia.

Regulatory framework applied to quarries



Source: DEM

State Government Department for Energy and Mining	State Government EPA
Environmental Licensing	**Environmental Licensing**
• Annual extraction limits • Noise • Air Emissions • Water Quality • Stormwater • Hours of operation • Truck movements • Blasting • Buffers • Rehabilitation • Cessation date	• Noise • Air emissions • Water quality • Stormwater

Dust Management at Boral

The safety of our people – our employees and contractors – is always our number one priority and part of our Zero Harm safety goal.

Our Dust Management Framework

Boral takes very seriously our commitments and responsibilities to manage dust across all of our sites.

We strive to lead the way through a comprehensive dust management framework informed by our ongoing work with specialists and regulators to help ensure we are using modern management practices and dust control technologies to keep our people safe and healthy while at work.

This includes occupational hygiene monitoring and personal health surveillance. Like many in our industry and related industries, monitoring of respirable dust (RD) and respirable crystalline silica (RCS) is an established practice in place for many years.

At the Linwood site we undertake regular personnel exposure monitoring with instruments sampling from the breathing zone of workers and periodic static workstation dust monitoring to monitor compliance with the occupational exposure standards for respirable dust and respirable crystalline silica. Additionally, we also constantly monitor ambient air (PM10) at the 3 TEOM monitoring stations on the site for conformance with the National Standard for particulate matter up to 10 micrometres (PM10).

Static dust monitoring and personal exposure monitoring helps us to better understand where potential risks to our people exist and if additional measures are required. Under current regulations, health surveillance of workers must be conducted at least every five years.

All South Australian mine and quarry sites are required to submit respirable dust and respirable crystalline silica sampling results to SafeWork SA. This is part of the regulatory framework to ensure the health and safety of workers. Any exceedances of the 24-hour PM10 Standard are reported to the EPA and DEM.

We continue to monitor and review our dust management approach and will work collaboratively with regulators and the government to make sure our controls meet the required standards to safeguard the health and safety of our people and the broader community.

Respirable Crystalline Silica (RCS)

Boral understands that communities close to our quarry sites have questions and concerns regarding possible inhalation exposures to airborne Crystalline Silica.

What is RCS?

Crystalline silica is a natural substance found in sand, stone, concrete, and mortar. It is also used to make a variety of products including artificial stone products (such as kitchen and bathroom benchtops), bricks and tiles. When workers process materials containing crystalline silica with power tools or other machinery, airborne dust particles can be generated, a proportion of which may be small enough in size to lodge deep in the respirable region of the lungs and potentially cause serious illnesses or diseases - including silicosis. These dust particles are thus called Respirable Crystalline Silica – or ‘RCS’.

Different types of rock and rock products can contain different amounts of crystalline silica, for example limestone has about 2%, slate 25-40% and shale about 22% of crystalline silica.

The rock present at the Linwood site is dolomitic siltstone and limestone hard rock which is crushed for use in the construction industry as aggregate for end uses such as road bases, concrete, asphalt (asphalt and road-sealing aggregates) and revetment works. It should be noted that the amount of silica in the source rock is not indicative of the respirable crystalline silica percentage in the dust. The respirable proportion in any dust is largely dependent upon how the rock is processed.

If the handling and processing of crystalline silica substances is controlled at the source, and workplace exposure limits and environmental dust criteria are appropriately managed, there is no risk of community exposure.

RCS in the air may appear to be concerning, especially as in recent years where there have been reports regarding health issues caused by respirable crystalline silica and the harm experienced by workers in the kitchen benchtop industry.

Visible dust observed around activities at the site is predominantly larger sized particles best described as nuisance sized dust particles, and although visible, is not small enough to be respirable or in the respirable range.

If you would like more information a fact sheet has been developed by the South Australia government which is available at www.energymining.sa.gov.au/industry/minerals-and-mining/forms-legislation-and-guidance/info-sheets

Dust management at Linwood Quarry

The management of dust emissions is a daily priority for quarry operators and management. The generation of dust at Linwood is greatly influenced by the coastal location of the quarry and local weather conditions, and a standard

daily management practice is to discuss the forecast weather and dust controls at the start of every shift with the site team. The function of dust engineering controls is confirmed, and procedural controls may be implemented according to the forecasted weather conditions.

The weather is a significant determinant in potential for generation of visible dust and the start of every shift, forecast weather conditions for the day are reviewed with the workgroup. Additional actions or modified activities may be adopted in addition to the standard dust management engineering controls utilised in all extraction and processing activities on the site.

Adelaide is also the driest Australian capital city with unreliable, light and infrequent rain through summer. The dry and windy conditions exacerbate any 'nuisance' dust factors present in the background. 'Fugitive dust' can be initiated by operational activities and a mixture of sources. Traffic using internal haul roads, crushing plant, and stockpile areas are the most significant contributors to dust emissions.

