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# Teven Quarry Blast Management Plan

Holcim Australia  
September 2021

# Teven Blast Management Plan

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# 1. Introduction

## 1.1 Background

Holcim (Australia) Pty Ltd (Holcim) own and operate an existing hard rock quarry located at Stokers Lane, Teven, New South Wales (NSW) in the Ballina Local Government Area (LGA). The site is approximately eight kilometers (km) north-west of Ballina town center (**Figure 1**).

In 2014, Holcim sought a Development Consent under Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act) for an extension of the approved quarry life for an additional 30 years to 2045. The Teven Quarry Development Consent (SSD 6422) (Development Consent) was granted on 15 July 2015 by the NSW Minister for Planning and Infrastructure.

The Development Consent allows for continued operations of the existing Teven Quarry at an increased production volume, within the approved extraction area (**Figure 2**).

Under the Development Consent, Holcim is required by the NSW Department of Planning Industry and Environment (DPIE) to prepare a Blast Management Plan (BMP) in consultation with the NSW Environment Protection Authority (EPA) and to the satisfaction of the Director General.

## 1.2 Project Description

The Teven Quarry Development Consent (SSD 6422) provides for the following listed in **Table 1**.

**Table 1 Teven Quarry Development Consent (SSD 6422)**

<b>Project component</b>	<b>Currently approved (2015-2045)</b>
Quarry life	30 years from date of approval (15 July 2015), ie to 15 July 2045
Limits of production	500,000 tonnes per annum (tpa)
Quarry footprint	Shown on <b>Figure 1.2</b>
Overburden management	Shown on <b>Figure 1.2</b>
Hours of operation	<b>Blasting:</b> 10:00 am–3:00 pm Monday–Friday, at no time on Sundays or public holidays <b>All other activities:</b> 7:00 am– 4:00 pm Monday–Friday 7:00 am–4:00 pm Saturday At no time on Sundays or public holidays <b>Extended hours for product loading and dispatch:</b> 7:00 am–10:00 pm Monday–Friday 7:00 am–4:00 pm Saturday At no time on Sundays or public holidays
Transport	Road transport at approved production level
Employment	11 full time equivalent positions
Infrastructure	Fixed primary, secondary and tertiary plants with the addition of a mobile crushing and screening plant, and a mobile pug mill
Site access	Off Stokers Lane
Concrete recycling for re- use	Recycling of up to 10,000 tpa of clean surplus concrete material on site using existing and proposed processing infrastructure for re-use as product

### 1.3 Purpose and Scope

The purpose of this BMP is to provide a description of the measures to be implemented by Holcim to manage blasting operations at Teven Quarry and to detail the blast monitoring requirements associated with the operation. This BMP also provides a mechanism for assessing blast monitoring results against the relevant blast impact assessment criteria.

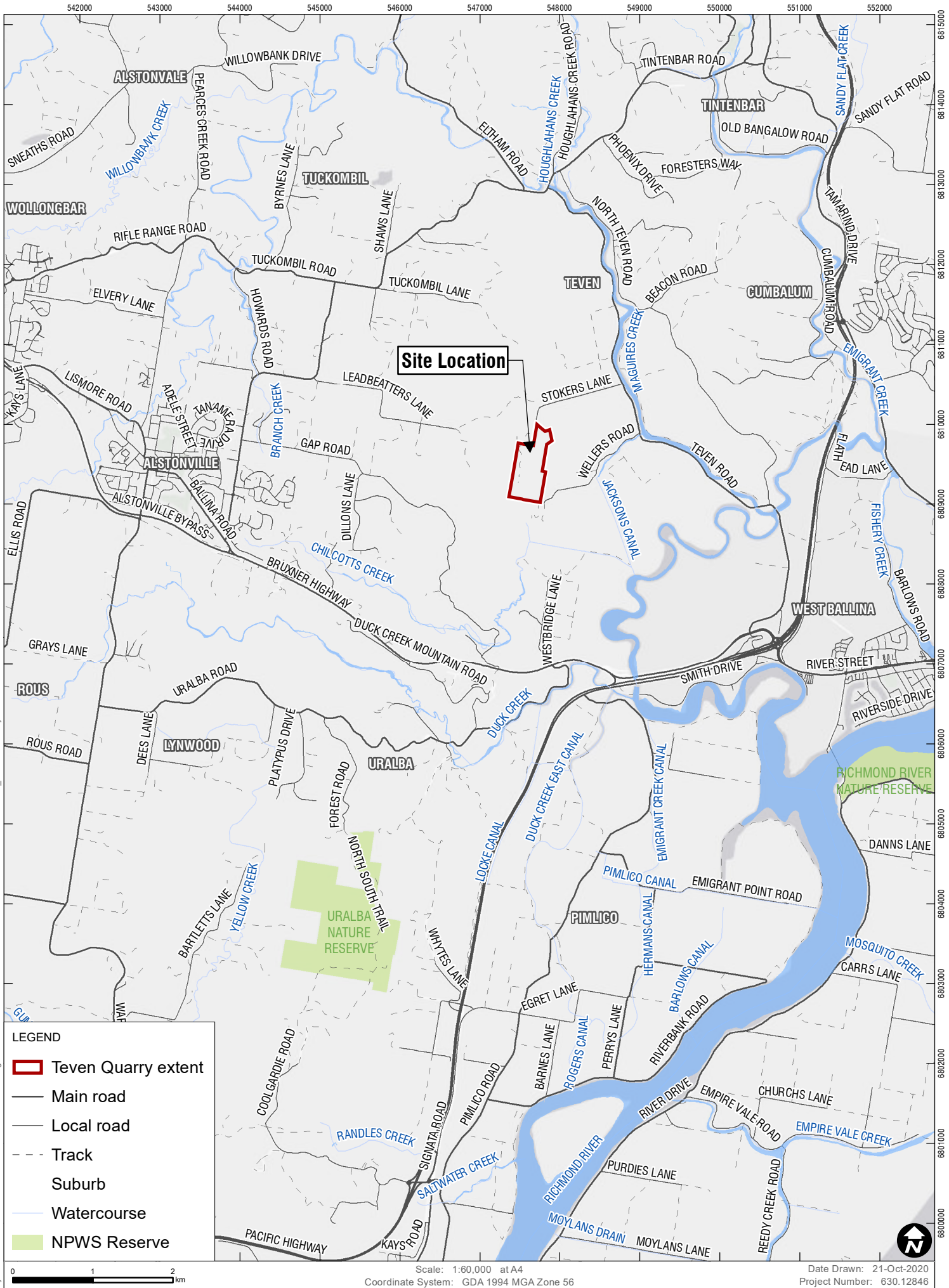
The BMP is stipulated as a key requirement under the Development Consent and is designed to be prepared to the satisfaction of the DPIE.

The relevant Development Consent conditions and Statement of Commitments are provided in **Sections 3.1 and 3.2** respectively. This plan also outlines the control measures to be implemented as part of the continued operations at Teven Quarry to minimise the potential impacts on sensitive receivers.

### 1.4 Objectives

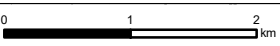
The objectives of this BMP include the following:

- Establish a blast monitoring system to assess the impact of blast emissions (noise and vibration) on surrounding sensitive receivers with the management of blasting to consider ‘best practice’ principles;
- Provide a mechanism to assess monitoring results against relevant Development Consent criteria to evaluate compliance;
- Detail the requirement for reporting blast criteria exceedances to the relevant stakeholders;
- Detail the controls to be implemented to minimise blasting impacts from the site, including potential impacts from blast fume generation;
- Manage blast-related community complaints in a timely and effective manner; and
- Detail the independent review process to be followed if Teven Quarry receives a written request by a landowner(s) for an independent review of blast overpressure and vibration impacts.



