

Lynwood Quarry Granite Pit Modification (DA 128-5-2005 MOD 4)

Environmental Assessment Report Section 75W of the *Environmental Planning and Assessment Act 1979*

1. BACKGROUND

Holcim (Australia) Pty Ltd (Holcim) owns and operates the Lynwood Quarry (Lynwood), located approximately 3 kilometres (km) west of Marulan and approximately 27 km northeast of Goulburn in the Goulburn Mulwaree local government area (see **Figure 1**).



Figure 1: Location of Lynwood Quarry

Lynwood currently covers an area of approximately 2054 hectares (ha) with an approved disturbance footprint of 383 ha. The topography of the area is gently undulating, with elevations ranging from 710 metres (m) AHD in the north to around 630 m AHD near Joarimin Creek in the south. The site lies within the Joarimin, Lockyersleigh and Marulan Creek catchments. All three catchments drain to either the Warragamba Dam or Shoalhaven River, which both contribute to Sydney's drinking water supply.

Lynwood is surrounded by rural properties to the north, south and west. Rural residential properties are located on the northeastern boundary and the township of Marulan lies about 1 km to the east of the Lynwood site boundary. The Main Southern Railway bisects the quarry site and the Hume Highway forms part of the site's southern boundary. Road access to the quarry is from an interchange on the Hume Highway that was financed by Holcim as a requirement of its development consent.

Lynwood operates under development consent DA-128-5-2005, granted by the Minister for Planning in 2005 under section 80 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The consent has been modified three times. In May 2009, the consent was modified to reduce the western extent of the approved quarry footprint and alter the layout of site infrastructure. It was modified again in March 2011 to reconfigure the site infrastructure, increase movements of heavy vehicles during construction and alter construction access routes. A third minor modification in April 2011 varied the dates for submission of the required Annual Report and Independent Environmental Audit. A plan showing the approved quarry layout is provided in **Figure 2**.

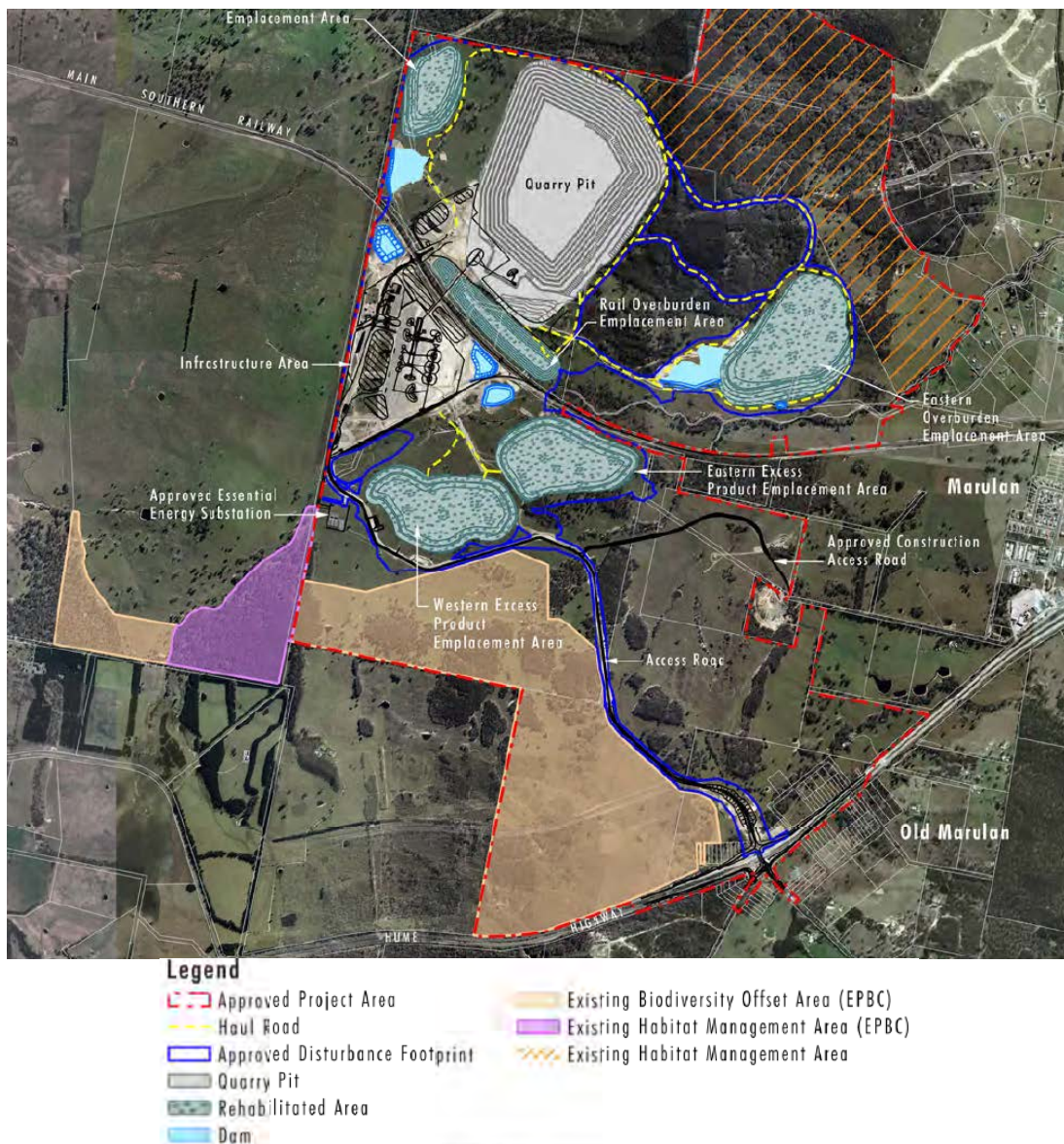


Figure 2: Approved quarry layout

The current consent allows the extraction of 5 million tonnes per annum (Mtpa) of hard rock extractive materials and for quarrying operations to continue until 2038. The consent allows the transportation of up to 5 Mtpa of quarry products from the site; however only 1.5 Mtpa may be transported by road. Although the quarry was approved in 2005, construction did not commence until late 2010 and quarrying operations commenced in late 2015.

2. PROPOSED MODIFICATION

Holcim is seeking approval to construct a new quarry pit (the Granite Pit) located in a granite resource on land to the west of the approved quarry pit, which sought to extract an ignimbrite resource. The new pit is needed because the ignimbrite resource has been found to be significantly more variable (ie more fractured and containing more clay) than predicted prior to approval.

Holcim has therefore identified another source of hard rock on its land about 2 km to the northwest of the ignimbrite pit (measured from pit centre to pit centre). Holcim has tested this additional granite resource and believes it would allow Holcim to provide the range of in-specification products required from Lynwood Quarry. Holcim therefore proposes to construct an additional 76 ha pit to access the granite resource and to reduce the size of the previously-approved ignimbrite pit by about 55 ha.

As a result of the modification, the western and eastern overburden emplacement areas near the ignimbrite pit (shown on **Figure 2**) would no longer be required. Instead, overburden from the Granite Pit would be emplaced back into the approved pit and in a new area immediately south of the Granite Pit (see **Figure 3**).

Holcim also proposes to construct a 12 m high visual bund to the west and northwest of the proposed Granite Pit and a new haul road to connect the pit to the processing infrastructure. The location of the Granite Pit, the proposed overburden emplacement areas and the visual bund are shown on **Figure 3**. The approved disturbance area is approximately 383 ha. As a result of the proposed modification, the total disturbance area would increase to approximately 499 ha.

Key aspects of the existing and proposed development are compared in **Table 1**.

Table 1: Key aspects of the existing and proposed development

Aspect	Existing	Proposed
<i>Production Rate</i>	5 Mtpa	No change
<i>Quarry Life</i>	To 2038	No change
<i>Transportation Rate</i>	Transportation of up to 5 Mtpa Only 1.5 Mtpa may be transported by road	No change
<i>Employees</i>	Approximately 115 (including drivers)	No change
<i>Hours of Operation</i>	7 am – 6 pm (topsoil/overburden removal/emplacement/drilling) 7 am – 10 pm (extraction) 24 hours a day (processing/loading/delivery/maintenance)	No change
<i>Blasting Hours</i>	9 am – 5 pm Monday to Saturday	No change
<i>Quarrying methods</i>	Excavation, drill and blast, load and haul	No change
<i>Processing methods</i>	Crushing and screening plant	No change
<i>Disturbance Footprint</i>	383 ha	499 ha, including development of the Granite Pit to the west of the existing approved pit and reduction of the approved pit footprint by approximately 55 ha
<i>Overburden Emplacement Areas</i>	Rail, eastern and western overburden emplacement areas	Eastern and western overburden emplacement areas no longer required. Overburden from the Granite Pit would be used to backfill the approved pit with additional overburden to be placed in a new emplacement area adjacent to the Granite Pit

Aspect	Existing	Proposed
Infrastructure	Processing plant, rail infrastructure, truck loading infrastructure, dams, weighbridge, workshop, offices and other minor infrastructure	No change to approved infrastructure. However, additional haul road to service new Granite Pit, amenity bund, water management structures and other minor ancillary additions
Construction	Completed initial stages of construction. Crushing and screening plant to be constructed in staged manner	Required construction of haul road to proposed extraction area, amenity bund and water management infrastructure

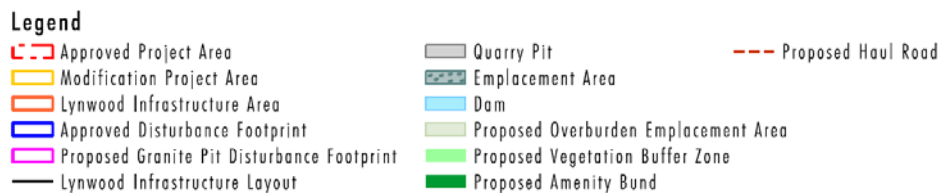
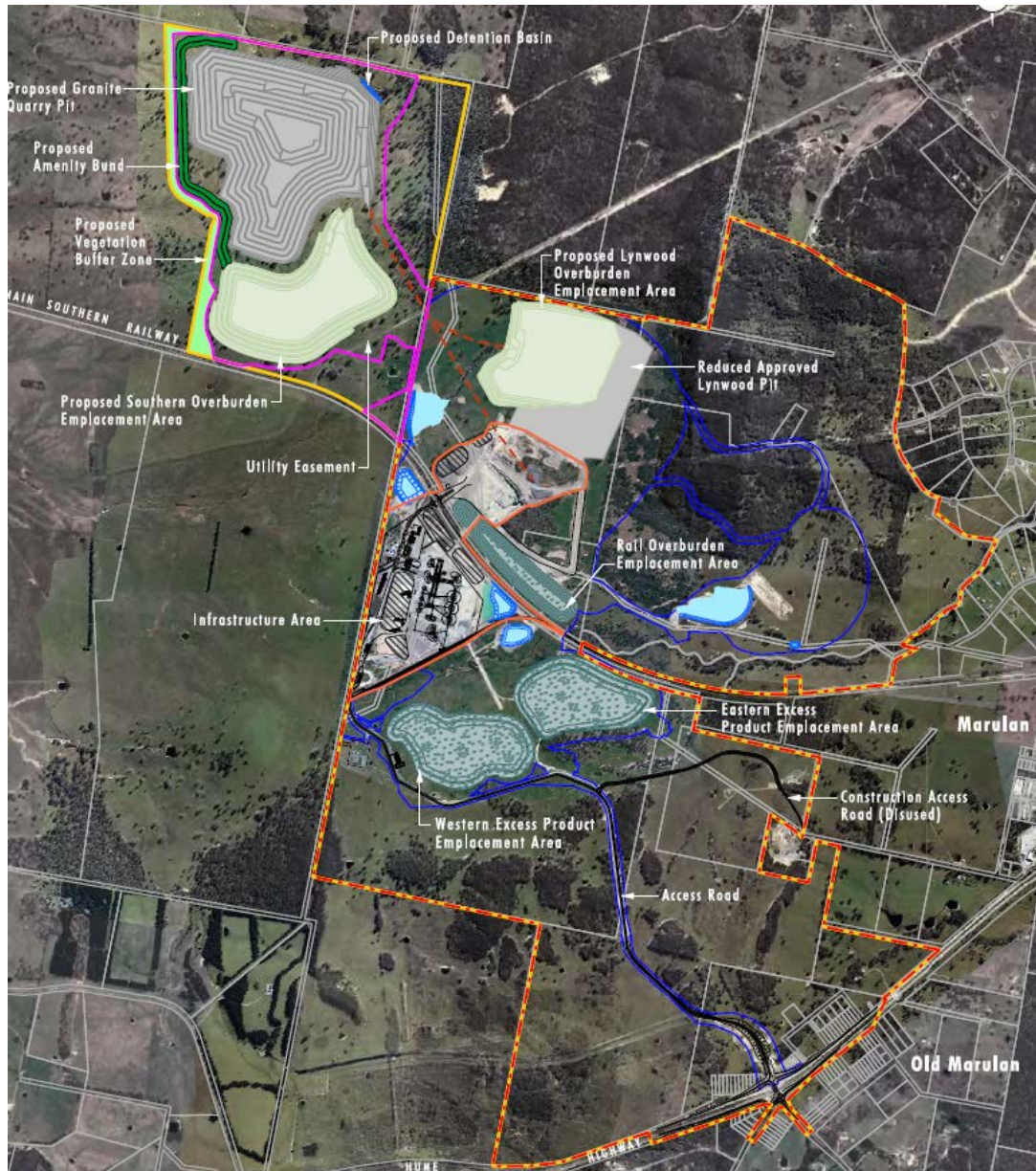


Figure 3: Proposed modification

The water management system would need to be modified under the proposal. A diversion dam would be developed on an ephemeral drainage line upslope of the Granite Pit to manage surface water flows and prevent runoff from entering the pit. Additional necessary surface water management infrastructure includes detention/retention dams, swale drains and a water treatment facility.

Holcim has undertaken an extensive consultation process throughout 2015 with regard to the proposed modification. Consultation included community information sessions, near neighbour meetings and door knocks, Community Consultative Committee meetings, regional stakeholder meetings and focus groups. Further, a community attitude survey was conducted that analysed the changes in people's perceptions about Lynwood between 2005 and 2014. The results of this survey indicated that in general the community maintains a high level of satisfaction with the operations at Lynwood. Out of 145 respondents, the average ranking of all attitudes towards Lynwood's operations was 7.09 out of 10 (where a ranking of 10 indicates an extremely positive attitude).

3. STATUTORY CONTEXT

3.1 Consent Authority

Lynwood was originally approved as State significant development under Part 4 of the EP&A Act. Under clause 8J(8)(c) of the *Environmental Planning and Assessment Regulation 2000*, section 75W of the EP&A Act applies to any modification of a development application for State significant development validly lodged before 1 August 2005. As DA 128-5-2005 was lodged prior to 1 August 2005 it must be modified under section 75W of the EP&A Act.

The Minister was the consent authority for the original development application and is therefore the consent authority for the modification application. However, under the Minister's delegation of 16 February 2015, the Executive Director, Resource Assessments & Compliance may determine the application as no political donations have been declared, Goulburn Mulwaree Council does not object to the modification and less than 25 public submissions by way of objection were received.

