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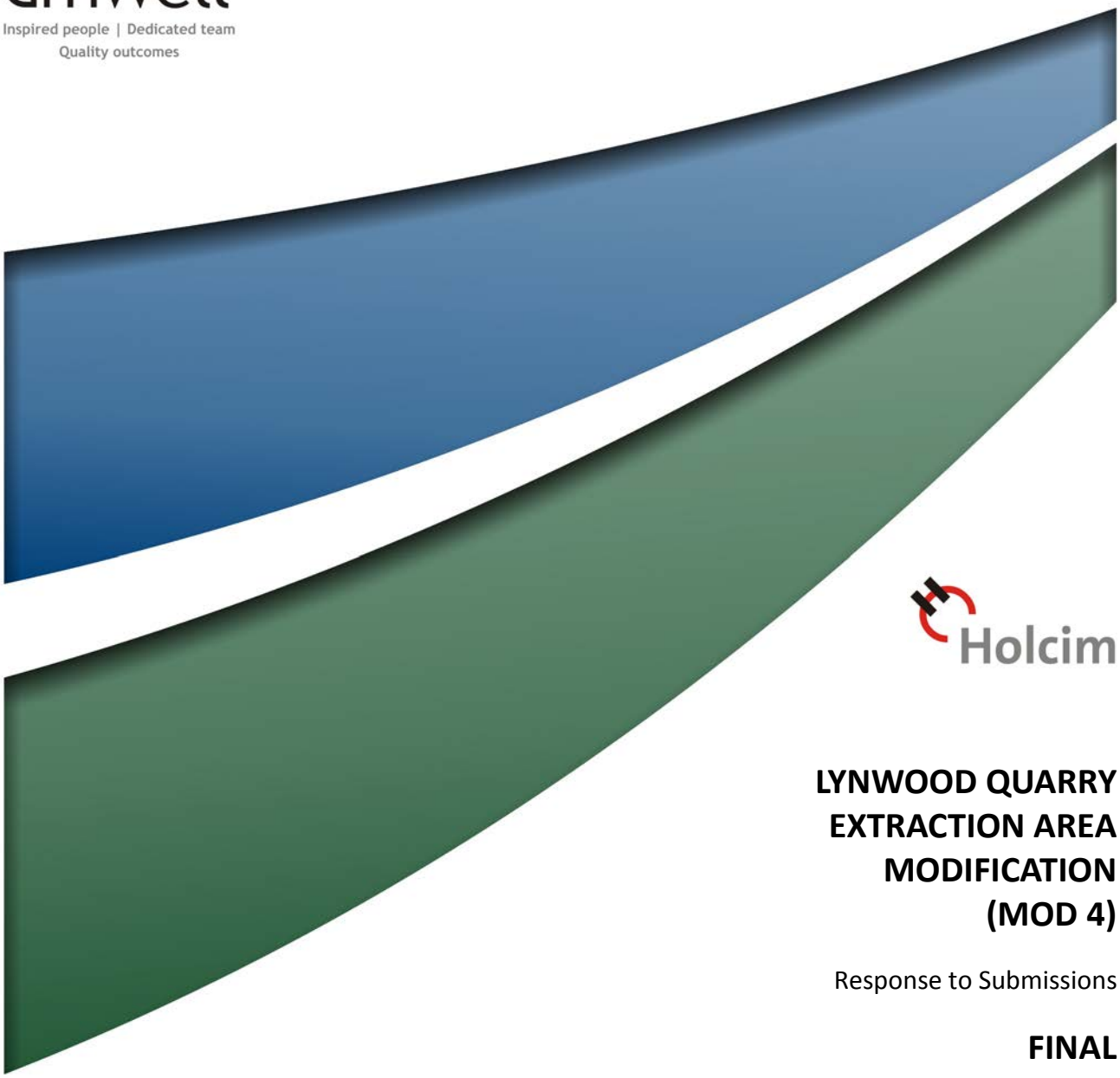

Holcim

LYNWOOD QUARRY EXTRACTION AREA MODIFICATION (MOD 4)

Response to Submissions

FINAL

February 2016

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Response to Submissions

FINAL

Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Holcim (Australia) Pty Limited

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Report No.	3330/R19/V4
Date:	February 2016

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This report was prepared using Umwelt's ISO 9001 certified Quality Management System.

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1.0 Introduction

This document provides a response to the issues raised in submissions made during the public exhibition of the Environmental Assessment (EA) for the proposed Lynwood Quarry Extraction Area Modification Project (the Modification Project). It has been prepared on behalf of Holcim Australia Pty Limited (Holcim Australia) in response to a request from the Secretary of the Department of Planning and Environment (DP&E) in accordance with Clause 85A of the *Environmental Planning and Assessment Regulation 2000*.

Holcim Australia is seeking approval for the proposed changes to Lynwood Quarry through a modification to the Lynwood Quarry development consent (DA-128-5-2005) in accordance with Section 75W of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The modification, if granted, will be the fourth modification of the Lynwood Quarry development consent.

The EA was exhibited from 23 November 2015 to 7 December 2015. This report outlines Holcim Australia's response to matters raised in the submissions.

1.1 Lynwood Quarry

Lynwood Quarry is an existing hard rock quarry owned by Holcim Australia located west of Marulan, New South Wales (NSW). The quarry is located in the Southern Tablelands region of NSW, approximately 160 kilometres south-west of Sydney and approximately 27 kilometres north-east of Goulburn (refer to **Figure 1.1**).

Lynwood Quarry has an approved production rate of up to 5 million tonnes per annum (Mtpa) of saleable product and is currently approved to operate until 1 January 2038. The quarry has approval to transport up to 5 Mtpa by train, with up to 1.5 Mtpa of the total 5 Mt also approved to be delivered to markets by truck via the Hume Highway. The key features of the existing approved operations of Lynwood Quarry (the Approved Operations) are shown in **Figure 1.2**.

1.2 The Project

The Modification Project comprises development of the following key features:

- a 76 hectare Granite extraction area to the west of the existing Approved Pit
- a reduction in the footprint of the Approved Pit from 91 hectares to 36 hectares to reflect limitations within the ignimbrite resource
- a new main haul road to connect the Granite Pit to the Approved Pit and infrastructure area, and other haul roads associated with access to the proposed overburden emplacement areas
- water management system structures associated with the Granite Pit
- revised overburden emplacement areas with two of the currently approved overburden emplacement areas no longer planned to be used, a new overburden emplacement area proposed to the south of the Granite Pit and overburden also to be emplaced back into the Approved Pit
- an amenity bund and vegetative screen to the west of the Granite Pit to provide for screening of the operations in the Granite Pit Area.

FIGURE 1.1

Locality Plan

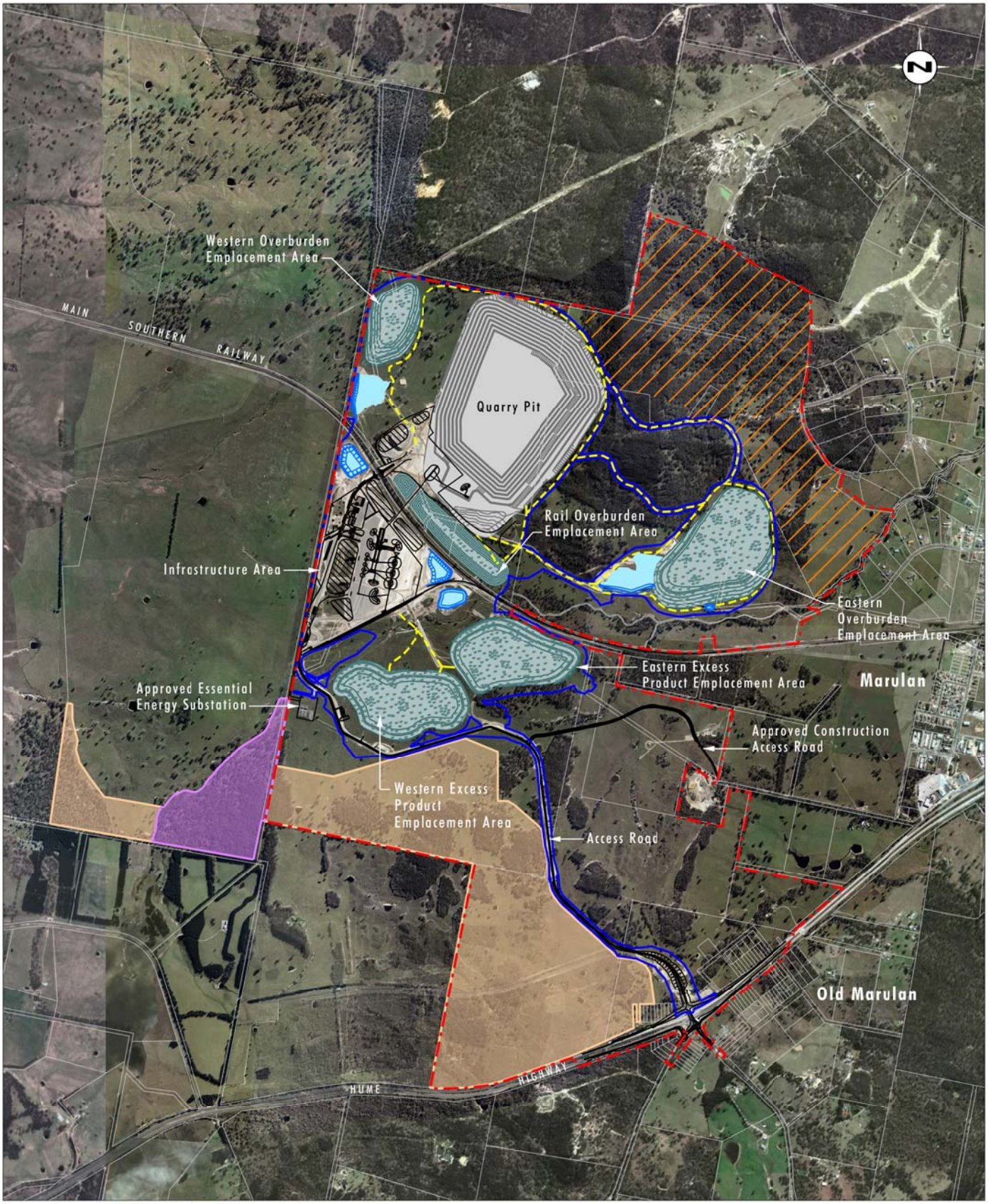

Image Source: Holcim Australia (March 2012)
Data Source: LPI (2014)

0 0.5 1.0 1.5km
1:30 000

Legend

- Approved Project Area
- Haul Road
- Approved Disturbance Footprint
- Quarry Pit
- Rehabilitated Area
- Dam
- Existing Biodiversity Offset Area (EPBC)
- Existing Habitat Management Area (EPBC)
- Existing Habitat Management Area

FIGURE 1.2

Lynwood Quarry Approved Operations
(Conceptual Quarry Plan Year 30)

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The key features of the Modification Project are shown in **Figure 1.3**. Other than the proposed changes to the location of quarrying activity, the overall Lynwood Quarry operational activities will be largely unchanged from the currently approved operations. A comparison of the proposed modified development to the existing approved operations is provided in **Table 1.1**.

Table 1.1 Comparison of Approved Project and the Modification Project

Major Project Components/Aspects	Approved Project	Proposed Modification Project
Quarry Life	Development consent to cease on 1 January 2038	No change.
Limits on Production	5 Mtpa saleable product	No change.
Maximum Transportation of Product by Rail	5 Mtpa	No change.
Maximum Transportation of Product by Road	1.5 Mtpa	No change.
Rail Facilities	Rail spur and loading facility as shown on **Figure 1.2**	No change.
Infrastructure (e.g. processing plant, rail infrastructure, truck loading infrastructure, workshop, offices etc.)	As shown on **Figure 1.2**	No change to approved infrastructure. Additional haul road to connect to new Granite Pit (refer to **Figure 1.3**) and water management structures and other minor ancillary consequential additions.
Hours of Operation	Topsoil/overburden removal/ emplacement; drilling: • 7 am to 6 pm Blasting: • Mon to Sat – 9 am to 5 pm • Sunday and public holidays – none Extraction: • 7 am to 10 pm Processing, loading, delivery and distribution; maintenance: • 24 hours per day	No change.

Major Project Components/Aspects	Approved Project	Proposed Modification Project
Employment	Employment at maximum production of approximately 115 people (including road transport drivers)	No change.
Quarry Footprint	As shown on **Figure 1.2**	Development of new Granite Pit to the west of the existing Approved Pit (refer to **Figure 1.3**). Reduction of the Approved Pit footprint by approximately 55 hectares.