**LEGEND**

- Teven Quarry extent
- Main road
- Local road
- Track
- Suburb
- Watercourse
- NPWS Reserve



Scale: 1:60,000 at A4  
 Coordinate System: GDA 1994 MGA Zone 56

Date Drawn: 21-Oct-2020  
 Project Number: 630.12846

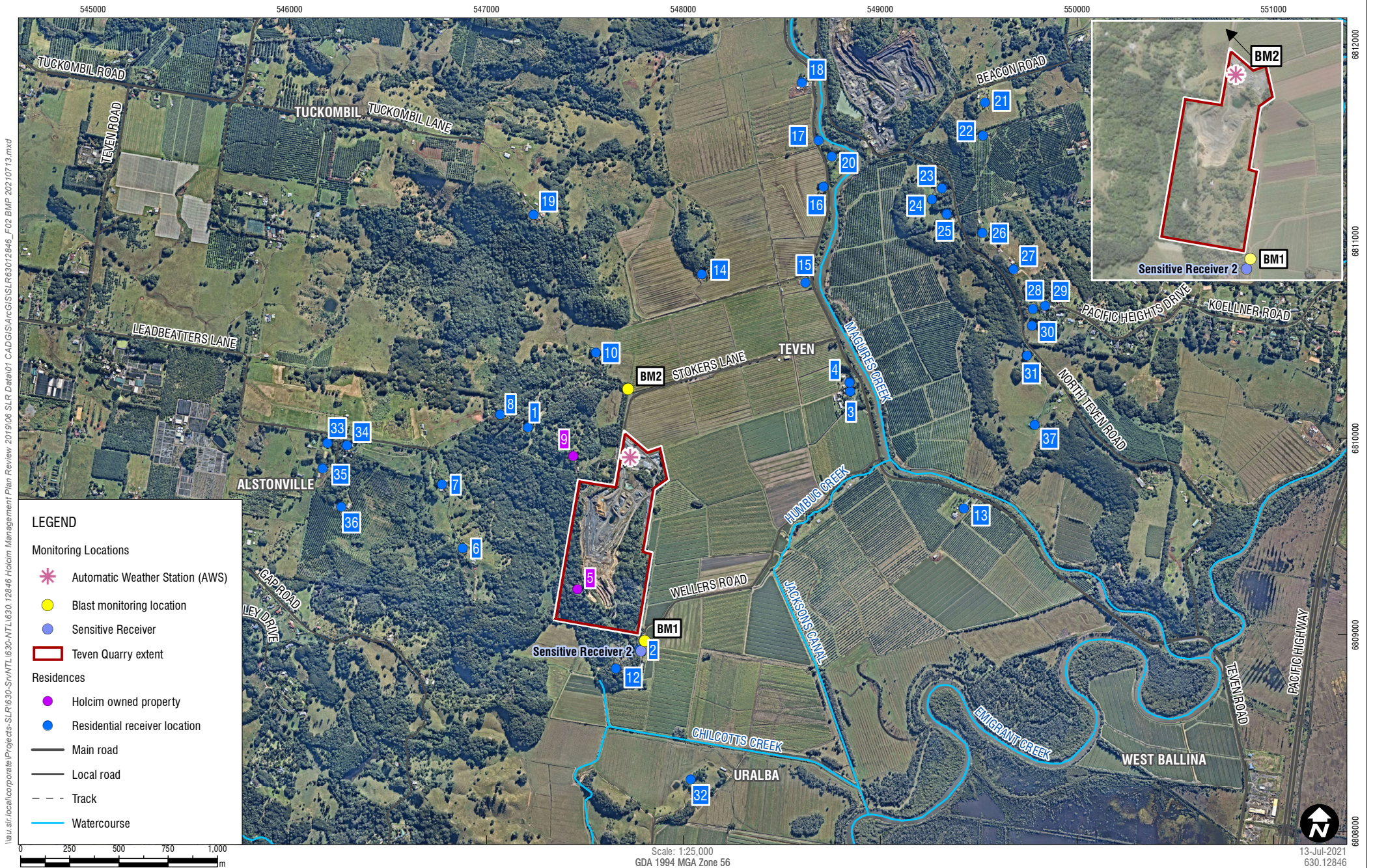


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**Site Locality**

**Figure 1**



**LEGEND**

- Monitoring Locations**
- ✱ Automatic Weather Station (AWS)
  - Blast monitoring location
  - Sensitive Receiver
  - Teven Quarry extent
- Residences**
- Holcim owned property
  - Residential receiver location
- Infrastructure**
- Main road
  - Local road
  - Track
  - Watercourse



Scale: 1:25,000  
GDA 1994 MGA Zone 56



13-Jul-2021  
630.12846

Source: Nearmap (January 2020)

## **2. Stakeholder Consultation**

### **2.1 Pre 2020 Consultation**

In accordance with Schedule 3, Condition 10 of the Development Consent, this Blast Management Plan was sent to the DPIE for approval. The previous management plan is dated 5 May 2016. There is no requirement under Schedule 3, Condition 10 to consult with the EPA.

### **2.2 2020-2021 Consultation**

A copy of the 2020 updated management plan was provided to DPIE in August 2020. Holcim received comments from DPIE on 7 October 2020 and updated and re-submitted this document during April 2021. Holcim received further comment from DPIE on the 6 July and re-submitted this document during August 2021. Holcim received further comment from DPIE on the 27 September 2021 and will resubmit this document to DPIE as required by the Development Consent (SSD 6422). Refer **Appendix A** for consultation.



### 3. Regulatory requirements

#### 3.1 Development Consent Requirements

The Development Consent for the Teven Quarry Project was assessed as State Significant Development under the Environmental Planning and Assessment Act. Approval for the Project was granted by the Minister for Planning on 15 July 2015. The requirement for this BMP arises from Schedule 3, Condition 10 of the Teven Quarry Development Consent. The requirements from the Development Consent relating to blasting, and where these requirements are addressed within this document, are provided in **Table 2**.

**Table 2 Development Consent conditions**

<b>Development Consent conditions</b>	<b>Section addressed</b>
<b>Schedule 3 - Environmental Performance Conditions</b>	
<p><b>Blasting Criteria</b></p> <p>7. The Applicant shall ensure that blasting on site does not cause any exceedance of the criteria in Table 3 (see Table 4.1).  However, these criteria do not apply if the Applicant has a written agreement with the relevant owner to exceed the limits in Table 3, and the Applicant has advised the Department in writing of the terms of this agreement.</p>	Section 6
<p><b>Blasting Frequency</b></p> <p>8. The Applicant may carry out a maximum of 2 blasts per calendar month, unless an additional blast is required following a blast misfire. This condition does not apply to blasts required to ensure the safety of the quarry or workers on site.  <i>Note: For the purposes of this condition a blast refers to a single blast event, which may involve a number of individual blasts fired in quick succession in a discrete area of the quarry.</i></p>	Section 7
<p><b>Operating Conditions</b></p> <p>9. During blasting operation, the Applicant shall:</p> <p>a) implement best practice management to:</p> <ul style="list-style-type: none"> <li>• protect the safety of people and livestock in the areas surrounding blasting operations;</li> </ul>	Section 7
<ul style="list-style-type: none"> <li>• protect public or private infrastructure/property in the surrounding area from damage from blasting operations; and</li> </ul>	Section 7
<ul style="list-style-type: none"> <li>• minimise the dust and fume emissions of blasting.</li> </ul>	Section 7
<p>b) operate a suitable system to enable the local community to get up-to-date information on the proposed blasting schedule on site; and</p>	Section 7 and 8.1
<p>c) carry out regular monitoring to determine whether the development is complying with the relevant conditions of this consent, to the satisfaction of the Secretary.</p>	Section 8
<b>Blast Management Plan</b>	Section 2

