



**LANDPRO**

Make the most of your land

23 October 2020

Landpro Reference: 19474

Otago Regional Council  
70 Stafford Street,  
Private Bag 1954,  
**Dunedin 9054**

Central Otago District Council  
PO Box 122,  
**Alexandra 9340**

Attention: Consent Managers

**Re: Application by Cromwell Certified Concrete to replace Discharge Permit - RM16.108.02 (ORC), Water Permit -RM16.108.01 (ORC) and Land use consent - RC150052 (CODC) and seek resource consent for the discharge of contaminants to air to authorise the operation and expansion of the Amisfield Quarry**

Please find enclosed the above consent applications for your consideration. The AEE attached to this application relates to resource consents sought from the Central Otago District Council and Otago Regional Council.

The required deposit fee will be paid online under reference Amisfield 19474.

If you have any questions in relation to this application, please do not hesitate to contact me directly (details below).

Yours Sincerely

Matt Curran  
Senior Planner

13 Pinot Noir Drive | PO Box 302 | Cromwell 9342  
P 03 445 9905  
matt@landpro.co.nz | www.landpro.co.nz

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13 Pinot Noir Drive  
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Central Otago, NZ  
info@landpro.co.nz  
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# Form 1 – Application for Resource Consent



This application is made under Section 88 of the Resource Management Act 1991 (RMA).

The purpose of this Form 1 and the relevant activity form(s) is to provide applications with guidance on information that is required under the Resource Management Act 1991. Please note that these forms are to act as a guide only, and Otago Regional Council reserves the right to request additional information or to reject the application as incomplete under Section 88 of the RMA if the provisions of the fourth schedule of the RMA are not provided (refer to page 6 of this form, which details these requirements).

**PLEASE NOTE: You must have Adobe Acrobat Reader installed onto your computer to use this editable version, which you can download for free from the Adobe website. This form cannot be filled in on your internet browser. REMEMBER to save the form to your computer after completing then attach and send via email along with the other relevant application forms/information to [consents.applications@orc.govt.nz](mailto:consents.applications@orc.govt.nz). The form can also be printed and completed manually.**

## 1(a). Applicant's details:

- The full names or Company name or Trust (including full names of all Trustees) of the consent holder who will be responsible for the consent and any associated costs.
- A resource consent can only be held by a legal organisation or fully named individual(s). A legal organisation includes a registered limited company, incorporated group or registered trust. If the application is for a Trust, the full names of all Trustees are required. If the application is not for a limited company, incorporated group or trust, then you must use fully named individual(s).
- All invoices will be made out to and sent to the applicant.

Full name(s): \_\_\_\_\_

**OR**

Registered company: Cromwell Certified Concrete Ltd  
\_\_\_\_\_

**OR**

Trust (include all Trustees full names)  
\_\_\_\_\_  
\_\_\_\_\_

Postal address: PO Box 17 195, Greenlane, Auckland  
\_\_\_\_\_  
Post code: 1546

**and**

Physical address: 1248 Luggate- Cromwell Road Cromwell  
(not a PO Box number) \_\_\_\_\_  
Post code: 9383

Phone number: Business: \_\_\_\_\_ Private: \_\_\_\_\_  
Mobile: 0272029453

Email address: tyler.sharratt@winstoneaggregates.co.nz  
\_\_\_\_\_

**Please provide a valid and clear email address. Otago Regional Council has adopted a paperless consenting process – therefore any correspondence including decision documents and consent (if granted) will be sent via email, unless you request a paper copy.**

Please tick if you do not prefer contact by electronic means

**1(b). Key contact for applicant details (if applicable):**

Only complete if the applicant consists of multiple parties (e.g. multiple consent holders, Trust etc). Please outline who the key contact for the consent will be, if granted:

Full name: Tyler Sharratt  
Phone number: Business: \_\_\_\_\_ Private: \_\_\_\_\_  
Mobile: 0272029453  
Email address: tyler.sharratt@winstoneaggregates.co.nz

**2. Consultant details (if applicable):**

Contact person: Matt Curran  
Company: Landpro  
Phone number: Mobile: 0273088424 Business: \_\_\_\_\_  
Email address: matt@landpro.co.nz

**3. Consents required in relation to this proposal:**

**Water**

Take surface water       Divert  
 Take groundwater       Dam

**Discharge onto or into:**

Land       Water       Air

**Land use:**

Bore construction       Activities in or on beds of lakes or rivers or floodbanks  
 Bore alteration       Disturbance of contaminated land

**Coastal**

Activities in the coastal marine area (i.e. below mean high water spring tide)

Where you have indicated the type of consent that is required, you must complete the appropriate application form before your application can be processed. Application forms can be found on the Council's website: [www.orc.govt.nz/consents/ready-to-apply-for-a-consent](http://www.orc.govt.nz/consents/ready-to-apply-for-a-consent)

**4. For what purpose is/are the consent(s) required (e.g. gravel extraction, water for irrigation etc):**

Discharge contaminants to land, abstract groundwater and construct a bore (pit that intercepts groundwater) in association with the operation of a quarry.

**5. Location of proposed activity:**

Address: 1248 Luggate-Cromwell Road

Legal description(s): Lot 3 DP 301379, Lot 5 DP 301379 and Lot 8 DP 301379

Map reference(s) (NZTM 2000): E 1305460 N 5017181

Please include location details on separate documentation if there are multiple sites or activities.

Note: Certificate(s) of Title less than three months old for the site to which this application relates are required.

**6. Are there any current or expired Resource Consents relating to this proposal:**

Yes  No

If yes, give consent number(s), description and expiry date(s):

Discharge Permit - RM16.108.02 - 21 July 2036, Water Permit -RM16.108.01 - 21 July 2036

(a) Do you agree to your current consent automatically being surrendered should a replacement consent be issued?

Yes  No Subject to the new consent being implemented

(b) Has there been a previous application for this activity that was returned as incomplete?

Yes  No

(c) Have you lodged a pre-application with Council for this activity?

Yes  No

(d) Have you spoken to a Council staff member about this application prior to lodging this application?

Yes  No

If yes, please state name of staff member: \_\_\_\_\_

**7. What is the term of consent you are seeking and reason for this term:**

20 years

**8. Territorial Local Authority in which activity is situated:**

<input type="checkbox"/> Dunedin City Council	<input type="checkbox"/> Queenstown Lakes District Council
<input type="checkbox"/> Clutha District Council	<input type="checkbox"/> Waitaki District Council
<input checked="" type="checkbox"/> Central Otago District Council	

**9. Do you require any other resource consent from any local authority for this activity:**

Yes  No

If yes, please give the date applied for or issued:

Land use consent - applied for at the same time as regional consents

**10. For the land on which the activity occurs, is the applicant (tick one):**

If the applicant does not own the land to which this application relates, unconditional written approval from the land owner/affected party will be required.

- The owner
- The lease holder
- The occupier
- Prospective purchaser

If the applicant is not the land owner, who is the owner of the land on which the activity occurs/is to occur:

Name of land owner: \_\_\_\_\_

Phone number:                      Mobile: \_\_\_\_\_ Business: \_\_\_\_\_

Email address: \_\_\_\_\_

**11. Site visit from the Consents Team:**

Consents staff are able to meet with you, visit your site and see what you are proposing to do. We find that this is beneficial to everyone involved. The cost of the visit will be included in the total cost of processing your consent. However, we find that applications that have an on-site visit are processed with less congestion and at a similar or lesser overall cost. Please let us know below if you would like us to come and see your site.

I would like a member of the Consents Team to visit my site:

- Yes       No

**12. How to pay:**

A deposit **must** accompany this application (see **page 8** for amounts and ways to pay). The applicant will be invoiced for all costs incurred in processing this application that exceed the deposit.

**If the required deposit does not accompany your application, staff will contact you on the email address provided on this form to request payment, and after 5 working days your application will be returned as incomplete if no payment is made for the required deposit.**

When paying online, please use the word **'Consent'** followed by the name of the applicant as a reference.

Method of payment:

- Online bank transfer       Cheque
- Credit card                       In person

Date of payment:      10/23/2020

Amount paid:                      \$2,300.00

Payment reference:      Amisfield 2020

**Please note:** Your deposit may not cover the entire cost of processing your application. At the end of the application process you will be invoiced for any costs that exceed the deposit. Interim invoices may be sent out for applications, where appropriate.

Information regarding the average costs in processing various types of single non-notified consent applications can be found via the following link, scrolling down to "Costs to process the application": [www.orc.govt.nz/consents/ready-to-apply-for-a-consent/fees-and-charges](http://www.orc.govt.nz/consents/ready-to-apply-for-a-consent/fees-and-charges)

## Checklist

Before signing the declaration below, in order to provide a complete application have you remembered to:

- Fully complete this Form 1, including signed declaration
- Completed the necessary application forms relating to the activity  
Application forms can be found on Council's website via the following link:  
[www.orc.govt.nz/consents/ready-to-apply-for-a-consent](http://www.orc.govt.nz/consents/ready-to-apply-for-a-consent)
- Payment of the required deposit (see page 8 for fees schedule)
- Written approvals from all potentially affected parties  
"Written Approval of an Affected Party" forms are available from Council's website
- An assessment of effects on the environment
- An assessment against the relevant objectives, policies and rules from Regional Council Plans, Regional Policy Statement (including proposed and partially operative versions), and relevant Regulations, National Policy Statements, National Environmental Standards and iwi management plans
- Site and location plans
- Certificate(s) of Title less than three months old for the site to which this application relates  
Certificates of Title can be obtained via the Land Information New Zealand website:  
[www.linz.govt.nz](http://www.linz.govt.nz)

## Declaration

I/we hereby certify that to the best of my/our knowledge and belief, the information given in this application is true and correct.

I/we undertake to pay all actual and reasonable application processing costs incurred by the Otago Regional Council.

Name(s): Matt Curran

Signature(s)\*: 

(or person authorised to sign on behalf of applicant)

**\* Ensure you use the "fill and sign" function of Adobe Acrobat when signing this form. Either draw your signature or add an image. Council cannot accept typed signatures.**

Designation: Consultant  
(e.g. owner, manager, consultant)

Date: 10/23/2020

Council can accept electronic lodgement of applications if sent to [consents.applications@orc.govt.nz](mailto:consents.applications@orc.govt.nz).

Alternatively, applications can be posted or delivered to:  
Otago Regional Council  
Private Bag 1954  
70 Stafford Street  
Dunedin 9054

## Consultation

(consultation is not compulsory, but it can make a process easier and reduce costs)

Under Section 95E of the Resource Management Act 1991 (the Act), the Council will identify affected parties to an application and if the application is to be processed on a non-notified basis the unconditional written approval of affected parties will be required. Consultation with potentially affected parties and interested parties can be commenced prior to lodging the application.

Consultation may be required with the appropriate Tangata Whenua for the area. The address of the local Iwi office is: Aukaha, 258 Stuart Street, P O Box 446, Dunedin, Fax (03) 477-0072, Phone (03) 477-0071, Email [info@aukaha.co.nz](mailto:info@aukaha.co.nz). If you are in the Clutha River area you may need to talk to Te Ao Marama Inc, Phone (03) 931 1242. If you require further advice, please contact the Otago Regional Council.

Good consultation practices include:

- Giving people sufficient information to understand your proposal and the likely effects it may have on them
- Allowing sufficient time for them to assess and respond to the information
- Considering and taking into account their responses

Written approval forms are available on Council's website.

## Information Requirements

In order for any consent application to be processed efficiently in the minimum time and at minimum cost, it is critical that as much relevant information as possible is included with the application.

Resource Management Act 1991

FOURTH SCHEDULE – ASSESSMENT OF EFFECTS ON THE ENVIRONMENT

**(Below are the provisions of the fourth schedule of the Act, which describes what must be in an application for resource consent, as amended in 2015)**

### 1. Information must be specified in sufficient detail

Any information required by this schedule, including an assessment under clause 2(1)(f) or (g), must be specified in sufficient detail to satisfy the purpose for which it is required.

