Appendix C

Mitigation measures table

EMM
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C.1 Mitigation measures

A summary of the environmental mitigation measures for the project is provided in Table C.1.

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Aspect	Measures
Noise and blasting	Noise and vibration mitigation measures will be implemented in accordance with a Noise and Blasting Management Plan. **Construction:** Construction mitigation measures to address noise generation from work practice methods and plant and equipment suggested in the NVIA include: work practice methods: • regular reinforcement (such as toolbox talks) of the need to minimise noise; • review and implementation of feasible and reasonable mitigation measures to reduce noise; • limiting the use of portable radios, public address systems or other methods of site communication that may unnecessarily impact upon nearby residents; • developing routes for the delivery of materials and parking of vehicles to minimise noise; • where possible, avoiding the use of equipment that generates impulsive noise; and • notifying potentially affected residents prior to the commencement of works; plant and equipment: • where possible, choose quieter plant and equipment based on the optimal power and size to most efficiently perform the required tasks; • operate plant and equipment in the quietest and most efficient manner; and • regularly inspect and maintain plant and equipment to minimise noise level increases, to ensure that all noise attenuation devices are operating effectively. **Operation:** The project was designed iteratively to manage potential operational noise impacts. This included 'at the source' mitigation of the primary screen/secondary (cone) crusher and construction off the bund along the boundaries of the WEA and SEA. **Blasting:** The project will adopt good industry practice blast management including real time monitoring of all blasts. It is noted that blasting is generally undertaken no more than once per week and that blast criteria adopted herein are applied to all development, including relatively larger scale mining operations where blasting occurs daily through the year. The BMP will include blasting design considerations to minimise the potential for flyrock. **Negotiated agreements**: Holcim will use its best endeavours to negotiate noise agreements with the owners of R2 and R3 to mitigate the noise impacts of the project. Holcim will commence discussions with the landowners in early 2021 and will report on the progress of noise agreement negotiations in the Submissions Report for the project.
Air quality	**Legislative requirements** The quarry will continue to comply with the POEO requirements as follows:

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Aspect	Measures
	• as a scheduled activity under the POEO regulations, the quarry operates under EPL 2212 issued by the EPA and is required to comply with requirements including emission limits, monitoring and pollution-reduction programmes (PRPs); • the quarry does not feature significant odour-generating emission sources and is, therefore, unlikely to generate odorous emissions; and • no large-scale open burning is performed on-site. **Best practice dust control** From the data considered in the AQIA, it has been concluded that the most significant sources of particulate matter emissions from the project's operations are associated with material handlings, hauling and wind erosion. To manage particulate matter emissions from the quarry's existing and proposed operations, a range of mitigation measures and management practices are required. Measures implemented at the quarry and include in the emissions estimation (where emission reduction factors exist) for both the existing and proposed scenarios include: • water sprays at conveyor transfer points; • scrapers used to clean conveyor belts; • cyclone and water injection on drills; • design blasts to minimise numbers needed per year; • minimising truck and dozer travel speeds; • ensure dozer routes are kept moist with the use of water carts; • minimising trucks and front-end-loader (FEL) drop heights; • watering of exposed areas where practical; • watering unpaved haul routes; • paved haul routes; • bunds in the SEA and WEA; • partial and full rehabilitation; and • watering at coal crusher screen. In addition to the above measures, Table 5.5 of Appendix E provides an overview of relevant applicable best practice dust control management measures as listed in the NSW Coal Benchmarking Study: International Best Practice to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining (the Best Practice Report) (Katestone 2011).
Biodiversity	**Offsets** A total of 132 ecosystem credits are required to offset the residual impacts of the project, comprising 127 credits from vegetation communities and 5 credits from paddock trees. 76

Biodiversity management measures

Impact	Action and outcome	Responsibility	Timing
Direct impact/ prescribed impact			
Clearing of native vegetation	Avoiding and minimising clearing impacts where possible.	Construction site manager.	Prior to and during