<b>Development Consent conditions</b>	<b>Section addressed</b>
<p>10. The Applicant shall prepare and implement a Blast Management Plan for the development to the satisfaction of the Secretary. This Plan must:</p> <p>a) be submitted to the Secretary for approval within 6 months of the date of this consent, unless otherwise agreed by the Secretary;</p>	
<p>b) describe the measures that would be implemented to ensure compliance with the blast criteria and operating conditions of this consent;</p>	Section 7
<p>c) include a monitoring program for evaluating and reporting on compliance with the blasting criteria;</p>	Section 8
<p>d) include community notification procedures for the blasting schedule; and</p>	Section 9
<p>e) include a protocol for investigating and responding to complaints</p>	Section 9.3
<b>Schedule 5 - Environmental Management, Reporting and Auditing</b>	
<p><b>Management Plan Requirements</b></p> <p>2. The Applicant shall ensure that the Management Plans required under this consent are prepared in accordance with any relevant guidelines, and include:</p> <p>a) detailed baseline data;</p>	Section 4
<p>b) a description of:</p> <ul style="list-style-type: none"> <li>• the relevant statutory requirements (including any relevant approval, licence or lease conditions);</li> <li>• any relevant limits or performance measures/criteria; and</li> <li>• the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;</li> </ul>	Section 3; Section 6; and Section 7
<p>c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;</p>	Section 6
<p>d) a program to monitor and report on the:</p> <ul style="list-style-type: none"> <li>• impacts and environmental performance of the development; and</li> <li>• effectiveness of any management measures (see (c) above);</li> </ul>	Section 8 and 9
<p>e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;</p>	Section 9 and 10
<p>f) a program to investigate and implement ways to improve the environmental performance of the development over time;</p>	Section 11
<p>g) a protocol for managing and reporting any:</p> <ul style="list-style-type: none"> <li>• incidents;</li> </ul>	Section 9

Development Consent conditions	Section addressed
<ul style="list-style-type: none"> <li>complaints;</li> <li>non-compliances with statutory requirements; and</li> <li>exceedances of the impact assessment criteria and/or performance criteria; and</li> </ul>	
<p>h) a protocol for periodic review of the plan.</p> <p><i>Note: The Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.</i></p>	Section 11

### 3.2 EIS Statement of Commitments

The blast-related Statement of Commitments relevant to the BMP and where they are addressed in this document, is detailed in **Table 3**.

**Table 3 Statement of Commitments (Blasting)**

Commitment	Section addressed
18. Blast monitoring will be undertaken for each blasting event.	Section 8
19. A summary of the blast monitoring and blast monitoring results will be reported in the Annual Review for the operation.	Section 7 and 9
20. In addition to the existing dust controls, Holcim (Australia) will implement the following controls as part of the Project: <ul style="list-style-type: none"> <li>designing of blasts to minimise dust, including adequate stemming;</li> </ul>	Section 7
<ul style="list-style-type: none"> <li>consideration of current and predicted weather conditions prior to blasting. This includes visual observations of wind speed and wind direction to determine whether any dust emissions from the blast will be carried in the direction of the nearest sensitive receiver;</li> </ul>	Section 7
<ul style="list-style-type: none"> <li>implementation of blast fume management procedures.</li> </ul>	Section 7.1

### 3.3 2019 Independent Environmental Audit – Updates

An Independent Environmental Audit (IEA) was completed for Teven Quarry by GHD, with the report dated April 2020. There were several recommendations from that report relevant to this management plan.

**Table 4 Independent Environmental Audit – Required Updates**

Recommendation	Comment
Update the management plans required under the consent to include a contingency plan to manage unpredicted impacts.	See Section 10
Include community notification procedures for the blasting schedule in the Blast Management Plan.	Information added to Section 9.2 and 9.3

Review the strategies, plans and programs following the annual review, incident report, audit report or modification and maintain evidence of the reviews.	Updated based on the IEA
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## 4. Baseline Data and Predictions

The impacts of blasting associated with the Project have been predicted at the nearest sensitive receiver (Sensitive Receiver 2) to the Project (see **Figure 2**). It is noted that this house is not inhabited. Ground vibration levels were predicted using the site law developed using the methodology outlined in *Australian Standard 2187.2*. The results of the calculated predictions are provided in **Table 5**.

**Table 5 Predicted blasting emissions at residential receivers**

Receiver location	Distance (m) <sub>1</sub>	Predicted blasting level			Blasting emissions criteria	
			Airblast Overpressure (dB (Lin Peak))	Ground vibration (mm/s)	Airblast Overpressure (dB (Lin Peak))	Ground vibration (mm/s)
		MIC <sub>2</sub> (kg) <sub>3</sub>	SPL <sub>4</sub> (dBL) <sub>5</sub>	PVS <sub>6</sub> (mm/s) <sub>6</sub>	SPL <sub>4</sub> (dBL) <sub>5</sub>	PVS <sub>6</sub> (mm/s) <sub>7</sub>
R002 – Lot 2 DP617131,168 Wellers Road, Teven	350	3 5	116	1.7	115	5

Notes:

1. m=metres
2. MIC= Maximum Instantaneous Charge
3. kg=kilograms
4. SPL=Sound Pressure Level
5. dBL= Peak un-weighted decibel
6. PVS=Peak Vector Sum
6. mm/s=millimetres per second

These predictions reflect the worst case airblast and vibration levels potentially experienced at the nearest residential receiver as a result of the Project and are based on both the historical maximum MIC values and the limiting MIC values.

The results indicate that the predicted ground vibration levels from the maximum 35 kilogram (kg) MIC would exceed the blasting emissions criteria by 1 dB at the nearest residential receiver (Receiver 2). It is noted that this house is not inhabited.

As stated in Section 5, during detailed design, the permissible MIC for each blast will be calculated based on the specific location in which the blasting will occur and on the blasting site law.

## 5. Potential Blasting Impacts

Potential blast impacts identified by the 2005 and 2014 EIS's included:

- Dust generated from blasts;
- Vibration generated from blasting events which has potential to damage building; and
- Noise generated by blasts which could impact residents.

Providing blasts are designed and implemented correctly by an appropriately qualified person as defined by *SafeWork NSW Guide for Blasting Explosives User License Applicants* (SafeWork NSW, 2019) then blasting impacts were modelled to be within the Development Consent criteria. Blasting contractors adhere to AS 2187.2 with Holcim checking all blasting requirements are met.

## 6. Blast Assessment Criteria

The relevant limits for non-quarry owned residences in relation to both vibration and airblast are included in **Table 6**.

**Table 6 Blasting emissions criteria**

Receiver	Airblast overpressure (dB(Lin Peak)) <sup>1</sup>	Ground vibration (mm/s) <sup>2</sup>	Allowable exceedance
Any residence on privately-owned land	120	10	0%
	115	5	5% of the total number of blasts over a period of 12 months

Notes: 1. dB(Lin Peak)=Peak un-weighted decibel 2. mm/s=millimetres per second

In accordance with the Development Consent, these criteria do not apply if Holcim has a written agreement with the relevant owner and Holcim has advised the department in writing of the terms of the agreement. Holcim has no existing agreements with stakeholders in the region of the Teven Quarry. Condition L4.1 of the EPL also outlines the same criteria outlined in **Table 6**. Condition L4.1 states:

*Blasting operations at the premises may only take place between 10:00 to 15:00 Monday to Friday. (Where compelling safety reasons exist, the Authority may permit a blast to occur outside the above mentioned hours. Prior written (or facsimile) notification of any such blast must be made to the Authority).*

Condition L4.2 has the same blasting criteria as the Development Consent.