3.2 Section 75W Modification

The Department has considered the nature of the modification and is satisfied that it is within the scope of section 75W of the EP&A Act. Although the modification would result in an increase in the disturbance area of the quarry and a change in the location of the overburden emplacements, many elements of the approved operations, including the extraction rate, the transportation rate, the number of employees, the quarrying methods and the location of key processing infrastructure, would not change. The Department is satisfied that the proposed changes can appropriately be characterised as a modification to the original consent, and can be determined under section 75W of the EP&A Act.

3.3 Environmental Protection and Biodiversity Conservation Act 1999

The existing operations at Lynwood were determined to be a 'controlled action' under the *Environmental Protection and Biodiversity Conservation Act* (EPBC Act) in 2013. Holcim therefore referred the proposed modification to the Commonwealth Department of the Environment in November 2015. On 15 April 2016, the Commonwealth determined that the proposed modification is not a 'controlled action' if it is undertaken in a particular manner. The determination requires Holcim to avoid all direct impacts on the critically endangered *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* (approximately 0.98 ha) and to incorporate the following actions in the project's Rehabilitation and Landscape Management Plan:

- rehabilitate disturbed areas with local indigenous species;
- create habitat corridors linking isolated remnant vegetation stands; and
- monitor and maintain all revegetation works and habitat enhancement activities.

4. CONSULTATION

The Department exhibited the modification application and associated Environmental Assessment (EA) (see **Appendix A**) from 23 November 2015 to 7 December 2015:

- on the Department's website;
- at the Department's Information Centre;
- at the offices of Goulburn Mulwaree Council; and
- at the Nature Conservation Council's office.

The Department advertised the exhibition in the *Goulburn Post* and referred the modification application and EA to relevant State Government authorities and to Goulburn Mulwaree Council for comment.

The Department received seven submissions from Government agencies and one submission from a nearby resident (see **Appendix B**).

4.1 Agency Submissions

The **Division of Resources and Energy** (DRE), within the NSW Department of Industry, advised that the granite resource in the proposed modification area is a regionally important source of hard rock aggregate, manufactured sand and road base for Sydney, the Southern Highlands and the ACT. DRE requested Holcim to provide additional information or details to demonstrate that the resource has been adequately tested and is suitable for its intended purpose. Holcim has since provided this information and DRE has confirmed that it is satisfied that the resource has been adequately assessed. DRE also recommended a condition requiring Holcim to provide it with production data on a yearly basis. There is an existing condition to this effect.

The **Environment Protection Authority** (EPA) made a number of comments in regards to noise levels at Location 11, air quality monitoring and water management on the site. Following receipt of further information, the EPA has advised that its concerns have been adequately addressed. The Department has considered water, air quality and noise impacts in its assessment of the proposed modification in **Sections 5.2, 5.3 and 5.4** respectively.

The **Office of Environment and Heritage** (OEH) raised a number of concerns regarding threatened species surveys and assessment, the initial absence of any proposed biodiversity offset and potential for amending an existing Aboriginal Heritage Impact Permit. OEH also emphasised the need to secure species credits for the Squirrel Glider.

The Department has carefully considered OEH's comments and recommendations and undertaken a detailed assessment of biodiversity impacts in **Section 5.1**. Aboriginal heritage matters are discussed in **Section 5.5**.

The **Department of Primary Industries - Water** (DPI Water) noted that any water storages in excess of existing harvestable rights are required to be licensed, and that only an 80 megalitre (ML) extraction is authorised from the Johnniefields Dam. It asked Holcim to demonstrate appropriate management of water supplies and water licensing. This matter is discussed further in **Section 5.2**.

The **Department of Primary Industries – Fisheries** (DPI Fisheries) raised concern with the existing water management system on site and recommended significant improvements be made prior to expansion of the quarry. In particular, DPI Fisheries requested additional water quality monitoring points and trigger action response plans for water quality breaches to be included in the Water Management Plan. This matter is discussed further in **Section 5.2**.

The **Department of Primary Industries – Agriculture** (DPI Agriculture) noted that the EA addressed critical issues associated with impacts of hard rock quarries on agricultural operations, and therefore had no objections to the proposed modification.

WaterNSW made a series of recommendations including a requirement for all future sediment dams to be capable of treating the 95th percentile 5 day rainfall event, adequate infrastructure and staff resources to achieve the desired outcomes of water management structures, additional surface water monitoring on the northern boundary of the western extraction area, and an updated Water Management Plan. The matters raised by WaterNSW are discussed further in **Section 5.2**.

Heritage Council of NSW noted that the broader development area contains one local heritage item: 'Lockyersleigh Homestead and Gardens' and four potential heritage items. The Heritage Council supported the EA's recommended mitigation measures and recommended conditions for preparation of a structural integrity report for the Lockyersleigh Homestead Property and implementation of a vibration monitoring program. This matter is discussed further in **Section 5.7**.

Roads and Maritime Services (RMS) noted that no changes are proposed to the currently approved traffic movements, times or routes, and therefore had no objection to the proposed modification.

No submission was received from **Goulburn Mulwaree Council**.

4.2 Community Submission

One community submission was received from Mr Colin and Mrs Catherine Beattie, whose residence is located approximately 2 km from both the Lynwood and Gunlake quarries and 700 m away from Johnniefelds Quarry.

The submission raised a number of concerns with the proposed modification including cumulative impacts from Lynwood, Gunlake and Johnniefelds quarries with regards to visual impacts, noise (including road traffic), air quality, blasting, road safety, groundwater, resource composition and diesel emissions.

Mr and Mrs Beattie requested to be notified of the receipt of Holcim's Response to Submissions (RTS). After reviewing the RTS, Mr and Mrs Beattie provided an additional submission which is included in **Appendix B**. This extensive submission raises further concerns about the cumulative environmental impacts of the three quarries and also raises concern about the community engagement process undertaken by Holcim, the accuracy of information in the EA and the adequacy of noise and air quality monitoring undertaken at the Beattie's property. The Department has addressed these concerns in its assessment for the proposed modification (see **Section 5**).

4.3 Response to Submissions and Residual Issues

On 29 February 2016, Holcim provided its RTS (see **Appendix C**). The Department forwarded the RTS to relevant Government agencies and made it publicly available on the Department's website.

DRE, DPI Water, DPI Fisheries, EPA and WaterNSW advised that the information in the RTS generally addressed the issues that they had raised. OEH requested further information regarding biodiversity offsets and alternative locations for the placement of overburden.

5 ASSESSMENT

In assessing the merits of the proposed modification, the Department has considered the:

- EA for the proposed modification (**Appendix A**);
- agency and community submissions (**Appendix B**);
- Holcim's RTS (**Appendix C**);
- agency and community responses to the RTS (**Appendix B and C**);
- provisions of relevant environmental planning instruments, government policies and guidelines; and
- relevant provisions of the EP&A Act.

The Department considers that the key assessment issues relating to the modification are biodiversity, water management, air quality, noise and Aboriginal heritage. The Department's assessment of these and other issues is summarised below.

5.1 Biodiversity

The EA included a Biodiversity Assessment Report (BAR) prepared by Umwelt Australia Pty Limited (Umwelt) in accordance with the requirements of the *Framework for Biodiversity Assessment – NSW Biodiversity Offsets Policy for Major Projects* (FBA). The BAR focussed on the development site (~227 ha) which is the area of the proposed modification not covered by the existing development consent. The development footprint (~175 ha) is the area of impact within the development site and includes the proposed Granite Pit, overburden emplacement areas, haul roads, water management infrastructure and associated development.

5.1.1 Flora and Fauna Vegetation Communities

The development site has been heavily modified by past and ongoing agricultural activities and contains scattered trees occurring in an understorey dominated by exotic grasses. More specifically, the development footprint contains about 97.5 ha of exotic pastures that do not meet the definition of native vegetation under the *Native Vegetation Act 2003*. Nevertheless, native vegetation does occur in the development footprint and would be directly impacted (see **Table 2** and **Figures 4 and 5**).

Threatened Flora and Fauna

Using the BioBanking calculator, the BAR examined the species predicted to occur on the site which would generate ecosystem-credits and species-credits. Five ecosystem-credit fauna species were detected during field surveys (Gang-Gang Cockatoo, Glossy Black Cockatoo, Speckled Warbler, Scarlet Robin and Eastern Bentwing-bat). Two species-credit species were detected during field surveys (Large-eared Pied Bat and Squirrel Glider). All seven species are listed as Vulnerable under the *Threatened Species Conservation Act 1995* (TSC Act). The Large-eared Pied Bat also listed under the EPBC Act.

The Department notes that, during the time that Holcim was preparing its RTS, the status of the Large-eared Pied Bat was changed to an ecosystem and species-credit species, where the species-credit components are captured for breeding habitat. The proposed modification area does not contain relevant habitat features and is not in close proximity to such features, and is therefore not considered to be breeding habitat. Species-credits for this species are therefore not required as part of an offset strategy. OEHL has agreed with this conclusion. However, species-credits for the Squirrel Glider would be required as part of an offset strategy with a total of 1725 credits required.

One species-credit generating flora species listed as Endangered under the EPBC Act was recorded during field surveys outside of the proposed development site. The Department notes that this species is currently under consideration for delisting and regardless, is unlikely to be impacted as a result of the proposed modification.

Table 2: Native vegetation communities within the proposed development footprint

Biometric vegetation type	Commensurate endangered ecological community*	Area directly cleared (ha)	Ecosystem credits required
HN614 Yellow Box – Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion (Moderate/ Good_Poor condition)	White Box Yellow Box – Blakely's Red Gum Woodland Endangered Ecological Community (EEC)	58.1	2124
HN570 Red Stringybark – Brittle Gum – Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion (Moderate/Good condition)	-	5.3	271
HN570 Red Stringybark – Brittle Gum – Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion (Moderate/Good_Poor condition)	-	13.1	610
HN515 – Broad-leaved Peppermint – Ribbon Gum grassy open forest in the north east of the South Eastern Highlands Bioregion (Moderate to Good condition)	Possible: Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland EEC	1.2	33
Total		77.7	3038

*Listed as endangered ecological communities under the TSC Act.

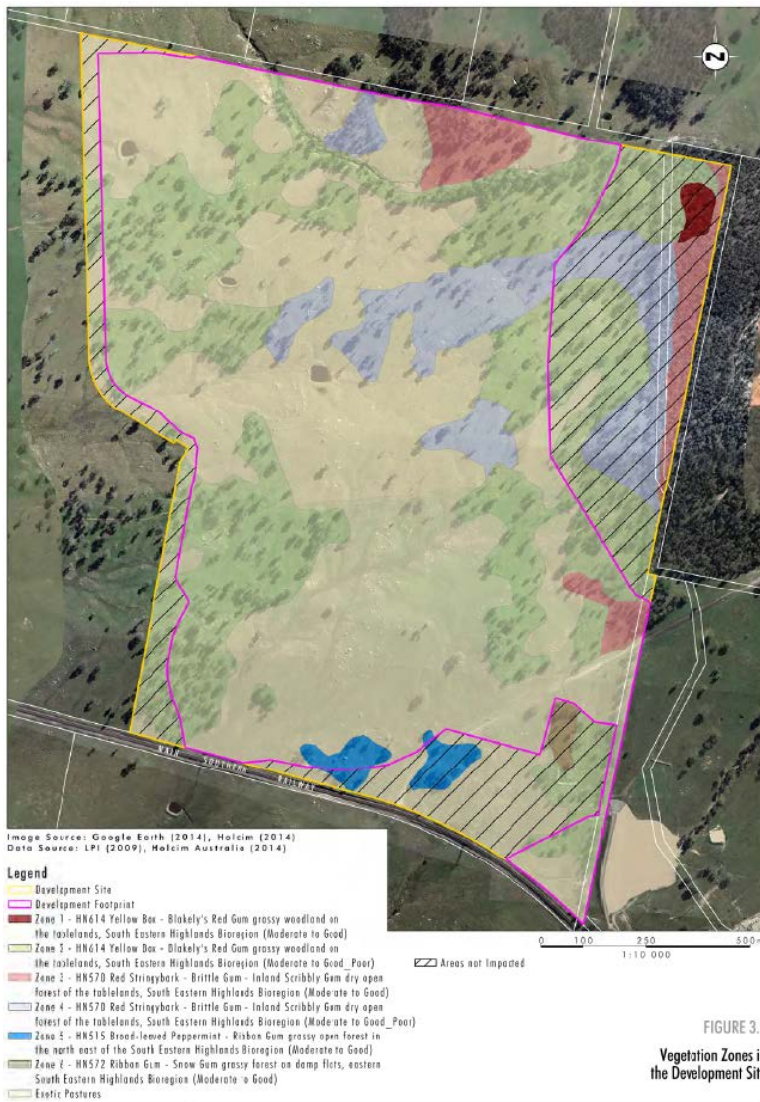
5.1.2 Assessment of Impacts

The construction and operation of the proposed modification would have an overall direct disturbance footprint through clearing approximately 175 ha, of which 77.7 ha comprises native vegetation and associated fauna habitat. The Department notes that some of the areas of vegetation proposed to be cleared are commensurate with listed EECs (refer to **Table 2**).

The proposed project is also likely to have a number of indirect impacts on the biodiversity values of surrounding lands, including:

- fugitive light emissions;
- noise impacts;
- dust impacts; and
- weed and feral animal encroachment.

These impacts are likely to be limited to the construction phase of the proposed modification with ongoing operations not expected to result in any substantial impact to biodiversity. The Department also notes that the detected threatened species (bats and birds) are highly mobile and capable of dispersing throughout the landscape, including to adjoining areas of native vegetation.



Figures 4 and 5: Biometric vegetation types and threatened ecological communities within the proposed development site

5.1.3 Avoidance, Mitigation and Management

During early development of the modification proposal, Holcim undertook ecological field surveys to assist in the site selection process. As a result, areas containing higher value vegetation and fauna habitat in structured woodland areas were avoided. Holcim has further avoided impacts to native vegetation by:

- designing the proposed quarry pit, emplacement areas and associated developments to avoid higher quality woodland habitats to the east of the development footprint;
- reducing the development footprint to further avoid EECs; and
- locating the majority of the proposed impacts on poorer condition native vegetation and exotic pastures.

The proposed modification would also result in a number of impacts to native vegetation and fauna habitat approved under the existing consent no longer occurring. This proposed avoidance involves approximately 27 ha of native woodland that would have been impacted by the approved quarry pit, emplacement areas and haul roads.

Where impacts to vegetation by the proposed modification could not be avoided, Holcim has proposed mitigation and management measures including:

- implementation of a tree felling procedure to minimise impacts to arboreal species;
- undertaking pre-clearance surveys with a suitably qualified and experienced person present;
- fencing or signposting the boundaries of the development footprint;
- advising all contractors of the designated work area via site inductions;
- employing appropriate lighting controls to minimise lighting impacts to nocturnal fauna;
- imposing traffic controls to reduce the potential for fauna strike and dust generation;
- measures to avoid the spread of weeds and control feral animals; and
- erosion and sediment control via implementation of an Erosion and Sediment Control Plan.