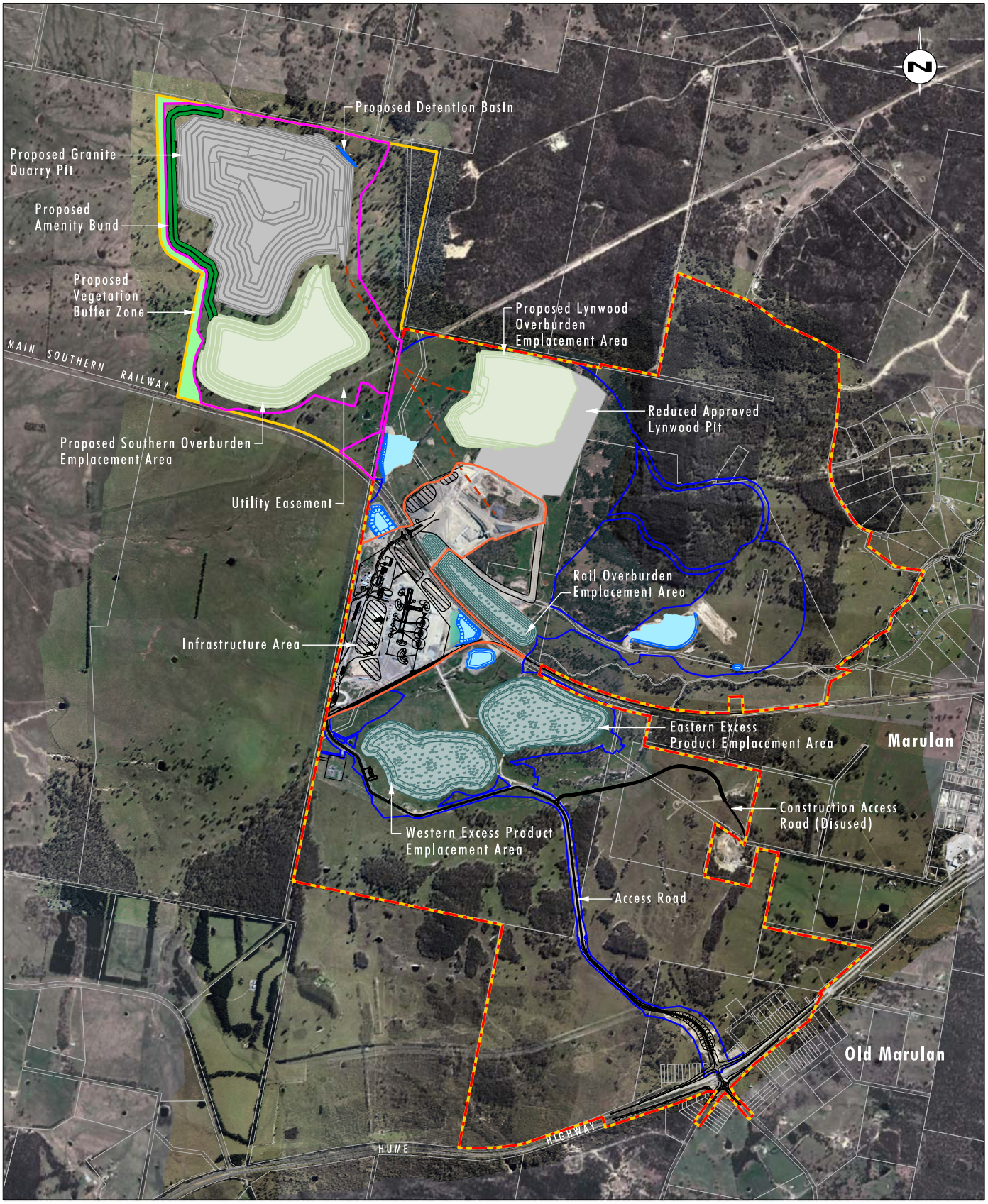

Image Source: Google Earth (2012), Holcim (2012, 2014)
Data Source: LPI (2014), Holcim Australia (2015)

0 0.5 1.0 1.5km
1:30 000

Legend

- Approved Project Area
- Modification Project Area
- Lynwood Infrastructure Area
- Approved Disturbance Footprint
- Proposed Granite Pit Disturbance Footprint
- Lynwood Infrastructure Layout
- Proposed Haul Road
- Quarry Pit
- Emplacement Area
- Dam
- Proposed Overburden Emplacement Area
- Proposed Vegetation Buffer Zone
- Proposed Amenity Bund

FIGURE 1.3

Overview of the Modification Project

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20160113 8.58

1.3 Submissions Received

The Department of Planning and Environment (DPE) advised that a total of eight submissions were received during the EA exhibition period. Seven of the submissions were from NSW government agencies including:

- Water NSW
- Office of Environment and Heritage (OEH)
- Office of Environment and Heritage – Heritage Council
- Environment Protection Agency (EPA)
- Department of Trade and Investment – Resources and Energy (DRE)
- Department of Primary Industries (DPI)
- Roads and Maritime Services (RMS).

Matters raised in these submissions are addressed in detail in **Section 2.0** of this report.

The RMS submission did not raise any issues in regard to the proposed quarry operation on the basis that there are no proposed changes to the currently approved production and transportation limits or controls. Therefore, a response to the RMS submission is not required.

In addition to the government agency submissions, one submission was received from a community member. This submission is addressed in **Section 3.0** of this report.

1.4 Report Structure

This response to submissions report has been prepared by Umwelt (Australia) Pty Limited (Umwelt) on behalf of Holcim Australia to address the key issues raised through the submissions received on the EA through the public exhibition period. For each issue, the theme of the issue raised is noted in bold, followed by a response in normal type.

2.0 Agency Submissions

2.1 Water NSW

It is recommended that the 95th percentile 5-day rainfall depth of 40.8mm should be used in Sediment basin designed and be addressed as part of the updated Water Management Plan.

Holcim Australia acknowledges that the quarry site is located within the Sydney drinking water catchment and upstream of the Marulan town water off take on the Wollondilly River. Holcim Australia accepts Water NSW's recommendation that the new sediment dams related to the Modification Project (i.e. Dams G1, G2, G3, G4, L2, L3 and L4, refer to **Figure 2.1**) are constructed to manage the 95th percentile 5 day rainfall depth of 40.8 millimetres. The design capacities of the additional dams related to the Modification Project, taking into consideration the design rainfall depth change for the sediment dams are shown in **Table 2.1** and will be included to this design standard in the updated Water Management Plan.

It is noted that this design criteria will only apply to the new sediment dams proposed as part of the Modification Project, with the existing design criteria of the 90th percentile 5 day rainfall event remaining in place for the existing and approved dams at Lynwood Quarry.

Table 2.1 New Dams Proposed as Part of the Modification Project

Dam	Purpose	Minimum Design Criteria	Approximate Volume (ML)
Detention Basin 1	Clean water management	100 year 24 hour storm event[1]	Detention Storage Only[2]
Detention Basin 2	Clean water management (optional)	N/A	Detention Storage Only[3]
Sediment Dam G1	Sediment control	95th percentile 5 day rainfall event type D/F	6.3
Sediment Dam G2	Sediment control	95th percentile 5 day rainfall event type D/F	0.7
Sediment Dam G3	Sediment control	95th percentile 5 day rainfall event type D/F	2.0
Sediment Dam G4	Sediment control and water transfer	95th percentile 5 day rainfall event type D/F	5.9
Sediment Dam L2	Sediment control	95th percentile 5 day rainfall event type D/F	3.2
Sediment Dam L3	Sediment control	95th percentile 5 day rainfall event type D/F	4.1
Sediment Dam L4	Sediment control	95th percentile 5 day rainfall event type D/F	2.1

1. Design capacity based on safety aspects related to detention dam above quarry pit
2. Maximum estimated detention storage for Detention Basin 1 is 22 ML
3. Maximum estimated detention for Detention Basin 2 is 16 ML
4. Estimated dam volumes are based on settling volume + sediment volume. Sediment volume is calculated to be 30% of settling volume.

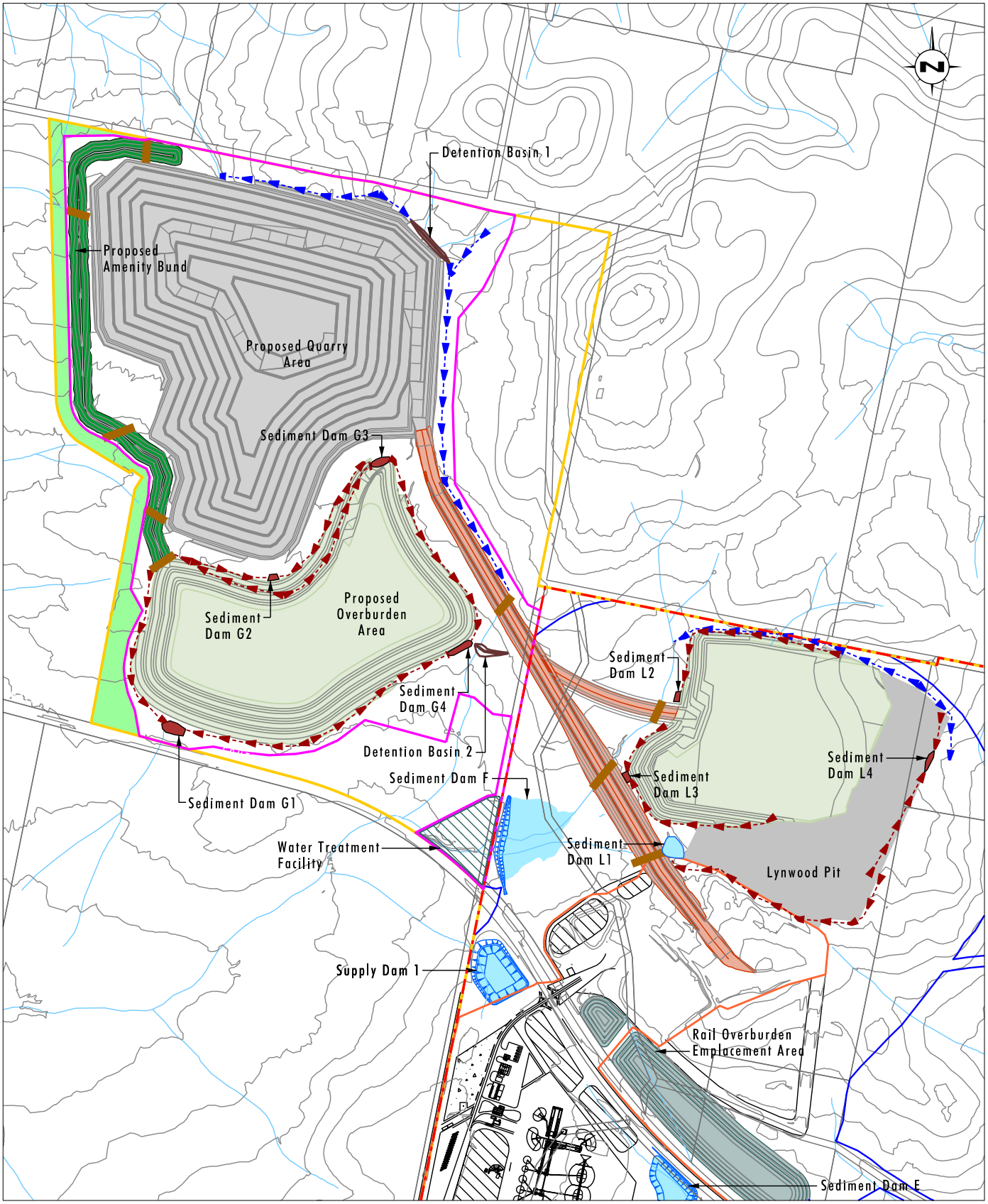

Image Source: Google Earth (2014)
Data Source: LPI (2009), Holcim Australia (2014)
Notes: 5m Contour Interval. Conceptual only and subject to detailed design.

0 250 500 750m
1:15 000

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 2.1

Plan of Existing and Proposed Sediment Dams

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20160222 13.23

The proposal requires the transfer of water between dams and water management structures on the site. To ensure that this is achievable and pollution events do not occur, the site must have adequate pumping / infrastructure / staffing capacity to achieve the desired outcomes and this should be addressed as part of the updated Water Management Plan.

Holcim Australia is currently undertaking the detailed design for the pumping/pipeline systems for the Modification Project. The design pumping capacity will be sufficient to meet relevant Blue Book (*Managing Urban Stormwater: Soils and Construction, Volumes 1 and 2*, Landcom, 2004 and DECC, 2008) design requirements, for example, the ability to pump out the sediment dams to provide the required freeboard in the design period (i.e. 5 days adopted as per **Table 2.1** above).

It is also noted that Holcim Australia will establish a sump in the Approved Pit to assist in capturing sediment laden runoff from the proposed Lynwood overburden emplacement area. This sump will also be used to store excess water for treatment and reuse as required.

The details of how the water management system will be operated will be included in the updated Water Management Plan. Holcim Australia will consult with Water NSW during the development of the updated Water Management Plan.

WaterNSW considers that the water treatment facility must be designed and operated to achieve a neutral or beneficial effect on water quality. Details should be included in the updated Water Management Plan.

The intent of the proposed water treatment facility is to assist Holcim Australia to deliver a neutral or beneficial effect on water quality as part of the development of the Granite Pit. The facility will be subject to a detailed design process as part of the implementation of the Modification Project, however, it is envisaged that it will act as a first flush system to reduce sediment loads. Holcim Australia will include further details of the proposed water treatment facility in the updated Water Management Plan.

Adequate surface water and groundwater monitoring data should be collected on the granite resource site and the Lockyersleigh Creek catchment prior to commencement of the modification development. WaterNSW recommends there be an additional surface water monitoring site on the northern boundary of the western extension area noting that the watercourse is a third order stream at this location.

Both the Surface Water Assessment and Groundwater Assessment submitted with the EA made commitments around additional water monitoring to be undertaken as part of the operation of the Granite Pit. These commitments are outlined below.

In regard to groundwater monitoring, Holcim Australia committed to extend the existing monitoring program to include monitoring of the bores listed in **Table 2.2** which are located within the Granite Pit Area. These bores will be monitored until they are progressively removed by the progression of the Granite Pit. The monitoring regime will be the same as the existing groundwater monitoring regime for the Lynwood Quarry. The final details of the proposed groundwater monitoring program will be contained within the updated Water Management Plan.