## 7. Blast Management

Holcim is committed to implementing reasonable and feasible best practice blasting measures at Teven Quarry. The relevant blast controls for the operation are detailed in **Table 7**. If there are non-compliances of the development consent blast criteria, the blast results will be evaluated and reported in accordance with **Section 9.3** and **9.4**. A contingency plan and adaptive management (continuous improvement) is addressed within **Section 10**.

**Table 7 Blasting Controls**

Mitigation ID	Mitigation Measures	Reference Document	When Required	Responsibility
<b>Hours of Operation</b>				
BL1	Impacts to noise amenity for sensitive receivers in the vicinity of Teven Quarry have been managed through operational controls, including the restriction of operating hours. The hours of operation for Teven Quarry are detailed in Table 1 of the Teven Quarry Development Consent.	Previous BMP (EMM, 2016)	All blasts	Quarry Manager
BL2	Blasting at the Teven Quarry will only occur on Monday to Friday between 10:00 am and 3:00 pm. No blasting will be undertaken on weekends, public holidays or at any other time.	Previous BMP (EMM, 2016)	All blasts	Quarry Manager
<b>Operational Controls</b>				
BL3	A maximum of two blasts per month will be undertaken unless an additional blast is required following a miss-fire, in accordance with Schedule 3 Condition 8 of the Development Consent	Schedule 3 Condition 8	All blasts	Quarry Manager
BL4	Detailed design will be undertaken for each blast in order to maximise the blast efficiency, minimise dust, fumes, ground vibration and air blast, the potential for fly rock and to ensure compliance with site specific blasting conditions	Previous BMP (EMM, 2016)	All blasts	Quarry Manager/Blast Engineer
BL5	An exclusion zone will be established for each blast to protect the safety of people, and livestock. The exclusion zone is established for each blast to protect the safety of people, and livestock by Holcim’s blasting contractor. The blasting contractor uses modelling to determine the exclusion zone for each blast. Please refer to <b>Appendix B</b> for an example of modelling undertaken by blasting contractor to determine exclusion zone.	Previous BMP (EMM, 2016)	All blasts	Quarry Manager
BL6	Holcim will monitor blasts as quarrying progresses so that blast prediction site laws can be further refined and future blast designs can be optimised based on more detailed site information	Previous BMP (EMM, 2016)	All blasts	Quarry Manager/Blast Engineer
BL7	In addition to the existing dust controls, Holcim (Australia) will implement the following controls as part of the Project:	EIS Statement of Commitments	All blasts	Quarry Manager



Mitigation ID	Mitigation Measures	Reference Document	When Required	Responsibility
	<ul style="list-style-type: none"> <li>• Designing of blasts to minimise dust, including adequate stemming;</li> <li>• Consideration of current and predicted weather conditions prior to blasting. This includes visual observations of cloud cover, wind speed and wind direction to determine whether any dust emissions from the blast will be carried in the direction of any sensitive receiver (refer to Blast Fume Protocol as per <b>Section 7.1</b>).</li> <li>• Prior to blasting, the Quarry Manager should look for the following cues and delay the blast if any of the cues are identified. Blasting would not occur until the cues are no longer present.</li> </ul> <p>- A surface temperature inversion is likely to be present if:</p> <ul style="list-style-type: none"> <li>○ mist, fog, dew or a frost have occurred;</li> <li>○ smoke or dust hangs in the air and moves sideways, just above the surface;</li> <li>○ if wind speed is constantly less than 11km/h in the evening and overnight; and</li> <li>○ distant sounds become clearer and easier to hear.</li> </ul> <p>-The following cues will assist the Quarry Manager determine whether temperature inversion is unlikely:</p> <ul style="list-style-type: none"> <li>○ continuous overcast weather, with low and heavy cloud;</li> <li>○ continuous rain;</li> <li>○ wind speed remains above 11km/h for the whole time between sunset and sunrise;</li> <li>○ after a clear night, cumulus clouds begin to form; and</li> <li>○ after sunrise when the air temperature has risen by more than 5°C above the overnight minimum and wind speed has been constantly above 7km/h for more than 45 minutes after sunrise.</li> </ul> <p><b>Note:</b> temperature inversions are unlikely to occur during blasting hours as temperature inversions generally occur at night and the permissible blasting hours for Teven Quarry are</p>			

Teven Blast Management Plan

Mitigation ID	Mitigation Measures	Reference Document	When Required	Responsibility
	<p>10 am -3pm.</p> <ul style="list-style-type: none"> <li>During unfavorable/ high wind conditions (winds blowing from the west or south-west directions and when wind speed is in excess of 30 km/hr), the Quarry Manager will postpone blasting and monitor weather conditions until conditions are appropriate to resume blasting activities.</li> </ul>			
BL8	Blast monitoring will inform future designs so that they can be optimized based on the increase of detailed site information.	New commitment. Best practice. Previous Blast Management Plan.	All blasts	Quarry Manager/Blast Engineer
BL9	All blasts will be video recorded (refer to Blast Fume Protocol as per <b>Section 7.1</b> ).	New commitment. Best practice. Previous Blast Management Plan.	All blasts	Quarry Manager/Blast Engineer
BL10	Blast Fume Protocol as per <b>Section 7.1</b> .	New commitment	All blasts	Quarry Manager/Blast Engineer

## 7.1 Blast Fume Management Protocol

Holcim are required to implement a blast fume protocol to minimize blast fumes emanating from the Teven Quarry operation. The following management controls will be undertaken:

- Use of appropriately qualified personnel as defined by *SafeWork NSW Guide for Blasting Explosives User License Applicants* (SafeWork NSW, 2019). This includes an assessment of whether the contractor is appropriately trained to undertake the drill or blast works;
- Use of appropriate blast design as approved by the Quarry Manager or delegate;
- Prior to blasting, a visual weather assessment of meteorological conditions will be undertaken by the Quarry Manager. If weather conditions require further consideration, the Quarry Manager will liaise with the site Environmental representative to confirm that the weather conditions are not conducive to fume migration;
- All blasts will be video recorded to confirm whether any blast fume has been generated. In the event that blast fume is generated, an investigation into the cause of the blast fume will be undertaken; and
- All wet blast holes will be loaded from the bottom and retracted in accordance with *D&B 001 WI007 - Charging Blast Holes* to ensure oxides of nitrogen NO<sub>x</sub> are not generated.

## 8. Blast Monitoring

Teven Quarry will monitor blasts as quarrying progresses to the south so that prediction site laws can be further refined and future blast designs can be optimised based on more detailed site information.

### 8.1 Blast monitoring program

To ensure compliance with the Teven Quarry Development Consent, monitoring of blasts will be undertaken. Blast monitoring locations have been selected based upon their spatial appropriateness in terms of capturing representative airblast and vibration signals nearby to residential receivers. **Table 8** details each blast monitoring location and the rationale behind the selection of each site. **Figure 3** shows the location of each blast monitoring location, residential receivers and the automatic weather station.

**Table 8 Monitoring locations**

Site Name	Easting	Northing	Rationale for Site Selection
BM1	547691	6808998	Located close to residential receivers 2 and 12 and down gradient to the south
BM2	547670	6810031	Will be used when blasts occur in the northern area of the project extent as a proxy location for residential receiver 1.