Holcim is proposing to establish nest boxes in retained vegetation located in close proximity to the proposed development footprint to mitigate the loss of hollow-bearing trees. The EA did not contain an assessment of the number of hollow-bearing trees likely to be impacted, but Holcim has proposed to carry out this assessment as part of its tree felling activities. In the absence of an assessment of the number of hollow-bearing trees to be impacted, the Department has some concern as to whether the impacts would be acceptable or not. To ensure that the impacts of clearing hollow-bearing trees are minimised and appropriately compensated, the Department has recommended a condition requiring Holcim to replace hollow-bearing trees with durable and appropriate nest boxes that reflect the type, size, usability and condition of the hollows to be cleared. Holcim would also be required to update its existing Landscape Management Plan.

5.1.4 Offsets

The Department considers that Holcim has limited impacts on vegetation communities and flora and fauna species through the avoidance of impacts where possible and the proposed management and mitigation measures. Nevertheless, the Department considers that the loss of 77.7 ha of native vegetation should be further mitigated through the development of an appropriate offset strategy. Since Lynwood's consent was granted, the *NSW Biodiversity Offset Policy for Major Projects (Offsets Policy)* commenced on 1 October 2014 and has recently completed its 18 month transitional phase. The Department therefore considers that Holcim should be required to fulfil its offsetting requirements under this policy.

Under both its existing development consent and Controlled Activity Approval under the EPBC Act, Holcim has a number of conservation and offsetting arrangements at or near the quarry, comprising:

- 130 ha habitat management area in the northeast portion of the approved project area (see Appendix 9 – Habitat Management Areas of the development consent);
- 185 ha biodiversity offset area in the southern portion of the approved project area and adjoining land to the west (Lynwood's EPBC Act Controlled Activity Approval);
- 51 ha cultural heritage management zone in the southern portion of the approved project area (incorporated in the EPBC biodiversity offset area), established to conserve (among others) the site's most significant Aboriginal site (see **Section 5.5** below and Appendix 6 – Cultural Heritage Management Zone of the development consent); and

- 8.7 ha habitat management area along Joarimin Creek (the 'Joarimin Creek Corridor') which provides for management of areas of significant biodiversity and Aboriginal cultural heritage values (see Appendix 9 – Habitat Management Areas of the development consent).

In accordance with the FBA, Holcim has calculated the required credits it would need to retire to offset biodiversity impacts associated with the proposed modification (see **Table 3**). A total of 4763 credits are required, comprising 3038 ecosystem credits and 1725 species credits for the Squirrel Glider.

Onsite offset

In response to requests from OEH and the Department, and to provide certainty that appropriate offsets are available, in April 2016 Holcim provided the Department with a progress report for its proposed biodiversity offset strategy. Holcim proposes to include in its offset the current Habitat Management Areas and Joarimin Creek Corridor, along with adjoining land that would mostly connect these two parcels of land, resulting in an overall area of approximately 280 ha (see **Figure 6**). This area was targeted to offset impacts to *Red Stringybark – Brittle Gum – Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion, Broad-leaved Peppermint – Ribbon Gum grassy open forest in the north east of the South Eastern Highlands Bioregion* and the Squirrel Glider. Offsets for impacts on *Yellow Box – Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion* would be sought at an offsite location (see below).

Table 3: Ecosystem credit requirements and offsetting opportunities

Biometric vegetation type and species	Credits required	Credits generated in onsite offset area
<i>HN614 Yellow Box – Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion</i>	2124	54*
<i>HN570 Red Stringybark – Brittle Gum – Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion</i>	881	3069
<i>HN515 – Broad-leaved Peppermint – Ribbon Gum grassy open forest in the north east of the South Eastern Highlands Bioregion</i>	33	0*
Squirrel Glider	1725	1526

*HN614 expected to be used to offset impacts on HN515 as they are the same vegetation formation as is allowable under the offset variation rules for the FBA

While it is likely that this onsite offset would be a major component of its final offset package, Holcim has requested a flexible approach to enable recognition of other offsetting arrangements acceptable under the FBA, such as purchasing credits on the market. The Department considers this approach to be reasonable given that an assessment has been undertaken and there is a degree of certainty that suitable credits are available, either onsite or offsite.

However, the Department raised concerns in that the Habitat Management Areas have previously been offered as compensation for the biodiversity impacts of the approved quarry. On 22 April 2016, Holcim provided additional information outlining its opinion that these areas were available as an offset under the FBA and subsequently the BioBanking Scheme.

There is currently no requirement under the existing development consent for Holcim to make arrangements to protect and provide long-term security for the Habitat Management Areas. Holcim is only required to manage this area for its biodiversity values for the currently approved life of the quarry. The majority of the Habitat Management Area is zoned IN2 – Light Industry under the *Goulburn Mulwaree Local Environmental Plan 2009* (the Goulburn Mulwaree LEP) and would be available for future development once the existing consent has lapsed.

Principle 4 of the Offsets Policy states that 'offsets must be additional to other legal requirements'. OEH's BioBanking Assessment Methodology (BBAM) specifies requirements that are classed as existing obligations and management actions under the FBA. The existing Habitat Management Areas do not fall within these requirements. The Department is therefore satisfied that, under the FBA, the Habitat Management Areas are available as an offset.

The currently approved area of impact has been reduced by approximately 60 ha due to the reduced extent of the approved pit and not progressing with the Eastern Overburden Emplacement Area. Unfortunately, the FBA does not have a mechanism for a positive outcome (ie reducing the impact of

the approved development in order to identify and offset a net impact). Therefore, the impacts associated with the proposed modification have been assessed in their entirety, without consideration of the reduced impacts. The Department considers this an acceptable approach.

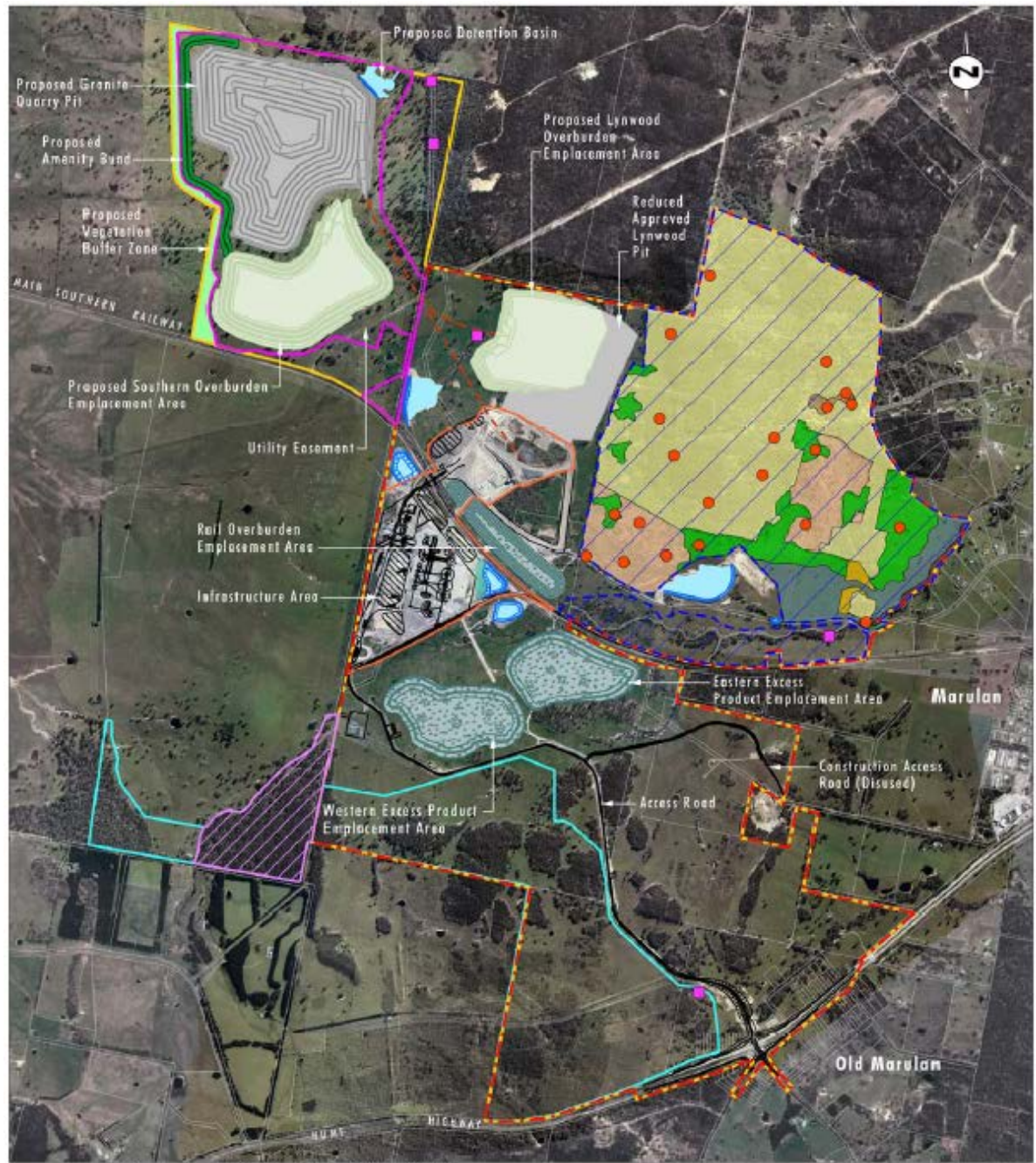


Image Source: Google Earth (2012), Holcim (2012, 2014)
 Data Source: LPI (2014), Holcim Australia (2015)



FIGURE 1
 Conceptual Onsite Offsetting Options

Figure 6: Proposed onsite offset areas

Holcim has undertaken a preliminary BioBanking assessment on the proposed onsite offset (excluding the Joarimin Creek Corridor) to determine the potential credit yield available (see **Table 3**). The Department notes that these figures may change, based on a final BioBanking assessment. However, it is satisfied that the preliminary assessment indicates that credits exist and are available.

The Department is satisfied that the proposed onsite offset area would provide adequate credits for *Red Stringybark – Brittle Gum – Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion* and *Broad-leaved Peppermint – Ribbon Gum grassy open forest in the north east of the South Eastern Highlands Bioregion*. It would also provide the majority of credit requirements for the Squirrel Glider. Holcim is currently investigating the suitability of including the Joarimin Creek Corridor and/or the provision of additional management actions (such as nest box installation) to make up the remaining credit requirements as per the BBAM.

The Department considers this to be a more favourable biodiversity outcome than under the existing development consent, as the land would be secured and managed in perpetuity.

Offsite Offsets

As can be seen from **Table 3**, the proposed onsite offset is deficient in credits required for *Yellow Box – Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion*. Holcim has identified an offsite offset opportunity near Googong that is known to contain a substantial area of the required vegetation type and is in negotiations with the landowners to agree to a suitable arrangement to secure this property as a BioBank site.

Offset Mechanisms

In recognition that not all clearing is undertaken at once, negotiations with private landowners may be lengthy and the establishment of a BioBank site takes time, the Department has recommended a condition requiring the progressive retirement of the required credits. It is recommended that, by 31 May 2017, Holcim must retire the credits associated with the projected vegetation clearing for the following five years. Credits must continue to be obtained and retired in five-yearly increments prior to clearance of the area of vegetation expected to be cleared in the forthcoming five years. Each Annual Review must record the number of credits retired in the reporting year (or previously) and the area of vegetation expected to be cleared in the forthcoming five years.

Holcim must retire the biodiversity credits specified in **Table 3** to the satisfaction of the Secretary and OEH. The retirement of credits shall be undertaken in accordance with the FBA by:

- (a) acquiring or retiring credits under the BioBanking Scheme in the TSC Act;
- (b) making payments into an offset fund that has been developed by the NSW Government; or
- (c) providing supplementary measures.

5.1.5 Conclusion

The Department is satisfied that Holcim has designed the proposed modification in a manner that avoids impacts on biodiversity values so far as is reasonable and feasible. However, the modification would still cause biodiversity impacts, as it would require clearing of 77.7 ha native vegetation, together with consequential loss of potential fauna habitat predominantly in the form of tree hollows.

Following its assessment the Department is satisfied that these impacts are able to be adequately mitigated or compensated for via a range of mitigation and offsetting measures. Holcim has been able to provide evidence that the required offset credits are available and able to be obtained. With the implementation of these avoidance, mitigation and offsetting measures, the Department is satisfied that the modification can be undertaken in a manner that would improve or at least maintain the biodiversity values of the locality over the medium to long term.

5.2 Water Resources

5.2.1 Introduction

The modification has the potential to impact surface water and groundwater resources in a number of ways, including changes to:

- catchment areas
- water quality and flow volumes in local watercourses;
- flooding (including flow rates, velocities and depths);

- geomorphological and hydrological values of watercourses, including environmental flows;
- riparian and ecological values of watercourses;
- water users, both in the vicinity and downstream of the site;
- groundwater inflows into both the approved and existing pits once quarrying is completed; and
- groundwater drawdown in nearby privately-owned bores.

The EA includes a detailed surface water assessment undertaken by Umwelt and a detailed groundwater assessment undertaken by Scientific Systems Pty Limited.

5.2.2 Surface Catchment and Groundwater Context

Lynwood is located within the catchments of Joarimin, Lockyersleigh and Marulan Creeks, all of which form part of the Sydney Drinking Water Catchment. Joarimin Creek and Lockyersleigh Creek drain to the Wollondilly River which is part of the Warragamba Dam catchment. A number of first and second order ephemeral creeks are also located within the proposed modification area (see **Figure 7**). These creeks only flow during heavy rainfall and storm events or after prolonged periods of rain.

The *Water Sharing Plan for the Great Metropolitan Region Unregulated River Water Sources 2011* applies to watercourses in the vicinity of Lynwood. As the creek systems are covered by a Water Sharing Plan, surface water use at Lynwood is governed by the *Water Management Act 2000* (see **Section 5.2.3** below).

There is one major dam (Johnniefields Dam) located about 6.4 km downstream of Lynwood on Joarimin Creek. Johnniefields Dam has a capacity of 550 megalitres (ML) and supplies water for irrigation, domestic, stock and industrial use. Holcim has access to 80 ML of water from Johnniefields Dam for use at Lynwood.

As shown on **Figure 7**, the Granite Pit area occupies about 332 ha (13%) of the Lockyersleigh Creek catchment. The proposed modification would intersect the catchments of a number of first and second order tributaries of Lockyersleigh Creek and has the potential to change surface water flows in these tributaries, and in a third order tributary to the south of the modification area.

Both the proposed Granite Pit and the approved pit are located relatively high in the local topographic landscape with most pre-quarrying groundwater flows generally flowing away from the pit areas. Existing monitoring data indicates that groundwater recharge is mainly linked to seasonal rainfall and associated runoff. Groundwater in the modification area is mainly located in the weathered zones of the porphyry and granite formations, ie in geological material that displays low hydraulic conductivity and low groundwater storage. Under the *NSW Aquifer Interference Policy*, the 'groundwater source' in the project area is classified as 'less productive' fractured rock due to low aquifer yields.

Groundwater quality across the site is quite variable, with total dissolved solids (TSS) ranging between 180 mg/L to 7300 mg/L. This high degree of variability in salinity is typical of geological material with low hydraulic conductivity and low groundwater storage. Monitoring results indicate that groundwater pH is near neutral.