Table 2.2 New Granite Pit Groundwater Monitoring Bores

Hole ID	Easting	Northing	Collar RL (mAHD)	Depth (m)	Casing Depth (m)	RWL[1] (mB TOC)	Date Drilled
GPZ01	770177	6158055	673	80.4	27.67	10.22	34/6/2014
GPZ02	770801	6157928	675	30.5	30.4	7.69	25/6/2014
GPZ03	771017	6157160	676	75.4	75.4	17.8	30/6/2014
GPZ04	770512	6157226	675	78.7	21.81	6.97	27/6/2014
GPZ05	770197	6157506	669	78.7	19.53	11.48	26/6/2014
GPZ06	769942	6157260	662	60.7	17.6	5.28	27/6/2014
GPZ07	770391	6156705	661	54.7	54.7	2.1	28/6/2014
GPZ08	769970	6156700	659	78.7	78.67	9.34	28/6/2014

In regard to surface waters, three new surface water quality monitoring sites were proposed in the Surface Water Assessment within the Lockyersleigh Creek catchment area (refer to **Figure 2.2**). In response to the WaterNSW comment suggesting an additional water quality monitoring site on the northern boundary of the western extension area (i.e. on the third order watercourse), Holcim Australia agrees to include this location as an additional surface water quality monitoring site. The additional, i.e. 4th monitoring point, on Lockyersleigh Creek is also shown on **Figure 2.2**. The final details of the proposed surface water monitoring program will be contained within the updated Water Management Plan.

Holcim Australia has engaged a monitoring contractor to commence the surface and groundwater monitoring program in the Granite Pit Area at the above locations with the first round of monitoring to be undertaken in late February 2016.

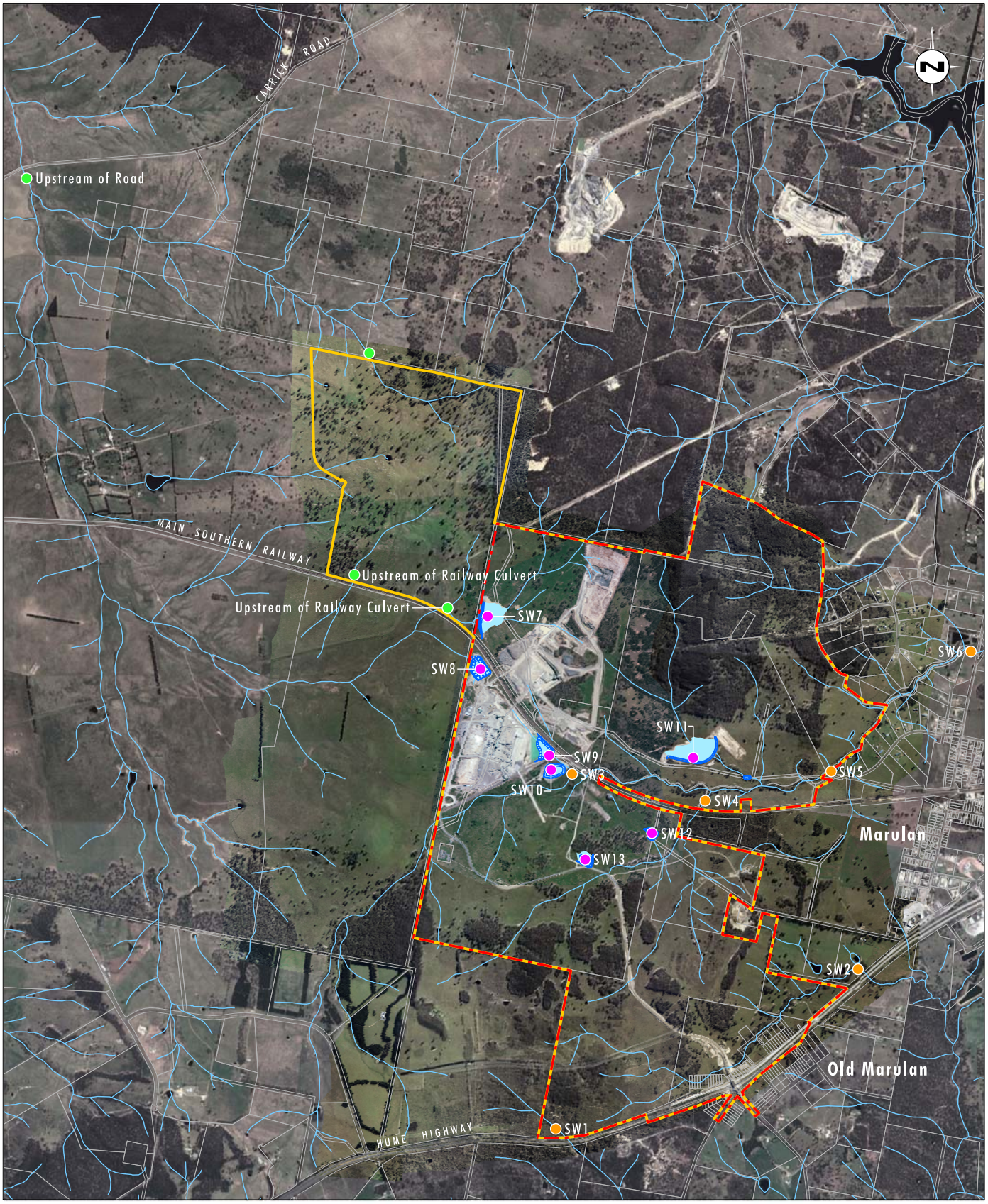

Image Source: Google Earth (2012), Holcim (2012, 2014)
Data Source: LPI (2014), Holcim Australia (2015)

0 0.5 1.0 2.0km
1:40 000

Legend

- Approved Project Area
- Modification Project Area
- Surface Water Monitoring Location
- Site Water Management Dams
- Proposed Surface Water Monitoring Location

FIGURE 2.2

Surface Water Monitoring Locations

As the site water management requires water from Johnniefields, it is essential that long term legal arrangements regarding the water from Johnniefields quarry are formalised, regardless of the future owner of the site.

As discussed in the Surface Water Assessment there is one major dam (Johnniefields Dam) located on Joarimin creek approximately 6.4 kilometres downstream of Lynwood Quarry. Johnniefields Dam is estimated to have a capacity of 550 ML and supplies water for irrigation, domestic, stock, and industrial use. Holcim Australia has an agreement with the owner of the licensed allocation at Johnniefields Dam, in regard to use of this water allocation at Lynwood Quarry.

Holcim Australia has Deeds for Water Supply with the owner of the Johnniefields site, to supply the Lynwood Quarry. This deed provides for security of supply to Lynwood Quarry.

These agreements allow for Holcim to:

- Draw 80 megalitres from Johnniefields Dam annually under licence and deed agreements.
- Potentially increase this to a total of 130 megalitres per year, or up to a total of 260 megalitres in a two year period, so long as take does not exceed 390 megalitres within a 3 year period. This increase is permissible on agreement with the landowner, and as long as a minimum dam water level is maintained.
- Is an in-perpetuity water allocation licence (that is, it will remain in place unless surrendered).
- Holcim Australia also has the following licences to support the use:
    - Water Use Approval
    - Access Licence
    - Works Approval.

Notwithstanding the close proximity of two significant quarries there has been no assessment of cumulative impacts of the proposal on water quality.

Both Johnniefields Quarry and Gunlake Quarry are located within the catchment of Joarimin Creek. As outlined in the EA, the Modification Project will result in reduced impacts on Joarimin Creek due to a reduction in the extent of quarrying development within the catchment area of Joarimin Creek. Therefore, no adverse cumulative impacts are predicted on Joarimin Creek as a result of the Modification Project.

In regard to the management of water quality impacts, an assessment of water quality for the Modification Project was included in Section 5.3 of the Surface Water Assessment. As stated in the Surface Water Assessment the water management strategy for the Modification Project has been developed to provide for a neutral or beneficial water quality impact on downstream catchment areas in accordance with *State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011*.

It is proposed to employ the same environmental protection mechanisms for the Modification Project as for the approved Lynwood Quarry. The commitments regarding water quality for the Project include integration of the proposed water management controls into the existing water management system, constructing controls to a higher level of protection (i.e. 95th percentile 5 day rainfall event as recommended by WaterNSW) and agreed to earlier in this document, and other controls such as the construction of a water treatment facility and in-pit sump to further assist in the management of water to reduce sediment loads.

As such, the Modification Project is considered to maintain the identified beneficial effects of the approved Lynwood Quarry on downstream water qualities. The Modification Project is therefore not expected to result in a negative impact on water quality in the downstream catchments relative to the approved Lynwood Quarry.

As committed by Holcim Australia in the EA, the Lynwood Quarry Water Management Plan will be updated as part of the implementation of the Modification Project and will guide the ongoing management of water quality at the site. Runoff from all disturbed areas within the Modification Project Area will be controlled on site for treatment in accordance with the Blue Book so that sediment transport off site is minimised.

Recommended Conditions of Approval for the modification (As proposed by WaterNSW)

- ***Replace Sydney Catchment Authority with WaterNSW wherever it appears in the consent***.

Noted.

- ***Amend Condition 18 of Schedule 3 to require all future sediment dams to be capable of treating the 95th percentile 5 day rainfall event***

Holcim Australia is in general agreement with this recommendation, however, it should be noted that the requirement for the Modification Project sediment dams to be capable of treating the 95th percentile 5 day rainfall event should only apply to Type D/F sediment dams (i.e. dispersive/fine) and it is also suggested that the wording should be changed to include a specific reference to being in accordance with the Blue Book. It is further noted that this design criteria will not apply to the existing and approved dams at Lynwood Quarry which were designed under alternate Blue Book design specifications consistent with current development consent conditions.

- ***Amend Condition 20 of Schedule 3 to require an updated Water Management Plan***

Agreed. This recommendation is consistent with Holcim Australia's commitment in the EA.

- ***Amend Condition 44 of Schedule 3 to require an updated Rehabilitation and Landscape Management Plan and that this plan is developed in consultation with Water NSW***

Agreed. Holcim Australia committed to update the Rehabilitation and Landscape Management Plan in the EA.

2.2 Office of Environment and Heritage

2.2.1 Biodiversity Assessment Report

The credit calculators in the online tool were not submitted as part of the application. So there is no way of knowing if the data has been entered correctly and the credits that have been generated are correct.

The credit calculator assessment prepared as part of this Project has been submitted formally online as per OEH's comment. It is noted that the calculator assessment has been updated to exclude the large-eared pied bat (*Chalinolobus dwyeri*) due to its change from a species credit species to a ecosystem credit species as discussed later in this section.

No digital shape files have been submitted as part of the BAR

As part of the preparation of this Response to Submissions, the relevant digital shape files, including vegetation mapping and plot locations by Umwelt, have been supplied to the OEH Queanbeyan office as per its request (22 February 2016).

While there is no direct guidance in the FBA about where plots should be located it is considered best practice to avoid the boundaries of a vegetation zone (ecotone). There were a number of plots which fell on an ecotone. These include:

The locations of the vegetation plots discussed below are shown on **Figure 2.3**.

- ***P09 – which did not plot within the study area.***

P09, while located outside the Development Footprint (FBA terminology, refer to Modification Project Biodiversity Assessment Report for definition), occurs within the Development Site (FBA terminology, refer to Modification Project Biodiversity Assessment Report for definition) and provides contextual information about the vegetation zones across the area. The P09 georeference is at the start of the 50 metre step point transect, with the transect running east through the quadrat and beyond. This placement is considered appropriate as it captures the floristics of HN614 (Moderate/Good/Poor) in this area, with the transect capturing the structure. It should be noted that the understorey is exotic both in HN614 (Moderate/Good/Poor) and adjacent non-woody vegetation.

- ***P06 – which would plot within an ecotone.***

The P06 georeference is at the start of the 50 metre step point transect, with the transect running south through the quadrat and beyond. This placement was necessary due to the small extent of HN572 (Moderate/Good) in this part of the site. Note that the understorey is exotic both in HN572 (Moderate/Good) and adjacent non-woody vegetation.

- ***P27 – plots 7m outside of the veg zone.***

It is noted that the location of P27 appears to occur in an ecotone. The ecotone between HN614 (Moderate/Good) and HN614 (Moderate/Good/Poor) is complex in the north-east of the Development Site due to an abundance of serrated tussock (*Nassella trichotoma*). This species was abundant within areas mapped as being in Moderate/Good condition, with a cover of approximately 10% with other groundcover in this area being typically sparse. This community is delineated as being native due to the presence a higher cover of native taxa. Outside of areas mapped as being native, serrated tussock was of greater dominance than native taxa.

- ***P20 – plots within the ecotones.***

Plot 20 does not occur in the Development Site.

It is noted that a range of plots undertaken as part of the assessment occur within ecotonal areas, as discussed above. Furthermore, the ecotone between HN614 (Moderate/Good) and HN570 (Moderate/Good) is complex in the eastern parts of the Granite Pit Area as in this location HN614 (Moderate/Good) has a strong dry sclerophyll forest influence with an abundance taxa typical of dry forest including red stringybark (*Eucalyptus macrorhyncha*), wallaby weed (*Olearia viscidula*), ivy goodenia (*Goodenia hederacea* subsp. *hederacea*). Delineating HN614 (Moderate/Good) over HN570 (Moderate/Good) was done in instances of unclear ecotones in the Development Site through consideration of the precautionary principle. Broad ecotones between HN570 (Moderate/Good) and HN614 (Moderate/Good) with a dry forest influence were observed in other areas in the Marulan area.