Monitoring will be undertaken within 30 m of a private residence, where possible. During each monitoring event, the following should be recorded to ensure general compliance with the Development Consent and to allow:

- Coordinates of the blast and each monitoring location;
- Measured vibration and overpressure at each monitoring location;
- Maximum instantaneous charge;
- Number of holes;
- Blast type; and
- Meteorological conditions.

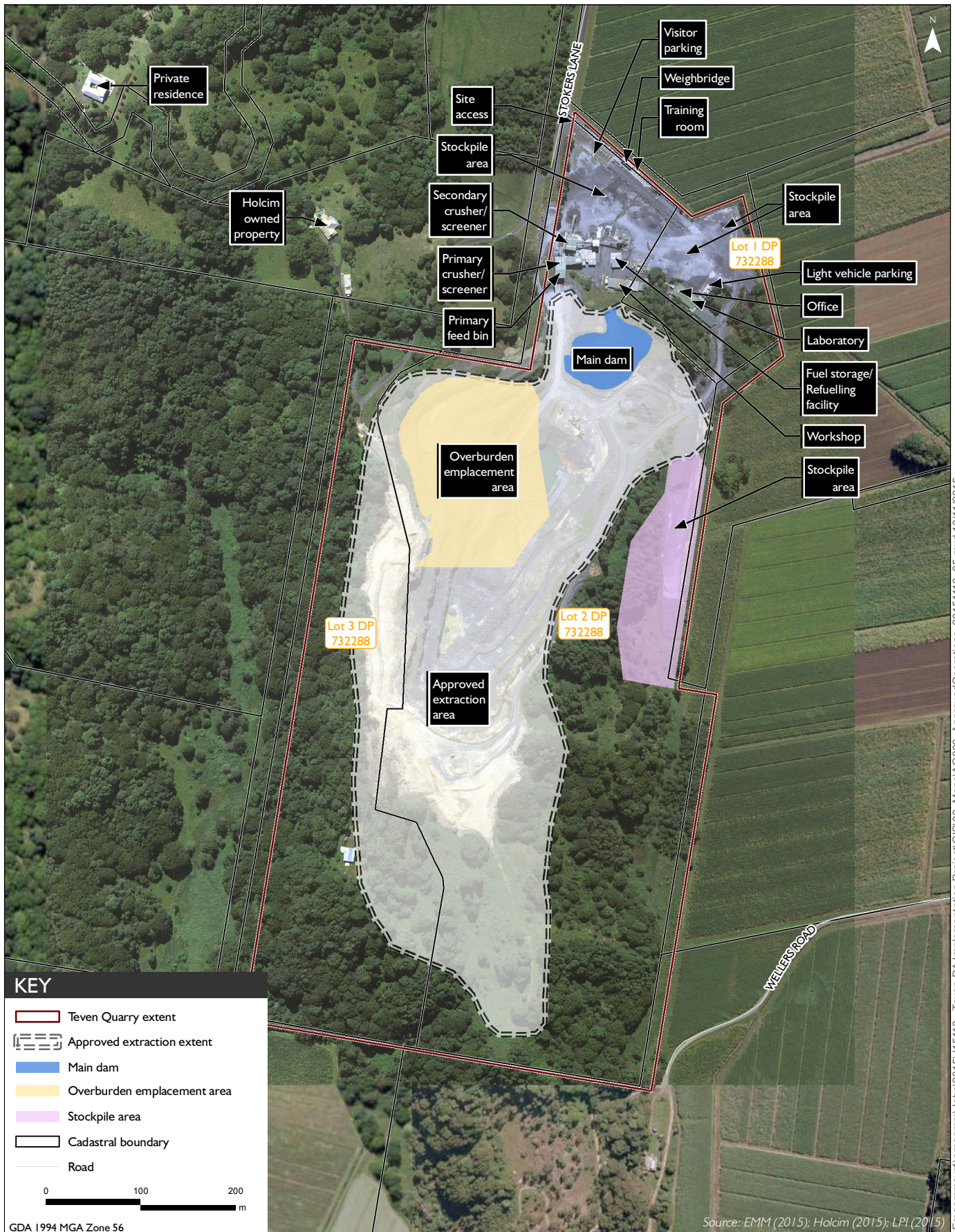
### 8.2 Meteorological monitoring

Meteorological data will be obtained from an Automated Weather Station (AWS) installed on-site. The AWS meets the requirements of Schedule 3 Condition 15 of the Development Consent.

### 8.3 Standards relevant to blast monitoring

Holcim will undertake blast monitoring at Teven Quarry in accordance with the policies, principles, regulations and guidelines contained within the following key reference documents:

- *Protection of the Environment Operations Act 1997* (PoEO Act) administered by the EPA;
- *Environmental Planning and Assessment Act 1979*;
- Australian Standard: 2187.2 Explosives–Storage and Use–Use of Explosives 2006;
- Prevention and Management of Blast Generated NOx Gases in Surface Blasting–Code of Good Practice (AEISG 2011); and
- Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration, ANZECC 1990.



Source: EMM (2015); Holcim (2015); LPI (2015)

Approved operations  
**Teven Quarry**  
**Blast Management Plan**

Figure 3



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## 9. Reporting and Compliance Management

### 9.1 Pre Blast Notification

As per Condition L4.4 of the EPL “*All sensitive receivers are to be given at least 24 hours notice when blasting is to be undertaken*”.

Sensitive receivers potential effected from blasting are:

1. community member that have complained regarding blasting; or
2. community member that have requested to be notified regarding blasting.

Sensitive receivers will be notified 24 hours prior to any blast for a period of 12 months, unless they request to extend.

### 9.2 Regular Reporting

A summary of blast monitoring results will be provided in the Teven Quarry Annual Review. The Annual Review will be prepared and submitted to the Secretary, in accordance with Schedule 5, Condition 4 of the Teven Quarry Development Consent. The Annual Review will be made available to the public through Teven Quarry web site.

The effectiveness of the blast management controls utilised at Teven Quarry will be reported to DPIE within the Annual Review by the reporting of monitoring data. The Annual Review will also identify whether any additional management controls are required to be implemented at Teven Quarry or whether there are any technological advancements in blasting which are suitable for implementation at Teven Quarry.

In addition, in accordance with *Protection of the Environment Legislation Amendment Act 2011 (Amendment Act)* and Schedule 5 Condition 11 of the Development Consent, Holcim will also publish blast monitoring results on the Holcim (Australia) website <http://www.holcim.com.au>.

### 9.3 Evaluation of Blast Results and Reporting

All blast monitoring results will be publicly available on Holcim's website.

Holcim will report blasting data annually, including a historical comparison, in the Annual Review to the DPIE. Annual reporting to the EPA will be completed through the EPL Annual Return. If the monitoring results are found to be outside the sites blast criteria the Quarry Manager will initiate the following protocol:

- As soon as becoming aware of the breach of results the Quarry Manager will notify the Holcim Environment Manager and enter the incident into the Holcim Safety, Health & Environment (SHE) reporting database (INX).
- The Quarry Manager will notify the EPA within 24 hours of the exceedance becoming known. The Quarry Manager will also notify the Secretary of the DPIE of the incident as soon practicable.
- A report will be prepared and submitted by the Quarry Manager to the DPIE and EPA within 7 days of becoming aware of the incident, this report will include:
  - Cause of the non-compliance.
  - Environmental Harm caused due to the non-compliance.
  - Actions undertaken to rectify the non-compliance and ensure.