### 2. Information required in all applications

- (1) An application for a resource consent for an activity (the **activity**) must include the following:
  - (a) a description of the activity; and
  - (b) a description of the site at which the activity is to occur; and
  - (c) the full name and address of each owner or occupier of the site; and
  - (d) a description of any other activities that are part of the proposal to which the application relates; and
  - (e) a description of any other resource consents required for the proposal to which the application relates; and
  - (f) an assessment of the activity against the matters set out in Part 2; and
  - (g) an assessment of the activity against any relevant provisions of a document referred to in section 104(1)(b) (*"document" includes regional and district plans, regulations, national policy statements, iwi plans*).
- (2) The assessment under subclause (1)(g) must include an assessment of the activity against:
  - (a) any relevant objectives, policies, or rules in a document; and
  - (b) any relevant requirements, conditions, or permissions in any rules in a document; and
  - (c) any other relevant requirements in a document (for example, in a national environmental standard or other regulations).
- (3) An application must also include an assessment of the activity's effects on the environment that:
  - (a) includes the information required by clause 6; and
  - (b) addresses the matters specified in clause 7; and
  - (c) includes such detail as corresponds with the scale and significance of the effects that the activity may have on the environment.

### 3. Additional information required in some applications

An application must also include any of the following that apply:

- (1) if any permitted activity is part of the proposal to which the application relates, a description of the permitted activity that demonstrates that it complies with the requirements, conditions, and permissions for the permitted activity (so that a resource consent is not required for that activity under section 87A(1))

- (2) if the application is affected by section 124 or 165ZH(1)(c) (which relate to existing resource consents), an assessment of the value of the investment of the existing consent holder (for the purposes of section 104(2A))
- (3) if the activity is to occur in an area within the scope of a planning document prepared by a customary marine title group under section 85 of the Marine and Coastal Area (Takutai Moana) Act 2011, an assessment of the activity against any resource management matters set out in that planning document (for the purposes of section 104(2B)).

4. **(relates to subdivisions – not included here as subdivisions are not within ORC’s jurisdiction)**

**5. Additional information required in application for reclamation**

An application for a resource consent for reclamation must also include information to show the area to be reclaimed, including the following:

- (1) the location of the area; and
- (2) if practicable, the position of all new boundaries; and
- (3) any part of the area to be set aside as an esplanade reserve or esplanade strip.

**Assessment of environmental effects**

**6. Information required in assessment of environmental effects**

- (1) An assessment of the activity's effects on the environment must include the following information:
  - (a) if it is likely that the activity will result in any significant adverse effect on the environment, a description of any possible alternative locations or methods for undertaking the activity
  - (b) an assessment of the actual or potential effect on the environment of the activity
  - (c) if the activity includes the use of hazardous substances and installations, an assessment of any risks to the environment that are likely to arise from such use
  - (d) if the activity includes the discharge of any contaminant, a description of:
    - (i) the nature of the discharge and the sensitivity of the receiving environment to adverse effects; and
    - (ii) any possible alternative methods of discharge, including discharge into any other receiving environment.
  - (e) a description of the mitigation measures (including safeguards and contingency plans where relevant) to be undertaken to help prevent or reduce the actual or potential effect
  - (f) identification of the persons affected by the activity, any consultation undertaken, and any response to the views of any person consulted
  - (g) if the scale and significance of the activity's effects are such that monitoring is required, a description of how and by whom the effects will be monitored if the activity is approved
  - (h) if the activity will, or is likely to, have adverse effects that are more than minor on the exercise of a protected customary right, a description of possible alternative locations or methods for the exercise of the activity (unless written approval for the activity is given by the protected customary rights group).
- (2) A requirement to include information in the assessment of environmental effects is subject to the provisions of any policy statement or plan
- (3) To avoid doubt, subclause (1)(f) obliges an applicant to report as to the persons identified as being affected by the proposal, but does not:
  - (a) oblige the applicant to consult any person; or
  - (b) create any ground for expecting that the applicant will consult any person.

**7. Matters that must be addressed by assessment of environmental effects**

- (1) An assessment of the activity's effects on the environment must address the following matters:
  - (a) any effect on those in the neighbourhood and, where relevant, the wider community, including any social, economic, or cultural effects
  - (b) any physical effect on the locality, including any landscape and visual effects
  - (c) any effect on ecosystems, including effects on plants or animals and any physical disturbance of habitats in the vicinity
  - (d) any effect on natural and physical resources having aesthetic, recreational, scientific, historical, spiritual, or cultural value, or other special value, for present or future generations
  - (e) any discharge of contaminants into the environment, including any unreasonable emission of noise, and options for the treatment and disposal of contaminants
  - (f) any risk to the neighbourhood, the wider community, or the environment through natural hazards or the use of hazardous substances or hazardous installations.
- (2) The requirement to address a matter in the assessment of environmental effects is subject to the provisions of any policy statement or plan.



Set out below are details of the amounts payable for those activities to be funded by fees and charges, as authorised by s36(1) of the Resource Management Act 1991.

## Resource Consent Application Fees (from 1 July 2020)

Note that the fees shown below are a **deposit** to be paid on lodgement of a consent application and applications for exemptions in respect of water metering devices. This deposit will not usually cover the full cost of processing the application, and further costs are incurred at the rate shown in the scale of charges. GST is included in all fees and charges.

If you wish to make a payment via internet banking, or on line, the details are below. Please note the applicants name and 'consent application' should be used as reference when paying the deposit.

**For ways to pay, visit:** [www.orc.govt.nz/consents/ready-to-apply-for-a-consent](http://www.orc.govt.nz/consents/ready-to-apply-for-a-consent)

<b>Publicly Notified Applications:</b> <sup>3</sup>	<b>\$</b>
First application	5,000.00
<b>Non Notified Applications and Limited Notified Applications:</b>	<b>\$</b>
<sup>3</sup> First application (except those below)	1,750.00
Multiple applications	2,300.00
Variation to conditions – s127	1,750.00
Administrative variation – s127	1,750.00
<b>Fixed fees</b>	
Exemptions from water measuring Regulations	400.00
Bores	600.00
<b>Hearings</b>	Per Note 2 below
Payment for Commissioner request – s100A	Per Note 4 below
<b>Objections</b>	
Payment for Commissioner request – s357AB	Per Note 4 below
<b>Transfers and Certificates Deposits:</b>	<b>\$</b>
Transfer of permits and consents	200.00
Priority Table	200.00
Section 417 Certificate	500.00
Certificate of Compliance	1,750.00
All Other Costs	As per Scale of Charges
	<b>From 1 July 2020</b>
<b>Scale of Charges:</b>	<b>\$</b>
Staff time per hour	
• Management	190.00
• Team Leader/Principle	170.00
• Senior Technical	135.00
• Technical	115.00
• Field Staff	115.00
• Administration	85.00
Disbursements	Actual
Additional site notice	Actual
Advertisements	Actual
Vehicle use per kilometre	0.70
Travel and accommodation	Actual
Testing charges	Actual
Consultants	Actual
Commissioners	Actual
Photocopying and printing	Actual
Councillor hearing fees per hour	
• Chairperson	100
• Member	80
• Expenses	Actual

## Notes

1. For additional permits in respect of the same site, activity, applicant, time of application, and closely related effect as the first application.
2. The deposit payable shall be 90% of the cost of a hearing as calculated by Council in accordance with information contained in the application file and using the scale of charges. The amount payable will be due at least 10 working days before the commencement of the hearing. If the amount is not paid by the due date, then the Otago Regional Council reserves the right under S36 (7) of the Resource Management Act to stop processing the application. This may include cancellation of the hearing.

Should a hearing be cancelled or postponed due to the non-payment of the charge, the applicant will be invoiced for any costs that arise from that cancellation or postponement.

Following completion of the hearing process, any shortfall in the recovery of hearing costs will be invoiced, or any over recovery will be refunded to the applicant.

Under Section 100A of the RMA, one or more submitters may make a request to have a resource consent application heard by one or more hearing commissioners who are not members of Council. In this case the applicant will pay the amount that Council estimates it would cost for the application to be heard had the request not been made, and the submitter(s) who made the request will pay, in equal shares, the cost of the application being heard that exceeds that amount payable by the applicant.

Further, the applicant may request to have a resource consent application heard by one or more hearing commissioners who are not members of Council. In this case, the applicant will pay the full costs.

3. Where actual and reasonable costs are less than the deposit paid, a refund will be given.
4. Where an applicant requests under s100A (for a consent hearing) or under s357AB (for the hearing of an objection) an independent commissioner(s); the applicant will be required to pay any increase in cost of having the commissioner(s).

Where a submitter(s) requests under s100A an independent commissioner(s) any increase in costs that is in addition to what the applicant would have paid shall be paid by the submitter. If there is more than one submitter who has made such request the costs shall be evenly shared.

## Administrative charges

The following one-off administration charges shall apply to all resource consent applications received:

<b>Publicly Notified and Limited Notified Applications</b>	<b>\$</b>
First application	100.00
Concurrent applications	50.00
<b>Non-Notified Applications</b>	<b>\$</b>
First application	50.00
Concurrent applications	25.00
<b>Other</b>	<b>\$</b>
Certificate of Compliance	25.00
Section 417 Certificate	25.00
Exemptions from water metering regulations	25.00

## Review of consent conditions

Following the granting of a consent, a subsequent review of consent conditions may be carried out at either request of the consent holder, or, as authorised under Section 128, as a requirement of Council. Costs incurred in undertaking such reviews will be payable by the consent holder at the rates shown in the Scale of Charges above.

Reviews initiated by Council will not be charged to consent holders.

## Compliance Monitoring Charges

Compliance charges may also be applied to any granted consent(s). These can be found via Council's website at: [www.orc.govt.nz/media/6959/chargesfees-june\\_2019-copy\\_web-pages.pdf](http://www.orc.govt.nz/media/6959/chargesfees-june_2019-copy_web-pages.pdf)

# Resource Consent Application Form 5

## To Take and Use Groundwater



Otago  
Regional  
Council

This application is made under Section 88 of the  
Resource Management Act 1991

Phone: 0800 474 082  
Website: [www.orc.govt.nz](http://www.orc.govt.nz)

### IMPORTANT NOTES TO THE APPLICANT

#### Disclaimer:

If council accepts your application for processing this does not constitute a guarantee that groundwater allocation is available. You should contact the council's Resource Science Unit in regard to water availability **before** you lodge your application. If no allocation is available then the activity will be prohibited and no resource consent will be granted.

Ensure that you complete this application Form 5 **and** Resource Consent Application Form 1 **in full**

For any consent application to be processed efficiently in the minimum time and at minimum cost, it is critical that as much relevant information as possible is included with the application. If all the necessary information is not entered on the form or supplied with the application then Otago Regional Council may **return your application**, request further information or publicly notify your application. This will lead to delays in the processing of your application and may increase processing costs. The Council advises as a precaution, applications for replacement water permits should be lodged at least **6 months** prior to their expiry, to ensure allocation is retained. Please note that an application to replace an existing water permit that has not been lodged and received by the Council at least **3 months** prior to its expiry, may lose its allocation.

This application form, when properly completed, should provide an adequate "Assessment of Effects on the Environment" (AEE) where the adverse effects of a proposal are not significant. However, this can only be determined on application. Guidance for the minimum aquifer test requirements are located at the end of this form.

### PART A: GENERAL

#### A.1 Is this application for (tick which applies):

- a NEW groundwater take; or
- an application to REPLACE a current Water Permit?

Water Permit number: .....

Expiry date:

If you are applying to transfer the point of a water take or vary a condition of an existing Water Permit, **stop now** and please use Form 16 or Form 22 instead.

#### A.2 If you are applying to replace an existing Water Permit, do you have evidence of the amount of water historically abstracted under the permit?

- Yes, my records are attached with the application \_\_\_\_\_ years of records attached
- Yes, the Otago Regional Council has my records. *Note: You will be charged for all time spent retrieving and analysing records held on Council files*

I don't have any records but have other evidence of historical use (e.g. description and photos of existing functioning infrastructure, aerial photographs of irrigated area, electricity records for pump). You must provide evidence of the previous use of the permit including how much water has been used each year over what period.

**PART B: DESCRIPTION OF THE POINT OF TAKE**

IF THE BORE IS NOT YET CONSTRUCTED, OR IS UNCONSENTED, **STOP** NOW AND APPLY FOR THE LAND USE CONSENT TO CONSTRUCT A BORE OR BORES AND OBTAIN THIS BEFORE YOU APPLY TO TAKE GROUNDWATER. FORM 9A IS AVAILABLE ON THE COUNCIL WEBSITE.