5.2.3 Assessment of Impacts

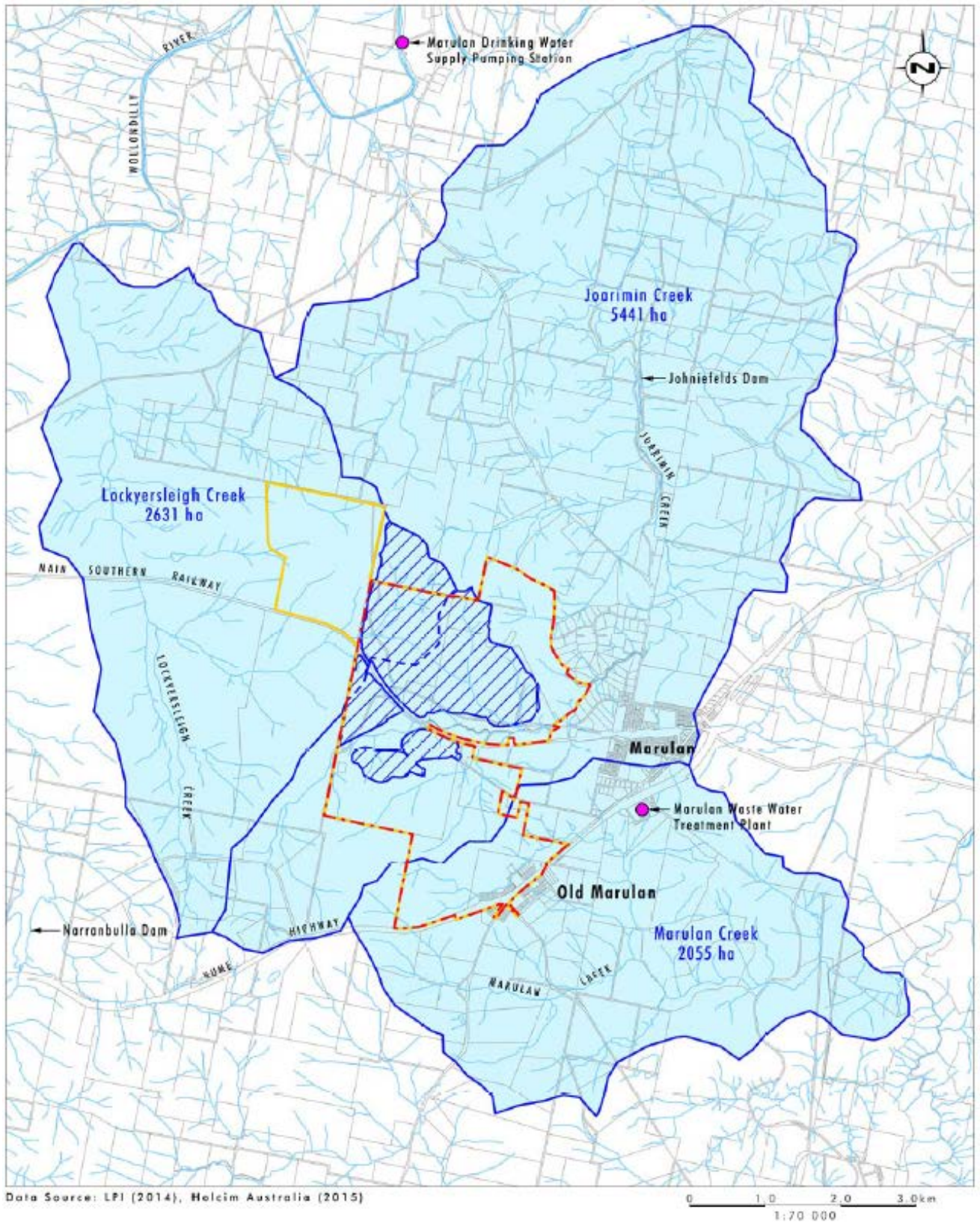
Surface Water Catchment Areas

The proposal would impact on the extent of local catchment areas as set out in **Table 4**.

Table 4: Predicted impacts on catchment areas associated with the proposed modification

Catchment*	Pre-quarry (ha)	With currently approved quarry (ha)	With currently approved final landform (ha)	With modified operational extent (ha)	With proposed final landform (ha)
Joarimin Creek	5,411	5,115	5,372	5,168	5,411
Lockyersleigh Creek	2,629	2,469	2,585	2,333	2,527
Wollondilly River	1,003,000	1,002,544	1,002,917	1,002,462	1,002,898

* Neither the approved nor modified quarry involves quarrying in the Marulan Creek catchment (see **Figure 7**).



- Legend**
- Approved Project Area
 - Modification Project Area
 - Catchment Boundary
 - Approved Water Management System

FIGURE 2.1
Catchment Context

Figure 7: Catchment divides and drainage lines within the approved and proposed quarry layouts

The proposal would reduce the approved quarry's impact on the Joarimin Creek catchment by about 53 ha, primarily as a result of removing the approved Eastern Overburden Emplacement Area. The final landform impact on this catchment area is predicted to decrease as no final void is now proposed in this catchment, which would be returned its pre-quarry extent.

However, impacts on Lockyersleigh Creek catchment would be increased as a result of the proposed modification. The catchment area would be reduced by approximately 136 ha when compared to the approved quarry operations, primarily as a result of the proposed Granite Pit. There would be an increase in the final void impacts in this catchment area from 2.7% (approved operations) to 3.9% (proposed modification).

Flooding

The predicted long-term impacts (ie as a result of water capture in the final void) on the Wollondilly River catchment area is negligible for the approved operations (<0.01%). This impact is predicted to lessen under the modification.

The proposed modification is not expected to impact on flooding, channel stability or in-stream habitat in the Joarimin Creek system, especially when the removal of the Eastern Overburden Emplacement Area is taken into account.

As the proposed modification would result in the removal of part of the upslope catchment from four tributaries of Lockyersleigh Creek and with clean water runoff to be diverted around the quarry to downstream watercourses, there is potential for flooding impacts to occur downstream of the quarry on tributaries of Lockyersleigh Creek. The EA therefore included results summarising peak flows, velocities and water levels for Lockyersleigh Creek for both the 1% and 5% Annual Exceedance Probability (AEP) storm events. This modelling indicated that the proposal would not increase downstream flooding impacts and there would be no cumulative increase in flood flows downstream of the quarry on the main channel of Lockyersleigh Creek.

Surface Water Quality

The original EIS and subsequent EAs have all concluded that the quarry would have a beneficial effect on water quality in downstream creeks and in the Wollondilly River. The beneficial effect is primarily due to the reduction of sediment, nitrogen and phosphorous loads leaving the quarry site (due to the reuse of water in the plant and for dust suppression) and treatment of water prior to release from the water management system. Holcim is proposing to implement the same environmental protection mechanisms as for existing operations and as such considers that the proposed modification would maintain the identified beneficial effects.

There have been four environmental incidents between 2012 and 2014 relating to unlicensed discharges from sediment dams where the TSS concentrations specified in the consent were exceeded during high rainfall events. Due to these unlicensed discharges and the sensitive receiving environment, WaterNSW recommended that proposed sediment dams G1, G2, G3, G4, L2, L3 and L4 are constructed to manage the 95th percentile 5 day rainfall depth of 40.8 mm. The Department notes that, since the unlicensed discharges Holcim has made improvements to the site's water management system and has moved from the quarry's construction phase (when the discharges occurred) to its operational phase. Nevertheless, the Department agrees with WaterNSW in regards to sediment dam design and has recommended a condition to this effect.

Riparian and Ecological Values of Watercourses

The proposed modification includes a new internal haul road to the area of expansion which would cross a 3rd order tributary of Lockyersleigh Creek. DPI Fisheries has advised that this tributary is considered Key Fish Habitat and the crossing should therefore be designed and constructed in accordance with the relevant guidelines. The Department has recommended a condition requiring Holcim to construct the proposed vehicular crossing of Lockyersleigh Creek in accordance with the *Policy and Guidelines for Fish Friendly Water Crossings* and *Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings*.

Groundwater

The Granite Pit would likely intercept groundwater from the first year and, for the remainder of the quarry's life, some part of the Granite Pit would be below the groundwater table. By Stage 6, the eastern end of the pit floor would be approximately 140 m below the pre-quarry groundwater table.

The EA suggests, and DPI Water concurs, that groundwater inflows would be low and meet minimal impact considerations for aquifer interference. The predicted average inflow rates for the Granite Pit range from 1.1 to 38.7 m³/day, which equates to approximately 0.4 ML to 14 ML per year. For the approved pit, predicted average inflow rates range from 1.75 to 3.3 m³/day. The Department notes that groundwater inflows, whilst modest, are expected to gradually increase over the life of the quarry due to its expanding footprint and depth.

The EA's groundwater assessment modelling indicates that the zone of groundwater influence and groundwater drawdown around both the approved and proposed pits would be very small due to the shallow elevation at which quarrying is occurring, and the hydrogeologically 'tight' granite material in which the pit would be constructed. The Department notes that the drawdown around the approved pit is now significantly less than assessed under previous modelling due to the shallow depth of extraction before quarrying in the pit is discontinued.

The Department considers that there would be negligible impacts on baseflows to local streams and, as there are limited local alluvial deposits, impacts on alluvial aquifers are unlikely. Furthermore, as the granite material is not known to contain any reactive minerals, significant changes to groundwater quality as a result of leaching and dissolution of reactive rock minerals is considered unlikely.

Water Users

The proposed modification would intersect the catchments of a number of minor tributaries of Lockyersleigh Creek. As such, there is potential to impact the quantity of water available for both harvestable rights and licensed extraction from these tributaries. However, there is a minimal number of farm dams on properties immediately downstream of the proposed Granite Pit that capture and use runoff. Holcim also has agreements with property owners to the north and west of the proposed Granite Pit. Therefore it is considered that impacts from the proposed modification would be minimal.

The proposed modification is predicted to have negligible impacts on both Joarimin Creek and the Wollondilly River and therefore negligible impact on water users in these catchments.

The groundwater assessment did not predict any impacts on privately-owned bores as they are located outside of the predicted cone of depression, with the closest bores being 1.8 km to the north and 2 km to the southwest.

Site Water Balance

Water is required at Lynwood for the crushing and screening plant, dust suppression on haul roads and stockpiles and for potable use in site facilities. The water balance for the proposed modification demonstrates that the quarry is likely (ie at 50th percentile total annual rainfall) to operate with a small water surplus for all modelled stages (see **Table 5**). The reduction in water surplus between the stages can be attributed to an increase in haul road surface area, and therefore, an increase in water demand for dust suppression as the operation progresses.

Table 5: Gross water balance (ML/year) with the proposed modification operating at 5 Mtpa, by quarry stage

Stage	10 th percentile rainfall	50 th percentile rainfall	90 th percentile rainfall
1	-147	130	766
3	-210	79	737
6	-282	11	695

During wet periods, water surplus would be stored in the approved pit prior to reuse within the water management system. During dry periods water supply would be primarily supplemented by imports from the Johnniefields Dam. DPI Water raised some concerns regarding how Holcim would manage deficits ranging from 147 ML/year in Stage 1 to 282 ML/year in Stage 6. Holcim provided further supply reliability information in the RTS (see **Table 6**).

Table 6: Water supply reliability, by quarry stage

Stage	Maximum operational demand (ML/day)	Supply reliability
1	1.82	92%
3	2.06	90%
6	2.27	83%

The Department acknowledges that the current off-site water supply from Johnniefields Dam (80 ML) cannot meet all potential water deficits for the proposed modification while ever the quarry is operating at maximum capacity. Nevertheless, a supply reliability of 83% to 92% at maximum production is considered reasonable and a clear indication that, under most circumstances, the quarry would have sufficient water supply. Furthermore, Holcim has committed, that in water shortage circumstances, it would either source additional off-site supplies or reduce operations to match the available water supply. The Department notes that there are existing conditions of consent to this effect.

Licensing

The key licensable water 'used' by the project would be:

- a) groundwater that flows into the pit in response to the extraction operation;
- b) any water above Holcim's approved 80 ML off-take from the Johnniefields Dam; and
- c) any capture of harvested water from undisturbed catchments in excess of the property's harvestable rights.

Advice from DPI Water confirms that water sourced from the water quality control ponds and water management structures is exempt from licensing under the *Water Management Act 2000*, providing the structures continue to capture runoff generated from the disturbed extraction and processing area and continue to function for environmental management purposes (ie capturing sediment and water quality control). Accessing water supplies from any existing surface water harvesting dam is also excluded from water licensing requirements, so long as the combined volume of structures is within the property's harvestable right.

The total volume of dams for water storage is 210 ML and includes the following dams: Dam 1 (existing), Dam A (existing) and Dam 2 (future approved dam). Dam 2 is yet to be constructed and is proposed to be a turkey nest dam capable of holding 30 ML (ie the dam does not have a catchment and is replenished by pumping only). As such, the total volume of dams for water storage is currently 180 ML. As Dam 1 (63 ML) and Dam 2 are turkey nest dams and do not capture water, they do not need to be included in harvestable rights calculations or require licensing under the *Water Management Act 2000*. Holcim's current landholding of 1556 ha gives it a harvestable right of 117 ML.

Groundwater inflows for the proposed Granite Pit range from 1.1 to 38.7 m³/day, which equates to approximately 0.4 ML to 14 ML per year. Holcim would be required to source a Water Access Licence to cover the predicted groundwater extraction in accordance with the *Greater Metropolitan Groundwater Water Sharing Plan – Goulburn Fractured Rock Management Zone*.

The Department and DPI Water are satisfied that surface water storages for both the existing development and proposed modification are either:

- a) within the property's identified harvestable right;
- b) exempt from licensing requirements;
- c) appropriately licenced (ie Water Access Licence to access water from Johnniefields Dam); or
- d) able to be appropriately licensed.

The Department is further satisfied that the existing consent ensures that Holcim is required to obtain licences and permits for the development and ensure it has sufficient water for all stages of the development, and if necessary, adjust the scale of operations to match its licensed water entitlements.

5.2.4 Avoidance, Mitigation and Management

Holcim has designed the modification to reduce impacts on water resources, including:

- diverting 'clean' water around the proposed Granite Pit;
- maintaining a predominantly closed 'dirty water' management system designed to collect and treat runoff and process water within the quarry; and
- recycling process water via the dirty water management system.

Water Management System

The existing water management strategy at Lynwood includes controlling runoff from all disturbed areas for treatment and minimising sediment transport off-site with the aim of maintaining it below the pre-quarry pollution loads. With the aim of meeting the *NSW Water Quality and River Flow Objectives*, Lynwood's water management strategy has been developed to provide for neutral or beneficial water quality impacts on the downstream catchment areas, in accordance with *State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011*.

The quarry operates under an existing Water Management Plan as required under its consent. The Water Management Plan details measures to convey clean water away from the quarry and associated infrastructure areas, and manage water affected by quarrying operations. Water is currently stored in five sediment control dams and two water storage dams. Dirty water reaches these water storages through a system of catch drains. Clean water is diverted around the perimeter of the site through a series of drainage systems.

Holcim has designed a water management system for the modification that can be integrated with the existing water management system at the site (see **Figures 8 – 10**). As quarrying progresses into the Granite Pit area, the existing clean water management system would be revised through the construction of new drains and dams to ensure clean water is diverted around the proposed disturbance areas.

Runoff from disturbed areas would be managed within the site's water management system and reused, or if water quality meets the required parameters, it would be released downstream. Holcim is proposing to construct a water treatment facility to the west of the existing Dam F to treat water for release to downstream watercourses if required.