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Aspect	Measures			
		Clearing limits will be clearly marked to prevent clearing beyond the extent of the disturbance area. Tree clearing and disturbance will be limited to the disturbance area. Appropriate signage such as 'No Go Zone' or 'Environmental Protection Area' will be installed. The locations of 'No Go Zones' will be included in site inductions.		vegetation clearing.
	Clearing of hollow bearing trees/habitat trees, resulting in fauna injury and mortality	Limiting removal of trees (including dead trees) to that required within the disturbance area during the installation of project infrastructure. A clearing procedure will be implemented during the clearing of the disturbance area, as follows: preclearance surveys will be completed to determine if any nesting birds are present; and a suitably trained fauna handler will be present during hollow-bearing tree (including dead hollow-bearing trees) clearing to rescue and relocate displaced fauna if found on-site. Appropriate exclusion fencing will be installed around trees and woodland to be retained within the disturbance area during construction in accordance with Standards Australia (2009).	Construction site manager and suitably trained fauna handler.	Prior to and during tree clearing.
	Vehicle collision with fauna	The site speed limit will be 40 km/hr.	Construction site manager	During construction and operation.
	Disturbance of river/creek beds and banks during crossing construction (including construction of creek crossings).	An erosion and sediment control (ESC) plan will be prepared in accordance with *Managing Urban Stormwater: Soils and Construction* (Landcom 2004) prior to commencement of construction. Disturbed areas will be stabilised and rehabilitated as soon as possible to reduce the exposure period. Source controls, such as mulching, matting and sediment fences, will be utilised where appropriate. A specific creek crossing sub-plan will be included as part of the CEMP.	Construction site manager.	Design stage, during vegetation clearing and construction.
	Indirect impact			
	Transfer of weeds and pathogen to and from site.	Appropriate wash down facilities will be available to clean vehicles and equipment prior to arrival and when leaving site.	Construction site manager.	Design stage, during vegetation clearing and construction.
	Artificial lighting impacting fauna behaviour	Lighting will comply with Australian Standard AS4282 (INT) 1997 – Control of Obtrusive Effects of Outdoor Lighting.	Construction site manager.	During construction and operation.

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Aboriginal heritage	**Management of identified sites within the survey area** Avoidance is proposed for three sites: DQ-IF2, DQ-OS1 and DQ-OS2. The three sites will be protected by a semi-permanent or permanent boundary fence around the visible extent of the sites and/or the PAD areas to avoid inadvertent impacts. The isolated artefact from Aboriginal site DQ-IF1 will be relocated by a qualified archaeologist and RAP representatives prior to any impacts for the site. Management measures proposed are summarised in the table below.

Site significance, impact, and management summary

Site name	AHIMS site number	Site type	Significance	Impact type	Project component	Minimum buffer required (m)	Management strategy
DQ-IF1	44-4-0383	Isolated find	Low	Direct	Haul road	N/A	Relocation
DQ-IF2	44-4-0384	Isolated find with PAD	Moderate	None	Nil	20 m	Avoidance
DQ-OS1	36-1-0773	Artefact scatter with PAD	Low	None	Nil	50 m	Avoidance
DQ-OS2	36-1-0774	Artefact scatter with PAD	Moderate	None	Nil	50 m	Avoidance

Special procedures

Special procedures will be implemented if ancestral remains or new sites are discovered during extraction works. These procedures are detailed in Appendix G and summarised below.

In the event that known or suspected human remains are encountered, the following procedure will be followed as soon as the suspected remains are discovered:

- all work in the immediate vicinity will cease and the site supervisor notified;
- the NSW Police and the State coroner to be notified;
- contact Heritage NSW for advice on identification; and
- if it is determined that the skeletal material is of Aboriginal ancestry, the RAPs will be contacted and consultative arrangements will be made to discuss ongoing care or reinterment of the remains.
- In the event of discovery of new Aboriginal sites within the development footprint, the following procedure will be followed:
- the immediate vicinity (an approximate 20 m buffer from the visible extent of the site) will be secured to protect the find;
- an archaeologist and select RAPs to determine the significance of the object(s); and
- any new sites must be registered in the AHIMS database.

In the event that newly identified sites will be impacted by the project and cannot be avoided, they will be managed in a manner commensurate with the assessed significance, consistent with the management measures provided for the identified sites similar.