**B.1 What are the consent and bore tag numbers for the bore(s) where water is proposed to be taken?**

Bore 1: Consent Number: RM16.108.01 Bore tag number G41/0127  
 Bore 2: Consent Number: RM16.108.01 Bore tag number G41/0456  
 If more than 2, please provide details on a separate sheet

**B.2 What are the GPS co-ordinates of the location of the bore(s) from which groundwater is proposed to be taken?**

Bore 1: NZTM 2000 E 1305397 N 5017068  
 Bore 2: NZTM 2000 E 1305502 N 5017223  
 If more than 2, please provide details on a separate sheet

**B.3 Tick the box next to the aquifer that the water is proposed to be taken from.** If you are unsure refer to Maps C1-C17 in the Regional Plan: Water for Otago and maps contained in Plan Change 4A (they are available for viewing on [www.orc.govt.nz](http://www.orc.govt.nz), or at our offices). Information on the location of the 'others' list can be obtained from council's Resource Science Unit.

- |   |  |   |
|---|--|---|
| <input type="checkbox"/> Cardrona Alluvial Ribbon         | <input type="checkbox"/> Lowburn Alluvial Ribbon | <input type="checkbox"/> Shag Alluvium                    |
| <input type="checkbox"/> Cromwell Terrace                 | <input type="checkbox"/> Lower Taieri            | <input type="checkbox"/> Wanaka Basin<br>Cardrona Gravels |
| <input type="checkbox"/> Dunstan Flats                    | <input type="checkbox"/> Lower Waitaki Plains    | <input type="checkbox"/> Wakatipu Basin                   |
| <input type="checkbox"/> Earnsclough Terrace              | <input type="checkbox"/> Maniototo Tertiary      | <input type="checkbox"/> Unknown                          |
| <input type="checkbox"/> Ettrick Basin                    | <input type="checkbox"/> Manuherikia Alluvium    | <b>Others:</b>  |
| <input type="checkbox"/> Hawea Basin                      | <input type="checkbox"/> Manuherikia Claybound   | <input type="checkbox"/> Bendigo                          |
| <input type="checkbox"/> Inch Clutha River/Mata-Au Gravel | <input type="checkbox"/> North Otago Volcanics   | <input type="checkbox"/> Clydevale                        |
| <input type="checkbox"/> Kakanui-Kauru Alluvium           | <input type="checkbox"/> Roxburgh Basin          | <input type="checkbox"/> Glenorchy                        |
| <input type="checkbox"/> Kuriwao Basin                    | <input type="checkbox"/> Papakaio                | <input type="checkbox"/> Strath Taieri                    |
| <input type="checkbox"/> Lindis Alluvial Ribbon           | <input type="checkbox"/> Pomahaka Basin          | <input type="checkbox"/> Tarras                           |
|   |  | <input type="checkbox"/> Wairuna                          |

Not listed - Cromwell Terrace

**B.4 Do you have a bore log for your bore(s)?**

- Yes and it is enclosed with this application, go to **Part C**.
- Yes and it was provided to the Otago Regional Council after the bore was constructed, go to **Part C**
- No, go to B.5

**B.5 Please complete the following if no bore log is available.**

Date bore drilled:	G41/0127	G41/0456
Driller:	McNeill	McNeill
Total depth of bore:	25.92	28.82
Diameter of bore:	0.15	0.30
Static water level:	13.8	7.1

If more than one bore, please provide the information on a separate sheet.

**PART C: VOLUME AND RATES OF TAKE**

**C.1 What quantity of water do you propose to take and at what rate will it be taken? Note: 1,000 litres = 1 cubic metre**

- (a) maximum rate of take ..... 70 ..... litres per second
- (b) maximum daily volume ..... 3024 ..... litres per day; **or**  
 ..... cubic metres per day
- (c) maximum weekly volume ..... cubic metres per week
- (d) maximum monthly volume ..... 93,744 ..... cubic metres per month
- (e) maximum annual volume ..... 846,720 ..... cubic metres per year

**C.2 What is the frequency of your proposed water take?**

- |   |                     |                |
|---|---------------------|----------------|
|   | <b>Average</b>      | <b>Maximum</b> |
| (a) How many hours per day?   | .....               | .....          |
| (b) How many days per week?   | Refer attached AEE. | .....          |
| (c) How many weeks per month?   | .....               | .....          |
| (d) In which months do you expect to take water? ( <i>tick those relevant</i> ) | All year            |                |

	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
<b>Average</b>												
<b>Dry year</b>												

**C.3 Over what part of the day will you typically take water?**

- During the day
- During the night
- Other *please specify* .....
- 24 hours
- 'on demand'

**C.4 Are you intending to harvest water for storage before subsequent use?**

- No, go to question C.6.
- Yes: Capacity of water storage reservoir(s) ..... cubic metres

**C.5 Is your water storage reservoir 3 metres or more in depth and impounds more than 20,000 cubic metres of water?**

- No.
- Yes, a building permit may be required, contact the Duty Resource Management Administration Officer or visit the Council website [www.orc.govt.nz](http://www.orc.govt.nz).

**C.6 Is your proposed take from a Schedule 2C Aquifer (of the Regional Plan: Water)?**

**Schedule 2C Aquifers:**

Kakanui Kauru Alluvium Aquifer, Shag Alluvium Aquifer, Lindis Alluvial Ribbon Aquifer, Cardrona Alluvial Ribbon Aquifer, Lowburn Alluvial Ribbon Aquifer

- Yes: which one .....
- No, go to question **C.9**.

**C.7 For Schedule 2C Aquifers what is the name of the surface water body connected to your proposed point of take?**

e.g. for Kakanui-Kauru Alluvium Aquifer is it the Kakanui River, Kauru River, a tributary of these or another named water course?

.....

**C.8. Is your proposed point of take(s) within 100 metres of a connected perennial surface water body?**

- No, go directly to **Part D**
- Yes, go to question **C.10**

**C.9 What is the name of the surface water body within 100 metres of your proposed point of take?**

i.e. Lake Dunstan, Waiareka Creek or a tributary of Stoney Creek, etc

.....

**C.10 Maximum Allocation Volume – Note to applicant**

The Regional Plan: Water manages the volumes of water taken from aquifers to prevent long term depletion of base flow to surface water bodies and salt water intrusion of the aquifer. It does this by either assigning a Maximum Allocation Volume for specific aquifers or by considering the maximum annual take and the expected recharge and requiring that a take should not exceed 50 % of the mean annual recharge of the aquifer.

An assessment of the maximum allocation volume for the Aquifer relevant to your take will be undertaken in processing your application and restrictions may be imposed in accordance with Schedule 4B of the Regional Plan: Water

**C.11 For Rivers, Streams, modified water courses, springs or drains answer questions (a)-(g), for Lakes, ponds and wetlands go to Question C.13.**

(a) What type of water course is identified in C.9 above. *Tick those relevant*

- River
- Stream
- Modified watercourse
- Spring
- Drain

(b) Is the water course:

- Perennial (flows all year around)
- Ephemeral (flows only as a result of rainfall)

(c) What is the average channel **width** nearest to your proposed point of take? ..... metres

(d) What is the average channel **depth** nearest to your proposed point of take? ..... metres

(e) What is the estimated average water flow velocity? ..... metres/second

(f) How would you describe the bed of the water course? *Tick those relevant*

- Muddy       Boulders       Gravels and cobbles       Sandy       Hard rock

(g) Are you able to supply estimated minimum and maximum flow rates for the water course?

No, go to **Part D**

Yes, please complete the following

Minimum: ..... litres per second

Maximum: ..... litres per second

Location of estimate:

- adjacent to proposed point of take       Other

Source of flow data:

.....

### C.11 For Lakes, Ponds and Wetlands, answer points (a)-(f) below.

(a) What type of water body is identified in C.10 above. *Tick those relevant*

- Lake       Pond       Wetland

(b) Has the water body been formed by artificial means?

- Yes       No

(c) What is the surface area of the lake/pond/wetland? .....

(d) How deep is the lake/pond/wetland? .....

(e) Does the lake/pond/wetland have an outlet? i.e. does water flow out of it?

- Yes       No

(f) What is the main source of water that fills the lake/pond/wetland? *Tick as many boxes as is relevant*

Direct rainfall

- Springs       Groundwater       Runoff from surrounding land

Stream/rivers      name: .....

Other consented water takes:  
consent numbers: .....

## PART D: WATER MEASURING AND REPORTING INFORMATION

The Resource Management (Measurement and Reporting of Water Takes) Regulations 2010 apply to water permits where water is taken at more than 5 litres per second. The Regulations require continuous measurement of the water taken and for the daily records to be provided to the Otago Regional Council at the end of the water year. It also requires verification of the device or systems installed.

Note: According to the Regulations the water year is from 1 July through to 30 June in the following year. It is also the Council's policy to require water measuring devices or systems and dataloggers to be fitted on **all** water takes.

**D.1 What is the maximum capacity of the pump you propose to install?** .....

**D.2 Is a water measuring device or system...**

Proposed to be installed; or  Already installed

**D.3 Is a data logger installed, or proposed to be installed, as part of your water measuring device or system?**

No  Yes

If a data logger is required by a Water Permit, it will need a minimum of 24 months data storage.

**D.4 Please indicate on a map or aerial photograph, the following details:**

- o The location of the bore(s) from which water is to be taken
- o The location, or proposed location of the water measuring device or system; and
- o The location of pipe work and infrastructure associated with the water take, specifically between the point of take and the measuring device, and include distances.

**Installation of a Water Measuring Device or System**

The Otago Regional Council has Standard Installation specifications for water measuring devices and systems. The Standard Installation of a water measuring device or system is:

*The water meter shall be installed in a straight length of pipe, before any diversion of water occurs. The straight length of pipe shall be part of the pump outlet plumbing, easily accessible, have no fittings and obstructions in it. The water meter shall be installed at least 10 times the diameter of the pipe from the pump and at least 5 times the diameter of the pipe.*

**D.5 Are you proposing to install your Water Measuring Device in accordance with the Otago Regional Council Standard Installation specifications outlined in the paragraph above?**

Yes  No  Already installed

If your answer is NO, you need to fill out and attach to this application form a **Non-Standard Installation Form** for Water Measuring Devices available on our Website or through the Environmental Services Unit of the Otago Regional Council.

**D.6 The Regulations require the taking of water to be measured at the point of take unless an Exemption is approved by the Otago Regional Council. Is your water measuring device or system installed at the point of take?**

Yes  No

If your answer is no, you need to apply for an Exemption by filling out *Application form 24 – Application for Exemption to use a device or system near the location from which water is taken*, which is available on our website [www.orc.govt.nz](http://www.orc.govt.nz) and from our offices.

**D.7 The Regulations require the taking of water to be recorded on a daily basis unless an Exemption is approved by the Otago Regional Council. Will you be keeping daily records of your water use?**

Yes  No

If your answer is no, you need to apply for an Exemption by filling our *Application form 25 – Application for Exemption to record water use on a weekly basis*, which is available on our website [www.orc.govt.nz](http://www.orc.govt.nz) and from our offices.

**D.8 For applications to take water for non-consumptive purposes which are at a rate of less than 5 litres per second, please explain why a water measuring device should not be installed.**

.....  
na  
.....  
.....  
.....  
.....





- (c) What type of irrigation system is or is proposed to be used?  
 K-line                       Centre pivot                       Travelling irrigator  
 Border-dyke/flood irrigation    Other
- (d) How many hectares will be irrigated in one day? .....
- (e) For how many hours per day? .....
- (f) What is the target (net) application rate? .....
- (g) How many days are there between irrigating the same block? .....
- (h) Please describe the soil types of the areas to be irrigated and state the source of this information.  
 .....  
 .....  
 .....  
 .....
- (i) How have you calculated the amount of water you need? (a separate sheet may be needed and attached to this application form)  
 .....  
 .....  
 .....  
 .....
- (j) Is the area to be irrigated:  
 Presently irrigated/developed  
 Partly irrigated/developed ( ..... ha complete ..... ha under development)  
 Proposed to be irrigated/developed ( ..... likely completion date)

**E.6 Irrigation of crops or horticulture**

- (a) What is the total area to be irrigated? .....
- (b) Show the area of land to be irrigated on the map specified in **E.4** and attach to this application.
- (c) What is the total property area (not just that proposed to be irrigated)? .....
- (d) If glass/plastic houses are used, what area do they cover? .....
- (e) What type of crops will be irrigated or are proposed to be used?  
 Grain/wheat                       Pip fruit                       Stone fruit  
 Market garden                       Flowers                       Nursery

- Viticulture ..... (vines/hectare)
- Nuts
- Other .....

(k) What type of irrigation system is or is proposed to be used?  
 Trickle                       Sprinkler                       Other .....

(f) How many hectares will be irrigated in one day? .....

(g) For how many hours per day? .....

(h) What is the target (net) application rate? .....

(i) How many days will there be between irrigating the same block? .....