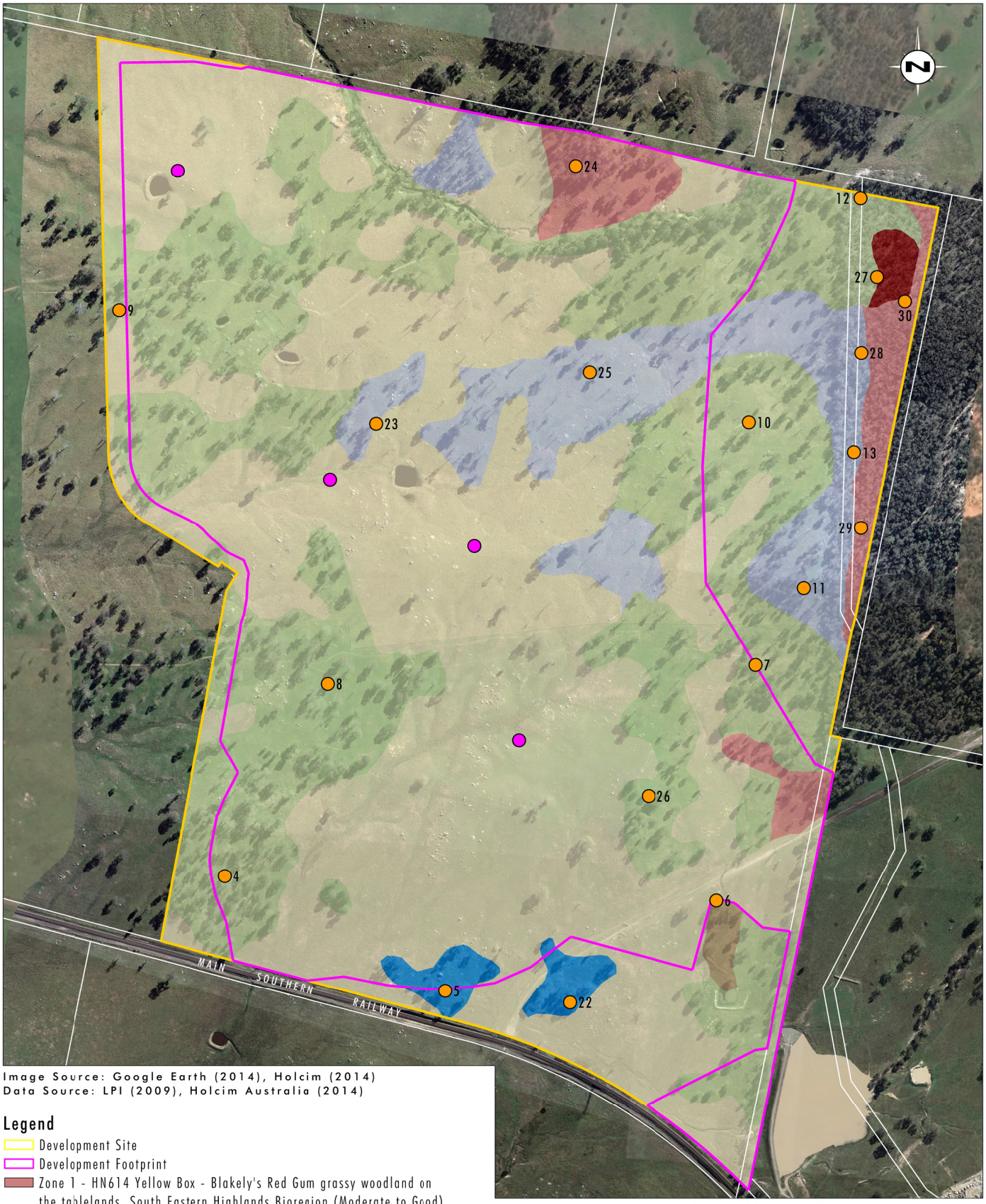

Image Source: Google Earth (2014), Holcim (2014)
Data Source: LPI (2009), Holcim Australia (2014)

Legend

- Development Site
- Development Footprint
- Zone 1 - HN614 Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion (Moderate to Good)
- Zone 2 - HN614 Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion (Moderate to Good_Poor)
- Zone 3 - HN570 Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion (Moderate to Good)
- Zone 4 - HN570 Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion (Moderate to Good_Poor)
- Zone 5 - HN515 Broad-leaved Peppermint - Ribbon Gum grassy open forest in the north east of the South Eastern Highlands Bioregion (Moderate to Good)
- Zone 6 - HN572 Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion (Moderate to Good)
- Exotic Pastures
- Flora Plot/Transect Location
- Rapid Sampling Location

FIGURE 2.3

Flora Survey Locations

File Name (A4): R19/3330_336.dgn
20160222 14.02

Noting that the location of some of these plots occurred in apparent ecotones, the systematic plot and transect surveys met, and in some cases exceeded, the minimum plot requirements of Framework for Biodiversity Assessment (FBA) (OEH 2014) (refer to Table 2.2 of the BAR) and are considered to have adequately described the condition and variability of the Development Site.

A number of plots appeared close to access tracks, there is a possibility of higher disturbances closer to roads which may lower the site value score unnecessarily.

There are numerous access tracks within the Development Site, with plots generally placed at a distance from these where disturbance from this was negligible and vegetation characterised the community being sampled. The understorey was highly degraded across much of the Development Site due to apparent heavy grazing over a number of years leading to a loss of palatable native species and a high abundance of annual and perennial exotic grasses and thistles. Based on the generally highly degraded condition of the Development Site, the locations of these plots are considered appropriate and are not expected to have decreased the site value score, rather these surveys have allowed for the inherent variability of the Development Site to be measured.

The barking owl was identified in the BioBanking tool as requiring further survey. However the consultant, concluded that this species was not on site because the closest record is 20 km away. However no call playback was done to rule it out. They have not described the habitat components which are absent from the site to rule this species out.

Ultimately this does not affect the credit output as the Masked and Power Owls remained on the list because they have suitable habitat on the site.

It should be noted that the barking owl (*Ninox connivens*) is an ecosystem-credit species and therefore, under the FBA (OEH 2014) its presence or absence is predicted by the habitat available on the site and surveys are not required for this species. The BioBanking Credit Calculator identifies ecosystem-credit species as having a high likelihood of being present, not requiring further survey. In Table 3.12 of the Biodiversity Assessment Report (BAR), Umwelt provides a justification for concluding that the barking owl is unlikely to occur on the site due to the lack of recent records in the locality (closest record is 20 km away and over 30 years old). Although it is acknowledged that habitat components outlined in the Threatened Species Profile Database do occur within the Development Site, the species is considered unlikely to occur due to a lack of recent records in the wider locality and the generally depauperate nature of habitat on site for this species and its potential prey. It is further noted that previous ecological survey work undertaken at the Lynwood Quarry site for the approved quarry development did include owl call playback (in accordance with the relevant survey guidelines in place at that time) and that the species was not recorded.

Nonetheless, as noted by OEH, the removal of this species from the predicted ecosystem-credit species list does not alter the highest threatened species multiplier that drives the credit requirement load for ecosystem credits.

[For squirrel gliders] . . . the offset must include 10 times the number of equivalent habitat trees for each tree cleared . . . A full audit of hollow-bearing trees to be impacted will need to be done prior to clearing. DPE will need to ensure that any consent is conditioned to require these hollows in the offset site.

Appropriate offset credits will be retired for the squirrel glider as required by the FBA methodology.

It is unclear from the BAR whether the development site is within 500m of [large-eared pied bat] breeding habitat or not.

The Development Site is not within 500m of breeding habitat for the large-eared pied bat (*Chalinolobus dwyeri*). Breeding habitat for the species consists of sandstone cliffs and escarpments. Likely breeding habitat for the species occurs approximately 35 kilometres southeast of the Development Site along the escarpment habitat associated with Morton National Park. No evidence exists of the large-eared pied bat roosting in tree hollows (DERM 2011) and the Development Site provides low quality and sparse woodland foraging habitat. Due to the absence of suitable cliffline or escarpment roosting habitat within 500m of the Development Site, there will be no loss of foraging habitat within 500m of potential breeding habitat and the impacts do not represent more than 10% loss of foraging habitat beyond 500m of breeding habitat.

It is also noted that, at the time of writing the BAR, the large-eared pied bat was a species-credit species for the Hawkesbury-Nepean CMA under the BioBanking Scheme. In reviewing the Threatened Species Profile Database (TSPD) as part of the Response to Submissions process, the large-eared pied bat has been changed to an ecosystem and species-credit species, where the species-credit components are captured for breeding habitat, being "*land containing escarpments, cliffs, caves, deep crevices, old mine shafts or tunnels*". As discussed above and in the BAR, the Development Site does not contain these habitat features for the species and is not within proximity to these habitats. The BAR reported on 77.8 hectares of woodland and riparian vegetation foraging habitat for the species which, at the time of writing for a species-credit species, generated an offset credit requirement of 1011 credits. It is understood that sourcing these offset credits as part of the Biodiversity Offset Strategy would no longer be required as the species-credit habitat component for large-eared pied bat (breeding habitat) does not occur on the site.

Table 2.3 below outlines the revised species-credit species to be impacted as a result of the Modification Project and the species credits required to offset those impacts (i.e. large-eared pied bat is no longer included).

Table 2.3 Species-credit Species Requiring Offset and the Species Credits Required

Common Name	Species Name	Threatened Species Offset Multiplier	Species Credits Required
squirrel glider	*Petaurus norfolcensis*	2.2	1725

Large-eared pied bat is listed as vulnerable under the Commonwealth Environmental Protection [and] Biodiversity Conservation Act. The BAR states that "A Referral to the Commonwealth Environment Minister was submitted in November 2015. The Referral indicates that the Modification Project is unlikely to be deemed to comprise a 'Controlled Action'". DPE should clarify this with the Commonwealth Department of the Environment prior to determining this modification as it may fall under the new bilateral agreement between the Commonwealth and NSW.

Noted. The referral was ultimately submitted to the Department of Environment for assessment in February 2016.

Section 4.3.1 of the BAR describes the use of nest boxes as a mitigation measure. Most standard nest boxes have an average life span of around 18 months before weathering processes break them up.

Previous nest box installation at the Lynwood site in 2013, required as part of the Lynwood Quarry Rehabilitation and Landscape Management Plan for the Lynwood Quarry approval (DA 128-5-2005), used premium nest boxes purchased from Hollow Log Homes that have an estimated life span of 10-15 years. Although these nest boxes have not been subject to detailed monitoring, a visual inspection was undertaken of a selection of the nest boxes in 2015 which found that they were all in good condition. It is also noted that equivalent nest boxes installed at a Hunter Valley mine site in 2010 (that have been monitored by Umwelt) showed slight signs of weathering during the 2015 monitoring surveys but were still providing effective habitat 5 years after installation (Umwelt 2015, unpublished).

Nest boxes to be installed as part of the Lynwood Quarry Modification mitigation strategy will continue to use premium nest boxes with extended lifespans. Holcim Australia will consider the use of alternative methods such as habitat pruning (which has been undertaken previously for the original Lynwood Project), to incorporate a range of hollow savage methods in the mitigation strategy for the Project. A cost-benefit analysis will be undertaken by Holcim Australia incorporating ecological advice comparing these salvage methods with the installation of high quality plywood or CYPLAS nest boxes as part of the clearing process.

The BAR has described the process that the proponent went through to avoid impacting on the better quality woodland. In a quarry there are certain impacts that cannot be avoided, however the placement of the overburden could be located away from the quarry site. An explanation as to why this is not possible should also be included in the BAR.

A detailed discussion of the various alternatives considered in regard to overburden emplacement area designs was included in the main text of the EA to which the BAR formed an appendix.

Several different overburden emplacement strategies were investigated as part of the design of the Modification Project. The greater distance that overburden is hauled, the greater the impacts on other environmental features (e.g. dust, noise, visual, energy consumption) and the greater the cost. Noise, dust and visual impacts are increased as more equipment is required and more dust is generated with increased distance travelled by the trucks. For these reasons it was determined that new overburden emplacement areas close to the Granite Pit were desirable.

The initial overburden emplacement design for the Modification Project had a much larger Southern Overburden Emplacement Area and another emplacement area adjacent to the eastern edge of the Granite Pit. As an outcome of the iterative project design and assessment process the size of the Southern Overburden Emplacement Area was reduced. The initially proposed emplacement area to the east significantly increased the disturbance footprint of the Modification Project, including impacting on some of the better areas of native vegetation, and was also visible from the west due to its elevated location. For these reasons it was decided not to proceed with it and instead emplace this material in the Lynwood Overburden Emplacement Area.

Furthermore, with the establishment of the Southern Overburden Emplacement Area, the approved Eastern Overburden Emplacement Area is no longer required, avoiding up to approximately 27 hectares of higher quality vegetation communities and habitats that that of the Development Footprint, including HN570 (Moderate/Good) with substantially higher native influences than the exotic pastures and HN614 (Moderate/Good/Poor) vegetation within the area to be disturbed by the Southern Overburden Emplacement Area.

None of the requirements in this section [Biodiversity Offset Strategy] have been completed. It is therefore unknown how the offset requirement will be met by this project.

Holcim Australia is committed to delivering a Biodiversity Offset Strategy that appropriately compensates for the unavoidable loss of ecological values as a result of the Modification Project under the NSW *Biodiversity Offsets Policy for Major Projects* (OEH 2014).

As per the requirements under the FBA (OEH 2014), Holcim Australia is taking all reasonable steps to secure matching ecosystem and species-credits for offsetting. Holcim Australia has placed an expression of interest on the BioBanking Public Register in November 2015 (Credits Wanted ID: 50) for the credits required as outlined in the BAR and as a result of the BioBanking Credit Calculator Assessment. Holcim Australia has also liaised with OEH and obtained up-to-date mapping products to assist in identifying available areas in the Goulburn region for offsetting *White box Yellow box Blakelys red gum Woodland* endangered ecological community (EEC) under the TSC Act.

Further to this, Holcim Australia is currently investigating the available lands within and surrounding the Development Site and a range of available properties in the locality for potential BioBanking Agreement offsetting opportunities.

It is noted that the Modification Project falls within the 18 month transitional implementation phase of the NSW *Biodiversity Offset Policy for Major Projects* with some components of this Policy (such as the Offset Fund) currently being undeveloped and/or unavailable for use by proponents at this stage. Holcim Australia will investigate, in consultation with OEH, the application of the Offsets Fund and the monetary contribution potentially required in addition to the future proposed offset sites through the use of a BioBanking Agreement.