Aboriginal Heritage Management Plan

An Aboriginal Heritage Management Plan will be developed in consultation with DPIE, the RAPs and Heritage NSW. It will provide detail of:

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Aspect	Measures
	• all Aboriginal sites identified during the archaeological investigation for the project; • management measures and their progress towards completion; • measures to ensure ongoing consultation and involvement of project RAPs; • protocols for newly identified sites; • protocols for educating staff and contractors of their obligations relating to Aboriginal cultural heritage values through a site induction process; • protocols for suspected human skeletal materials; • protocols for the ongoing care of salvaged Aboriginal objects; and • provisions for review and updates for the AHMP.
Historical heritage	All workers and contractors will be informed of their obligations under the NSW *Heritage Act 1977*. If any potentially significant heritage items are uncovered during the course of the works, the Heritage Council of NSW and relevant Commonwealth department will be contacted for advice.
Surface water	All surface water management will be constructed in accordance with the methods recommended in *Managing Urban Stormwater: Volume 1* (Landcom 2004) and *Volume 2E* (for mines and quarries) (DECC 2008). Holcim will continue monitoring water quality and levels in groundwater and surface water in the water storages and Eulomogo Creek. A water management plan will also be prepared which details the management measures that will be implemented to manage quarry groundwater inflows and to monitor surface water levels and water quality. Contingency measures to address excess water within the water management system are provided in the below table **Contingency measures** **Trigger** — **Contingency measure** Groundwater inflows exceed existing WAL allocations — • If practical, maintain higher water levels in pit sumps to reduce groundwater inflows. • Acquire additional WAL entitlements. The water management system is in surplus and discharges from the East Pit are required frequently, outside of significant wet weather events. — • Irrigation activities can be expanded to include the proposed bund walls around the WEA and SEA, new rehabilitation areas established progressively during the project life and unused haul roads. This would substantially increase water use. • There is potential for Holcim to supply water to nearby irrigators for beneficial use.
Groundwater	The potential for detrimental impacts to groundwater quality from a contamination event will be mitigated through standard construction environmental management including: • development and implementation of an OEMP which would detail relevant procedures, including but not limited to; – plant and equipment refuelling; – vehicle wash down and/or cement truck washout; and – notification requirements to the EPA for incidents that cause material harm to the environment; • development and implementation of a site-specific spill management plan as part of the OEMP; and

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Aspect	Measures
	• all fuels and combustible liquids will be managed and handled in accordance with *AS 1940 The storage and handling of flammable liquids*, the WH&S Act and Regulation and the *Storage and Handling of Dangerous Goods – Code of Practice 2005* (WorkCover 2005).
Land resources	**Soil inventory** The details of the quality and distribution of soil materials able or unable to support plant growth will guide material handling processes (ie stripping, stockpiling, sorting and amelioration) and eventual rehabilitation of disturbed areas. The LSCA notes that effective soil management is imperative to successful rehabilitation, and post mining land use objectives. The fertility of the topsoil materials has generally been assessed as moderate to high; however, handling and stockpiling could easily degrade the fertility of these soils. To assist with soil management, a summary of the estimated growth media volumes is provided in Table 12 of the LSCA. It is noted that bulk earthworks and handling of materials has the potential to mix different soil layers and materials and either improve, or degrade, the quality of materials as growth media. Landloch recommends that, should growth media be salvaged from these areas, it may be useful and cost-effective to undertake more detailed survey work to delineate soils and allow the segregation of undesirable materials during stripping **Contamination** To manage any potential contamination impacts associated with the construction and operation of the project, a construction environmental management plan (CEMP) should be prepared to address applicable provisions under the POEO Act. Work, health and safety controls to prevent exposure of construction workers to contamination would be implemented in accordance with the requirements of the *Work Health and Safety Act 2011* and the *Work Health and Safety Regulation 2017*. As well as typical environmental management measures, other components of the CEMP would include: • an unexpected finds protocol, including procedures to identify and manage contamination, if encountered; • procedures for the handling and storage of waste including contaminated materials; • surface water management and sediment and erosion control; • requirements for the storage of dangerous goods and other materials; and • decommissioning requirements, including remediation and rehabilitation if necessary. To manage spills and leaks associated during the operation of the project, spill containment measures will be installed in permanent operational facilities where there is a risk of impact from spills. Site management activities would be documented in an OEMP prepared for the project.
Rehabilitation	**Erosion and sediment control** The following erosion and sediment control measures will be implemented to mitigate erosion risk and predicted rates: • implementation of progressive erosion and sediment control plans for individual areas to ensure sediment erosion risks are identified and appropriately managed and mitigated; • rock/soil matrices and hydromulching will be implemented to further reduce erosion rates along pit walls; • dispersive soils will be treated with gypsum during the stripping process to improve electrochemical stability and such parameters as ESP and EMP; • a sump will be excavated into the floor of the SEA to collect runoff during the rehabilitation phase and until 60% of soil surface has been retained; and • implementation of sowing techniques for the revegetation of the final landforms. **Post-closure monitoring**