(j) Please describe the soil types of the areas to be irrigated and state the source of this information.  
 .....  
 .....  
 .....  
 .....

(k) How have you calculated the amount of water you need? (a separate sheet may be needed and attached to this application form)  
 .....  
 .....  
 .....  
 .....

(l) Is the area to be irrigated:  
 Presently irrigated/developed  
 Partly irrigated/developed ( ..... ha complete                      ..... ha under development)  
 Proposed to be irrigated/developed (..... likely completion date)

**E.7 Frost Fighting**

(a) List the crops, and the area (ha) of each crop, for which frost fighting may be undertaken.  
 .....  
 .....

(b) How many hours a day? .....

(c) How many days per year? .....

(d) How many days on average do you expect a frost?

- (e) How have you calculated the amount of water you need? (a separate sheet may be needed and attached to this application form)

.....  
.....  
.....  
.....  
.....

**E.8 Industrial Use**

- (a) What type of industry/process will be using the water?

.....  
.....  
.....  
.....

- (b) How will the water be used?

.....  
.....  
.....  
.....

- (c) How have you calculated the amount of water you need? (a separate sheet may be needed and attached to this application form)

.....  
.....  
.....  
.....  
.....

**E.9 Private Community Water Supply**

As a guide only the council considers efficient water use for a household is 1,000 litres per day in winter and 3,000 litres per day in Summer (average 2,000 litres per day). This is derived from wastewater volumes in ASNZ 1547:2000.

- (a) What type of institution uses the water?

- Households – number of households to be supplied: .....
- Camping grounds – maximum number of visitors and staff per year: .....
- Schools - maximum number of students and staff per year: .....
- Other: .....

- (b) For applications to supply water to households what is the minimum, maximum and average lot size?

..... Square metres (minimum)  
..... Square metres (average)  
..... Square metres (maximum)

- (c) How have you calculated the amount of water you need? (a separate sheet may be needed and attached to this application form)

.....

.....

.....

.....

.....

**E.10 Private Community Water Supply**

As a guide only the council considers efficient water use for a household is 1,000 litres per day in winter and 3,000 litres per day in Summer (average 2,000 litres per day). This is derived from wastewater volumes in ASNZ 1547:2000.

- (a) What population will be served by the supply?  
 ..... General location of population  
 ..... Approximate number of households
- (b) How have you calculated the amount of water you need? (a separate sheet may be needed and attached to this application form)

.....

.....

.....

.....

.....

**E.11 Stock Water and / or Dairy Shed Use**

The Council considers the following values as efficient use of water for stock.

Sheep	5 litres per day per head
Beef cattle	40 litres per day per head
Dairy cows	70 litres per day per head
Deer	1.5 litres per day per head
Dairy shed use	50 litres per day per head

- (a) What type and how much stock will be supplied with water?
- Sheep      number: .....water required: .....litres/head/day
- Beef cattle      number: .....water required: .....litres/head/day
- Dairy cows\*      number: .....water required: .....litres/head/day
- Other      number: .....water required: .....litres/head/day
- \* excluding dairy shed usage
- (b) If you have dairy cows, and require water for your dairy shed, please state the estimated volume required

.....Litres/head/day

**E.12 Other**

- (a) Please describe the proposed water use:

Water will be used in association with a extraction and processing of gravel from a quarry, including gravel washing, dust suppression and irrigation.

.....

.....

.....

- (b) How have you calculated the amount of water you need? (a separate sheet may be needed and attached to this application form)
- Refer attached AEE - Based on historical use and the proposed increase in production.
- .....
- .....
- .....
- .....

**PART F: ASSESSMENT OF ENVIRONMENTAL EFFECTS (AEE)**

An AEE should be proportional to the scale and significance of the proposed activity. Where your proposed take could have significant effects on the groundwater resource a more detailed environmental assessment is required.

Note: Environment includes ecosystems, people, communities, all natural and physical resources and amenity values, and social and economic, aesthetic and cultural conditions that affect them.

**F.1 An Aquifer test (pumping test) is required to be submitted with your application.** Instructions on the minimum requirements are attached to this application form.

- Yes a copy of the results are attached                      na - bores are existing

**F.2 Provide details of all known neighbouring bores assessed under Schedule 5B\* of the Regional Plan: Water which may be potentially affected by your application or within 1 kilometre of the proposed point of take.**

*\* within the calculated interference radius based on the aquifer properties from testing and proposed volume*

Owner name	Bore number (if known)	Distance (m)	Depth (m)	Use (e.g. domestic irrigation etc)
	G41/0238	232/638	44.8	Irrigation, frost fighting
	G41/0321	315/339	31.7	Communal domestic
	G41/0220	335/319	36.5	Irrigation, frost fighting
	G41/0265	340/497	33	Irrigation, domestic

**F.3 Have you undertaken an assessment of effect on water availability to neighbouring bores in accordance with Schedule 5 of the Regional Plan: Water for Otago?** (available on our website [www.orc.govt.nz](http://www.orc.govt.nz) )

- Yes and it is attached to the application     No, go to F.6

**F.4 If the answer to F.3 was yes, then at what distance may calculated effects on water availability be experienced?**

Refer groundwater assessment ..... metres

**F.5 Are there any of the following present within 500 metres\* of the proposed point(s) of take:**

*\* or within the calculated interference radius based on the aquifer properties from testing and proposed volume*

- (i) Surface water bodies?  Yes  No
- (ii) Natural wetlands or springs?  Yes  No

If you have answered 'yes' to any of the above, describe what adverse effects your take may have and the steps you propose to mitigate these effects:

.....  
.....  
.....  
.....  
.....

**For water takes in Schedule 2C Aquifers or within 100 metres of a surface water resource only**

If your groundwater take is not from a Schedule 2C Aquifer or within 100 metres of a surface water resource, go to **F.8**.

**F.6 Will the taking of water have an effect on surface water availability to neighbouring properties?**

- Yes  No  Unknown

**F.7 Are there any of the following present within 500 metres of the proposed point of take?**

- (i) Obvious signs or known aquatic biota?  Yes  No
- (ii) Areas where food is obtained from a water body?  Yes  No
- (iii) Natural wetlands?  Yes  No
- (iv) Waste discharges?  Yes  No
- (v) Recreational activities?  Yes  No
- (vi) Areas of special aesthetic value?  Yes  No
- (vii) Areas or aspects of significance to iwi?  Yes  No
- (viii) Other water takes (ground or surface)?  Yes  No

If you have answered 'yes' to any of the above, describe what adverse effects your take may have and the steps you propose to mitigate- these effects: Refer attached AEE

.....  
.....  
.....  
.....  
.....

**F.8 Has any water quality analysis been undertaken on groundwater taken from your bores??**

Yes – *attach a copy of the results*  No  Unknown

**F.9 Are there any waste disposal sites (e.g. septic tanks, offal pits, landfills etc) within 100 metres of your proposed point of take(s) ?**

Yes – *show on the site plan required by question E.4 and state distances*  
 No

**F.10 Is your proposed take point(s) (bores) within 1 kilometre of the coastline?**

Yes – *show on the site plan required by question E.4 and state distances*  
 No

**F.11 Do you anticipate that your proposed water take will affect the water quality of the groundwater resource? (e.g. contamination from septic tanks or saltwater intrusion)**

Yes  No Refer attached AEE

If you have answered 'yes', describe what adverse effects your take may have and the steps you propose to mitigate these effects: Refer attached AEE

.....  
.....  
.....  
.....  
.....

**F.12 Can your maximum abstraction rate (litres per second) be reduced by increasing the length of time over which water is taken?**

Yes

Over what time period would you take water and at what rate?

.....  
.....  
.....

No

Why not?

Refer attached AEE.

.....  
.....  
.....

**F.13 What are the positive effects of your proposed take and use?** This could include any environmental, social and economic benefits that management by a Water Management Group could provide.

Refer attached AEE

.....  
.....  
.....



**F.14 What measures are you proposing to minimise wastage of water and maximise its efficient use?**

.....  
Refer attached AEE  
.....  
.....  
.....  
.....

**PART G: ALTERNATIVE WATER SUPPLIES**

**G.1 Does your property have alternative water sources available?** (such as other water bodies, reticulated supplies, groundwater bores, other water permits, irrigation schemes?)

- No
- Yes

If yes, Please detail the sources, quantities, uses and any current Water Permit numbers or any takes authorised by permitted activity rules in the Regional Plan: Water for Otago.

.....  
.....  
.....

**G.2 Have you considered the option of using other sources of water?**

- No
- Yes

If yes, Please detail the sources, quantities, uses and any Water Permit numbers

.....  
.....  
.....

**G.3 Explain why you have decided to take water from the proposed groundwater source rather than any alternative source?**

.....  
.....  
.....

**PART H: CONSULTATION**

**H.1 Please describe any consultation undertaken with persons/parties potentially affected by your proposed groundwater take.** This should include parties you identified in F.2 and using Schedule 5B of the Regional Plan: Water.

.....  
Refer to attached AEE.  
.....  
.....

Schedule 5B of the Regional Plan: Water for Otago provides a method to identify groundwater takes potentially affected by bore interference. Use this Schedule (found on our website) to assist you in determining who may be affected by your application and thus who to obtain written approval from.

Written approvals are required from parties who are considered by the Otago Regional Council to be affected by your proposed water take. To reduce costs and processing times, it is recommended that written approval is obtained, and submitted with the application, for parties who may be affected.

**H.2 Provide any written approvals using the Council's standard Form 1 – Resource Consent Application available on our website.**

## **PART I: CHECK LIST**

**I.1 In order to submit a complete application, have you remembered to?**

- Fully completed this application form and Form 1?
  - For replacement applications, provide evidence of how much water has historically been accessed under that consent (unless held by Council). *refer A.2*
  - Attached a bore log (unless held by Council)? *refer B.4*
  - Attached a Non-Standard installation form if required? *refer D.5*
  - Attached an Exemption Application Form for the point of take? *refer D.6*
  - Attached an Exemption application form for weekly records? *refer D.7*
  - For water management groups, provide evidence that the group meets the requirements of Appendix 2A of the Regional Plan: Water for Otago? *refer E.1*
  - A detailed site map or aerial photograph? *refer E.3*
  - A copy of an Aquifer test (pumping test) results? *refer F.1*
  - A copy of the Regional Plan: Water Schedule 5 Assessment? *Refer F.3*
  - A copy of water quality analysis? *refer F.8*
  - Attached any written approvals? *refer H.2*
  - Paid your deposit or attached a cheque? *refer I.1*
  - Attached Certificate of Title(s) less than 3 months old? *refer E.3*
- Or**
- Council to obtain Certificate of Title(s) at your expense

To keep consent processing costs to a minimum it is strongly recommended that the checklist is complete and all items required are attached **before** you lodge your application to the Otago Regional Council.

## Otago Regional Council - minimum aquifer test requirements

### 1.1 Why do I have to do an aquifer test?

Aquifer tests are required by the Otago Regional Council as part of the information requirements for a resource consent application to take and use groundwater. This information sheet outlines the Otago Regional Council's minimum aquifer test requirements to support resource consent applications. Aquifer tests are required for two reasons. First to demonstrate that you can actually take the amount of water you are seeking and second for information on aquifer parameters which are used to assess the potential effects of the proposed take.

### 1.2 What is an aquifer test?

Aquifer tests consist of pumping a bore at a certain rate and recording drawdown in the pumped bore and nearby observations bores at specific times. There are two main types of pump tests; step-drawdown tests and constant-rate tests.

A **step-drawdown** test occurs when a bore is pumped at successively greater discharge rates for relatively short periods of time. These tests are used to describe bore performance which is a function of the construction of the bore and aquifer characteristics.

A **constant-rate** test occurs when a bore is pumped for a significant length of time at one rate and often includes monitoring of groundwater level recovery once pumping has ceased (a recovery test). These tests are used to provide information on aquifer parameters such as transmissivity, storativity and leakage.

### 1.3 Doing an aquifer test

The aquifer test must be of sufficient quality to demonstrate to the Council you are able to take the amount of water you are seeking and to provide a reliable assessment of aquifer properties to support an assessment of environmental effects. If the pump test is not of sufficient quality your application may not be accepted.

It is recommended that you discuss your aquifer test with a groundwater scientist and or the Otago Regional Council Resource Science Unit before proceeding.

The aquifer test data should be designed and analysed by a suitably qualified and/or experienced groundwater scientist. It is recommended that they are contacted before undertaking a pump test so that they can advise you on aquifer test design.