In accordance with the FBA process, the credit requirements for the Modification Project have been clearly defined and Holcim Australia has identified in the EA and the BAR the steps it is following to secure the required offsets. Finalising the offsets will involve a significant capital investment and will therefore be done as part of the implementation of the Modification Project following the granting of approval. Holcim Australia proposes that a condition be included in the modified development consent listing the credit requirements that need be sourced and retired for the Modification Project. It is further proposed that the wording of this condition provides for the staged retirement of credits in a manner that reflects the staged clearing of vegetation proposed as part of the Modification Project. A draft proposed condition is included below for consideration by DPE.

> *<u>Proposed Draft Condition for Modification Project Biodiversity Offsets</u>*
>
> *The Applicant shall retire biodiversity credits as outlined in Table A prior to the disturbance of native vegetation in the Granite Pit Area. The credits may be retired progressively based on the staging of native vegetation disturbance in line with the progressive development of the quarry, using five year increments. Holcim Australia will retire credits for the first 5 year stage by 12 months post the date of approval of Modification 4. The area of progressive disturbance and associated credits retired is to be reported annually in the Annual Return, along with an indication of when the next stage of disturbance requiring further credits will occur. Credit retirement is to be undertaken in accordance with the Framework for Biodiversity Assessment – NSW Biodiversity Offsets Policy for Major Projects (OEH September 2014).*

Table A – Biodiversity Credits to be Retired

Credit Type	*Credits to be Retired*
Ecosystem Credits	
HN614 Yellow Box – Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion	*2124*
HN570 Red Stringybark – Brittle Gum – Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion	*881*
HN515 Broad-leaved Peppermint – Ribbon Gum grassy open forest in the north-east of the South Eastern Highlands Bioregion	*33*
Total	***3038***
Species Credits	
squirrel glider (Petaurus norfolcensis)	*1725*
Total	***1725***

Notes:

- *The number of credits to be retired for each stage of disturbance (i.e. if progressive retirement of credits is undertaken) is to be calculated using an average credit load per hectare for each type of credit.*

This proposed approach will ensure that the offset requirements for the Modification Project as identified through the FBA process are appropriately implemented.

2.2.2 Aboriginal Cultural Heritage and Archaeological Assessment

OEH reviewed the Aboriginal Cultural Heritage Assessment (ACHA) prepared as part of the Lynwood Quarry Extraction Area Modification and provides the following comments:

Aboriginal consultation and survey methodology – OEH is satisfied that the Aboriginal consultation and survey methodology undertaken for the modification area has been consistent with the methodologies already approved under the current Aboriginal Heritage Impact Permit issued for the existing Lynwood Quarry area.

Noted.

OEH requires advice from DPE regarding the permissibility of the modification proposal to include the new quarry extension as a variation to the existing AHIP. This may include the need to modify the existing DPE development consent condition, under Schedule 3.

It is noted that the proposed approach to modifying the existing AHIP as part of the implementation of the Modification Project was discussed and agreed in concept with both OEH and DPE as part of the EA preparation process. As noted in the cultural heritage assessment, this approach has also been agreed to by the registered Aboriginal parties for Lynwood Quarry.

We concur with OEH's assessment of the need to modify the existing conditions in Schedule 3 of the Lynwood Quarry consent. These conditions would need to be amended to incorporate the sites identified as impacted in the Granite Pit Area.

OEH would require completion of the consultation process, and copies of written responses from RAPs to be provided as part of an AHIP variation application, before a variation to the AHIP could be issued.

Noted. The AHIP variation application would be subject to consultation following relevant OEH guidelines.

Recommendation for test excavation after modification approval – OEH would require a firm commitment to the consideration of other mitigation or management measures if sites of high significance were located as a result of test excavations etc.

The existing Aboriginal Cultural Heritage Management Plan (ACHMP) and excavation methodologies implemented under the existing AHIP for Lynwood Quarry identify the mitigation or management measures to be implemented in the event that sites of high significance are located by test excavations. These existing measures which have been previously agreed OEH will be implemented for the Modification Project.

As per the commitment in the EA, the ACHMP will be updated as part of the implementation of the Modification Project.

Updating of existing Aboriginal Cultural Heritage Management Plan

As per the commitment in the EA, the ACHMP will be updated as part of the implementation of the Modification Project. Holcim Australia will undertake consultation with OEH as part of the revision of the ACHMP.

2.3 Office of Environment and Heritage – Heritage Council

The recommended mitigation measures for the affected areas outlined in Section 6.2 of the assessment are supported. Consequently the following conditions are recommended to ensure appropriate mitigation of the loss of this resource:

1. ***A structural integrity report should be prepared for the Lockyersleigh Homestead Property and Garden prior to the commencement of the extended mining works; and***

2. ***A vibration monitoring program should be undertaken during the blasting works associated with Project Area as stated in the Lynwood Quarry Extraction Area Modification Historical Heritage Assessment (Final)' prepared by Umwelt (Australia) Pty Limited dated November 2015.***

As identified in Section 6.2.1 of the Historical Heritage Assessment and the EA Statement of Commitments, Holcim Australia is committed to the implementation of these two actions.

2.4 NSW Environment Protection Authority

The submission received from the EPA included comments on the following issues which require further discussion:

- Noise
- Air Quality

- Water Management.

A response to these issues raised by the EPA is provided in the following sections.

It is noted that the EPA has also stated that EPL no. 12939 pertaining to the operation will be required to be varied, should the Modification Project be approved. Holcim Australia concurs with this statement and identified the need to modify the EPL as part of the EA.

2.4.1 Noise Criteria Location 11

The EPA generally accepted the results and conclusions of the noise assessment and has indicated that it is satisfied that the Modification Project will not have any adverse noise impacts on the environment. The EPA accepted the proposed increased noise criteria at Location 11 from 35dB(A) to 36dB(A) and advised the following:

EPA would seek to either:

(a) Negotiate a Pollution Reduction Program with Holcim to conduct noise monitoring to validate the predicted noise impacts under the operational conditions at Location 11; or

(b) Recommend such a noise validation is undertaken as a condition of any modified development consent.

As defined in Section 6.3.3 of the EA, with respect to Receiver Location 11 (refer to **Figure 2.4**), future operations at Lynwood Quarry were predicted to be unable to achieve the approved noise criteria of 35dB(A) during the night time periods (10 pm to 7 am) due to the inclusion of a night time easterly wind assessable under the INP (EPA, 2000). It is noted that this outcome is not due to the Modification Project, as no changes to the approved night-time operations are proposed, with only the approved processing and product delivery activities occurring during the night-time period (i.e. as part of the Approved Operations). This change in predictions is due to the inclusion of the night-time easterly wind condition in the noise modelling via an update to the previous noise models for Lynwood Quarry using local meteorological data collected on the Lynwood Quarry site.

As the pre-existing consent criteria for Receiver Location 11 (35dB(A)) were less than the project specific noise levels (PSNLs) calculated in accordance with the NSW Industrial Noise Policy (INP) (EPA, 2000), new criteria were developed for Receiver Location 11 in accordance with the INP. The proposed LAeq,15minute night time noise at criteria Receiver Location 11 is 36 dB(A), 1 dB below the original night time PSNL for the location. As the predicted noise impacts meet the PSNL for Receiver Location 11, the noise impacts at this location are considered acceptable under the INP.

In accordance with recommendation (b) of the EPA submission regarding a noise validation program, Holcim Australia agrees to continue noise monitoring at Location 11 as part of the implementation of the development.

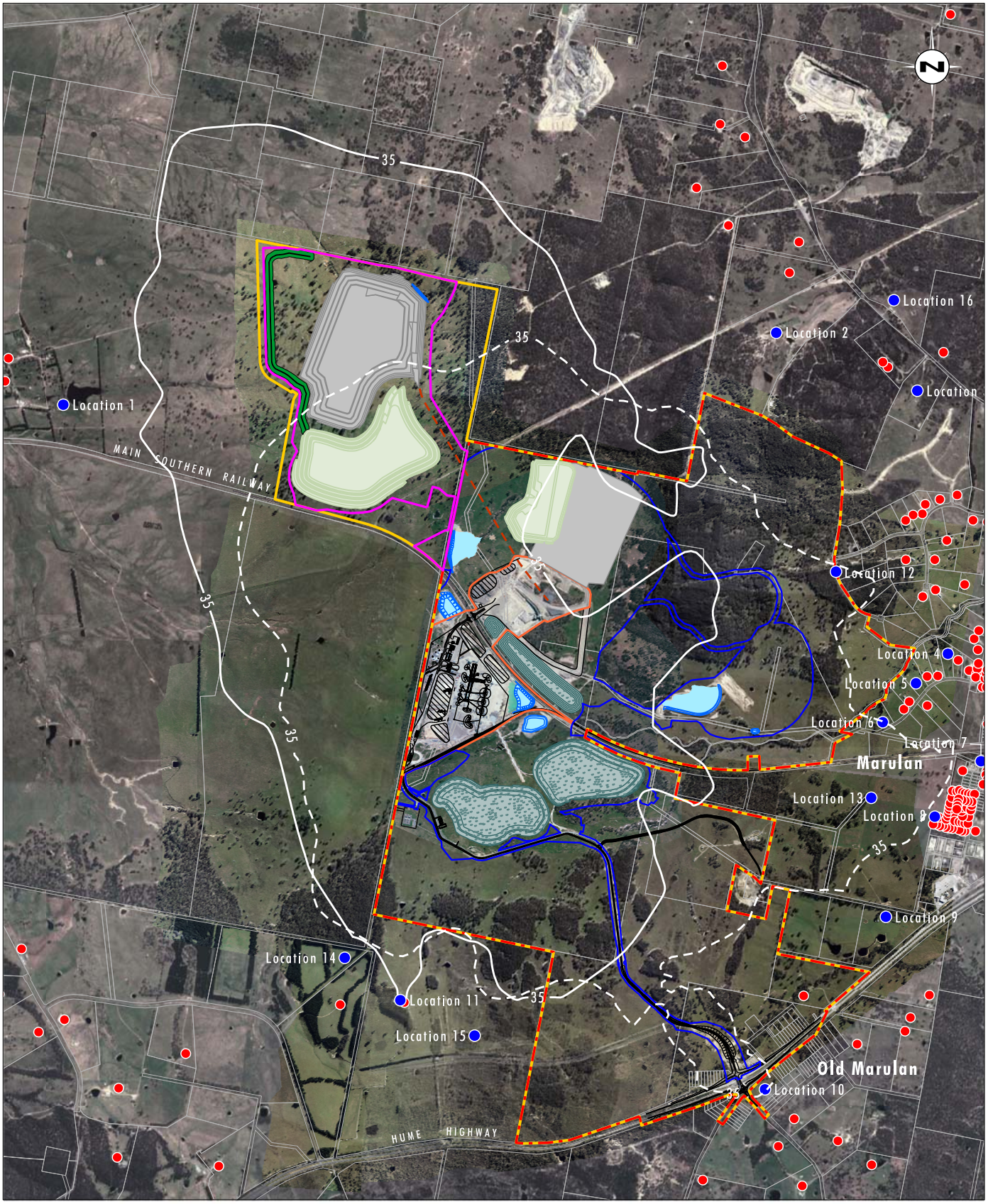

Image Source: Google Earth (2012), Holcim (2012, 2014)
Data Source: LPI (2014), Holcim Australia (2015)

0 0.5 1.0 1.5km
1:35 000

Legend

- Approved Project Area
- Modification Project Area
- Lynwood Infrastructure Area
- Approved Disturbance Footprint
- Proposed Granite Pit Disturbance Footprint
- Approved Operations Predicted Noise Level 35 dB(A)
- Modification Project Noise Level 35 dB(A)
- Lynwood Infrastructure Layout
- Quarry Pit
- Emplacement Area
- Dam
- Proposed Overburden Emplacement Area
- Proposed Amenity Bund
- Proposed Haul Road
- Residence
- Residence/Noise Assessment Location

FIGURE 2.4

Noise Contours during Calm Meteorological Conditions Stage 3 - Comparison between Approved Operations and Modification Project

File Name (A4): R19/3330_337.dgn
20160222 14.06

2.4.2 Air Quality

Ideally a HVAS or at least a dust deposition gauge should be installed at a suitable location to the north-east of the granite pit extension area following any modification of the Project Approval, given that prevailing winds in the area are generally from the west (winter and spring).

In addition.....there is no monitoring of dust deposition to the west of the quarry. With the presence of predominant easterly winds during summer as identified by the AQIA, the EPA believes that a dust deposition gauge should be installed to the west of the quarry.

Holcim Australia has undertaken a further review of the existing dust monitoring network in response to the EPA's comments and in preparation of an application to vary the EPL for the site and proposes changes to the existing monitoring network to address the EPA's comments. Subject to the agreement of the relevant landholders, this will include the installation of new dust deposition gauges to the west and northeast of the Granite Pit. The proposed, revised dust deposition monitoring locations are shown on **Figure 2.5**.

Holcim Australia will also investigate the potential relocation of an existing high volume air sampler to the west of the quarry to the nearest residence to the Granite Pit (i.e. to the west) in consultation with the land owner. Should a change in location of the high volume air sampler be proposed as an outcome of these investigations, Holcim Australia will address this issue in the EPL variation and the updated monitoring programs.