To account for these factors, the quarry has developed an active system for minimising the risk of dust emissions. This involves:

- Stockpile water spray system - an automatically activated water sprinkler system for 'priority' stockpiles. The 24-hours-per-day system uses pre-set timers which can be adjusted according to weather conditions.
- Water cart - two 35,000 litre water cart vehicles are used to keep roads and unsealed surfaces at the site damp to decrease the chances of fugitive dust from vehicle movements or the prevailing wind. Polymers are regularly added to the water to assist moisture retention and improve dust suppression.
- Wheel wash - all vehicles exiting the quarry must be driven through the wheel wash, to minimise mud and sand carriage onto the roadways.
- Use of dust suppressant in use which helps improve worker safety, protect the environment, and reduce the risk of airborne particles.
- Enclosure of plant - the primary crusher raw material feed hopper is roofed, enclosed on three sides, and has directional fine water sprays to minimise dust generation during tipping operations.
- Conveyers are covered and product transfer points are fitted with fine water sprays.
- The final crushing and screening section of the plant is fitted with a dry dust extraction and collection system ('bag house') ducted to all crushers, screens, bins and conveyor transfer points.
- Street sweeping - depending upon the frequency of sales and weather conditions, a street sweeper is regularly used at the quarry to clean the roads.
- A range of engineering improvements have been undertaken on the fixed crushing plant and additional containment and suppression engineering improvements are in the planning stages.
- Hydro mulching and seeding has been undertaken in two vulnerable areas to prevent wind erosion and improve visual amenity.
- Rehabilitation of the former weighbridge and entrance roadway is nearing completion and will be revegetated in coming months to stabilise and beautify the area.
- Unsealed internal roads are appropriately constructed and graded and where necessary, treated with polymers to limit dust lift-off from transportation activities.
- Adoption of suitable speed limits on unsealed roads.
- Ensuring materials do not extend above truck sidewalls and that all loads leaving the sites are fully covered.

- Monitoring: Dust monitoring 'stations' have been established around the quarrying operations. These include five static deposition monitors, five directional monitors, three weather stations, and three state-of-the-art dichotomous samplers (TEOM's) which measure particulate matter 'PM10', 'PM2.5' in the atmosphere. The TEOM system provides site personnel with real-time data and an alerting function which is used to manage the timing of operational activities. Alerts are set which allows the Quarry Manager to make informed decisions during operations and curtail or cease operations during adverse wind and weather conditions, as required. The system also allows the site to identify background levels and off-site sources and is frequently referenced against local EPA monitors.
- The TEOM system is also utilised for regulatory reporting purposes. Public access to details of the 24-hour average PM10 readings at each of the TEOMs is available on the Boral Linwood webpage www.boral.com.au/linwood.

Rehabilitation and visual screening of the Linwood Quarry

Extensive tree planting and screening mounds have been established around the quarry boundary over time to improve visual amenity.

These areas are maintained as part of an overall site management program. A management strategy has also been implemented which has seen:

- The formation of a western screening mound and landscaping to match the adjacent completed areas.
- Visual upper 'terminal' faces on the east side of the quarry being laid back to a gentle angle, backfilled with overburden and topsoil, grassed and established with small stands of trees and shrubs.
- The upper faces on the west and east sides of the quarry being laid back as quarrying has progressed southward. This has been done to create landforms which assimilates with the adjacent landscape; and
- The main overburden dump, located southwest of the quarry, continued filling across an east-west gully to a point of equal elevation towards the southern boundary. The final landform will be shaped and graded into the adjacent natural contours, grassed and planted with trees and shrubs.

Waste Products

The Boral Marino Concrete plant contains 'washout' pits, used to collect waste concrete washed out of the bowls of concrete trucks.

Waste oil is placed into a single storage facility that is regularly emptied by a licensed contractor, and waste tracking forms are retained on-site.

Scrap steel is stockpiled and occasionally sold to waste metal merchants. Used tyres are sold or returned to the supplier.

Water Recycling

An on-site water recycling network has been established to serve the needs of the concrete plant, the quarry's 'pug mill', and to access road stormwater.

The eco-friendly design allows the site to capture, filter and re-use stormwater by:

- Use of a filtration system for the truck wash, enabling clean water to be used for vehicle cleaning.
- Diverting stormwater to designated storage areas to reduce road maintenance and safety issues from mud and water build up around the plant; and
- Reducing mains water usage by 75 percent through filtering and re-using stormwater and wastewater in the concrete and pugmill plants for production and wash down.

Site Operating Hours

The approved Mine operation plan allows the following hours of operation:

Activity	Times	Days
Drill and blasting	7:00 am - 5.00 pm	Monday to Saturday
Load and haul operations	7:00 am - 10.00 pm 7:00am - 4.00 pm	Monday to Friday Saturday
Crushing and Screening and Pugmill	7.00 am – 10.00 pm	Monday - Sunday
Concrete batching plant, sales and freight distribution	24 hours per day	Monday - Sunday

Maintenance activities may be conducted outside of the standard operating hours.

Community engagement

We are continuously improving processes at our site and Boral welcomes feedback from the community regarding our operations.

If you would like to contact us at any time, please email community@boral.com.au.