If for some reason you are unable to meet the recommended minimum aquifer test requirements, then it is advisable to contact either the Otago Regional Council or your consultant to discuss appropriate alternatives to ensure that your application will be accepted.

---

### 1.4 Do I need resource consent?

Under our Regional Water Plan, aquifer tests are a permitted activity the pumping rate does not exceed 2,000,000 litres per day (23.15 litres per second) and they do not exceed three consecutive days duration. If you are planning an aquifer test that does not meet these requirements you will need to obtain resource consent. However, you can apply for a water permit for the aquifer test at the same time you are applying for your bore permits.

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### 1.5 Further information

For more information please contact either a suitably qualified and/or experienced person in hydrogeology or Otago Regional Council.

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### 1.6 References

Aitchison-Earl, P. and Smith, M. 2008. *Aquifer test guidelines (2<sup>nd</sup> Edition)*. Environment Canterbury Technical Report R08/25, Environment Canterbury, New Zealand.

Kruseman, G. P. and de Ridder, N. A. 1994. *Analysis and evaluation of pumping test data (2<sup>nd</sup> Edition)*. Publication 47: International Institute for Land Reclamation and Improvement, Wageningen, the Netherlands.

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### 1.7 Acknowledgements

This document is based on the Aquifer Pump Tests Information Sheet from Environment Southland (ES). ORC would like to thank ES for the sharing of information and ideas.

<b>General requirements</b>	
<ul style="list-style-type: none"> <li>The pumping rate should be kept constant within +/- 5% and measured to within +/- 5% accuracy. It is recommended that a data logging electronic flow meter be used to achieve these requirements.</li> <li>After step and constant rate aquifer tests, recovery should be measured to within 10% of the initial static water level.</li> <li>After the start of pumping and during recovery, at a minimum, water levels in the pumping and observation wells should be measured at 30 second intervals during the first 5 minutes, 1 minute intervals between 5 and 15 minutes, 5 minute intervals between 15 and 60 minutes and 15 minute intervals thereafter. It is recommended that data logging pressure transducers be used to achieve these requirements.</li> <li>Pumped water should be discharged at a location where it won't cause recharge of the aquifer and influence the aquifer test.</li> <li>Aquifer pumping tests should be conducted during stable weather conditions. Significant rainfall, barometric pressure changes, high or variable river flows and other factors may influence the results of your test. Be prepared to delay the test if required.</li> </ul>	
<b>Specific requirements</b>	
<b>Takes less than 250 m<sup>3</sup>/d</b>	2 hour pumping at the maximum proposed rate. Water level monitoring should include drawdown and recovery in the pumping well.
<b>Takes between 250 to 750 m<sup>3</sup>/d</b>	<ol style="list-style-type: none"> <li>Static water level to be monitored for at least 24 hours prior to start of test in the pumping and observation wells</li> <li>A step-drawdown aquifer test comprising a minimum of 4, 1 hour pumping steps followed by measurement of recovery. The maximum pumping rate should be equal to the maximum proposed rate.</li> <li>A 24-hour constant-rate aquifer test undertaken at the maximum proposed rate. Water level monitoring should include drawdown and recovery in the pumping bore and in at least one observation bore within the area of localized drawdown.</li> </ol>
<b>Takes greater than 750 m<sup>3</sup>/d</b>	<b>Confined or leaky aquifers</b>
	<ol style="list-style-type: none"> <li>Static water level to be monitored for at least 24 hours prior to start of test.</li> <li>A step-drawdown aquifer test comprising a minimum of 4, 1 hour pumping steps followed by measurement of recovery. Maximum pumping rate should be equal to the maximum proposed rate.</li> <li>A 72-hour constant-rate aquifer test undertaken at the maximum proposed rate. Water level monitoring should include drawdown and recovery in the pumped bore and at least two observation bores in the source aquifer and one observation well in the overlying aquifer within the area of localized drawdown.</li> </ol>
	<b>Unconfined aquifers</b>
	<ol style="list-style-type: none"> <li>Static water level to be monitored for at least 24 hours prior to start of test.</li> <li>A step-drawdown aquifer test comprising a minimum of 4, 1 hour pumping steps followed by measurement of recovery. Maximum pumping rate should be equal to the maximum proposed rate.</li> <li>A 48-hour constant-rate aquifer test undertaken at the maximum proposed rate. Water level monitoring should include drawdown and recovery in the pumped bore and at least two observation bores within the area of localized drawdown.</li> </ol>
<b>Information requirements to be included with the aquifer test results</b>	
<p>The following information should be provided with the aquifer test results:</p> <ul style="list-style-type: none"> <li>A map of the site with key features including the pumping and observation bores, surface water features and pumped water discharge location identified</li> <li>Coordinates for pumping and observation bores used in the aquifer test</li> <li>Surveyed elevations for pumping and observation bores used in the aquifer test and for nearby surface water level</li> <li>Bore logs and construction information, including depth and diameter for the pumping and observation bores</li> <li>Information on the location of pumped discharge, the method used to measure discharge and the discharge monitoring records in electronic format (Excel).</li> <li>Records of measured groundwater levels in the pumping and observation bores in electronic format (Excel)</li> <li>Records of measured or observed of rainfall, barometric pressure and river flows</li> <li>Analysis of aquifer test results to provide estimates of relevant aquifer parameters to support the effects assessment. This should include details of any data corrections used, analysis methods, plotted data, calculations used and discussion of data and analysis reliability</li> </ul>	



# 6

## Application To Discharge Contaminants to Land



(For Office Use Only)

Consent No.: \_\_\_\_\_

Show the location of the discharge and adjoining properties on your map on Form 1.

### Part A: General

1. What is the source of the contaminant (e.g., sewage, treatment, industry, water treatment, rural activity, solid waste, etc)?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. Describe the contaminant, including, where appropriate, the physical and chemical content and their toxicity to the receiving environment.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3. Is the contaminant treated in any way before being discharged? Yes  No

If yes, describe treatment \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

3. What is the location of the discharge, including map reference in NZTM 2000?

\_\_\_\_\_

NZTM 2000: E 1305460 N 5017181

5. For liquid contaminants, what method of discharge will be used (e.g., spray irrigation, soakage, etc)

Settling pond.

\_\_\_\_\_

6. Describe the soils, topography and vegetation cover of the land onto which the discharge will be made:

Refer to attached AEE

\_\_\_\_\_

7. What is the total area of land onto which the discharge is to be made? na hectares

What is the area of land over which the discharge is made each day? na hectares

## Part A: General (continued)

**8. Discharge Rate Information:**

Maximum flow rate: 70 litres per second  
 Maximum discharge rate: 3024 cubic metres per day  
 or \_\_\_\_\_ cubic metres per week

Is the discharge: continuous  or intermittent

What will be the maximum discharging period? \_\_\_\_\_ hours per day  
 \_\_\_\_\_ days per week  
 Refer attached AEE - as per operating hours of the quarry \_\_\_\_\_ weeks per month  
 \_\_\_\_\_ months per year

**9. For animal manure, what is the source of the manure?**

Cows  Pigs  Poultry  Other, specify, \_\_\_\_\_

How many animals in your herd: \_\_\_\_\_

What maximum herd size are you planning? \_\_\_\_\_

What is the volume of waste produced daily: \_\_\_\_\_

If you have treatment ponds, how many do you have: \_\_\_\_\_

What are their dimensions?  
 \_\_\_\_\_ metres long, \_\_\_\_\_ metres wide \_\_\_\_\_ metres deep

**10. For septic tanks, what is the source of waste?**

Multiple dwelling  Motel/Restaurant  Park/Recreation facility

Other, specify \_\_\_\_\_

Is the waste: Toilet and hand washing  Toilet, bathroom and kitchen waste?

Other, specify \_\_\_\_\_

What is the estimated number of people using the facility per day? \_\_\_\_\_

Please provide details of your design, design calculations, soils, percolation tests and site plan which justify your choice of septic tank size, type and layout.

		Yes	No
11.	Does the discharge also involve		
	Outlet structure?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Diversion?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Discharge to air?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Discharge to water?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

If you have answered "Yes" to any of 11. above, another schedule to this consent application may be required.

## Part B: Assessment of Effects on the Environment

1. Comment on the possible effects the discharge may have on the drainage capacity, fertility, ground or surface water of or near the site:

Refer to attached AEE

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- |  | Yes                                 | No                                  | Not<br>Known             |
|--|-------------------------------------|-------------------------------------|--------------------------|
| 2. Within the vicinity of the discharge are there any:   |                                     |                                     |                          |
| (a) Waterbodies, groundwater or groundwater bore(s)?   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |
| (b) Water abstractions?  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |
| (c) Obvious signs of fish, eels, insect life, aquatic plants, etc?   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| (d) Wetlands (e.g., swamp areas)?  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| (e) Recreational activities carried out (eg., swimming, fishing, canoeing)?                                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| (f) Areas of particular aesthetic or scientific value (eg., scenic waterfall, rapids, archaeological sites)? | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| (g) Areas or aspects of significance to Iwi?   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

If you have answered "Yes" to any of the above, describe what effects your operation may have and the steps you propose to take to mitigate these.

Refer to attached AEE

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(Continue on a separate page if necessary)

3. What alternative methods of disposal or discharge locations have you considered?

The discharge is existing meaning the required infrastructure is established, alternative locations would be too far from plant or would occupy parts of the quarry that are being actively quarried. Pumping water to surface water would result in worse environmental consequences and would be uneconomical.

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4. Why did you choose the proposed method of disposal and location point?

Soakage ponds are an effective method of removing sediment from water prior to it discharging to groundwater. The the soakage pond is locataed away from part of the quarry where gravel is extracted and close to plant where it is processed.

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## Part B: Assessment of Effects on the Environment (Contd.)

5. How will the equipment controlling the discharge be operated and maintained to prevent equipment failure, and what measures will be implemented to ensure that the effects of any malfunction are remedied?

The soakage pond is periodically cleared of sediment.

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6. What, if any, monitoring do you propose to carry out to ensure that the discharges does not have any adverse effect?

Groundwater is monitored as a condition of consent on the existing discharge permit, it is proposed that this same condition is applied to the permit sought.

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# 8

## Application To Discharge Contaminants To Air



(For Office Use Only)

Consent No.: \_\_\_\_\_

Please provide an accurate plan showing the location of the site, existing works or works to be constructed, property boundaries and neighbouring properties.

### Part A: General

#### 1. Process Details

- (a) Please supply a detailed flow chart and description of the process that results in either a discharge to the atmosphere, or could potentially result in a discharge to air.

#### 2. Discharge Details

- (a) Describe the contaminant discharged and quantities: Dust - refer attached AEE.

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- (b) Has there been carried out, or do you have access to, any discharge, monitoring, or monitoring of impacts of the discharges? Yes  No   
(If yes, please supply a copy of the information obtained.)

- (c) Has any meteorological data relevant to the site been obtained? Yes  No   
(If yes, please give details and, if possible, a copy/summary of the information obtained.)

- (d) Describe the type of land use surrounding the site (eg. north, residential – closest 500m; south, industrial, etc): Refer attached AEE.

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- (e) What alternative methods of disposal or discharge have you considered? Refer attached AEE.

- (f) How is the equipment controlling the discharge operated and maintained to prevent equipment failure, and what measures are implemented to ensure that the effects of any malfunction are remedied? Refer attached AEE.

- (g) What, if any, monitoring do you carry out to ensure that the discharge does not have an adverse effect? Refer attached AEE.

- (h) Please provide the following discharge information relevant to your process.  
(See overleaf)

# Air Discharge Permit Information

## Combustion Processes (metric units should be used)

- Type of fuel, sulphur content, amount used.
- Describe combustion processes and details of boiler or heat unit.
- Maximum heat release rate (kilowatts, megawatts).
- Concentration of contaminants in discharge ( $\text{mg}/\text{m}^3$ ).
- Height of discharge point (chimney(s)).
- Height of building the chimney is attached to.
- Describe fitting on top of chimney(s), cone, rain excluded, Chinaman's hat).
- Frequency of discharge (hours of operation).
- Describe air pollution control equipment.
- Velocity of flue gas (m/s).
- Monitoring system (for checking and recording discharge).
- Location of discharge points in relation to factory and boundaries.
- Condition of boiler or heat unit, chimney and details of last service.
- Insulation of chimney.

## Quarries

- Describe quarrying process.
- Type of rock being mined.
- Open cast extraction capacity (tonnes/hour).
- Size reduction and screening capacity (tonnes/hour).
- Storage capacity (tonnes/hour).
- Dust control measures.
- Monitoring systems (for checking and recording dust emissions).
- Frequency of discharge (i.e., hours of operation).
- Quarry management plan.