Despite this sound and straightforward system of management for both clean and dirty water, the proposed modification still has some potential to cause erosion and sedimentation. Works within existing and proposed cleared areas and the clean water diversion drains have potential to cause erosion and sedimentation. To manage this risk, the existing consent requires Holcim to include an Erosion and Sediment Control Plan in the site's Water Management Plan. The consent also requires that this plan is updated following any approval of the proposed modification.

Water Monitoring System

The quality of surface water at the quarry site and in the vicinity has been monitored since July 2004 at four locations on Joarimin Creek and two locations on Marulan Creek. One location on Lockyersleigh Creek has been monitored since February 2005. Water quality is monitored against the *NSW Water Quality and River Flow Objectives*. Due to the four recent unlicensed discharges, DPI Fisheries recommended improvement of the existing monitoring system. To monitor potential surface water quality impacts, Holcim is proposing the addition of three new monitoring points on Lockyersleigh Creek.

Holcim is also proposing to expand its groundwater monitoring system to include the new piezometers that were constructed during for the Granite Pit. Groundwater monitoring at Lynwood would include:

- quarterly water level monitoring;
- quarterly water quality monitoring;
- pit inflow monitoring; and
- annual water level and field pH, field conductivity and field TDS monitoring of licensed bores in the vicinity.

The Department supports both the surface water and groundwater monitoring proposals and has recommended preparation and implementation of a Surface Water Monitoring Program and a Groundwater Monitoring Program.

5.2.5 Conclusion

The Department is satisfied that Holcim has designed the proposed modification to avoid significant impacts on key water resources. Subject to these conditions, the Department is satisfied that the proposed modification would not significantly alter flow regimes or annual flow volumes in either Joarimin Creek or Lockyersleigh Creek in terms of peak discharges, flood levels or peak in-stream velocities either upstream of or downstream of the quarry. Therefore, the proposed modification is not expected to adversely impact on channel stability or in-stream habitat of either the Joarimin Creek or Lockyersleigh Creek systems.

The Department, WaterNSW, EPA, DPI Fisheries and DPI Water all generally agree that the proposed modification would not adversely impact water quality in Joarimin Creek or Lockyersleigh Creek, or the downstream drainage systems. Furthermore, as water use within the catchments is regulated by a Water Sharing Plan and Holcim's water take would be within its harvestable rights, the proposed modification is not expected to have a significant impact on downstream water users.

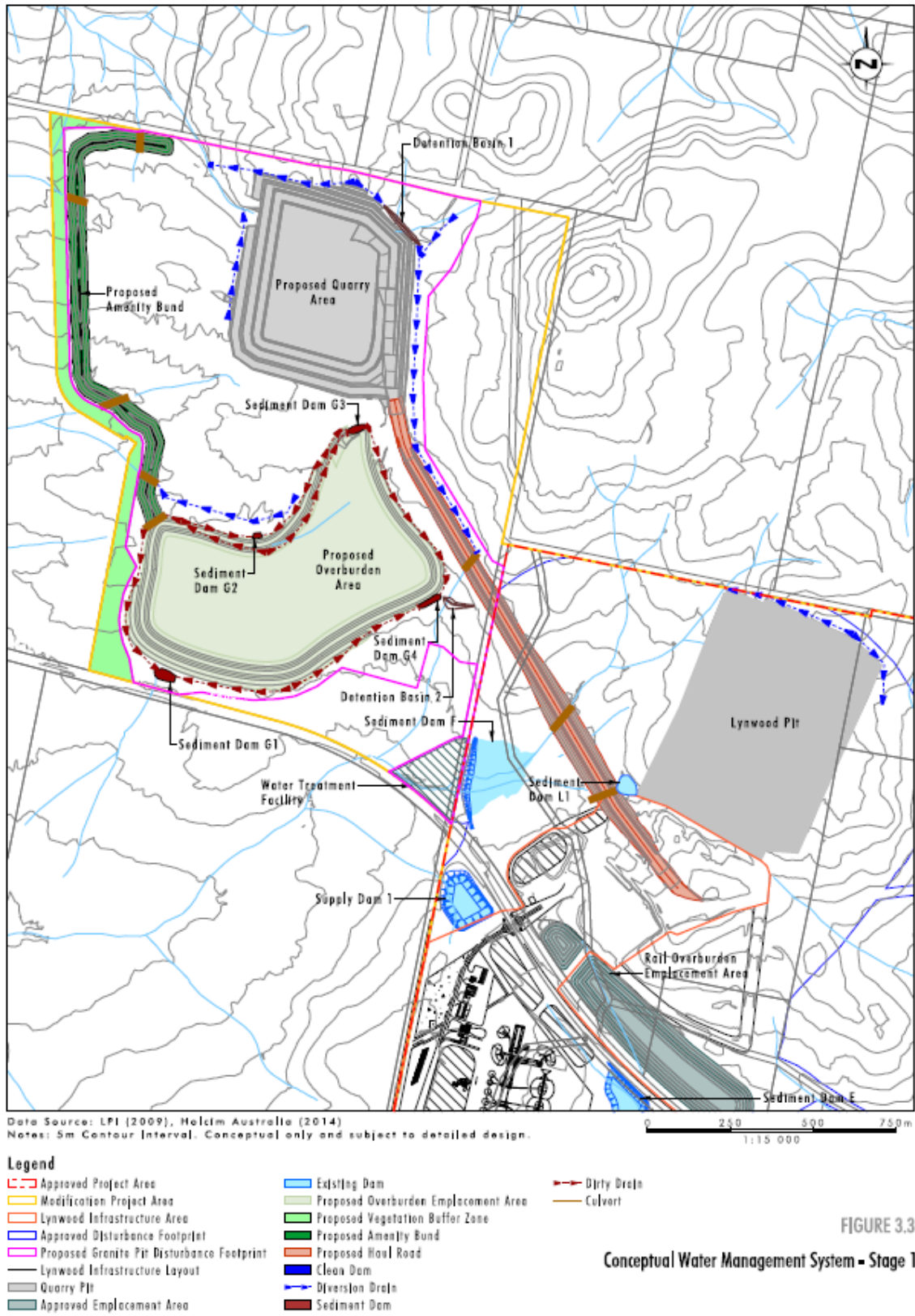


FIGURE 3.3

Conceptual Water Management System - Stage 1

Figure 8: Stage 1 water management system

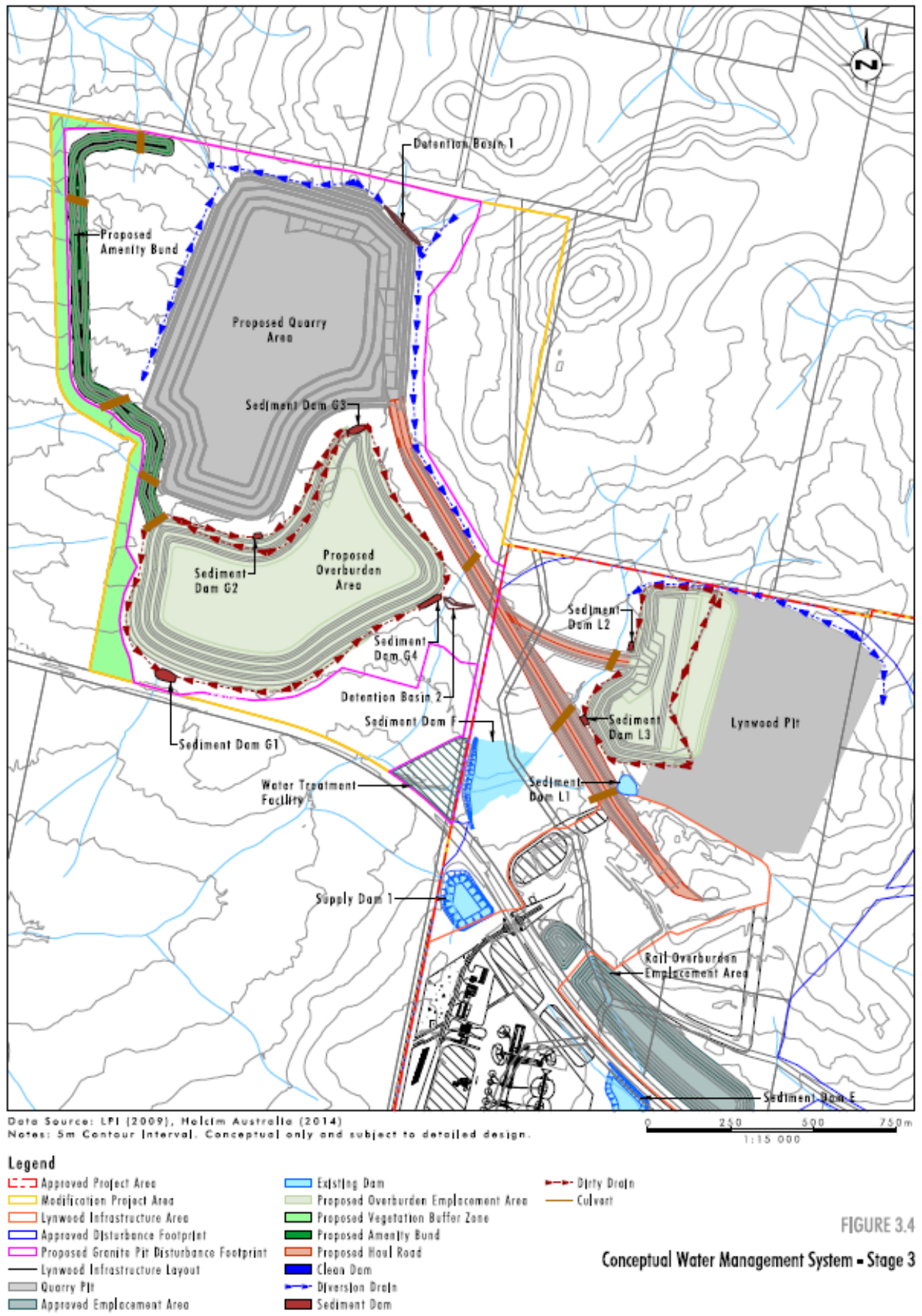
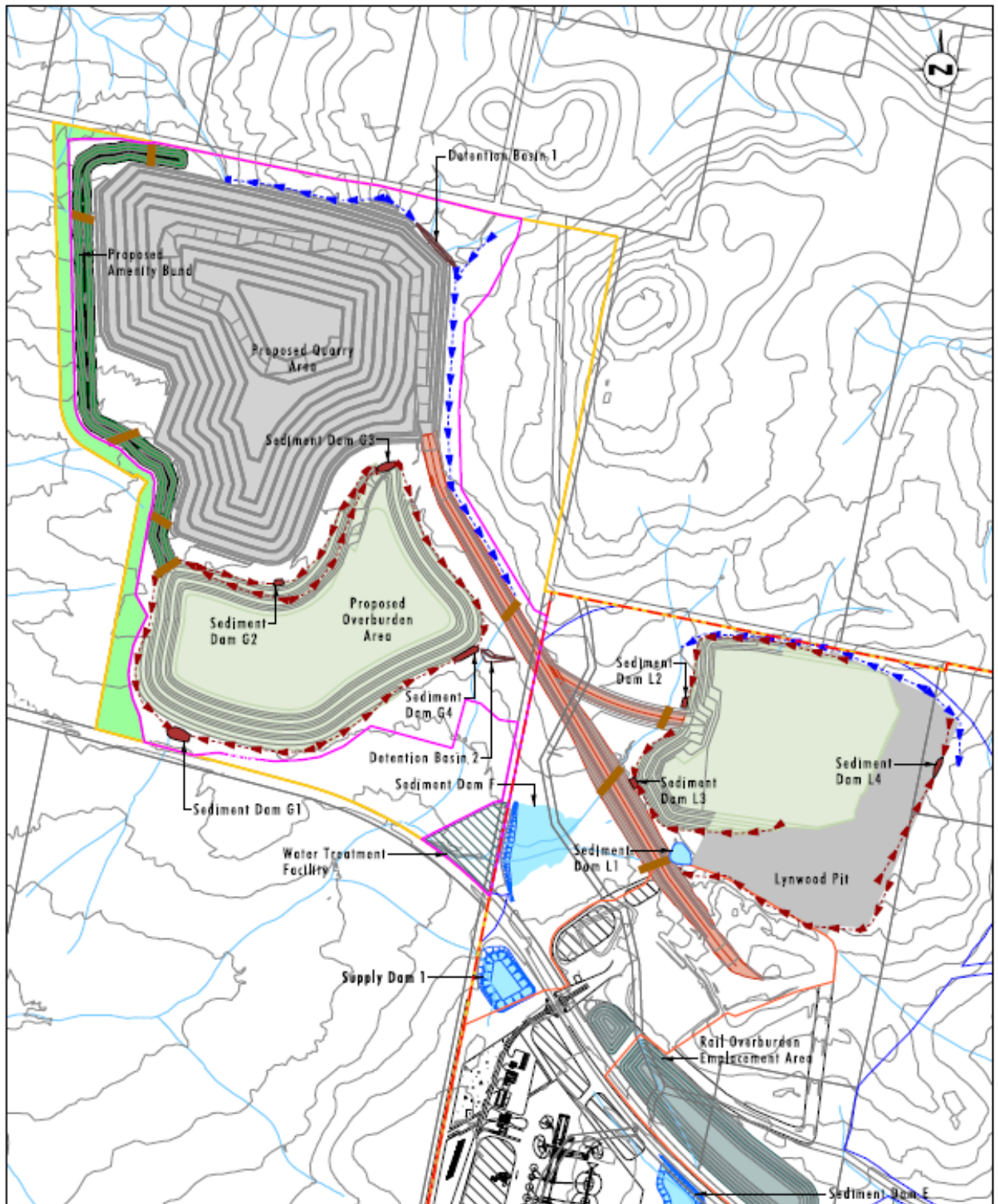


FIGURE 3.4

Conceptual Water Management System - Stage 3

Figure 9: Stage 3 water management system



Data Source: LPI (2009), Holcim Australia (2014)
 Notes: 5m Contour Interval. Conceptual only and subject to detailed design.

- Legend**
- [- - -] Approved Project Area
 - [---] Modification Project Area
 - [---] Lynwood Infrastructure Area
 - [---] Approved Disturbance Footprint
 - [---] Proposed Granite Pit Disturbance Footprint
 - [---] Lynwood Infrastructure Layout
 - [---] Quarry Pit
 - [---] Approved Emplacement Area
 - [---] Existing Dam
 - [---] Proposed Overburden Emplacement Area
 - [---] Proposed Vegetation Buffer Zone
 - [---] Proposed Amenity Bund
 - [---] Proposed Haul Road
 - [---] Clean Dam
 - [---] Diversion Drain
 - [---] Sediment Dam
 - [---] Dirty Drain
 - [---] Culvert

FIGURE 3.5
 Conceptual Water Management System - Stage 6

Figure 10: Stage 6 water management system

To ensure that water resources are effectively managed, the Department has either recommended conditions, or has existing conditions in place requiring Holcim to:

- ensure that it has sufficient water for all stages of the project, and if necessary, adjust the scale of quarrying operations on-site to match its available water supply;
- ensure that it has adequate water access licenses to account for all water used by the project (including gross groundwater inflows);
- ensure that any surface water discharges from the site comply with the limits set in any Environment Protection Licence;
- construct the proposed vehicular crossing of Lockyersleigh Creek in accordance with the *Policy and Guidelines for Fish Friendly Water Crossings* and *Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings*;
- construct sediment dams G1, G2, G3, G4, L2, L3 and L4 to manage the 95th percentile 5 day rainfall event;
- prepare and implement a Water Management Plan, including a:
 - water balance;
 - erosion and sediment control plan;
 - surface water monitoring program;
 - groundwater monitoring program; and
 - surface water and groundwater response plan to address any potential adverse impacts associated with the development.