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Aspect	Measures
	Rehabilitation monitoring to assess rehabilitation progress will be undertaken annually during operation and every 5 years once rehabilitation has commenced (or less if the rehabilitation criteria have been met). Post-rehabilitation, review of the monitoring frequency will be undertaken based on the performance of the revegetation and an appropriate monitoring frequency determined. Rehabilitation monitoring will identify areas requiring maintenance and identify and address deviations from the expected. Rehabilitation areas will be assessed against performance indicators and regularly inspected for the following aspects: • evidence of any erosion or sedimentation; • success of initial establishment cover; • natural regeneration of improved pasture; • weed infestation (primarily noxious weeds, but also where rehabilitation areas are dominated by other weed); • integrity of drainage, erosion and sediment control structures; and • general stability of the rehabilitation areas. Monitoring techniques will include photographic monitoring and soil sampling in established transects or quadrants within the rehabilitation areas. Specific monitoring within grazing and also native woodland and riparian rehabilitation areas will be undertaken such as indicators of grazing productivity and rapid ecological assessment techniques. **Post-closure maintenance** Where monitoring has identified that rehabilitation criteria has not been met, maintenance works may be undertaken and include: • re-seeding and, where necessary, re-soiling and/or the application of specialised treatments; • use of materials such as composted mulch to areas with poor vegetation establishment; • replacement of drainage controls if they are found to be inadequate for their intended purpose, or compromised by vegetation or wildlife; and • de-silting or repair of sediment control structures. Maintenance works will also be carried out to target specific issues, like weeds management, the upkeep of access tracks and public safety. The spreading of noxious weeds could impact the success of revegetation and will be controlled through the following measures: • herbicide spraying or scalping weeds; • post-closure use of rehabilitated areas as a working farm, with associated management practices; and • rehabilitation inspections to identify potential weed infestations. Access tracks may be required to facilitate the revegetation and ongoing maintenance of rehabilitation areas. These tracks will be kept to a practical minimum and will be designed prior to the completion of the project. Controls will be implemented to minimise the potential for impacts on public safety and may include maintenance of fencing and warning signs around areas that have the potential to cause harm and that are accessible to the public. As pit walls will be rehabilitated to a safe and stable gradient of 18°, permanent bunding is not anticipated to be required. Additionally, any large rocks within the pit walls that pose a safety risk post-rehabilitation will be removed and relocated. **Management and closure plans**

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Aspect	Measures
	A RMP will be developed to provide a structured and documented process for managing and improving rehabilitation activities at the quarry. The plan will serve as a process map for interdepartmental administration of rehabilitation activities within the quarry planning and implementation
Traffic and transport	**Driver's Code of Conduct** Holcim will implement a Driver's Code of Conduct to facilitate the future safe site operations for all the quarry trucks traffic using Sheraton Road, in combination with all the other road users (including school buses) and pedestrian traffic. The Code of Conduct will be required to be read and signed by all truck drivers operating to and from the quarry and will address all relevant road safety and traffic management measures such as, compliance with all rules and regulations, vehicle speeds, driver behaviour near schools, residential and shopping areas, courtesy to other road users, fatigue management, drug and alcohol testing, checking vehicles and covering loads, the appropriate use of compression braking, procedures for accidents and breakdowns, procedures for oversize vehicles accessing the site, and procedures for monitoring and compliance. **Road pavement maintenance** A road maintenance agreement for Sheraton Road will be discussed with the DRC. **Stakeholder engagement** Further meetings of the CCC will continue to address traffic and road safety related matters.
Social	The proposed mitigation and management strategies for potential social impacts are summarised in the below table.