## Wood Processing Industries

- Describe the process.
- Describe air pollution control equipment (including height of discharge point(s), exhaust flow and velocity).
- Monitoring system (for checking and recording discharge(s)).
- Particulate emission test (to determine dust concentration and mass emission levels discharged from the vent, measured over three runs, with all wood sanding equipment working at the same time).
- Frequency of discharge (i.e., hours of operation).
- Location of discharge points in relation to the premises and neighbouring premises.

## Chemical Manufacturing Blending Processes/Electroplating

- Describe the process.
- Describe air pollution control equipment including fan flow rates.
- Monitoring system (for checking and recording discharge).
- Frequency of discharge (i.e., hours of operation).
- Distance of discharge points from neighbouring premises.
- Raw material capacity of operation? or product rate.
- Height of discharge points.

## Air Discharge Permit Information (continued)

### **Abrasive Blasting**

- Describe the process and details of blasting chamber, blasting media used.
- Describe air pollution control equipment and height of discharge points, velocity of gases, fitting on top of vent(s).
- Particulate emission tests (to determine dust concentration and mass emission levels discharged from the vent, measured over three runs).
- Monitoring system (for checking and recording discharge).
- Frequency of discharge (i.e., hours of operation).
- Distance of discharge points from neighbouring premises.

### **Wool Scourers and Tanneries**

- Describe the process.
- Describe air pollution control equipment and height of discharge point(s), fitting on top of vent(s).
- Monitoring system (for checking and recording discharge).
- Describe raw material capacity of operation.
- Frequency of discharge (i.e., hours of operation).
- Distance of discharge points from neighbouring premises.

### **Spray Painting Process**

- Describe the process and details of spray painting booth.
- Describe air pollution control equipment and height of discharge point(s), velocity of gases, fitting on top of vent(s).
- Describe paints and solvents used (provide MSDS where available).
- Paint and solvent usage rates.
- Distance of discharge points from neighbouring premises.

### **Concrete Manufacturing Plants**

- Describe the process.
- Give details of raw material capacity (tonnes/hour).
- Dust control measures.
- Hours of operation.
- Monitoring system (for checking and recording dust).

### **Foundries**

- Describe the process, raw materials used, products made and equipment used.
- Give details of raw material capacity (tonnes/hour) and tonnes/hour product made.
- Hours of operation.
- Describe air pollution control equipment and height of discharge point(s), velocity of gases, fitting on top of vent(s).
- Monitoring system for discharges.

## Air Discharge Permit Information (continued)

### Rendering Process

- Describe the rendering process (high/low temperature, drying, etc.).
- Describe combustion process (if applicable, i.e., type of combustion process, fuel used, fuel combustion rate, contaminants released to air, exit velocity, concentration).
- Describe air pollution control equipment.
- Height and number of discharge point(s) and any fitting on top of vent(s).
- Hours of operation.
- Distance of discharge points from neighbouring premises.

### Asphalt Production

- Describe the process, including dust control equipment.
- Give details of raw material capacity (tonnes/hour).
- Hours of operation.
- Monitoring systems.

### Coffee Roasting Processes/Vegetable Frying Processes

- Describe roasting process (roast or frying cycle, maximum raw material capacity (kg/hr).
- Describe combustion process (if applicable, i.e., type of combustion processes, fuel used, fuel combustion rate).
- Describe air pollution control equipment.
- Height and number of discharge point(s) describe fitting on top of vent(s).
- Hours of operation.
- Monitoring system (for checking and recording discharge).
- Distance of discharge points from neighbouring premises.

### Other Processes

- Describe the process.
- Describe air pollution control equipment.
- Hours of operation.
- Monitoring systems, for recording discharges.

## Part B: Assessment of Effects on the Environment

Where your activity could have an effect on the environment an assessment of environmental effects is required in accordance with the Fourth Schedule of the Resource Management Act 1991.

1. Comment on all possible effects the discharge may have on the quality of the receiving air, persons living in the area and local plant and animal life:

Refer attached AEE.

(Continue on a separate sheet if necessary)

2. In the vicinity of the discharge are there any:
- |   | Yes                                 | No                                  |
|---|-------------------------------------|-------------------------------------|
| (a) Residential developments?   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| (b) Production land (eg., crops, dairy farming)?                                | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| (c) Recreational activities carried out (eg sports grounds, parks etc)?         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| (d) Sources of similar on other discharges to air?                              | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| (e) Areas of particular aesthetic or scientific value (e.g., scenic views etc)? | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| (f) Areas or aspects of significance to Iwi?                                    | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| (g) Commercial activities (eg. office blocks)?                                  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |

If you have answered yes to any of the above, describe what effects your discharge may have and the steps you propose to mitigate these:

Refer attached AEE.

(Continue on a separate sheet if necessary)



# Schedule 8B Discharge Permit To Discharge Contaminants to Air From Quarry or Mining Processes



This form is to be used for applications seeking to discharge contaminants to air from quarry or mining activities within the Otago Region.

(For Office Use Only)

Consent No.: \_\_\_\_\_

Job No: \_\_\_\_\_

## PLEASE READ BEFORE COMPLETING THE APPLICATION FORM

In order for any consent application to be processed efficiently in the minimum time and at minimum cost, it is critical that as much relevant information as possible is included with the application. **If all the necessary information is not supplied with the application then Otago Regional Council may, under section 88 of the Resource Management Act 1991 (the Act) return your application, request further information or decline your application. This will lead to delays in the processing of your application and may increase processing costs.**

Form 1 and Schedule 8B, when properly completed, may provide an adequate "Assessment of Effects on the Environment" (AEE) where the adverse effects of a proposal are not significant. However, this can only be determined on application. The required detail for an AEE should reflect the scale and significance of the potential adverse effects the activity may have on the environment. If the size of your proposed activity or scale of its potential effects is significant, a report by a professional advisor in support of your application may be required. An AEE is required by the Act so that you and others can understand what happens to the environment when you discharge contaminants to air. When considering applications to discharge contaminants to air, the effects of the discharge on the receiving environment and iwi values must be assessed.

Details of information required in an AEE is included in the Fourth Schedule of the Act appended to Form 1: Resource Consent Application.

## PART A: Description of the Proposed Activity

### A.1 (a) Please provide an accurate site plan showing:

- i. a description of the type of land use surrounding the site (eg. north, residential – closest dwelling 500m; south, industrial, etc);
- ii. property boundaries and neighbouring properties;
- iii. Identify the closest residential property to the site
- iv. nearby buildings
- v. road access
- vi. the rock extraction, processing, storage and dispatch areas;
- vii. specific location of discharge point(s); and
- viii. scale and north arrow.

### (b) Provide mid-point GPS location for the activity in NZTM 2000 (New Zealand Transverse Mercator)

NZTM 2000: E 1305460 N 5017181

### A.2 What type of material do you propose to quarry / mine?

Gravel

### A.3 Please detail the chemical components of the quarried or mined matter (if known).



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**A.5 Please identify and describe in full the quarry / mining processes undertaken on site.**

**(a) Extraction / Excavation**

i. Describe the method of extraction / excavation that you use

Shovel - refer attached AEE.

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ii. Please describe the machinery used in the extraction and / or excavation process

Refer attached AEE

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iii. Describe anything else relevant to your extraction / excavation process

Refer attached AEE

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iv. How much material is extracted / excavated per year?

200,000 m<sup>3</sup>/yr

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**(b) Transportation**

i. How is the material transported for screening, crushing, storage and / or dispatch?

Dump truck - refer attached AEE.

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- ii. How far is the material transported for screening, crushing, storage and / or dispatch?

Refer attached AEE

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- iii. What type of matter / substance forms the basis of the roads used for this transportation?

Aggregate

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- iv. What dust prevention measures do you currently implement to ensure that dust from the roads and / or transportation is minimised?

Refer attached AEE

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**(c) Crushing, screening, washing**

- i. Please describe each method used to crush, screen and wash the quarried or mined material and detail the machinery involved and its purpose

Refer attached AEE

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- ii. What is the size reduction and screening capacity (tonnes/hour)

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**(d) Storage**

i. How long can material remain in the storage area?

Material is stockpiled and regularly taken by customers

ii. What is your maximum storage capacity? (tonnes /hour)

na

iii. What size(s) is / are the material that is stored?

iv. Is the area or each material storage pile covered? (*If yes, please describe how*)

No

v. What dust emission prevention measure do you have to ensure that dust entrainment in the air is minimised?

Refer attached AEE.

**(e) Dispatch**

i. How often is material dispatched?

Refer attached AEE

ii. How is material loaded for dispatch?

Loader

**(f) Other Site Activities (*Please describe*)**



**A.10 Section 105 of the Resource Management Act 1991 requires consideration of alternatives to the discharge and the reasons for proceeding with your proposed choice.**

**(a) What alternative methods of disposal or discharge to air from your quarry / mine have you considered?**

Refer attached AEE

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**(b) Justify why you have made the choice to proceed with the proposed activity described in this application.**

Refer attached AEE

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## **PART B: Assessment of Environmental Effects**

**B.1 In the vicinity of the discharge are there any:**

	<b>Yes</b>	<b>No</b>
(a) Residential developments?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(b) Production land (e.g., crops, dairy farming)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(c) Recreational Areas (e.g. sports grounds, parks)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(d) Sources of other similar discharges to air?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(e) Areas of particular aesthetic or scientific value?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(f) Areas or aspects of significance to Iwi?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(g) Commercial activities and/or schools?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**B.2 List and describe all possible effects the discharge from your quarry / mining operation may have on:**

**(a) The receiving air quality**





(j) Any appropriate additional information (e.g. photographs)





# Resource Consent Application Form 9A



## Land Use Consent

- To construct or alter a bore
- To drill over an aquifer

## IMPORTANT NOTES TO THE APPLICANT

You must complete this form **and** Resource Consent Application Form 1 in full.

It is crucial that you provide as much relevant information as possible with your application and in an understandable way. This will help ORC staff process it efficiently, and at the minimum cost.

If all the necessary information is not entered on the form or supplied with the application then Otago Regional Council may return your application, request further information or publicly notify your application. This will lead to delays in the processing of your application and may increase processing costs.

This application form, when properly completed, should provide an adequate "Assessment of Effects on the Environment" (AEE) where the adverse effects of a proposal are not significant. However, this can only be determined on application.

**For bores:** Depending on the location, quantity and intended use of the groundwater to be taken from the bore, you may require a separate Water Permit to take and use water from the Otago Regional Council. **If you need a water permit please refer to the aquifer testing requirements attached to this form.** When siting your bore you should consider the location in terms of compliance with the rules permitting abstraction in the *Regional Plan: Water for Otago*. You should also consider any effects on water levels in neighbouring bores, allocation availability within the aquifer, and potential stream depletion effects. Such effects may influence the likelihood of obtaining a resource consent to take groundwater at the volume you request.

**Disclaimer: It is the applicant's responsibility to ensure that:**

- the bore is suitable for the purpose required;
- the bore will penetrate water-bearing material;
- the consent holder will have physical access to any water in the bore;
- the consent holder will be legally able to take water; and
- any future taking of water will not have adverse effects on other users or the environment.