Following the reporting of subsequent review, should it be concluded that the sites blasting practices have caused elevated results, the continuous improvement process outlined in the EMS is to be implemented and corrective actions identified.

## 9.4 Community Complaints and Independent Review

### 9.4.1 Community complaints

Complaints relating to blasting from Teven Quarry are to be managed in accordance with the requirements of the Teven Quarry EMS. A summary of complaints will be published on the Teven Quarry website and provided in the Annual Review.

**Table 9** summarises the potential blasting and related issues that may arise and the appropriate corrective action to be taken.

**Table 9 Blast Complaints and Non Compliance Management**

Problem	Corrective Action
Exceedance of conditions for airblast or ground vibration criteria	<p>In accordance with Condition L5.6 of the EPL, report exceedance to EPA within 24 hours of the exceedance becoming known to the licensee or to one of the licensee's employees or agents.</p> <p>Investigation of exceedance and undertake mitigation measures for future blasting where applicable.</p>
Community Complaints	<p>Investigation of complaint, undertake mitigation measures where applicable and provide feedback to complainant. Report complaint to senior management. Provide feedback to quarry planning and production personnel where relevant.</p> <p>If a community member complains regarding blasting or requested to be notified ('sensitive receivers'), the community member will be notified 24 hours prior to any blast for a period of 12 months, unless they request to extend.</p>
Private property damage as a result of blasting operations	<p>Investigation of issue and initiation of measures where appropriate. Report issue to senior management. If requested, an independent review of the blast impacts at the property may be undertaken. The independent review will be conducted in accordance with the development consent.</p>

### 9.4.2 Independent review

In the event that a landowner considers that Teven Quarry is exceeding blast emission criteria at their property, the landowner may request an independent review of the impacts at the property. The independent review will be conducted in accordance with the procedure described in Schedule 4 Condition 2 of the Development Consent.

## 9.5 Training

All employees and contractors working on site will undergo a site induction and training, which will cover issues relating to blast management, including:

## Teven Blast Management Plan

- The existence and requirements of this Plan;
- Blast control measures, including exclusion zones; and
- Complaints reporting.

Further details regarding staff induction and training are outlined in the EMS.



## 10. Adaptive Management/Contingency Planning

In accordance with Schedule 5 Condition 3 of the Development Consent, Holcim will assess and manage blast related risks to ensure compliance with the noise criteria.

In accordance with Schedule 5 Condition 2 e) of the Development Consent Holcim will develop:

*“a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible.”*

The following section addresses this requirement by providing actions to manage any unpredictable impacts and their consequences.

Where a non-compliance with the development consent performance criteria has occurred (i.e. a defined ‘incident’), Holcim will, to the satisfaction of the DPIE:

- Take all reasonable and feasible measures to ensure the exceedance ceases and does not reoccur;
- Consider all reasonable and feasible options for remediation (where relevant) and submit a report to the DPIE describing those options and any preferred remediation measures of other course of action; and
- Implement remediation measures as directed by the Secretary to the satisfaction of the Secretary.

**Section 9.3** and **9.4** provides examples of complaints and non – compliance management relating to blasting.

The continuous improvement process shall strive to:

- Identify areas of opportunity for improvement of environmental management and performance;
- Determine the cause or causes of non-conformances and deficiencies;
- Develop and implement a plan of corrective and preventative action to address any non-conformances and deficiencies;
- Verify the effectiveness of the corrective and preventative actions;
- Document any changes in procedures resulting from process improvement; and
- Make comparisons with objectives and targets.

**Section 7** outlines the blast management controls. Any incident management following non compliances are outlined in **Section 9**.

**Table 10** outlines the Trigger Action Response Plan (TARP) for this management plan with this prepared to meet Schedule 5 Condition 2 e) of the Development Consent.

**Table 10**      **Trigger Action Response Plan – Airblast Overpressure and Ground Vibration Impacts**

Key Element	Trigger / Response	Condition Green	Condition Amber	Condition Red
Airblast overpressure and Ground vibration impacts at sensitive	Trigger	Airblast overpressure and Ground vibration levels do not exceed applicable criteria (Table 6).	Airblast overpressure and Ground vibration levels reach applicable criteria (Table 6).	Airblast overpressure and Ground vibration levels exceed applicable criteria (Table 6).

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Key Element	Trigger / Response	Condition Green	Condition Amber	Condition Red
receiver locations	Response	Ongoing best practice management measures to minimise impacts.	Carefully monitor Airblast overpressure and ground vibration levels and prepare for a potential exceedance.	Undertake all feasible and reasonable mitigation and management measures to minimise impacts.
Blast fume impacts	Trigger	Blast fumes are not detected.	Blast fumes are detected.	Blast fumes are observed by site personnel or nearby residents as leaving the site and have the potential to impact on the surrounding community.
	Response	Ongoing best practice management measures to minimise impacts.	Undertake all feasible and reasonable mitigation and management measures to minimise impacts and investigate the cause of the blast fume.	Undertake all feasible and reasonable mitigation and management measures to minimise impacts. Notify nearby residents and advise to stay indoors until notified the blast fume has dispersed.

## 11. Review

Ongoing monitoring and review on the performance and implementation of this BMP will be undertaken in accordance with the Teven Quarry EMS.

In accordance with Schedule 5 Condition 5, Holcim shall review, and if necessary revise, the strategies, plans, and programs required under the Development Consent to the satisfaction of the Secretary, within 3 months of the submission of an:

- Annual Review under Condition 4;
- Incident report under Condition 7;
- Audit report under Condition 9; and
- Any modifications to this consent.

In terms of Schedule 5 Condition 5 sub clause a), the requirement to review and update management plans will be assessed during the preparation of each Annual Review. The Annual Review will state which management plans require updating and which management plans do not require updating. Details on the requirements to prepare Annual Reviews are outlined in the Environmental Management Strategy.

Updated versions of management plans will be put on the website once approved.

## 12. Roles and responsibilities

Relevant roles and responsibilities associated with this BMP are presented in **Table 11** below.

**Table 11** Roles and responsibilities

Roles	Accountabilities for this document
Holcim Australia District Manager	<ul style="list-style-type: none"> <li>• Approve appropriate resources for the effective implementation of this plan.</li> </ul>
Teven Quarry Manager	<ul style="list-style-type: none"> <li>• Provide sufficient resources for the implementation of this plan;</li> <li>• Coordinate the implementation of blast management controls and strategies in accordance with this Plan;</li> <li>• Coordinate the blast monitoring requirements of this Plan, and evaluate and report monitoring results as required;</li> <li>• Coordinate blast related incident investigations and reporting as required by legislation and internal standards and guidelines; and</li> <li>• Coordinate the review of this plan in accordance with the requirements of the Development Consent.</li> </ul>
Environment Manager	<ul style="list-style-type: none"> <li>• Assist in the coordination of blast related incident investigations and reporting as required by legislation and internal standards and guidelines; and</li> <li>• Assist with the review of this Plan.</li> </ul>

### **13. References**

AEISG 2011. *Prevention and Management of Blast Generated NOx Gases in Surface Blasting – Code of Practice*

Australian and New Zealand Environment and Conservation Council (ANZECC) 1990. *Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration*

Maxam 2016. *D&B 001 WI007 - Charging Blast Holes*

SafeWork NSW, 2019. *SafeWork NSW Guide for Blasting Explosives User License Applicants.*

Standards Australia, AS 2187.2 1993. *Explosives – Storage, Transport and Use*

Standards Australia, AS 2187.2 2006. *Explosives – Storage and Use – Use of Explosives.*

## 14. Change Information

Version	Date	Change Summary
1	May 2016	Prepared to meet SSD 6422.
2	August 2020	<p>Review of the template for all Teven management plans;</p> <ul style="list-style-type: none"> <li>• General structure updates;</li> <li>• Section 2- Consultation;</li> <li>• Section 3 – Statutory requirements – separate section;</li> <li>• Section 4 – Update to baseline information;</li> <li>• Section 5 – Addition of potential impacts section;</li> <li>• Section 7 – inclusion of responsibilities and timing for controls. Additional controls added;</li> <li>• Section 10 – addition of adaptive management information; and</li> <li>• Section 14 – inclusion of change information.</li> </ul> <p>The following did not change:</p> <ul style="list-style-type: none"> <li>• No change to monitoring or reporting requirements; and</li> <li>• No change to figures.</li> </ul>
3	July 2021	See Appendix A for changes in response to DPIE's reviews.
4	August 2021	Addition of identification and management measures around high winds and temperature inversions (Table 7).
5	September 2021	Minor changes to Table 2 to ensure all conditions align with SSD 6422.