5.3 Air Quality

5.3.1 Introduction

The proposed modification has the potential to impact on air quality through the revised location of the quarry pit, overburden emplacement areas and haul roads. Fugitive dust emissions would be generated by blasting, removal and emplacement of overburden, and extraction, hauling and processing of hard rock. Combustion of diesel in quarrying equipment would also result in emissions of particulate matter (PM₁₀ and PM_{2.5}), oxides of nitrogen (NO_x), carbon monoxide (CO) and sulphur dioxide (SO₂).

Other potential sources of dust in the locality are from the existing quarrying operations at Lynwood, Holcim's Johnniefields Quarry (located 3 km to the northeast of Lynwood) and Gunlake Quarry (located 2.5 km to the north of Lynwood), as well as from agricultural activities in the area. The location of residences with respect to the three local quarries is shown on **Figure 11**. The dominant wind direction at Lynwood is from the west, particularly in winter, although in the summer months a significant proportion of winds come from the east.

The EA included an Air Quality Impact Assessment (AQIA), undertaken by Pacific Environment Limited. The AQIA considered the impacts of dust deposition (particles larger than 50 micrometres (µm)), TSP (total suspended particles generally less than 50 µm in diameter), PM₁₀ (particles with a diameter of less than 10 µm), PM_{2.5} (particles with a diameter of less than 2.5 µm) and Respirable Crystalline Silica.

Air quality at Lynwood has been monitored since 2004 by two high volume air samplers (HVAS), measuring PM₁₀ on a six day cycle, and eight dust deposition gauges (DDG). Monitoring results over the period July 2004 to July 2014 were used to assist in establishing air quality background levels.

Annual average PM₁₀ concentrations at the two HVAS monitoring sites ranged from 3.3 to 13.1 µg/m³ over this period. The highest annual average PM₁₀ concentrations (13.1 µg/m³) occurred in 2004 and 2009. The AQIA conservatively adopted this level as the annual average PM₁₀ background level for the assessment. The AQIA also established background levels for annual average PM_{2.5} (5.2 µg/m³); annual average TSP (33 µg/m³); and annual average dust deposition (1.8 g/m²/month).

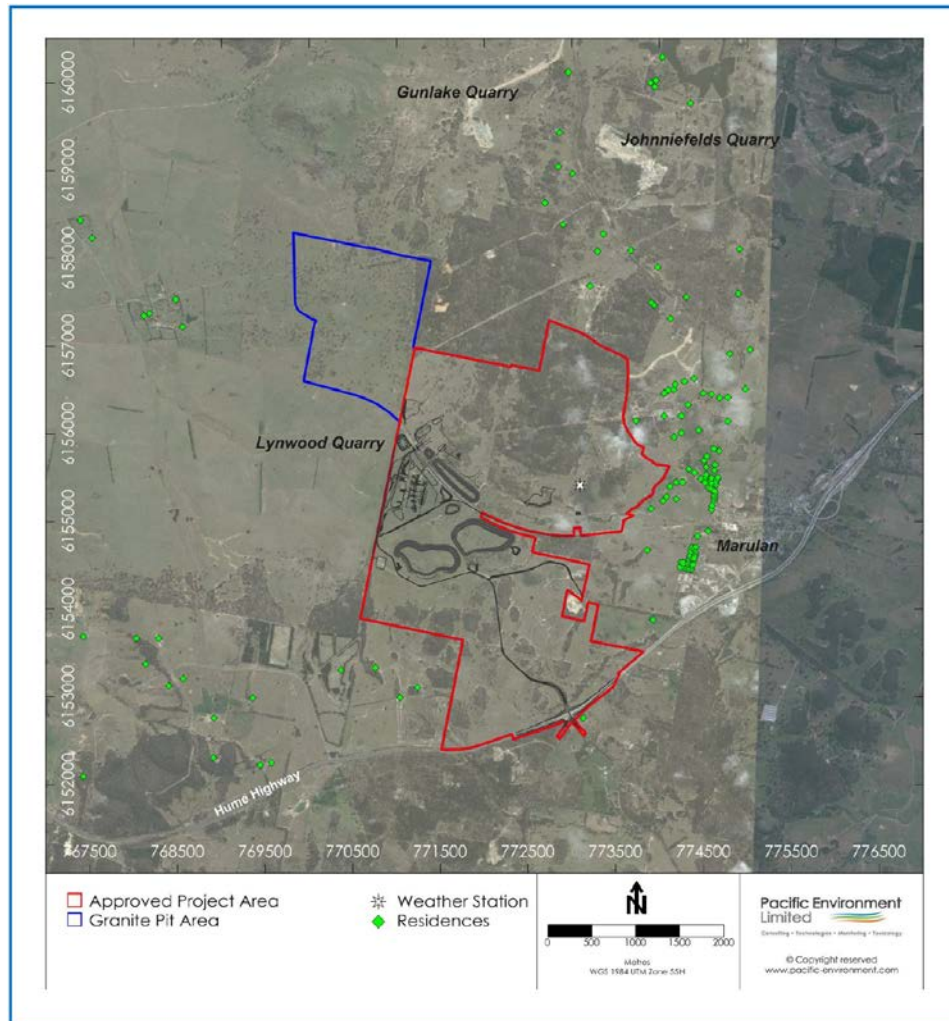


Figure 11: Location of surrounding residences and nearby quarries

5.3.2 Assessment of Impacts

The proposed modification was assessed against the air quality criteria in the existing consent (see **Table 7** below) which are consistent with standard criteria recommended by the EPA and specified in the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*. The overall effect of the proposed modification would be to move the air quality impacts of quarrying operations further away from the township of Marulan and the majority of residences near the quarry (see **Figure 11**).

Table 7: Air quality criteria

Pollutant	Averaging Period	Criterion
PM ₁₀	Annual mean	30 µg/m ³
	24-hour max	50 µg/m ³
TSP	Annual mean	90 µg/m ³
Deposited Dust	Annual	Max increase of 2 g/m ² /month
		Max total of 4 g/m ² /month

The predicted PM_{2.5} concentrations were compared with the National Environment Protection Council’s advisory reporting standard of an annual average of 8 µg/m³ and a maximum 24-hour average of 25 µg/m³. The AQIA modelled the air quality impacts associated with the three ‘worst-case’ stages of the proposed modification (ie Stages 1, 3 and 6) using the dispersion model AERMOD.

Annual average PM₁₀ concentrations are predicted be below the 30 µg/m³ criterion at all residences during all three stages. The proposed modification is also predicted to be less than the maximum 24-hour average PM₁₀ criterion of 50 µg/m³ at all residences, except for one residence where it is predicted to meet the criterion (ie 50 µg/m³). This residence is located approximately 2 km to the northeast of the Granite Pit.

The Department notes that there have only been two occasions in ten years of monitoring when the PM₁₀ levels exceeded the 50 µg/m³ criterion. On these two occasions (22 and 28 November 2009) there was significant bushfire activity in the area. Given the isolated nature of these exceedances, the Department accepts that, in all likelihood, it would be regional (rather than local) sources of dust which would lead to any future breach of the criterion. Further, the AQIA took a conservative approach, in that air emissions associated with the modified project were added to the 99th percentile background levels. Given these factors, the Department considers that Lynwood would be able to operate in compliance with the 24-hour average PM₁₀ criterion under almost all meteorological conditions.

Annual average cumulative concentrations of PM_{2.5}, TSP and dust deposition associated with the proposed modification are predicted to be below the relevant advisory reporting standard or criterion at all residences.

The EPA has reviewed the AQIA and also noted that no exceedances of air quality criteria are predicted as a result of the proposed modification. However, the EPA raised some concern with regard to potential cumulative impacts of the proposed modification when considered in conjunction with existing and proposed operations at nearby quarries. This concern was also raised by the Beatties, whose property is located between the three quarries on Brayton Road (but closest to the Johnniefelds Quarry).

The AQIA considered the cumulative air quality impacts on the Beattie's residence. At this location, the annual average PM₁₀ concentrations were predicted to be less than 15 µg/m³ with background levels accounting for 13 µg/m³ of this. The Department notes that both these concentrations are well below the EPA criterion of 30 µg/m³ and must conclude that the proposed modification would not result in any significant air quality impacts on this residence. Notwithstanding, the Department supports the EPA's suggestion for improved monitoring and has recommended a condition to this effect.

In its RTS, Holcim agreed to review its air quality monitoring system in consultation with the EPA and has also reiterated its statement that it intends to cease operations at Johnniefelds Quarry within two years of the proposed Granite Pit consistently producing high quality hard rock.

The Beattie's submission also raised concern about the potential impacts of Respirable Crystalline Silica (RCS) as a result of the proposed modification. Silica is present in the rock in some quarries, including at Lynwood. As NSW does not have a criterion for RCS, the AQIA made reference to the Victorian EPA's criterion for RCS for mining and extractive industries of 3 µg/m³ (annual average). The AQIA predicted that the RCS levels would be well below 3 µg/m³ at all nearby residences.

5.3.3 Mitigation and Management

There are a number of measures already in place at Lynwood to ensure the air quality impacts of quarrying and processing operations are minimised. These include enclosure of the majority of the crushing and screening plant, partial enclosure of the conveyors (top and one side), the use of a dust extraction system at the crushing and screening plant, and the sealing of the access road.

In addition, Holcim has a number of operational measures in place, including:

- watering of stockpiles, haul roads and hardstand areas;
- rehabilitation of exposed areas as quickly as possible; and
- ongoing assessment of meteorological conditions to enable changes to operations if conditions are likely to be conducive to excessive dust generation.

Holcim has committed to the continuation of these measures which would be detailed in an Air Quality Management Plan for the project.

As the prevailing winds in the area are generally from the west, the EPA recommended that either a HVAS or a dust deposition gauge is installed at a suitable location northeast of Lynwood. The EPA also noted that no DDG was currently installed to the west of the quarry, and in light of the proposed modification and predominant easterly winds in summer; considered a DDG should be installed in this location. The Department agrees that additional monitoring is warranted and has recommended a condition requiring an Air Quality Management Plan to be prepared in consultation with the EPA.

5.3.4 Conclusion

The proposed modification is predicted to comply with all annual average air quality criteria at all residential receivers. The proposed modification is predicted to comply with the maximum 24-hour average PM₁₀ concentration at all residences, except for one residence where it is predicted to meet the criterion of 50 µg/m³. However, given the conservative nature of the modelling, the Department is satisfied that the modified project would be able to operate in full compliance with all relevant air quality criteria.

In summary, the AQIA has demonstrated that the project would be able to continue to operate in compliance with current air quality criteria at all nearby residences and the Department is satisfied that the air quality impacts of the proposed modification are acceptable.

The Department has recommended conditions that would require Holcim to:

- continue to comply with the consent's current air quality criteria;
- implement all reasonable and feasible mitigation and management measures to minimise air quality impacts; and
- develop and implement a comprehensive Air Quality Management Plan.

5.4 Noise and Blasting

5.4.1 Introduction

A Noise Impact Assessment (NIA) for the proposed modification was undertaken by Umwelt in accordance with the *NSW Industrial Noise Policy* (INP). As the proposed modification involves changes to the quarry footprint, changes to the overburden emplacement areas and the construction of an additional internal haul road, there is potential for the quarry's noise impacts to change.

Generally, the proposed modification would result in extraction activities taking place further away from almost all nearby residences, including those in the Marulan township. The proposed modification, however, would result in extraction activities being closer to several residences to the north and west of the quarry.

The objective of the NIA was for the proposed modification to meet the existing noise criteria, and if that was not practicable, then to comply with the requirements of the INP. The NIA modelled the noise impacts of the proposed modification at 16 residences around the existing and proposed quarry pits. Two additional residences were included in the noise assessment (due to the changed location of the pit and the construction of a new house) as well as the 14 residences identified in the existing consent. The additional residences are Receiver 15, which was assigned the same noise criteria as Receiver 11, and Receiver 16, which was assigned the same noise criteria as Receiver 2 (see **Figure 12**).

Meteorological data from an on-site meteorological station was used for the assessment. Previously meteorological data was obtained from a weather station located 8 km southeast of the quarry. The acoustically significant conditions that are included in the NIA are:

- day, evening and night calm conditions;
- night time 3 m/s easterly winds; and
- night time 3 m/s westerly winds.

5.4.2 Assessment of Impacts

Noise modelling was undertaken for three representative stages of quarry development (Stage 1, Stage 3 and Stage 6). These stages were considered to represent the potential worst-case scenarios for noise emissions under the proposed modification.

Modelling demonstrated that the proposed modification would not exceed the existing L_{Aeq,15min} day and evening noise criteria at any receiver location. The proposed modification would not result in any exceedance of the existing night-time criteria at 15 of the 16 receiver locations, with the single exception being a 1 dB(A) exceedance at Receiver 11, under easterly wind conditions.

The modelled 1 dB(A) exceedance at Receiver 11 is not due to any additional noise from quarrying (as only processing and product dispatch activities are allowed during the night), but rather due to the use of more accurate, site-specific meteorological data in the model, rather than regional data.