## GENERAL

**1. Which of the following activities are you seeking to undertake? (please tick)**

- Construct a new bore
- Alter an existing bore Gravel extraction pit that intercepts groundwater
- Drilling over an aquifer identified in the C-series maps, other than for the purpose of creating a bore
- Constructing a piezometer / monitoring well
- Drilling for a geological, geotechnical or groundwater investigation

**2. Legal Description of the site where the drilling will occur. Please also attach a Certificate of Title less than 3 months old.**

Lot 3 DP 301379 and Lot 8 DP 301379

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**3. Owner of the site where the drilling will occur (if different from applicant on Form 1)**

Full name(s) of owner(s) Cromwell Certified Concrete Ltd

Address PO Box 17 195, Greenlane, Auckland 1546

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Phone number 0272029453

Email address tyler.sharratt@winstoneaggregates.co.nz

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**4. Name and address of driller of person undertaking the works**

Full name(s) \_\_\_\_\_

Company (if applicable) Cromwell Certified Concrete Ltd

Phone number 0272 480 192

Email address info@amisfieldquarry.co.nz

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**5. How many drill holes are proposed?** Activity could be described as two pits

**6. Please provide an accurate GPS location in NZTM2000 (New Zealand Transverse Mercator) format for each drill hole. Note: this should be two seven digit numbers e.g. E1415593 N4923363 and can be obtained from your driller or using a GPS.**

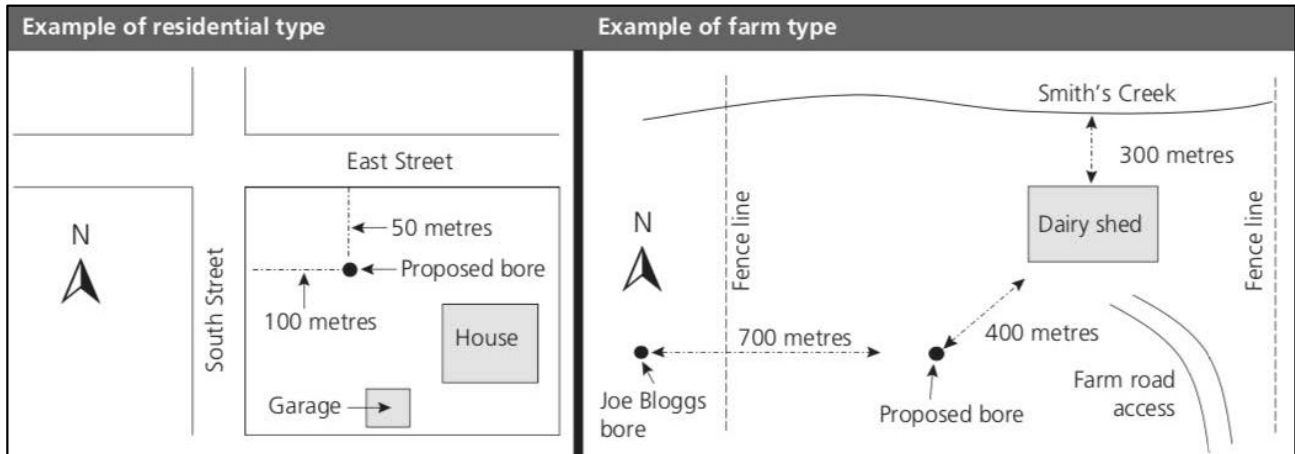
E 1305460 N 5017181

E 1305964 N 5017048

E \_\_\_\_\_ N \_\_\_\_\_

E \_\_\_\_\_ N \_\_\_\_\_

7. Please attach a site plan. This must show the location of the proposed drill sites in relation to nearby houses, driveways, streets, intersections, springs, waterways, and property boundaries. If possible, please also show bores, septic tanks, and waste disposal sites. Two examples of acceptable drawings are shown below.



8. Please provide drill hole details. If more than four drill holes are proposed, provide the following details on a separate sheet. Two large pits - refer attached AEE

Hole 1		Hole 2	
Hole Diameter (mm):		Hole Diameter (mm):	
Estimated Hole Depth (m):		Estimated Hole Depth (m):	
Estimated Casing Depth (m):		Estimated Casing Depth (m):	
Casing Material (if PVC, state grade):		Casing Material (if PVC, state grade):	
Aquifer:		Aquifer:	
Method of Drilling:		Method of Drilling:	
Method of Construction:		Method of Construction:	
Backfill material:		Backfill material:	

Hole 3		Hole 4	
Hole Diameter (mm):		Hole Diameter (mm):	
Estimated Hole Depth (m):		Estimated Hole Depth (m):	
Estimated Casing Depth (m):		Estimated Casing Depth (m):	
Casing Material (if PVC, state grade):		Casing Material (if PVC, state grade):	
Aquifer:		Aquifer:	
Method of Drilling:		Method of Drilling:	
Method of Construction:		Method of Construction:	
Backfill material:		Backfill material:	

## BORES ONLY

### 9. What is the bore to be used for? (please tick)

- Domestic. Number of houses: \_\_\_\_\_
- Stock drinking water
- Irrigation
- Industrial / Commercial
- Exploratory
- Other. Please specify: Gravel extraction pit that intercepts groundwater

### 10. What quantity of water do you propose to take and at what rate?

Maximum rate of take \_\_\_\_\_ litres per second

Maximum daily volume \_\_\_\_\_ cubic metres per day

## DRILLING OVER AN AQUIFER

### 11. Which aquifer do you propose to drill over? If you are unsure refer to Maps C1-C17 in the Regional Plan: Water for Otago and maps contained in Plan Change 4A (they are available for viewing on [www.orc.govt.nz](http://www.orc.govt.nz), or at our offices). Information on the location of the 'others' list can be obtained from Council's Resource Science Unit.

- |  |  |
|--|--|
| <input type="checkbox"/> Cardona Alluvial Ribbon     | <input type="checkbox"/> North Otago Volcanics       |
| <input checked="" type="checkbox"/> Cromwell Terrace | <input type="checkbox"/> Roxburgh Basin              |
| <input type="checkbox"/> Dunstan Flats               | <input type="checkbox"/> Papakaio                    |
| <input type="checkbox"/> Earnsclough Terrace         | <input type="checkbox"/> Pomahaka Basin              |
| <input type="checkbox"/> Ettrick Basin               | <input type="checkbox"/> Shag Alluvium               |
| <input type="checkbox"/> Hawea Basin                 | <input type="checkbox"/> Wanaka Basin Cardona Gravel |
| <input type="checkbox"/> Inch Clutha River / Mata Au | <input type="checkbox"/> Wakatipu Basin              |
| <input type="checkbox"/> Kakanui-Kauru Alluvium      | <input type="checkbox"/> Unknown                     |
| <input type="checkbox"/> Kuriwao Basin               | Others:  |
| <input type="checkbox"/> Lindis Alluvial Ribbon      | <input type="checkbox"/> Bendigo                     |
| <input type="checkbox"/> Lowburn Alluvial Ribbon     | <input type="checkbox"/> Clydevale                   |
| <input type="checkbox"/> Lower Taieri                | <input type="checkbox"/> Glenorchy                   |
| <input type="checkbox"/> Lower Waitaki Plains        | <input type="checkbox"/> Strath Taieri               |
| <input type="checkbox"/> Maniototo Tertiary          | <input type="checkbox"/> Tarras                      |
| <input type="checkbox"/> Manuherikia Alluvium        | <input type="checkbox"/> Wairuna                     |
| <input type="checkbox"/> Manuherikia Claybound       |  |

# ASSESSMENT OF ENVIRONMENTAL EFFECTS

**12. Please tick appropriate boxes:**

Refer attached AEE

**YES NO**

- Is the proposed drilling within 50 metres of a known contaminated site?
- Is the proposed drilling within 100 metres of any existing bores on neighbouring properties?
- Is the proposed drilling within 50 metres of any existing septic tank / outfall or long drop toilet?
- Are there any surface water bodies within 100 metres of the proposed drilling?
- Is the proposed drilling over either the Papakaio or Lower Taieri Aquifer?
- Is the proposed drilling located in a historical place, recorded archaeological site, or in an area of cultural or spiritual significance to Tangata Whenua?

**Details of any neighbouring bores:**

Owner's Name	Bore number	Distance (m)	Depth of bore (m)

**Details of any nearby septic tank / outfall or long drop toilets:**

Owner's Name	Distance (m)

**Details of any nearby surface water bodies:**

Surface Water Body	Distance (m)

**Distance to the coast if less than 50 metres:** \_\_\_\_\_

**13. What is the minimum distance from the drill site(s) to the property boundaries?**

\_\_\_\_\_

We advise that you consult with your neighbour if the drill site(s) are near your property boundary.

**STATUTORY ASSESSMENT**

14. The following policies from the Regional Plan: Water for Otago may be relevant to your application.

- *Policy 9.4.14 To require appropriate siting, construction and operation of new groundwater bores, to prevent:*
  - a) *Contaminants from entering an aquifer; and*
  - b) *The contamination of groundwater in any aquifer from the groundwater in another aquifer; and to promote such management for existing bores.*
- *Policy 6.4.10C To require appropriate siting, construction and operation of new groundwater bores, to maintain artesian pressure in confined conditions and to promote such management for existing bores.*
- *Policy 6.4.10D To require that new bores in the Papakaio and Lower Taieri Aquifers are constructed of materials suitable to resist corrosion and in a manner that enables their complete shutdown.*
- *Policy 6.4.10E Unless provision has been made to permanently decommission and seal the bore, to require the structural condition and control mechanisms of all existing bores in the Papakaio and Lower Taieri Aquifers to be certified as being secure against uncontrolled artesian discharge at no more than 5 year intervals.*

In situations where more than one hole is drilled, this policy also applies:

- *Policy 9.4.17 To require new drill holes to be appropriately sealed to prevent contaminants entering any aquifer.*

**Is your proposed activity consistent with Policies 9.4.14, 6.4.10C, 6.4.10D, 6.4.10E and where relevant 9.4.17?**

Yes  No

If No, please explain.

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**AFFECTED PARTIES AND WRITTEN APPROVALS**

If you are not the owner of the land upon which the drilling is proposed, written approval is required from all parties who own the land as shown on the Certificate of Title. This is to demonstrate that agreement has or is being attained where the activity is located on property that you do not own.

**Supply written approvals at the time of lodging your application to reduce delays in consent processing and to keep costs to a minimum. You can use the written approval form available on the ORC website.**

## CHECKLIST

In order to submit a complete application, have you remembered to?

- Fully completed this application form and Form 1?
- Attached maps and drawings as appropriate?
- Attached a Certificate of Title less than 3 months old?
- Attached any written approvals?
- Paid your deposit or attached a cheque?

To keep consent processing costs to a minimum it is strongly recommended that the checklist is complete, and all items required are attached **before** you lodge your application to the Otago Regional Council.

# OTAGO REGIONAL COUNCIL - MINIMUM AQUIFER TEST REQUIREMENTS

## **1. Why do I have to do an aquifer test?**

Aquifer tests are required by the Otago Regional Council as part of the information requirements for a resource consent application to take and use groundwater. This information sheet outlines the Otago Regional Council's minimum aquifer test requirements to support resource consent applications. Aquifer tests are required for two reasons. First to demonstrate that you can actually take the amount of water you are seeking and second for information on aquifer parameters which are used to assess the potential effects of the proposed take.

## **2. What is an aquifer test?**

Aquifer tests consist of pumping a bore at a certain rate and recording drawdown in the pumped bore and nearby observations bores at specific times. There are two main types of pump tests; step-drawdown tests and constant-rate tests.

- A step-drawdown test occurs when a bore is pumped at successively greater discharge rates for relatively short periods of time. These tests are used to describe bore performance which is a function of the construction of the bore and aquifer characteristics.
- A constant-rate test occurs when a bore is pumped for a significant length of time at one rate and often includes monitoring of groundwater level recovery once pumping has ceased (a recovery test). These tests are used to provide information on aquifer parameters such as transmissivity, storativity and leakage.

## **3. Doing an aquifer test**

The aquifer test must be of sufficient quality to demonstrate to the Council you are able to take the amount of water you are seeking and to provide a reliable assessment of aquifer properties to support an assessment of environmental effects. If the pump test is not of sufficient quality your application may not be accepted.

It is recommended that you discuss your aquifer test with a groundwater scientist and or the Otago Regional Council Resource Science Unit before proceeding.

The aquifer test data should be designed and analysed by a suitably qualified and/or experienced groundwater scientist. It is recommended that they are contacted before undertaking a pump test so that they can advise you on aquifer test design.

If for some reason you are unable to meet the recommended minimum aquifer test requirements, then it is advisable to contact either the Otago Regional Council or your consultant to discuss appropriate alternatives to ensure that your application will be accepted.

## **4. Do I need resource consent?**

Under our Regional Water Plan, aquifer tests are a permitted activity the pumping rate does not exceed 2,000,000 litres per day (23.15 litres per second) and they do not exceed three consecutive days duration. If you are planning an aquifer test that does not meet these requirements you will need to obtain resource consent. However, you can apply for a water permit for the aquifer test at the same time you are applying for your bore permits.

## **5. Further information**

For more information please contact either a suitably qualified and/or experienced person in hydrogeology or Otago Regional Council.