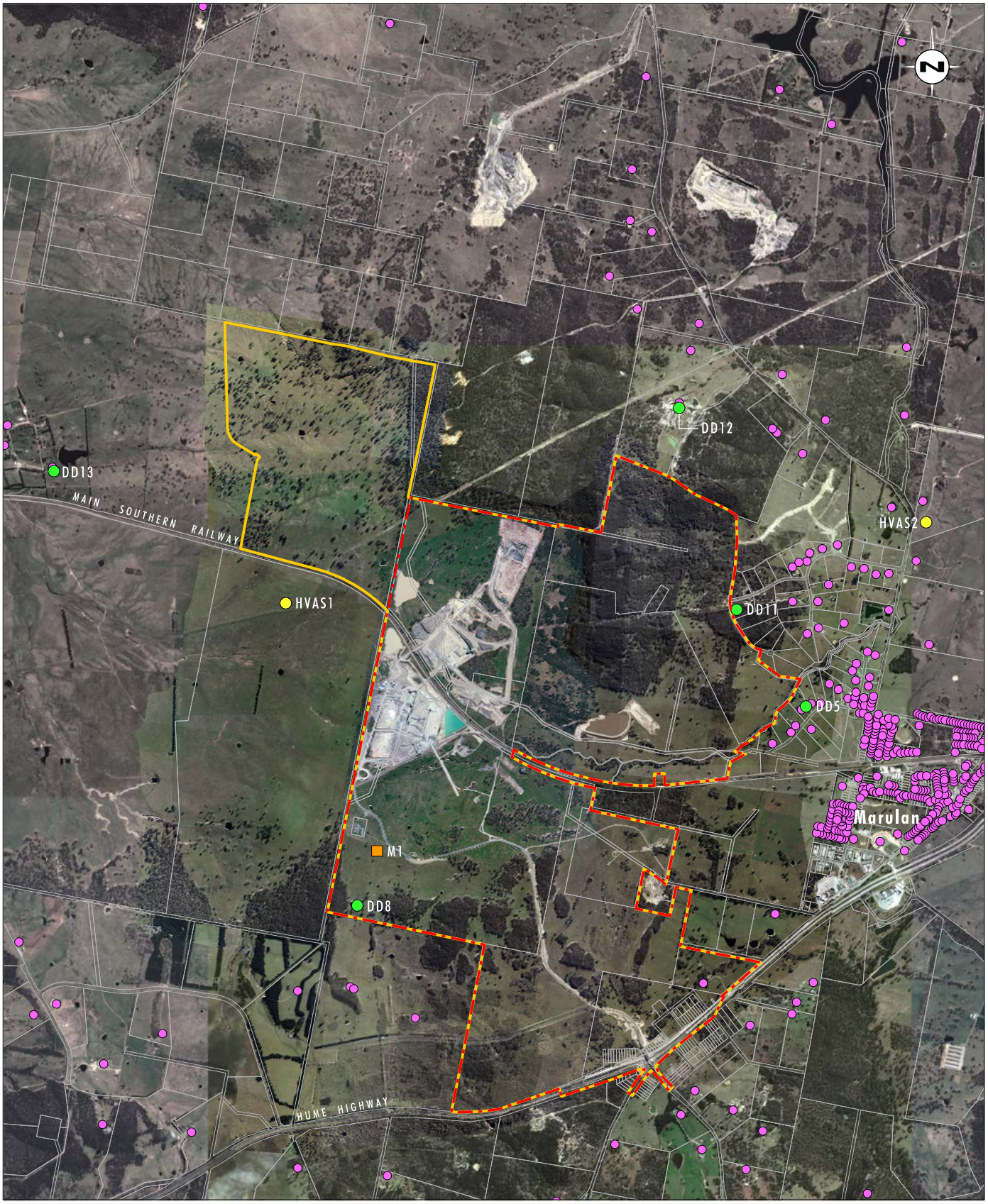

Image Source: Google Earth (2012), Holcim (2012, 2014)
Data Source: LPI (2014), Holcim Australia (2015)

0 0.5 1.0 2.0km
1:40 000

Legend

- Approved Project Area
- Modification Project Area
- Meteorological Station
- Depositional Dust Monitoring Location
- HVAS Location
- Residence Location

FIGURE 2.5

Proposed Air Quality Monitoring Network

File Name (A4): R19/3330_333.dgn
20160215 13.32

2.4.3 Water Management

The proponent has committed to updating the current Lynwood Quarry Water Management Plan (WMP) to reflect the necessary changes to the surface water catchments and additional monitoring and management measures.

We consider this a mandatory action given the recent compliance issues with the management of water at Lynwood Quarry. The proper and competent management of water infrastructure is relevant not just to maintaining an adequate supply of water for operations and dust suppression, but also to minimizing potential discharges of sediment laden water from the quarry.

As per the commitments in the EA, Holcim Australia will complete a revision of the Water Management Plan as part of the implementation of the Modification Project. The EPA's comments regarding management of water infrastructure to minimise discharges is noted and Holcim Australia has addressed this issue in the concept design of the water management system for the Granite Pit. As previously discussed with the EPA, Holcim Australia also proposes to seek a variation to the existing EPL for the quarry to provide for future water discharge from the site. As discussed in **Section 2.1**, Holcim Australia has made improvements to the operation of the site water management system to address past issues and has now moved from construction phase (when the historical water incidents occurred) to operations phase. As also discussed in **Section 2.1**, additional control measures such as the Water Treatment Facility plus storage of water in the Approved Pit for treatment and reuse as required, will also contribute to improved overall water management at the site.

2.5 Department of Industry – Division of Resources and Energy

The DRE provided a submission on the Modification Project regarding the resource assessment and noted that the EA has conceptually addressed the standard requirements for quarry operations. However, it requested further information relating to dot points 2 and 3 of the Resource Assessment attachment included as an appendix to the DRE submission. The submission noted that this information could be provided separately to DRE if deemed commercial-in-confidence. The specific further requirements noted by DRE are summarised as follows:

- ***The amount of material to be extracted and the method or methods used to determine the size of the resource (e.g. drilling, trenching, geophysical methods); and***

- ***Characteristics of the material or materials being produced.***

Holcim Australia has identified that the information requested by DRE is commercial-in-confidence. Holcim Australia commits to providing a separate report to DRE, addressing the requirements of the DRE submission.

2.6 Department of Primary Industries – Fisheries, Agriculture, Water and Land

DPI – Land advised that it had no issues relating to the Modification Project, while DPI - Agriculture responded that the EA addressed the issues associated with impacts of hard rock quarries. Therefore, responses to DPI Land and DPI Agriculture are not necessary.

Detailed comments are provided in the Appendix of the DPI - Fisheries, Agriculture, Water and Land submission. Key issues raised by DPI are summarised in the sections below.

2.6.1 DPI Fisheries

The DPI Fisheries submission noted that the EA identified that four reported incidents have occurred at Lynwood Quarry relating to overflow of sediment dams containing turbid waters and commented that:

Justification has not been provided that the current Water Management Plan operating at the approved quarry has demonstrated a neutral effect on all relevant water quality parameters as was intended.

It is noted that the above incidents referred to by DPI Fisheries occurred while the quarry was in its construction phase and therefore the water management system at the quarry was not yet operating as per its full design. The operational quarry has a greater water demand when compared to the construction phase and assists in the drawdown of sediment dams to maintain appropriate freeboard in accordance with Blue Book design criteria. The design of the system is in accordance with the Blue Book and Holcim Australia has implemented new operational controls in consultation with the EPA to address the previous issues that occurred during construction. Holcim Australia continues to actively engage with the EPA, providing reporting on overflow events (not a non-compliance) as they occur in full compliance with approvals to demonstrate the improvements that have been achieved with water management on site as the quarry has moved into an operational phase. The process has improved in rigour and will be amended to include the Modification Project.

It is considered therefore that operations under the Water Management Plan will have a neutral affect on all relevant water quality parameters and this will also be the case if the Modification Project is implemented.

It is important that water management practices are significantly enhanced, in consultation with DPI Fisheries.

As noted above, significant changes have been made to the operational control of the water management system and the quarry is now in operational phase, as opposed to being in construction phase. The required enhancement of water management practice at the site has occurred.

As part of the implementation of the Modification Project, Holcim Australia has committed to updating the Water Management Plan. The revised Water Management Plan will include details of the revised water management system for the site, as a result of the commitment to the ongoing pumping regime, construction of new surface water dams, and potential in pit storage as previously discussed in **Section 2.1**.

A comprehensive water quality management and monitoring plan specific to the expanded proposal with a focus on the highest risk parameter (suspended sediment) needs to be developed.

The current Water Quality Plan for the expanded quarry relies on a single water quality monitoring point located 3km downstream of the proposal boundary. This is not sufficient to demonstrate water quality outcomes. A sampling point much closer to the quarry, where dilution from broader catchment inflows have not had an effect is required.

DPI recommends that significant improvement to water management is required prior to any expansion of the quarry.

Holcim Australia has committed to the inclusion of additional surface water monitoring points as per Section 6.7.1.5 of the EA and has further expanded this commitment in light of comments provided by Water NSW (refer to **Section 2.1**). Holcim Australia is also undertaking a review of the EPL for Lynwood Quarry and commits to the submission of an EPL variation to EPA, to include the modified environmental monitoring program as a result of the Modification Project. The revised EPL will include additional surface water discharge and monitoring locations for the modified Lynwood Quarry.

The proposal includes a new internal haul road to the area of expansion which will be crossing a 3rd order tributary of Lockyersleigh Creek.... In the event that the proposal is approved, the department recommends the inclusion of the following conditions:

1. ***The vehicular crossing of Lockyersleigh Creek must be designed and constructed in accordance with DPI Fisheries 'Policy and Guidelines for Fish Friendly Waterway Crossings (2004') and 'Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings (2004)'***

2. ***The design plans for the crossing must be referred to DPI fisheries for approval prior to commencement of construction.***

Holcim Australia agrees that the identified waterway crossing will need to be constructed in accordance with the relevant DPI Fisheries Policies and Guidelines.

It is noted that as discussed in the EA, a permit under the *Fisheries Management Act 1994* may be required for the Modification Project and further consultation will be undertaken with the NSW Department of Primary Industries to confirm requirements. The quarry was previously exempt from obtaining approvals under this Act due to the exemptions in place associated with the *Rivers and Foreshores Improvement Act 1948* (now repealed), however, with the transitional arrangements in place for legislative changes since that time, a permit may be required.

2.6.2 DPI Water

DPI Water reviewed the Environmental Assessment for the project and provided detailed responses in relation to:

- ***Quarry water demand and supply requirements;***
- ***Appropriate water licensing for all water taken / intercepted;***
- ***Impacts on surface water and groundwater resources; and***
- ***Impacts on other water users.***

2.6.2.1 Quarry Water Demand and Water Supplies

DPI Water considers that the how the project will deal with such water supply deficits is not well demonstrated by the proponent.

The predicted water balance for the Modification Project was presented in the Surface Water Assessment and Water Balance Assessment Reports. As discussed in the reports and presented in **Table 2.4** the gross water balance results include water imports from Johnniefields Dam, in addition to water captured on site for pollution control purposes (e.g. water from sediment dams) and water harvesting in accordance with harvestable rights provisions.

Table 2.4 Gross Water Balance (ML/year) at Maximum Production

Stage	10th Percentile	50th Percentile	90th Percentile
1	-147	130	766
3	-210	79	737

Stage	10th Percentile	50th Percentile	90th Percentile
6	-282	11	695

The water balance predicts that the Lynwood Quarry as modified is likely (i.e. 50th percentile) to operate with a small water surplus for all modelled stages. The reduction in water surplus between the stages can be attributed to an increase in haul road surface area, and therefore, an increase in haul road dust suppression water demand as the operation progresses.

During periods of water surplus it is assumed that surplus water will be stored in the Approved Pit prior to reuse within the WMS. During dry periods water supply will be primarily supplemented by imports from the water resource at Johnniefields Dam. However, during sustained dry periods, where the secondary water storage in the Approved Pit is empty, and with consideration of water imports from Johnniefields Dam, water deficits are predicted to range between 147 ML per year in Stage 1 to 282 ML per year in Stage 6 (refer to **Table 2.2**) based on a full approved production level of 5 Mtpa.

Also presented in the Water Balance Assessment (refer to Table 5.6 of the Water Balance Assessment) was the modelled supply reliability. This assessment output for the supply reliability at maximum production rates (i.e. 5 Mtpa) is reproduced in **Table 2.5**.

Table 2.5 Supply Reliability

Stage	Maximum Operational Demand (ML/day)	Supply Reliability
1	1.82	92%
3	2.06	90%
6	2.27	83%

Note: The maximum operational demand includes the maximum haul road dust suppression demand which has not been varied in the sensitivity analysis.

Holcim Australia acknowledges that the current off site industrial water supply from Johnniefields Dam (80 ML) cannot meet all of the predicted water deficit periods for the Modification Project with the quarry operating at the maximum production rate of 5 Mtpa. However, the 83% to 92% supply reliability at maximum production is considered reasonable and is an indication that under most circumstances there will be sufficient water for operations at Lynwood Quarry. It is also noted that as discussed in **Section 2.1**, under the deed of agreement and licences that Holcim Australia has in place for this supply, Lynwood Quarry has access to up to 130 ML per year from Johnniefields Dam if required. This opportunity for increased supply further reduces any water supply risk.

Holcim Australia, as discussed in Section 6.1.5 of the Surface Water Assessment proposes to, if water shortages develop, either source additional off-site supplies or reduce operations to match the available water supply.

As discussed in both the Surface Water Assessment and the Water Balance Assessment the maximum production rate of 5 Mtpa has been modelled for all three quarry stages. However, as also presented in Section 3.6.2 of the EA actual production levels will be driven by market demand which can vary significantly from year to year. Water demand is higher at higher levels of production. As such, it is likely that the maximum production rates of 5 Mtpa will not be required for all years and that if required production will be able to be reduced during dry periods.

2.6.2.2 Water Licensing

DPI Water reiterates that despite the size of the Johnniefields Dam, Holcim are reminded that only 80ML of extraction (in accordance with Water Access Licence (WAL) conditions) is authorised.