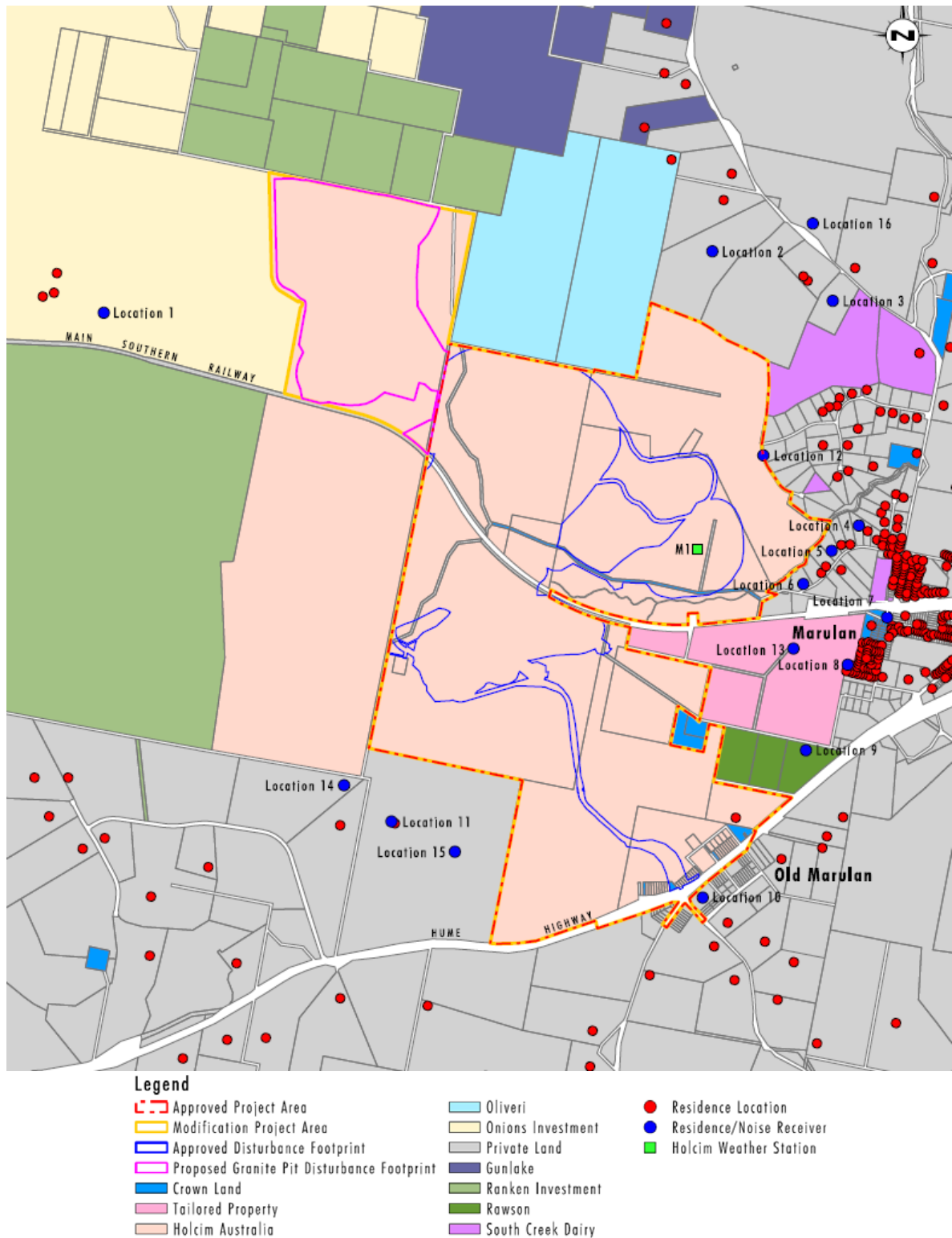


Figure 12: Noise receiver locations

Holcim notes that the 2005 Environmental Impact Statement (EIS) for Lynwood proposed a Project Specific Noise Level (PSNL) for Receiver 11 of 37 dB(A). However, the consent’s noise emission criterion was set at the then-predicted noise level of 35 dB(A). The Department’s practice is to set emission criteria at either the PSNL or predicted noise emissions, whichever is the lower.

The EPA has reviewed the NIA and accepts Holcim’s position that its now-proposed criterion of 36 dB(A) for Receiver 11 has been derived in accordance with the INP. The Department notes that the proposed criterion of 36 dB(A) is below the 37 dB(A) PSNL originally proposed for this location.

The Department therefore has recommended that the consent's night-time criterion for Location 11 be changed from 35 to 36 dB(A). The EPA recommended that noise validation at Receiver 11 be undertaken as a condition of any modified consent. Holcim has agreed to this recommendation, and the Department has also recommended a condition to this effect

As the proposed modification would not result in any changes to the transportation of products from Lynwood, the impacts of noise from road or rail transportation would not change as a result of the proposed modification.

5.4.3 Cumulative Noise Impacts

Lynwood is generally located in a rural area, with rural-residential developments and the township of Marulan to its east. There are two other quarries in the vicinity as discussed in **Section 5.3.1** above.

The NIA states that it is unlikely that noise generated by the proposed modification would cumulatively add to noise emissions from the Johnniefields and Gunlake quarries, due to the direction of significant winds for the area which are unlikely to enhance the noise from more than one operation at a time (see **Figure 11**).

To test this assumption, the NIA considered the noise contours from a noise assessment of the Gunlake operations which indicated that the noise impacts from Gunlake Quarry on properties to the south of Gunlake, and northeast of the Granite Pit area, would be less than 35 dB(A). Should these be added to the noise impacts of the proposed Lynwood modification, the worst case cumulative noise impact is predicted to be 38 dB(A), which is less than the relevant daytime amenity criterion of 50 dB(A), the evening criterion of 45 dB(A) and the night time criterion of 40 dB(A) at this location.

The NIA also looked at the cumulative impacts on the closest residence to the proposed Granite Pit (Location 1 on **Figure 12**). The maximum predicted noise impact at this residence as a result of the proposed modification is 31 dB(A). The noise impacts from the Gunlake Quarry are predicted to be less than 35 dB(A) at this location. The worst-case cumulative impact at this residence would be 37 dB(A), which is 3 dB(A) less than the most stringent criterion of 40 dB(A) at night.

5.4.4 Management and Mitigation

Currently one of the key noise management measures at Lynwood is the restriction of certain activities to daytime and evening periods. The proposed modification does not propose any changes to current operating hours. However, the proposed quarry pit has been designed to minimise potential noise impacts, particularly with regard to the design of the proposed amenity bund.

As well as current noise management measures, Holcim has proposed additional measures including:

- use of broad-band reversing alarms;
- management of mobile machines during adverse weather conditions;
- regular inspections and maintenance of noise attenuation systems; and
- periodic review of noise performance equipment.

The Department is satisfied that the measures previously adopted and the new measures proposed include all reasonable and feasible noise mitigation measures and that Lynwood would be able to operate in accordance with the proposed noise criteria. The Department has recommended that Holcim be required to prepare and implement a Noise Management Plan for the quarry, rather than the Noise Monitoring Plan required under the current consent.

5.4.5 Blasting

A Blasting Impact Assessment (BIA) for the proposal was undertaken by Enviro Strata Consulting. The blast criteria for Lynwood Quarry are set out in the existing consent and are consistent with the current blast criteria recommended by the EPA. Currently, blasting at Lynwood is undertaken between the hours of 9 am to 5 pm Monday to Saturday. No changes are proposed to these hours.

The closest residential receiver to the proposed Granite Pit is located about 1.5 km to the west, on the Lockyersleigh property. The township of Marulan is located about 3.2 - 4 km southeast of the proposed pit. The closest public infrastructure to the proposed pit is a natural gas pipeline and the Main Southern Railway Line, located 540 m and 550 m (respectively) from the pit.

The only historic heritage site that could potentially be impacted by blasting is the Lockyersleigh Homestead and Gardens. While the Homestead is 1.7 km west of the proposed pit, the Gardens are only 1.3 km away at their closest point. With regard to Aboriginal heritage, there are some scarred trees on the quarry site located about 1.5 km from the proposed pit. The BIA considered the impact of blasting on these features.

The BIA found that the ground vibration exposure for all residences would be well below the applicable vibration limits of 5 mm/s (for 95% of blasts) and 10 mm/s (not to be exceeded) during a typical blast. The BIA found that the airblast exposure for all residences would be below the applicable limits of 115 dBL (for 95% of blasts) and 120 dBL (not to be exceeded). Modelling also showed that ground vibration levels for the gas pipeline and the Main Southern Railway Line would be below relevant criteria (100 mm/s and 25 mm/s respectively). The vibration exposure was also found to be below the relevant criterion for these items (100 mm/s).

The Department is satisfied that the impacts of blasting associated with the proposal would be low, and could be appropriately managed to ensure negligible environmental impacts. OEH has recommended that a structural integrity report for the Lockyersleigh Homestead be carried out prior to commencing works in the proposed pit area and a condition requiring this has been recommended. A condition requiring that the existing Blast Management Plan is revised has also been recommended.

5.4.6 Conclusion

Predicted operational noise from the proposed modification is expected to meet existing noise criteria at Lynwood at all but one residential location. At this location, the Department and the EPA both support Holcim's request for a 1 dB(A) increase in the relevant noise criterion.

The Department has also recommended conditions requiring Holcim to:

- implement best practice management to minimise the operational noise of the development;
- carry out monitoring to determine whether the development is complying with the relevant conditions of the consent;
- prepare and implement a Noise Management Plan; and
- prepare and implement an updated Blast Management Plan.

With the implementation of these recommended conditions, the Department is satisfied that the noise and blasting impacts associated with the proposal are acceptable.

5.5 Aboriginal Cultural Heritage

The EA contained an Aboriginal Cultural Heritage and Archaeological Assessment (ACHAA) prepared by Umwelt, in consultation with the registered Aboriginal parties and OEH.

5.5.1 Assessment of Impacts

The ACHAA found 20 Aboriginal sites the within the proposed Granite Pit area, including 5 isolated finds, 9 artefact scatters, 4 Potential Archaeological Deposits (PADs) and 2 scarred trees. The proposed impact on these sites, as well as their archaeological and Aboriginal significance, is summarised in **Table 8**.

Table 8: Surveyed sites and their archaeological and Aboriginal significance

Site	Archaeological Significance	Aboriginal Significance	Proposed impact
LA31E	Moderate – High	Very High	Partial Destruction
LA31W	Moderate – High	Very High	Partial Destruction
MRN25	Moderate – High	High	Destruction
LKAS1	Moderate	Very High	Destruction
LKAS2	Low	High	Destruction
LKAS3	Low	High	Destruction
LKAS4	Low	High	Destruction
LKAS5	Low	High	No Impact
LKAS6	Low	High	No Impact
LA32	Low	High	Destruction
LA33	Low	High	No Impact
LKIF1	Low	High	No Impact
LKIF2	Low	High	Destruction

Site	Archaeological Significance	Aboriginal Significance	Proposed impact
LKIF3	Low	High	Destruction
LKST1	Moderate	Very High	Destruction
LKST2	Moderate	Very High	Destruction
PAD2	Low – Moderate	High	Destruction
PAD4	Moderate	High	Destruction
PAD5	Low – Moderate	High	Destruction
PAD6	Low – Moderate	High	Destruction

The proposed modification would result in the destruction or partial destruction of 16 of the 20 identified sites. A number of these sites have been identified as being of substantial archaeological and Aboriginal significance. In particular, LA31E, LA31W, LKAS1, MRN25, LKST1 and LKST2 have moderate or moderate to high archaeological significance and very high Aboriginal significance.

MRN25 is located within the approved disturbance footprint and has approval for site burial (overburden) under Aboriginal Heritage Impact Permit (AHIP) #1100264. However, this site is within the footprint of the proposed haul road to the Granite Pit, and would be impacted by its construction. Holcim has proposed a variation to AHIP #1100264 to allow for disturbance of this site.

LA31E and LA31W are low density artefact scatters located within the proposed amenity bund and water drainage areas. Both would be subject to partial destruction.

LKST1 and LKST2 are scarred trees located within the proposed amenity bund and Granite Pit areas. Holcim noted that both these sites would be destroyed during construction and operation of the proposed modification. The Department questioned whether impacts to LKST1 could be avoided by diverting the proposed amenity bund around the site. Holcim advised that avoidance of LKST1 was considered; however could not be achieved due to the proposed height of the amenity bund and the required ramping (ie width) on either side needed to maintain the bund at the proposed height.

5.5.2 Management, Mitigation and Offsets

Due to the archaeological and Aboriginal significance of the key sites identified above, Holcim has proposed subsurface testing and salvage of LA31E and LA31W, subsurface salvage of MRN25, and removal and relocation of LKST1 and LKST2 to a roofed enclosure for conservation. Subsurface testing salvage is also proposed for LKAS1, PAD2, PAD4, PAD5 and PAD6.

For the four sites not predicted to be impacted by the proposed modification, Holcim has proposed their conservation *in-situ* by restricting access and monitoring as required under the existing AHIP.

Holcim also proposes to offset impacts to Aboriginal cultural heritage by expanding the existing Cultural Heritage Management Zone (CHMZ). This area was established to conserve the most significant Aboriginal site (and a range of other sites) at Lynwood. The CHMZ would be increased to incorporate the Aboriginal sites within the current Joarimin Creek Corridor (which includes a major camp site complex) and an additional corridor approximately 250 m in width either side of the tributary of Joarimin Creek that would join the camp site complex to the CHMZ. This proposed expansion would provide for the conservation of an additional 21 sites; including three isolated finds, 17 artefact scatters, one boulder with a grinding bowl and five large areas previously identified as PADs.

5.5.3 Conclusion

The Department and OEH are generally satisfied with the measures proposed by Holcim to manage and mitigate the proposal's Aboriginal heritage impacts. However, due to the number of sites impacted and their significance, as well as the proximity of the proposed Granite Pit to other sites of Aboriginal cultural heritage, the Department has recommended stringent conditions for the management of Aboriginal cultural heritage. This includes a revised Aboriginal Cultural Heritage Management Plan which must detail a conservation management plan, archaeological salvage programs, monitoring of sites outside the disturbance footprint and management of access for Aboriginal stakeholders.

5.6 Visual

5.6.1 Introduction

The proposed modification would increase the visibility of Lynwood's quarry operations at residences to the south, southwest, west and northwest of the quarry, including at elevated residences in

Towrang, a rural-residential community located approximately 8 km west of Lynwood. Visual impacts associated with the proposal could result from the:

- relocation of Lynwood's extraction area further towards the west;
- proposed changes to the location and size of emplacement areas; and
- construction of a 12 m high amenity bund along the western side of the proposed Granite Pit.

Conversely, some elements of the proposed modification, particularly the deletion of the currently approved Eastern Overburden Emplacement Area, have the potential to reduce the visual impacts of Lynwood on residents living in and around Marulan to the east of the quarry.

In early discussions with residents about the proposed modification, Holcim identified that residents living at Towrang, with elevated viewing locations and expansive views across the rural landscape towards Marulan, were particularly concerned about the visual impacts associated with the proposed movement of quarrying operations to the west and the potential impacts of night lighting.

The impact of night lighting from the quarry was first raised as an issue by these residents during the quarry's commissioning in 2014. Since that time, Holcim has worked with the community to minimise the impacts of lighting from the quarry. Although a review of the lighting on site, commissioned by Holcim, found that the external lights met the relevant Australian standards (as required by conditions of consent), Holcim sought to identify further measures that could be implemented to reduce the impacts of night lighting. As a result of this work, a number of mitigation measures have been implemented at Lynwood over the past two years, including:

- reducing the wattage of lights in the light vehicle car park and at the workshop;
- lowering the height of the light vehicle car park lights from 12.5 m to 7.5 m;
- installing additional glare shields;
- re-angling and re-configuring various lights across the site; and
- constructing a 9 m high light-proof screen (comprising concrete blocks and fabric screens) along the western boundaries of the car park access road and light vehicle car park.

5.6.2 Assessment of Impacts

The EA includes photomontages which illustrate the visual impact of the proposed final landforms associated with the proposed modification from a number of representative locations around the quarry. These photomontages and the visual impact analysis indicate that:

- none of the elements associated with the proposed modification would be visible from the Marulan township and its immediate surrounds;
- for several rural residential properties to the south of the Granite Pit, there would be distant (from 5 km) views of the southern overburden emplacement area and a portion of the upper benches of the Granite Pit. These views would diminish as the outer faces of the southern overburden emplacement area and the uppermost benches of the Granite Pit are rehabilitated;
- similarly, from a property 6 km to the southwest of the Granite Pit area, there would be distant views of the amenity bund, the southern overburden emplacement area and the upper benches of the northeastern portion of the Granite Pit;
- from the Lockyersleigh Homestead, located 1.7 km west of the proposed Granite Pit, it is predicted that existing intervening vegetation, as well as large garden trees in the homestead garden, would fully screen any potential views of the quarry operations;
- from the Towrang area, the view would include the amenity bund, the southern overburden emplacement area and a small section of the uppermost benches of the Granite Pit;
- from two other representative locations in Towrang, further to the northwest and approximately 7 km from the Granite Pit, the amenity bund would screen part, but not all, of the Granite Pit. Consideration was given to extending the amenity bund to run along the northern boundary of the Granite Pit; however this was not feasible due to the location of a creek in this area. Therefore, from this location, sections of the quarry operations would be visible over a distance of 7 km with the views reducing as rehabilitation is progressively completed.