Summary of mitigation and management strategies for identified social risks

Impact	Description of social risk	Proposed mitigation and management strategies	Responsibility
Way of life	Access to adequate employment (ongoing)	Local participation strategy and plan and provision of training and upskilling opportunities for workers	Holcim Truck contractors
	Access to adequate employment (short-term)	Local participation strategy and plan	Holcim Construction contractors
	Noise from truck movements causing amenity issues	Continued maintenance of community grievance mechanism	Holcim
	Noise from quarry operations causing amenity issues	Development of community and stakeholder engagement strategy that includes provisions for residents affected by noise Continued maintenance of community grievance mechanism	Holcim Contractors
	Dust causing amenity issues	Continued maintenance of community grievance mechanism	Holcim Contractors
	Voids and bunding affecting visual amenity	Development of community and stakeholder engagement strategy that includes provisions for residents affected by visual changes from voids and bunding	Holcim

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			Continued maintenance of community grievance mechanism	
		Land rehabilitation	Inclusion of local stakeholders in the rehabilitation and closure planning and implementation process	Holcim
	Culture impacts	Destruction of culturally significant Indigenous artefacts	Development and implementation of AHMP, including avoidance measures and unexpected finds and discovery protocols	Holcim Contractors
	Health and community well-being	Public safety issues due to truck movements through school zones	Implementation of Driver's Code of Conduct continued engagement in the form of the CCC and a grievance mechanism	Holcim Dubbo Regional Council Representatives of schools located along Sheraton Road South Keswick Quarry
		Dust exacerbating health related issues	Include information about air quality in any updates provided to the local community as part of Holcim's community and stakeholder engagement strategy	Holcim Contractors
			Continued maintenance of community grievance mechanism	
	Surrounding	Discharge of water from the quarry into Eulomogo Creek	Implementation of water management strategy	Holcim
	Personal and property rights	Land rehabilitation	Inclusion of local stakeholders in the rehabilitation and closure planning and implementation process	Holcim
	Fears and aspirations	Contributions to continued economic growth and development of the local area and the region	Operation of the Dubbo Quarry Continuation Project and liaison with Dubbo Regional Council for economic opportunities	Holcim

A monitoring and management framework will be developed to ensure that the identified social impacts are monitored over time to measure the effectiveness or otherwise of the proposed mitigation and management measures, including changing conditions and trends in the local and regional areas over the same period. This will:

- track progress of mitigation and management strategies;
- access actual project impacts against predicted impacts;
- identify how information will be captured for reporting to impacted stakeholders including landholders, communities and government on progress and achievements;
- provide key performance indicators, targets and outcomes;
- identify responsible parties; and
- describe mechanisms for ongoing adaptation of management measures when and if required.

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Aspect	Measures
Hazard	Hazard related procedures and plans currently implemented at the quarry will continue to operate under the project.
Bushfire	The table below provides a summary of recommendations to achieve compliance with the relevant requirements for PBP for bush fire protection for asset protection zones, construction standards, access, water supply, provision of services, and emergency management.

Summary of recommended management measures

Mitigation element	Objectives	Bushfire assessment reference
Asset protection zones	APZs are provided commensurate with the construction of the building. A defendable space is provided. Vegetation is managed within asset protection zones in perpetuity.	Section i.
Property access	Safe access to/from the public road system is provided for firefighters providing property protection during a bushfire and for occupant egress for evacuation; Firefighting vehicles are provided with safe, all-weather access to structures and hazard vegetation. The capacity of access roads is adequate for firefighting vehicles. There is appropriate access to water supply.	Section ii.
Water supply	Adequate services of water for the protection of buildings during and after the passage of bushfire are provided. Water supply requirements for firefighting are designed in accordance with the relevant Australian Standards and PBP.	Section iii.
Other services	Location of electricity services limits the possibility of ignition of surrounding bush land or the fabric of buildings. Location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.	Section iv.
Construction standards	The proposed building can withstand bush fire attack in the form of embers, radiant heat and flame contact.	Section v
Landscaping	Landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions.	Section vi.
Potential ignition sources	To provide for the storage of hazardous materials away from the hazard wherever possible.	Section vii.
Bushfire management plan (including emergency management)	A BFMP for the construction and operation of the project, will provide details for the ongoing management and maintenance of bushfire protection measures. The BFMP should include a bushfire emergency management and evacuation plan to provide suitable emergency and evacuation (and relocation) arrangements for occupants of the development.	Sections i through to viii.

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Aspect	Measures
Visual	Consultation with rural residences R2 and R3 in regard to the overall moderate visual impacts of the project will inform the need for additional design solutions, mitigation measures, or interventions to reduce the level of visual impact. Additional tree plantings will be undertaken within the project area between the western disturbance boundary and the boundary with Lot 221.