**Appendix A  
Consultation**



Mr Evan Smith  
Environmental Manager

Teven Quarry

By email: [evan.smith@lafargeholcim.com](mailto:evan.smith@lafargeholcim.com)

07/10/2020

Dear Mr. Evan Smith

**Teven Quarry (SSD-6422)  
Request for Additional Information**

I refer to your submission of the revised Blast Management Plan (BMP), dated August 2020, in accordance with condition 10 of Schedule 3 of the Teven Quarry development consent (SSD-6422).

The Department has carefully considered the revised BMP and requests that you provide additional information as detailed in Attachment A.

You are requested to provide the revised BMP to the Department by Friday 6 November 2020. If you are unable to meet this deadline, you are required to provide an updated timeframe for the provision of this information.

If you have any questions, please contact Mark Davis, who can be contacted at 8275 1518.

Yours sincerely

A handwritten signature in black ink that reads 'Colin Phillips'.

Colin Phillips  
Team Leader  
Resource Assessments (Coal & Quarries)



Mr. Evan Smith  
Environmental Manager  
Teven Quarry  
18 Little Cribb Street  
Milton  
QLD, 4064

06/07/2021

Dear Mr. Smith

**Teven Quarry (SSD-6422)  
Blast Management Plan SSD-6422-PA-8 - request for additional information**

I refer to your submission of the revised Blast Management Plan (BMP), dated April 2021, in accordance with condition 10 of Schedule 3 of the Teven Quarry development consent (SSD-6422).

The Department has carefully considered the revised AQMP and requests that you provide additional information as detailed in **Attachment A**.

You are requested to provide a revised BMP to the Department by Fri 23 July 2021. If this timeframe is not achievable, please provide and commit to an alternative timeframe for providing this information.

If you have any questions, please contact Emily Pemberton on 8275 1783/ at [emily.pemberton@dpie.nsw.gov.au](mailto:emily.pemberton@dpie.nsw.gov.au).

Yours sincerely

A handwritten signature in black ink, appearing to read 'J McDonough'.

James McDonough  
Team Leader  
Resource Assessments (Coal & Quarries)



Attachment A  
Teven Quarry  
Blast Management Plan Reviews – Oct 2020

<b>Blast Management Plan, Schedule 3, Condition 10</b>	<b>Satisfactory (Yes/No)</b>	<b>Comment</b>	<b>Action Required</b>	<b>Holcim Responses</b>
<p><b>Blast Management Plan (BMP) 10.</b> The Applicant shall prepare and implement a Blast Management Plan for the development to the satisfaction of the Secretary. This plan must: (a) be submitted to the Secretary for approval within 6 months of the date of this consent, unless otherwise agreed by the Secretary;</p>	<p><b>Partial</b></p>	<ul style="list-style-type: none"> <li>Section (S.) 1.4 dot point 6 reference to noise impacts should be referenced to blast overpressure and vibration impacts.</li> </ul>	<p>Holcim must update this plan to address the DPIEs comments.</p>	<p>Updated as requested.</p>
<p>(b) describe the measures that would be implemented to ensure compliance with the blast criteria and operating conditions of this consent;</p>	<p><b>No</b></p>	<ul style="list-style-type: none"> <li>S.3.1 states that condition 9 requires a BMP whereas it should be condition 10.</li> <li>S.4 para 1 states that the nearest sensitive receiver (SR) is identified in Figure 2, however, the SR is not identified and must be identified on the map provided.</li> <li>The Orica 2012 reference is not in the list of References at the end of the BMP.</li> <li>The Australian Standard (AS) is incorrectly attributed to ANZEC 2006 and should be removed.</li> <li>Table 5 (T.5) Notes need a correct definition of dBL (refer T.6), there is no definition of MIC and the SPLs are set at different levels. The blasting emissions criteria should be expressed as Airblast Overpressure (dB(Lin Peak)) and Ground</li> </ul>		<ul style="list-style-type: none"> <li>Addressed.</li> <li>SR 2 has been added to Figure 2.</li> <li>Removed reference to ANZEC.</li> <li>Table 5 updated to address all comments and expand on definitions which did not provide appropriate explanation. Peak Velocity Sum was not expanded upon as the explanation is extremely technical and will take away from the focus of that Section.</li> <li>Addition of potential blasting impacts including dust, vibration impacts on buildings and noise impacts at nearby dwellings.</li> <li>Note explaining blasting impacts will likely exceed blasting criteria by 1dB. Commitment added:</li> </ul>

<b>Blast Management Plan, Schedule 3, Condition 10</b>	<b>Satisfactory (Yes/No)</b>	<b>Comment</b>	<b>Action Required</b>	<b>Holcim Responses</b>
		<p>Vibration and the term PVS needs clarification.</p> <ul style="list-style-type: none"> <li>• S.5 The potential blasting impacts are superficial and should include damage to buildings, emissions of dust and fumes and residents' discomfort. What are the <i>subsequent modifications</i> as there has been no Modification to the quarry consent?</li> <li>• S.5 states that blasting impacts were modelled to be within development consent criteria. However, T.5 indicates the predicted overpressure levels exceeds the level by 1dB and should be clarified.</li> <li>• S.5 states that an 'experienced blasting engineer' and needs defining e.g. SafeWork NSW <i>Guide for Blasting Explosives User Licence Applicants September 2019</i> (BEUL). If blasting is undertaken by an external contractor how does Holcim assure that they meet current requirements?</li> <li>• S.7 does not constitute a Contingency Plan (s.3.3 T.4).</li> <li>• T.7 refers to a previous BMP, what is the previous BMP?</li> </ul>		<p><i>Blast generated noise would be reviewed if Receiver 2 became inhabited.</i></p> <ul style="list-style-type: none"> <li>• Reference to qualified personnel as defined by SafeWork NSW <i>Guide for Blasting Explosives User Licence Applicants September 2019</i> (BEUL). Holcim will ensure requirements are met through pre-start meetings.</li> <li>• Section on the Contingency Plan moved to Section 10 where it is appropriately addressed.</li> <li>• Addressed - See Table 12 BL5</li> <li>• Addressed.</li> </ul>