5.6.3 Management and Mitigation

In designing the proposed Granite Pit area, Holcim was sensitive to the potential visual impacts associated with moving its operations towards the west. Holcim therefore engaged in an iterative process with the community to analyse the visual impact of various options, particularly relating to the location and size of the emplacement areas and the amenity bund, and determined that the following mitigation measures would be incorporated into the project:

- construction of a 12 m (or 14 m in some locations) high amenity bund during the initial construction phase along the western boundary of the Granite Pit area;
- vegetating the outer face of this amenity bund as quickly as possible;
- rehabilitation of the upper west-facing benches of the Granite Pit (which would be visible from some elevated properties in Towrang) as quickly as practicable;
- no installation of fixed lighting in the Granite Pit area;
- management of evening quarrying activities to minimise the visibility of these activities from viewing locations to the west (ie quarrying would be undertaken on lower benches or on the western face of the Granite Pit during this time); and
- construction of 5 m high bund on the southern and western sides of the haul road between the Granite Pit area and the existing infrastructure area, to screen the headlights of haul trucks during the evening period.

5.6.4 Conclusion

Parts of the Granite Pit, the amenity bund, the southern overburden emplacement area and the Lynwood overburden emplacement area would be visible from a number of rural-residential properties to the south, southwest, west and northwest of Lynwood. However, the views would be distant (from between 5 - 9 km) and in the context of other built elements that exist in the view-shed, which include the Main Southern Railway, local roads and the existing approved elements of the Lynwood quarry, are not considered to represent a significant change to the view that currently exists.

The Department considers that Holcim has worked proactively and responsively with the community to minimise the potential visual impact of the proposed modification and is satisfied that the proposed modification has been carefully designed to minimise its visual impact on residents.

The Department also considers that Holcim has identified and incorporated all reasonable and feasible mitigation measures relating to minimising the proposal's visual impacts. In particular, Holcim has committed to early and progressive rehabilitation of the amenity bund and the outer faces of the southern overburden emplacement area. The Department has recommended a condition to ensure that the existing Rehabilitation and Landscape Management Plan is revised following any approval of the proposed modification to ensure that these actions are included in that plan.

In consultation with the Towrang community, Holcim has developed a number of very specific commitments relating to lighting and the visual impact of the existing and proposed quarrying operations. The Department supports Holcim's community engagement initiatives and considers it appropriate to specifically reference Holcim's commitments in the recommended conditions.

In conclusion, the Department is satisfied that the project has been designed to minimise its visual impacts, and that operations at Lynwood would continue to be undertaken in a manner that would ensure that the impacts of night lighting are kept as low as reasonably and feasibly possible.

5.7 Other Issues

The Department's consideration of and recommendations regarding other issues associated with the project are listed in **Table 9**.

Table 9: Other issues

Issue	Consideration	Conclusion and Recommendation
<i>Land Capability and Agriculture</i>	<ul style="list-style-type: none"> • The proposed modification would result in the loss of about 175 ha of mostly Class 4 agricultural land, which has been used for relatively low-intensity grazing for many years. • The loss of this grazing land is significantly offset by the reduction in size of the currently approved pit (~55 ha) and the proposal not to construct the currently approved Western and Eastern Overburden Emplacement Areas (~49 ha). • Post quarrying, the EA predicts the 175 ha of Class 4 land would be replaced with predominantly Class 5 and 6 land, with the exception of the final quarry void which would be classified as Class 8 land, and therefore be 	<ul style="list-style-type: none"> • DPI Agriculture advised that the EA adequately addressed the critical issues associated with impacts on agriculture. • The Department accepts that 175 ha of Class 4 agricultural land would be lost as a result of the proposal. However, the loss of 175 ha of Class 4 agricultural land is not a significant loss of

	<p>unsuitable for agricultural production.</p> <ul style="list-style-type: none"> As part of its rehabilitation strategy, Holcim proposes to establish native woodland vegetation with a primarily native grass groundcover on the emplacement areas and decommissioned infrastructure areas. Although most of this land would be suitable for low intensity grazing post quarrying, Holcim intends to manage the land predominantly for its habitat values, particularly the area to the north of the railway line. In terms of indirect impacts on nearby agricultural resources, the proposed modification is not predicted to have any downstream water quality impacts or any significant impacts on off-site water availability. 	<p>agricultural land in the context of the extent of similar agricultural land in the region.</p> <ul style="list-style-type: none"> The Department is also satisfied that the proposed modification would not have any significant indirect impacts (eg through air or noise emissions) on nearby agricultural land.
<i>Heritage</i>	<ul style="list-style-type: none"> The EA contained a Historical Heritage Assessment (HHA) undertaken by Umwelt. The Granite Pit area is currently located within the boundary of the listing of the 'Lockyersleigh Homestead and Gardens', an item of local significance in the Goulburn Mulwaree LEP. Holcim purchased the Granite Pit area from the owners of Lockyersleigh in 2006. Although the Granite Pit area was subdivided from the Lockyersleigh property, the heritage schedule and LEP maps have yet to be updated. The Lockyersleigh Homestead itself is located approximately 1.7 km west of the Granite Pit area. The Homestead's garden of exotic trees and plants (first established in 1820) is located approximately 1.3 km west of the Granite Pit area. The HHA found that the Granite Pit area is separate from, and does not form part of, the significant garden setting of the Lockyersleigh Homestead. The HHA therefore does not predict any direct impacts to the assessed heritage significance of the Lockyersleigh Homestead and Gardens. The potential for indirect impacts to the Lockyersleigh Homestead as a result of blasting was also considered in the HHA. The homestead and associated buildings are well-maintained and predicted levels of ground vibration as a result of blasting are below 3 mm/s at all main buildings. Therefore it is predicted that there would be no impacts on the Lockyersleigh estate as a result of vibration from blasting. A historic heritage survey of the Granite Pit area was carried out in conjunction with the Aboriginal cultural heritage survey. During the survey, four potential heritage items were identified in the Granite Pit area including two culverts under the Main Southern Railway Line, a stockyard and a garden feature. However, none of these potential items were assessed as having any heritage significance or research potential. The blasting assessment found that the proposed modification would be unlikely to have any impact of the railway culverts. Other heritage items in the vicinity of the Granite Pit area include: <ul style="list-style-type: none"> 'Old Marulan Town' listed on the State Heritage Register and located 3.5 km southeast of the Granite Pit area; and 'Marulan Railway Station' listed on the State Heritage Register and located over 4 km from the Granite Pit area. <p>Due to the distance of these two items from the Granite Pit area, it is predicted that there would be no direct or indirect impacts.</p> 	<ul style="list-style-type: none"> The Heritage Council of NSW reviewed the HHA and advised that it supports the recommended mitigation measures in the EA. The Department accepts the findings of the HHA that there would be no direct impact on the Lockyersleigh Homestead and Gardens as a result of the proposal and that any indirect impacts as a result of blasting are unlikely. The Department has included conditions requiring preparation of a structural report of the Lockyersleigh Homestead and Gardens before commencement of quarrying in the Granite Pit. As well, conditions relating to the management and monitoring of blasting would continue to be included in the consent.
<i>Socio Economic</i>	<ul style="list-style-type: none"> The EA included a social impact and opportunity assessment prepared by Umwelt. The construction program at Lynwood is now largely 	<ul style="list-style-type: none"> The Department agrees that the proposed modification would provide

	<p>complete, representing a capital expenditure by Holcim of approximately \$178 million.</p> <ul style="list-style-type: none"> • When operating at full capacity, the quarry is expected to provide direct employment for 115 people and about \$9 million in annual wages. • The proposed modification would allow for the recently established infrastructure at Lynwood to be fully utilised over the life of the development. • As part of the assessment, Umwelt engaged in extensive consultation with the local community, in an effort to gauge public perceptions of the existing Lynwood operation. Generally, the feedback from the local community was positive. • The key issues of concern for local stakeholders with regard to the proposed modification were found to be: <ul style="list-style-type: none"> – lighting and visual impact; – noise impacts; – air quality impacts; and – traffic impacts • Each of these issues has been considered in this assessment report. The Department is satisfied that there would be no significant increase in these impacts resulting from the proposal. 	<p>socio-economic benefits to the local economy as well as enable the quarry to continue to contribute to the long-term supply of construction materials to the Sydney and regional markets, replacing supply from the Penrith Lakes Quarry in the western Sydney area which has exhausted its resources.</p> <ul style="list-style-type: none"> • The Department is satisfied that these local and regional socio-economic benefits could be achieved without significantly increasing the environmental impacts of the approved operations or the demand on local services and infrastructure.
<i>Traffic</i>	<ul style="list-style-type: none"> • The proposed modification would not result in any changes to the: <ul style="list-style-type: none"> – current production limit (up to 5 Mtpa); – limit on transportation of product by rail (up to 5 Mtpa); – limit on transportation of product by road (up to 1.5 Mtpa); – approved transportation hours (24 hours per day, 7 days per week); or – road access arrangements to and from the quarry (currently via the Hume Highway interchange constructed by Holcim). 	<ul style="list-style-type: none"> • The RMS notes that no changes are proposed to production or transportation limits and therefore raises no objection to the proposed modification. • The Department is satisfied that there are no additional traffic impacts associated with the proposal and that the quarry's traffic impacts are suitably managed under existing conditions.
<i>Hazard Management</i>	<ul style="list-style-type: none"> • The EA includes a risk assessment addressing proposed haul road construction above the Moomba to Sydney natural gas and ethane pipelines which identifies accidental damage to the pipes as the most probable hazard. This damage may occur during excavation, or due to the movement of heavy construction vehicles and equipment within the easement. However, the assessment concludes that these risks can be adequately mitigated with the implementation of suitable safeguards. • Proposed mitigation measures include: <ul style="list-style-type: none"> – geotechnical assessment of soil stability at the pipeline crossing location prior to construction; – civil design of the haul road to ensure that it meets load-bearing requirements; – construction protocols, including limited excavation depths, buffer distances and designated crossings to limit contact with, or stress on the pipes; and – awareness/induction training for construction workers and drivers • No assessment was undertaken with respect to the storage and transport of hazardous materials, as no relevant changes are proposed to the approved project. The Department notes that there are existing conditions in place with respect to the handling of dangerous goods. 	<ul style="list-style-type: none"> • The Department is satisfied with the preliminary hazard analysis and agrees with its conclusions and proposed management measures. • The Department has recommended a revised condition requiring Holcim to carry out the development generally in accordance with the EA for Mod 4, which includes the measures outlined in the preliminary hazard analysis. • Subject to this condition, the Department is satisfied that the risks associated with the proposed modification would be minimal.
<i>Rehabilitation</i>	<ul style="list-style-type: none"> • A Rehabilitation and Landscape Management Plan (RLMP) for Lynwood was prepared and approved under existing conditions of consent. 	<ul style="list-style-type: none"> • The Department has recommended a condition requiring Holcim to review

	<ul style="list-style-type: none"> • The RLMP would need to be revised to take into account the different landform that would result from the proposed modification, including changes to the location of overburden emplacement areas, the backfilling of the existing pit, the new Granite Pit area and amenity bund, and the overall increase to the disturbance footprint. • The EA's Conceptual Final Rehabilitation Plan indicates that the final landform for the proposed Granite Pit would consist of a large void with rehabilitated batters. A similar approach was approved for the existing pit under the original consent and RLMP. • The key aspects of Holcim's Rehabilitation Strategy as set out in the EA, include: <ul style="list-style-type: none"> – progressive and timely rehabilitation of disturbed areas; – a particular focus on early rehabilitation of the proposed amenity bund and outer faces of the southern overburden emplacement area, to minimise the visual impacts of these landforms; and – shaping of the overburden emplacement areas and bunds to blend in with the surrounding landforms. • The Department currently holds a rehabilitation bond for the Lynwood Quarry in the amount of \$1,844,272.00. 	<p>and revise its existing RLMP.</p> <ul style="list-style-type: none"> • The current consent contains conditions requiring the sum of the rehabilitation bond to be reviewed periodically. This review is an ongoing requirement of the consent's independent audit process, and no changes to existing conditions are required as a result of the proposed modification.
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6 CONCLUSION

The Department has assessed the proposed modification in accordance with the requirements of the EP&A Act, including the objects of that Act and the principles of ecologically sustainable development.

The Department notes that, in essence, the proposed modification would result in the construction of a new pit to access a granite resource to the west of Lynwood's existing quarrying operations, with no changes being proposed to the processing or transporting of quarry products.

The Department has carefully considered the amenity impacts associated with the new pit, particularly with regard to air quality, noise and visual impacts, and is satisfied that the impacts of the proposal would not be significantly different from those already approved, and would be able to be managed and/or mitigated so as to comply with all relevant criteria at all privately-owned residences.

The proposed modification would result in the clearing of an additional 77.7 ha of native vegetation. The Department accepts that Holcim has avoided impacts on native vegetation communities and flora and fauna as far as is reasonable and practicable. Therefore, it is appropriate to allow the proposed clearing of native vegetation, subject to an offset. The Department has recommended a condition, developed in consultation with OEH, to require Holcim to progressively retire biodiversity credits equivalent to the deficit arising from the clearing of native vegetation in accordance with the Offsets Policy.

The Department considers the proposed modification would provide economic benefits to the local community, particularly in terms of continued and assured employment, as well as significant regional economic benefits, particularly through enabling Holcim to continue to provide hard rock aggregate to the Sydney metropolitan region for construction and road building purposes.

The Department is satisfied that the proposed modification is in the public interest and should be approved, subject to conditions.

7 NOTICE OF MODIFICATION

A Notice of Modification (see **Appendix D**) and version of the Lynwood Quarry consent (see **Appendix E**) as proposed to be amended have been prepared. Holcim has reviewed and accepted these conditions.

8 RECOMMENDATION

It is RECOMMENDED that the Executive Director, Resource Assessments & Compliance, as delegate of the Minister for Planning:

- **considers** the findings and recommendations of this report;
- **determines** that the proposed modification is within the scope of section 75W of the EP&A Act;
- **approves** the proposed modification under section 75W of the EP&A Act; and
- **signs** the attached Notice of Modification (**Appendix D**).

Howard Reed

Howard Reed
Director
Resource Assessments
6.5.15

Oliver Holm 18/5/16

Oliver Holm
Executive Director
Resource Assessments & Compliance

APPENDIX A: ENVIRONMENTAL ASSESSMENT

Refer to the Department's website:

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=7093

APPENDIX B: SUBMISSIONS

Refer to the Department's website:

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=7093

APPENDIX C: RESPONSE TO SUBMISSIONS

Refer to the Department's website:

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=7093

APPENDIX D: NOTICE OF MODIFICATION

APPENDIX E: CONSOLIDATED CONSENT