DPI Water reiterates that all current and proposed surface waters to be extracted and used for the quarry operation, must be appropriately authorised by a WAL unless subject to relevant exemptions under the Water Management Act 2000.

DPI Water recommends that, should the modification be approved, a condition of consent be imposed requiring that the applicant demonstrate that all proposed water supplies are appropriately authorised by DPI Water as required under the Water Management Act 2000.

As stated in Section 3.1.3 of the Surface Water Assessment Report, Holcim Australia has a number of existing and future approved dams for the purposes of water storage and/or sediment control. The total volume of dams listed for "water storage" in Tables 3.1 and 3.2 of the Surface Water Assessment is 210 ML and includes the following dams: Dam 1 (existing); Dam A (existing); and Dam 2 (future approved dams).

It should be noted that Dam 2, although approved, has not yet been constructed and is also planned to be a turkeys nest dam (i.e. the dam does not have a catchment area and is replenished by pumping only). As such the current total volume of dams designated for "water storage" at the Lynwood Quarry is 180 ML. Dam 1 (existing) has a storage volume of 63 ML and is also a turkey's nest dam. As both Dam 1 and Dam 2 are turkeys 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*.

The only water dams proposed as part of the Modification Project are for clean water management as detention storages and sediment control dams. As stated in the DPI Water Submission and in DPI Water guidelines neither of these dam types requires licensing for take under the *Water Management Act 2000*.

The approach taken by Holcim Australia, which is discussed in the Surface Water Assessment and which is consistent with the approach taken for other quarries and mines in NSW, is to account for and licence all water taken from clean undisturbed catchment areas. The allowable annual water take under Harvestable Rights Provisions is calculated based on the average regional runoff rate (as published by DPI Water on the farm dams calculator website) and water take above this volume is proposed to be licensed by Water Access Licences (WALs).

As stated in the Surface Water Assessment Report both Dam A and Dam F (both existing sediment dams) have catchments that include a portion of land that will not be disturbed by the quarry operations. That is, in addition to their pollution control function they also harvest water from Holcim Australia's land. These are the only areas on site of undisturbed land which report to water storage or sediment dams associated with the quarry operations.

The 50th percentile modelled value for runoff harvested from natural undisturbed catchments is 107 ML per year (refer to Table 6.1 of the Surface Water Assessment).

Holcim Australia owns a land area of approximately 1556 hectares. Based on 100 per cent capture of runoff at the regional runoff rates (refer to www.farmdamscalculator.dnr.nsw.gov.au) of 0.75 ML per hectare per year, this equates to capture of approximately 117 ML per year of harvestable rights. As such, on average the capture of clean water runoff is within the harvestable rights provisions of Holcim Australia. In the submission DPI Water has confirmed that this calculation is correct.

Based on the information above and a harvestable right provision of 117 ML per year, Holcim Australia believes that on average the capture of clean water will be within Harvestable Rights Provisions.

As stated in the Surface Water Assessment, Holcim Australia will licence any surface water take from clean water catchments (i.e. water not managed for pollution control purposes) that is in excess of harvestable rights provisions, if additional water harvesting dams are constructed in the future.

The approach to calculating water harvesting for the quarry discussed above is considered the most appropriate approach for determining compliance with harvestable rights provisions. However, it is noted that in its submission DPI Water calculates on-site quarry dam volumes as a proxy for harvestable rights. As discussed above, only two dams on site have a proportion of clean water catchment and therefore in our view are the only two dams that would appropriately be considered in such a calculation. Regardless, applying the approach used by DPI Water, the current dam volume associated with capture of water for either pollution control or water harvesting on site is 117 ML (i.e. total storage of 210 ML minus Dam 2 (30 ML, not constructed and if constructed will be a turkeys nest dam) and minus Dam 1 (63 ML, turkeys nest dam). This is equivalent to the harvestable rights provisions as agreed to by DPI Water.

2.6.2.3 Groundwater Interception

DPI Water confirms that a WAL with sufficient groundwater allocation to offset any future groundwater take will be required prior to any groundwater interception taking place

Holcim Australia will licence groundwater extraction as per the advice from DPI Water and as per the commitments in the EA.

2.6.2.4 Other Water Users

It is further indicated that Holcim has some agreements in place with some adjoining landholder, presumably relating to water supplies.

DPI Water advises that, if this is the case, providing water supplies to other landholders may require licensing action. DPI Water should be consulted in this regard.

Holcim Australia has agreements in place relating to potential impacts of the quarry operations on the adjoining landholder to west that covers potential water impacts, however, this agreement does not include supply of water. If it is required at some point in the future, DPI Water will be consulted.

2.6.2.5 Monitoring Bores

DPI Water advises that the construction of monitoring bores less than 40 metres deep no longer require licensing. Other bores will continue to be licensed under the Water Act 1912.

Holcim Australia will continue to licence monitoring bores as per the advice from DPI Water.

2.6.2.6 Controlled Activity Approvals

Clarification is requested in this regard to determine if certain future works on waterfront land will require a Controlled Activity Approval or not. Notwithstanding the above, all works on waterfront land should continue to be designed in accordance with DPI Water Guidelines for Controlled Activities on Waterfront Land.

The original development consent for Lynwood Quarry was granted under Part 4 of the EP&A Act in 2005 as a transitional Part 3A project. That means that the exception provisions for State Significant developments in place under Part 3A did not apply and the quarry is not exempt from Controlled Activity Approvals. It is noted that if approved now, as a new development, such exemptions would apply. Holcim Australia will consult with DPI Water regarding the approval needs for the Modification Project.

Holcim Australia proposes to update the Riparian Area Management Plans for Joarimin Creek and Lockyersleigh Creek to include the required controls for works within riparian zones in accordance with relevant guidelines. Subject to any alternate advice from DPI Water, Holcim Australia will also submit applications for Controlled Activity Approvals for all works to support the quarry, excluding the quarry pit, for all works on waterfront land.

2.6.2.7 Monitoring Plans

DPI Water concurs that it would be appropriate for the proponent to update relevant monitoring plans for the Modification Project to ensure that environmental standards are being met and additional contingencies put in place where thresholds are being exceeded.

As stated in the EA and discussed in **Section 2.1**, as part of the implementation of the Modification Project, the water monitoring program for Lynwood Quarry will be updated.

3.0 Community Submission

One community submission was received on the Modification Project during the EA exhibition process. The matters raised in the submission and a response is provided in **Table 3.1**. It is noted that the submission raises a number of matters about the existing Johnniefields Quarry (operated by Holcim Australia) and Gunlake Quarry (another quarry operator) neither of which are the subject of the Modification Project and both of which are closer to the resident's property than Lynwood Quarry. The responses provide in **Table 3.1** focus on the matters raised in relation to Lynwood Quarry, except where the submission focuses on the cumulative impacts of Lynwood Quarry combined with those of Johnniefields and Gunlake Quarries, with these cumulative impact issues also addressed. The text in italics in **Table 3.1** is direct quotes from the submission. Other matters are briefly summarised to assist in the reader understanding the context of the response provided.

It is also noted that Holcim Australia has been engaging with the resident that made the submission over the past 12 months in relations to the impacts they have raised in relation to Johnniefields Quarry. This has included undertaking both dust and noise monitoring and providing property specific reporting and assessment outcomes. Holcim Australia has discussed with the broader community its plans to cease operations at Johnniefields Quarry within two years of the Granite Pit consistently producing high quality primary raw feed.

Table 3.1 Matters raised in community submission and response

Issued Raised	Response
Granite Pit Site	
Our property and residence are east of both the Approved Pit and the Granite pit and will be directly exposed to the revised overburden emplacement areas and additional haul roads. (Figure 1.3) but will not have the protection of any amenity bunds.	It is noted that the residence associated with the submission is located to the northeast of the Granite Pit Area and that it is correct that the amenity bund proposed to be located to the west and northwest of the Granite Pit is not of benefit to their residence. However, due to the natural topography, there is a ridge and heavily vegetated area between the Granite Pit and all of the residences to the northeast which will be effective in screening the operations. The Granite Pit Area will not be visible from residences to the northeast and the ridge line will also be effective in mitigating the potential for noise impacts.

Issued Raised	Response
An assessment of the area has identified potential environmental impacts on a residence 1.5kms from the Granite pit area as a result of the easterly summer winds yet has failed to identify any potential dust and noise impacts on nearby residences, including ours, which are affected by the predominant westerly winds of autumn, winter and spring.	The detailed assessments undertaken for the Modification Project, including the assessment of air quality, noise and blasting impacts, considered the potential impacts of the Modification Project on all surrounding residential receivers, including those to the northeast. The assessments found that Lynwood Quarry, with the proposed modifications, would comply with all relevant limits and criteria for all residences to the northeast, including at the residence in question. The specific residence that is the subject of the submission is located approximately 3 km northeast of the Granite Pit at its closest point.
In addition to the proposed Holcim Granite Pit, Gunlake Quarries currently has a development application with the Planning Department for an extension to their existing pit. If approved, the Lynwood Granite Pit and the Gunlake Quarry Extension Pit, will increase the footprint of both quarries.	The cumulative impacts of the Modification Project combined with the existing quarry operations (Gunlake, Johnniefields) were considered in the EA. The assessments found that the relevant cumulative impact criteria would be met at all residences surrounding Lynwood Quarry. It is noted that Gunlake Quarry has obtained Secretary's Environmental Assessment Requirements for a potential expansion. The environmental assessment that will be required to support this expansion application is not currently available and was not available at the time the Modification Project assessments were completed. Thus the cumulative assessments considered the currently approved Gunlake operations. As the full details of the Modification Project are now available it is expected that the Gunlake expansion assessment, when completed, will consider the Modification Project in its cumulative impact assessment.

Issued Raised	Response
Air Quality	
Between 16 and 30 June 2014, Holcim arranged for dust and noise monitoring to be carried out at our property in order to assess the impact of quarrying in the area, including Lynwood Quarry which was yet to be fully operational…… *Pacific Environment Limited carried out the air quality component of the assessment and reported that the maximum 24 hour average PM10 concentration for Lynwood quarry on a day in June 2014 was 10.8 ug/m^3 yet results from monitoring at our property for the same period shows concentrations at approx 38 ug/m^3.* *The above-mentioned real-time site specific data could have been made available to Pacific when undertaking the assessment of air quality for the Lynwood modification however as modelling was used, the results of that data collection would have contradicted their predictions.*	The Pacific Environment Limited (PEL) report referred to in the submission was a report prepared for the resident following a commitment made by Holcim Australia as part of the community engagement program. As per the agreed scope of work for this report, it included a calculation of the dust levels contributed at the residence from the combined operations of the three quarries; Lynwood, Johnniefields and Gunlake. The purpose of this assessment was to provide the resident with an understanding of the relative contribution of each of the three quarry operations. The assessment was undertaken using 2014 meteorological data (to provide a full year of data as per relevant EPA guidelines) but as the quarries were modelled at full operations, was not intended to replicate actual dust levels in 2014. The modelling, which was designed to determine proportional contribution, did not include background dust levels. Based on the above, the monitored dust levels on a particular day in 2014 cannot be compared to the predicted dust levels from the three quarry operations at full operations. The above discussion relates to the specific dust modelling report undertaken as part of a separate exercise following voluntary commitments made to the resident by Holcim Australia. For the Modification Project, the detailed air quality assessment has predicted dust levels at all of the surrounding residences including the specific property discussed in this submission. The assessment was undertaken in accordance with EPA requirements and found that the relevant dust criteria will be met at all surrounding residences. In the vicinity of the particular residence discussed in this submission, the annual average PM_{10} dust levels (including background and cumulative dust sources) were predicted to be less than 15 µg/m^3, with background dust levels accounting for 13 µg/m^3 of this total. The Modification Project is not predicted to result in significant air quality impacts on this residence.

Issued Raised	Response
Issues relating to the practice of combining certain materials such as recycled concrete, cement and flyash to aggregates and associated dust impacts.	Holcim Australia has existing approval for a pug mill operation (not yet constructed), with no changes proposed to this approved infrastructure. A pug mill has the ability to mix cement and fly ash to road base and aggregate material. Current pug mill technology has an enclosed silo system with dust extraction/filter to seek to prevent particulate air emissions. The mixing chambers on modern pug mills are also enclosed with dust extraction. Holcim Australia has made a commitment to the community that there will be no cement manufacture on site. As noted above, a detailed air quality assessment was undertaken for the Modification Project considering all potential dust emission sources (including from all approved infrastructure). The assessment found that the relevant dust criteria will be met at all surrounding residences.
Request for a high volume air sampler to be installed on the property.	Following further discussions with the resident during 2015 Holcim Australia voluntarily agreed to place a low volume air sampler at this residence for a trial 6 month period to monitor dust levels. The monitor was placed on the property in December 2015.
at any one time, all wind directions have the potential to carry dust and noise towards our property from either Lynwood, Gunlake or Johnniefields quarries, whether through the means of operations, traffic or transportation, therefore making the impacts on us constantly present.	The detailed air quality assessment undertaken for the Modification Project considered all relevant wind conditions based on local meteorological data collected on the Lynwood Quarry site. The assessment also included consideration of cumulative impacts associated with other dust sources including dust from other quarries and roads. As noted above, the assessment found that the relevant air quality criteria would be met with the Modification Project.