Teven Blast Management Plan

<b>Blast Management Plan, Schedule 3, Condition 10</b>	<b>Satisfactory (Yes/No)</b>	<b>Comment</b>	<b>Action Required</b>	<b>Holcim Responses</b>
		<ul style="list-style-type: none"> <li>T.7 BL5: Provide a description or a map if appropriate of how the exclusion zone is determined?</li> <li>T.7 BL7: change “nearest” to “any sensitive receiver”.</li> </ul>		
(c) include a monitoring program for evaluating and reporting on compliance with the blasting criteria in this consent;	<b>No</b>	<ul style="list-style-type: none"> <li>T.7 Weather monitoring (refer 8.2), what other conditions will stop/delay blasting (include relevant details from AQMP) e.g. low cloud cover impacts on overpressure wave?</li> <li>T.7 BL8: Only BL8 refers to s.7.1 Protocol.</li> <li>S.7.1 how are wet blast holes managed to ensure NOx are not generated?</li> </ul>		<ul style="list-style-type: none"> <li>Addition of cloud cover to T.7.BL7. However, there are no further explanations regarding meteorological conditions in the AQMP.</li> <li>Reference to Blasting Protocol added to other commitments.</li> <li>Brief description of how wet holes are managed and reference made to the guideline which is used for blasting.</li> </ul>
(d) include community notification procedures for the blasting schedule; and	<b>Yes</b>	<ul style="list-style-type: none"> <li>S.9</li> </ul>		
(e) include a protocol for investigating and responding to complaints.	<b>Yes</b>	<ul style="list-style-type: none"> <li>S.9.3 &amp; S.9.4</li> </ul>		

<b>Other Comments on Blast Management Plan</b>	<b>Holcim Response</b>
<ul style="list-style-type: none"> <li>The BMP is not to an acceptable standard.</li> <li>Figure 1 location does not show the current location of the Pacific Highway.</li> <li>S.9.3 What is INX?</li> </ul>	<ul style="list-style-type: none"> <li>The previous BMP (EMM, 2016) as a reference document in Table 7.</li> <li>Figure 1 has been updated.</li> <li>INX has been expanded.</li> </ul>

Attachment A  
Teven Quarry  
Blast Management Plan Reviews – July 2021

<b>Blast Management Plan, Schedule 3, Condition 10</b>	<b>Satisfactor y (Yes/No)</b>	<b>Comment</b>	<b>Action Required</b>	<b>Holcim Response</b>
<b>Blast Management Plan (BMP) 10.</b> The Applicant shall prepare and implement a Blast Management Plan for the development to the satisfaction of the Secretary. This plan must:	<b>Partial</b>	The April version of the revised BMP addressed some of the Department comments.	See below	
(a) be submitted to the Secretary for approval within 6 months of the date of this consent, unless otherwise agreed by the Secretary;	<b>Yes</b>	The original Blast Management Plan (BMP) was submitted in January 2016 after consent was granted in July 2015. A May 2016 revision of the BMP was approved by the Secretary.	Nil	
(b) describe the measures that would be implemented to ensure compliance with the blast criteria and operating conditions of this consent;	<b>Partial</b>	Section 7, Table7, BL7 and the blast fume management protocol commits to visual observation by the quarry manager of cloud cover, wind speed and wind direction, but does not define adverse weather conditions or the actions to be taken in response to such conditions.	Please define adverse weather conditions and the actions taken to avoid or minimise impacts to sensitive receivers during such conditions.	Wording added to BL7 describing adverse meteorological weather conditions (unfavourable/ high wind conditions and temperature inversions) and actions to be taken during these conditions.
		Section 7, Table7 - mitigation measure numbering is not consecutive.	Please update numbering of Mitigation IDs in Section 7, Table 7.	Addressed.
(c) include a monitoring program for evaluating and reporting on compliance with the blasting criteria in this consent;	<b>Yes</b>	The blast monitoring program is set out in Section 8. A program for evaluating and reporting on compliance is set out in Section 9.	Nil	
(d) include community notification procedures for the blasting schedule; and	<b>Yes</b>	Community notification procedures are set out in Section 9.	Nil	
(e) include a protocol for investigating and responding to complaints.	<b>Yes</b>	A protocol for investigating and responding to complaints is provide in Sections 9.3 and 9.4.	Nil	
<b>Other Comments</b>		<b>Holcim Response</b>		
Figure 2 has been updated, but no longer includes multiple residential receiver locations (displayed in the former EMM BMP 2016 Figure 6.1). Please check the figure presented in the revised version of the BMP and include any relevant residential receivers identified through the EIS' and project commitments.		The residential receivers have been included in Figure 2.		

## Appendix B Blast Exclusion Modelling

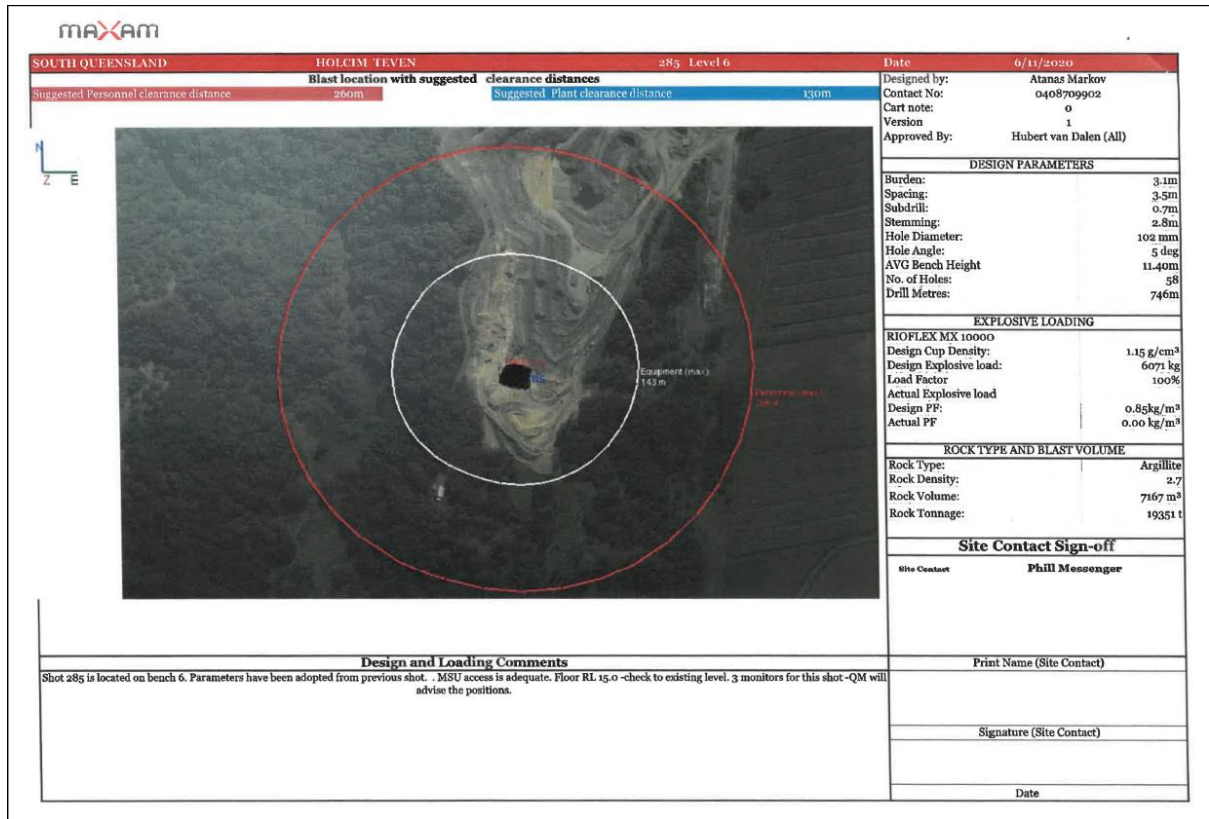


Figure: Example of modelling undertaken by blasting contractor to determine exclusion zone.