Issued Raised	Response
We believe that the Air Quality portion of the EA is incomplete as it has not addressed any impact on our residence and property if development of the Granite Pit is approved, such as:	The air quality assessment included assessment of dust levels at all surrounding residential receivers including the specific residence discussed in this submission. The assessment found that the relevant air quality criteria would be met with the Modification Project.
• *the cumulative impact of Johnniefields quarry remaining operational until Lynwood Approved Pit is fully productive;*	The assessment included consideration of the cumulative impacts of Johnniefields Quarry.
• *the cumulative impact of both Johnniefields quarry and the Lynwood Approved Pit being operational during construction of the Granite Pit;*	The assessment included consideration of the cumulative impacts of both Johnniefields Quarry and the Approved Pit being operational at the same time as the Granite Pit.
• *the impact of dust being carried on westerly winds during the removal of topsoil and overburden from the pit location as well as during construction of the amenity bund and haulage road;*	Westerly winds, topsoil and overburden removal, and works associated with construction of the amenity bund and haulage road were all considered in the air quality assessment.
• *the cumulative impact of dust emissions from the haulage of rock from the Granite Pit and Approved Pit to the primary crusher, 7am to 10pm, 7 days per week; and*	Haulage of rock to the primary crusher and operation of the crushing and screening plant was included in the air quality assessment.
• *the impact of dust emissions from introduced materials such as recycled concrete, cement and flyash.*	As discussed above, a detailed air quality assessment has been completed for the Modification Project including all potential dust emissions. The assessment found all relevant criteria would be met.

Issued Raised	Response
Concern that Pacific Environment Limited was engaged to undertake both the Lynwood and Gunlake air quality assessments.	Pacific Environment Limited (PEL) undertook the air quality assessment in accordance with all relevant EPA guidelines. The assessment has been subject to review by the EPA as part of the assessment process. There are no conflicts with PEL undertaking both assessments, with this experience giving them a more sound understanding of the local air quality environment and of the dust emissions from these two quarry operations. It is also noted that air quality assessment for the Modification Project was subject to a peer review to ensure that it was undertaken in accordance with relevant guidelines.
Blasting	
Concern that blasting will occur more frequently with the Proposed Modification.	As the maximum production of Lynwood Quarry will not change, the overall number of blasts will not change due to the Modification Project.
Noise	
Discusses noise monitoring undertaken at the residence by Umwelt (in response to a request from the resident to Holcim Australia) in July 2014 and raises concern that noise modelling was used for the Modification Project assessment as opposed to the monitoring data.	The noise monitoring referred to was related to the resident raising questions about the noise level from Johnniefields Quarry. The attended monitoring recorded noise from Johnniefields Quarry and traffic noise on Brayton Road. In regard to the noise impacts from the Modification Project, noise modelling is required as the assessment needs to consider future operations that do not presently exist and thus cannot be monitored. Noise modelling was undertaken for the Modification Project in accordance with the NSW Industrial Noise Policy (INP) (EPA, 2000). There is a ridge that provides topographic shielding between the Granite Pit and the residence discussed in this submission, reducing the potential for adverse noise impacts. The noise modelling identified that the predicted noise levels at residences to the northeast of the Granite Pit Area (including the specific residence in question) would readily comply with the relevant noise criteria.

Issued Raised	Response
Concern about not undertaking a construction noise assessment for the amenity bund, haul road and water management system.	NSW government policy provides less stringent construction noise criteria compared to the standard industrial noise criteria that apply to 'operations'. Holcim Australia proposes to undertake the required construction activities as part of ongoing operations as the major construction activities will be undertaken primarily using quarrying equipment. Therefore, by default, Holcim Australia has opted to adopt more stringent noise criteria for the construction activities. The noise impacts of these activities were assessed as part of the operational noise assessment for the Modification Project, which found that the relevant noise criteria would be met for all residences to the northeast of the Granite Pit Area.
Concern that 'the predominantly westerly winds will carry an excessive amount of noise' from quarrying activities to the residence in question.	As noted above, a detailed noise impact assessment was undertaken for the Modification Project in accordance with the INP finding that the relevant noise criteria would be met for all residences to the northeast of the Granite Pit Area, including the specific residence in question. This assessment included consideration of the prevailing westerly winds.
In addition to the impact of noise from the operations from Lynwood's Approved Project and the potential of the Modification Project, is the cumulative impact of operations from Gunlake and Johnniefields quarries.	Section 5.4 of the noise impact assessment included an assessment of cumulative impacts. The assessment found that the Modification Project would not result in adverse cumulative noise impacts.
Concerns about quarry traffic impacts on Brayton Road.	Lynwood Quarry has direct access onto the Hume Highway and does not use Brayton Road as an access route to the quarry. As outlined in the EA, there are no changes to traffic or road haulage as a result of the Modification Project. It is noted that this matter was raised in the submission as relating to Gunlake and Johnniefields Quarries.

Issued Raised	Response
Resources	
Contains discussion about the proportion of overburden compared to primary raw feed (PRF) in the Granite Pit.	Weathering profiles, including depth of weathering, are based on a number of factors, rock type, rainfall, surface and subsurface water penetration rates, land use, vegetation cover, geological structures, age of the rocks being weathered and numerous other factors. Despite their proximity, the Approved Pit containing ignimbrite at Lynwood and the Granite Pit containing granite have differing geology and have undergone different processes which have generated separate weathering profiles for each site. The proportions of weathered overburden, partially weathered material and fresh rock in the granite pit is typical of granite environments and is appropriate for its intended use for producing quarry products. In designing the Granite Pit, Holcim Australia has considered the best use of all materials being extracted from the pit, including the overburden. While Holcim Australia has stated that the overburden and interburden reported as waste from a JORC perspective, it does not mean that the material has no purpose. Holcim Australia will use this material in construction of the amenity bunds and haul roads and visual barriers at the overburden emplacement areas. Holcim Australia has also considered the overburden removal and granite extraction sequencing in the pit design and will look to commence the pit in an area of low overburden cover. This will allow for high grade PRF granite extraction to occur within the first 6 to 12 months from commencement. Holcim Australia will also review the concept extraction staging and may commence in a different location to that shown in the stage 1 concept quarry stage plan provided in the EA.

Issued Raised	Response
Raises questions about the magnetite content in the rock and the potential for it to redeposit in the faults and dykes present. Also asks about iron content and the potential contribution to oxidation in water systems.	The geological assessment has determined the main minerals found in the granite deposit. In the EA Holcim has grouped magnetite in with other ancillary minerals as it forms only a very minor contribution to the overall granite body. The modal mineral content of granite falls within the following ranges: • K-feldspar (15-34%), • Quartz (18-36%), • Plagioclase (24-43%), • Biotite (2-12%) • Magnetite (0-1%) • Other (1–2%) Holcim has assessed that the potential for the magnetite in the Granite pit to be redeposited in the faults and dykes that are present in the rock mass is inconsequential. Iron is a common element found in many rock forming minerals. However, the iron content of the minerals contained within the granite would not be liberated in any way, or to any greater extent, other than by natural weathering processes that can occur to any granite exposed naturally at surface.
Groundwater Impacts	
Identifies concerns about groundwater impacts.	A detailed groundwater assessment was undertaken as part of the EA identifying that low volumes of groundwater would be intercepted by the Granite Pit. In summary, the assessment found that no groundwater users or groundwater dependent ecosystems would be impacted and that the rock formation was generally 'tight' and low yielding, with no significant impacts on groundwater predicted. The assessment identified the need for Holcim Australia to licence all groundwater take in accordance with the *Water Management Act 2000*. Holcim Australia has committed to obtain the necessary licences.

Issued Raised	Response
Radon Gas	
Contains general discussion about local radon gas concentrations and comments on the health effects of radon gas in the community.	In response to the commentary about radon gas contained in the submission, Holcim Australia has undertaken a review of the potential for any issues in relation to radon gas and the Modification Project. The Australian Radiation Protection and Nuclear Safety Agency (ARPNSA) conducted a nationwide survey in 1990 to assess the potential risk to the Australian population of natural background radiation levels which includes radon. Findings from ARPNSA's survey conclude that the background levels of naturally occurring average concentration radon in Australian homes are about 10 Bq m^{-3}. Reported levels across the Marulan region where the proposed Lynwood Granite Pit is to be located, is estimated to be 18 Bq m^{-3}. These levels by comparison to a global average indoor value of 40 Bq m^{-3} is less than half. APRNSA have assessed the potential risk of naturally occurring Radon exposure and have stated that "Average radon levels in Australian homes are only a little larger than the radon levels in outside air and are of minimal concern to the health". Additional information in regard to APRNSA work on radon gas and potential risks can be found at http://www.arpansa.gov.au/radiationprotection/factsheets/is_RadonMap.cfm
Diesel Emissions	
Raised concerns about vehicles associated with quarrying operations emitting particulate matter and nitrous oxides.	Particulate matter associated with diesel emissions was included in the assessment of PM10 emissions undertaken as part of the air quality assessment. The assessment found that the relevant criteria would be met at all residences surrounding Lynwood Quarry. Nitrous oxide (NOx) emissions from diesel vehicles are not considered a potentially significant air quality issue for the Project. NOx emissions have been modelled for large scale mining projects that are much larger than Lynwood Quarry and it has been concluded that adverse impacts are extremely unlikely for such large scale project. The total NOx emissions resulting from Lynwood Quarry combined with other local quarry operations will be significantly less than that for a large mine. As such, it is highly unlikely to exceed air quality criteria at the nearest residential receivers.

Issued Raised	Response
Summary	
The only additional matter raised in the summary was silica dust which was mentioned as of concern in regard to health.	A detailed assessment of respirable crystalline silica dust was undertaken as part of the air quality assessment for the Modification Project. It concluded that the predicted levels were well below the relevant criteria and were potentially indistinguishable from background levels. The Modification Project is therefore not predicted to result in community health impacts associated with crystalline silica dust.

4.0 References

NSW EPA, (2000). Industrial Noise Policy

Department of Environment and Climate Change (DECC), 2008. *Managing Urban Stormwater – Soils and Construction, Volume 2A Installation of services.*

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Department of Environment and Resource Management (DERM) (2011) *National recovery plan for the Large-eared Pied Bat Chalinolobus dwyeri*. Draft. Report to the Department of Environment and Water Resources, Canberra. Brisbane: Queensland Parks and Wildlife Services.

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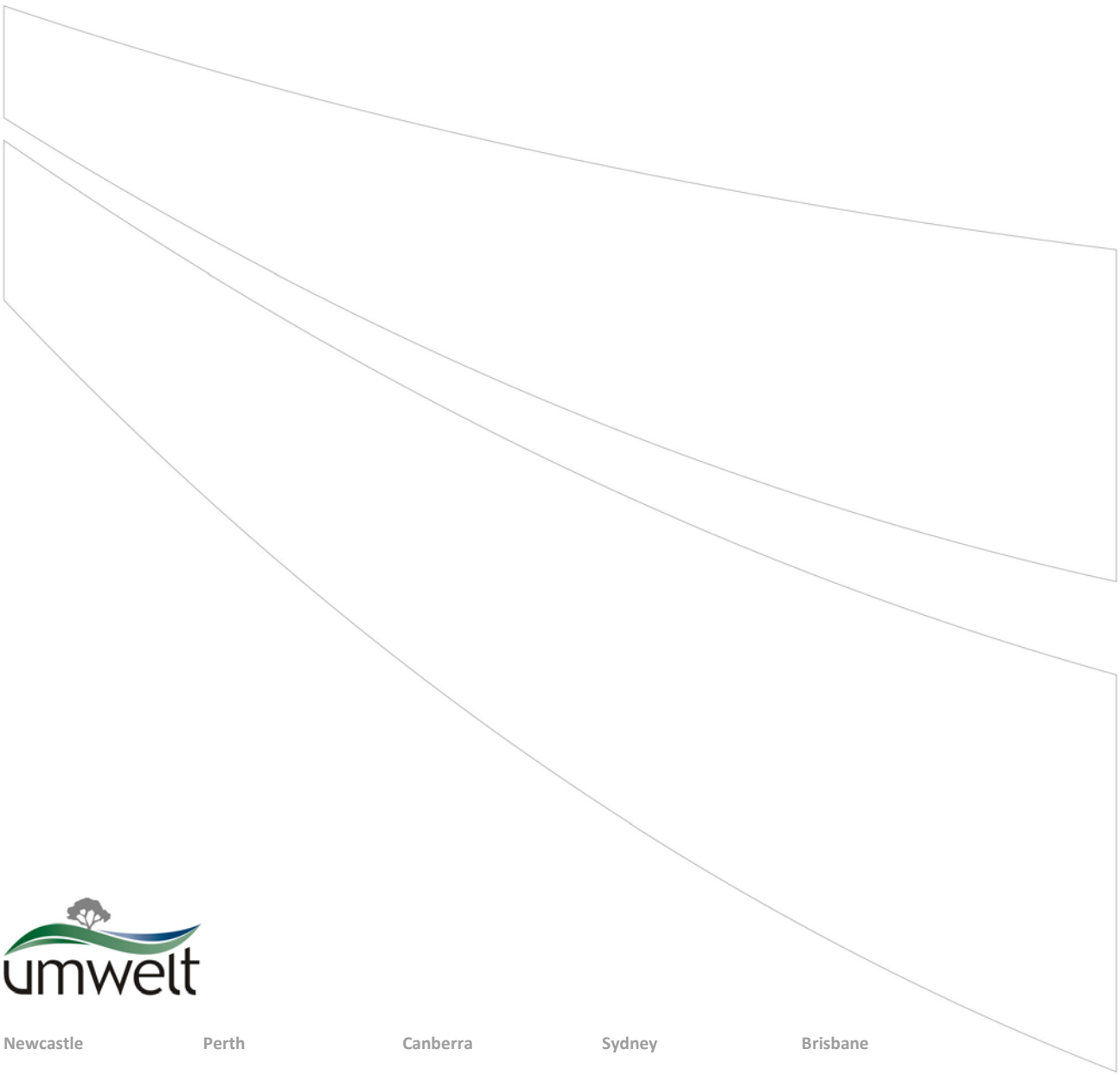

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