## 6. General Requirements

- The pumping rate should be kept constant within +/- 5% and measured to within +/- 5% accuracy. It is recommended that a data logging electronic flow meter be used to achieve these requirements.
- After step and constant rate aquifer tests, recovery should be measured to within 10% of the initial static water level.
- After the start of pumping and during recovery, at a minimum, water levels in the pumping and observation wells should be measured at 30 second intervals during the first 5 minutes, 1 minute intervals between 5 and 15 minutes, 5 minute intervals between 15 and 60 minutes and 15 minute intervals thereafter. It is recommended that data logging pressure transducers be used to achieve these requirements.
- Pumped water should be discharged at a location where it won't cause recharge of the aquifer and influence the aquifer test.
- Aquifer pumping tests should be conducted during stable weather conditions. Significant rainfall, barometric pressure changes, high or variable river flows and other factors may influence the results of your test. Be prepared to delay the test if required.

## 7. Specific Requirements

Takes less than 250 m3/d	2 hour pumping at the maximum proposed rate. Water level monitoring should include drawdown and recovery in the pumping well.
Takes between 250 to 750 m3/d	<ol style="list-style-type: none"> <li>1. Static water level to be monitored for at least 24 hours prior to start of test in the pumping and observation wells</li> <li>2. A step-drawdown aquifer test comprising a minimum of 4, 1 hour pumping steps followed by measurement of recovery. The maximum pumping rate should be equal to the maximum proposed rate.</li> <li>3. A 24-hour constant-rate aquifer test undertaken at the maximum proposed rate. Water level monitoring should include drawdown and recovery in the pumping bore and in at least one observation bore within the area of localized drawdown.</li> </ol>
Takes greater than 750 m3/d	<p><b>Confined or leaky aquifers</b></p> <ol style="list-style-type: none"> <li>1. Static water level to be monitored for at least 24 hours prior to start of test.</li> <li>2. A step-drawdown aquifer test comprising a minimum of 4, 1 hour pumping steps followed by measurement of recovery. Maximum pumping rate should be equal to the maximum proposed rate.</li> <li>3. A 72-hour constant-rate aquifer test undertaken at the maximum proposed rate. Water level monitoring should include drawdown and recovery in the pumped bore and at least two observation bores in the source aquifer and one observation well in the overlying aquifer within the area of localized drawdown.</li> </ol>
	<p><b>Unconfined aquifers</b></p> <ol style="list-style-type: none"> <li>1. Static water level to be monitored for at least 24 hours prior to start of test.</li> <li>2. A step-drawdown aquifer test comprising a minimum of 4, 1 hour pumping steps followed by measurement of recovery. Maximum pumping rate should be equal to the maximum proposed rate.</li> <li>3. A 48-hour constant-rate aquifer test undertaken at the maximum proposed rate. Water level monitoring should include drawdown and recovery in the pumped bore and at least two observation bores within the area of localized drawdown.</li> </ol>

### **8. Information to be included with the aquifer test results**

The following information should be provided with the aquifer test results:

- A map of the site with key features including the pumping and observation bores, surface water features and pumped water discharge location identified.
- Coordinates for pumping and observation bores used in the aquifer test.
- Surveyed elevations for pumping and observation bores used in the aquifer test and for nearby surface water level.
- Bore logs and construction information, including depth and diameter for the pumping and observation bores.
- Information on the location of pumped discharge, the method used to measure discharge and the discharge monitoring records in electronic format (Excel).
- Records of measured groundwater levels in the pumping and observation bores in electronic format (Excel).
- Records of measured or observed rainfall, barometric pressure and river flows.
- Analysis of aquifer test results to provide estimates of relevant aquifer parameters to support the effects assessment.

This should include details of any data corrections used, analysis methods, plotted data, calculations used and discussion of data and analysis reliability

### **9. References**

Aitchison-Earl, P. and Smith, M. 2008. Aquifer test guidelines (2nd Edition). Environment Canterbury Technical Report R08/25, Environment Canterbury, New Zealand.

Kruseman, G. P. and de Ridder, N. A. 1994. Analysis and evaluation of pumping test data (2nd Edition). Publication 47: International Institute for Land Reclamation and Improvement, Wageningen, the Netherlands.

### **10. Acknowledgements**

This document is based on the Aquifer Pump Tests Information Sheet from Environment Southland (ES). ORC would like to thank ES for the sharing of information and ideas.



**LANDPRO**

Make the most of your land

**Resource Consent  
Application to Central Otago  
District Council and Otago  
Regional Council**

Prepared for Cromwell Certified Concrete Ltd

**Prepared For**

Cromwell Certified Concrete Ltd

**Prepared By**

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Cromwell

Tel +64 3 445 9905

## QUALITY INFORMATION

Reference: L:\19474 - Cromwell Certified Concrete Limited - Permit applications for expansion of the Amisfield Quarry\Docs\Lodgement Package\Lodgement documents\20201022 19474 Assessment of Effects FINAL.docx

Date: 23 October 2020

Prepared by: Matt Curran

Reviewed by: Claire Perkins

Client Review: Tyler Sharratt

Version Number: Final

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# 1. INTRODUCTION

## 1.1 Overview of Proposal

Cromwell Certified Concrete Limited (the applicant) is seeking the resource consents required to expand the existing Amisfield Quarry (the quarry) located at 1248 Luggate-Cromwell Road (State Highway 6), north of Cromwell. The existing quarry has been in operation since 1994, and is authorised by a suite of resource consents which were obtained in 2015 and 2016, including:

- Discharge Permit - RM16.108.02 - To discharge contaminants to land for the purpose of gravel washing and dust suppression;
- Water Permit -RM16.108.01 - To take and use groundwater for the purpose of gravel washing and dust suppression; and
- Land use consent - RC150052 – To operate a metal quarry and crushing plant.

Demand for aggregate resource since the current consents were granted is such that the applicant wishes to expand the existing quarry. The proposed expansion includes increasing the depth of the existing quarry and extending operations onto an adjoining parcel of land, purchased for that purpose in 2017. The resource consents sought include:

- Discharge permits for the discharge of contaminants to air and land;
- A water permit for the abstraction of groundwater at an increased rate of 70 l/s (currently a rate of 47 l/s is authorised);
- Land use consent to construct a bore (to authorise excavation below groundwater);
- Land use consent to operate the expanded quarry, including increasing the rate of production from 70,000 m<sup>3</sup>/yr to 200,000 m<sup>3</sup>/yr, and to install a sign at the entrance to the quarry.

The Central Otago District Council (CODC) and Otago Regional Council (ORC) have statutory jurisdiction for the effects of the activities proposed within this application. These effects are managed through the Central Otago District Plan (CODP), Regional Plan: Water for Otago (RWP) and the Regional Air Plan (RAP), which include rules that apply to the proposed activities. The proposal requires resource consent as a discretionary activity under all three of the applicable plans. The specific reasons for resource consent being required are detailed in Section 4 of this report.

This AEE is submitted as a joint application to both CODC and ORC for the resource consents required from both authorities to avoid unnecessary duplication where the same issues need to be considered by both authorities.

## 1.2 The applicant

Cromwell Certified Concrete is a joint venture between McNulty's Investment Limited (a local Cromwell company) and Fletcher Concrete and Infrastructure Limited. The applicant is a major supplier of aggregate for the Central Otago district and contributes to the local economy by providing employment, purchasing materials and utilising local contractors.

### **Applicant Address and Address for Service:**

Cromwell Certified Concrete  
C/- Landpro Limited  
PO Box 302  
Cromwell 9342

## 1.3 Background

The construction of the Clyde Dam and the creation of Lake Dunstan in 1992 - 93 flooded extensive areas of land, including the site of the former metal quarry operated by Cromwell Certified Concrete near Cromwell. After extensive investigations, a new quarry site above the proposed lake level was located. Resource consent was subsequently obtained to enable subdivision of the site, together with the establishment and operation of a metal quarry in 1995.

On 10 April 2015 the applicant was granted replacement land use consent (RC150052) which authorises the use of land to continue the operation of a metal quarry and crushing plant. RC150052 does not have an expiry date. In July 2016 resource consents were issued by the ORC that authorise the taking and use of groundwater (RM16.108.01) and discharge of contaminants to land (RM16.108.02) in association with gravel washing and dust suppression.

In January 2018 the applicant purchased land that adjoins the quarry to the north with the intention of expanding the quarry onto this land at the appropriate time. The available consented gravel resource in the existing quarry is sufficient to meet current local demand for up to the next approximately five to six years, however projected demand is such that expansion of the quarry is considered necessary.

In addition to expanding the quarry, the applicant has also identified an opportunity to increase production and extend the life of the existing quarry by increasing the depth of excavation. RC150052 is therefore proposed to be replaced with a new land use consent that enables the expansion of the existing quarry and the proposed increased rate of production.

## 1.4 Purpose of Documentation

Pursuant to Section 88 of the Resource Management Act 1991 (the RMA), this report provides an assessment of the activities' effects on the environment as required by Schedule 4 of the RMA.

In this document;

Section 2 provides details of the proposal;

Section 3 describes the existing environment;

Section 4 defines the status of the activity under the relevant regional and district plans;

Section 5 provides a detailed assessment of the actual and potential adverse environmental effects of the activities, and discusses the current and proposed mitigation measures to minimise effects;

Section 6 sets out the statutory considerations for the proposal;

Section 7 describes consultation undertaken;

Section 8 addresses notification;

Section 9 addresses the proposed consent duration and lapse dates;

Section 10 provides a conclusion and overall summary of the application.

**Table 1** outlines the reports which have been prepared or relied upon in this document.

**Table 1: Summary of reports**

Report name	Prepared by & date	Referred to as	Appendix no.
Amisfield Quarry Expansion - Transport Assessment	Abley	Transport Assessment	3
Amisfield Quarry - Technical Assessment of Potential Effects of Dust Discharges	Beca Limited	Dust Assessment	4
Landscape and Visual Assessment	Align Limited	Landscape and Visual Assessment	5
Assessment of Noise Effects	Styles Group	Noise Assessment	6
Assessment of the Effects of Increased Water Take at Amisfield Quarry	Landpro Limited	Assessment of Groundwater Effects	7
Amisfield Quarry Expansion, Ecological Impact Assessment	Landpro Limited	Ecological Assessment	8

## 2. DETAILS OF PROPOSAL

### 2.1 Location

The application site is located between State Highway 6 and Lake Dunstan, northwest of the Amisfield Burn and approximately 15km north of Cromwell as indicated on **Figure 1**.



**Figure 1: Location of the application site**

The site is owned by the applicant and includes parcels of land that contain the existing quarry, vehicle access to Cromwell-Luggate Road, and the land on which the expansion of the quarry is proposed. **Appendix 1** includes a Site Plan for the existing quarry and the proposed expansion. The existing quarry is approximately 19 ha in area and the proposed expansion area is approximately 8 ha in area. The quarry is set back from the Luggate-Cromwell Road and is accessed via a sealed access way within Lot 3 DP 301379. **Table 2** includes the legal description, street address and size of the parcels of land that make up the application site. **Appendix 2** includes copies of the relevant Records of Title.

The site is zoned Rural Resource Area in the CODP. As noted in the CODP, activities that locate within the rural environment generally do so for certain reasons. In this case, the applicant is reliant upon the resources of the rural area (being aggregate), and the proposed expansion area being located next to an existing quarry where the necessary infrastructure is already located and operating. The applicant needs to be close to the activities that require aggregate. The cost of transporting aggregate otherwise makes aggregate extraction

uneconomic. In addition, quarries need large open spaces where they can generate effects without significantly affecting more sensitive activities.

**Table 2: Description of properties that form the application site**

Address	Legal description	Certificate of title	Area (ha)	Purpose
1248 Luggate-Cromwell Road	Lot 3 DP 301379.	5965	9.8714	Proposed expansion of quarry
	Lot 5 DP 301379	5967	0.2119	Vehicle access to quarry
	Lot 8 DP 301379	5967	18.9420	Existing quarry

## 2.2 Proposed activities

The area of the proposed quarry expansion is shown in the Site Plan contained in **Appendix 1**, including the extent of the expansion, method of access, bunding, planting, setbacks and location of signage.

The key features of the proposal are as follows:

- Expansion of the Amisfield quarry on to an 9.8 ha parcel of land that adjoins the existing quarry;
- Establishing access to the expanded quarry via an underpass under an access road within the site;
- Increasing the annual production rate of the quarry from 70,000 m<sup>3</sup> to 200,000 m<sup>3</sup>; and
- Increasing the rate of groundwater take from 47 l/s to 70 l/s.

Key activities for which resource consents are sought are described in more detail below.

### 2.2.1 Hours of operation

The existing consent provides for the arrival of staff and loading of trucks between 06:00 and 07:00 (Monday to Saturday), then the use of fixed and mobile processing plant, front end loaders, excavators and trucks between the hours of 07:00 and 19:00, Monday to Saturday. There is no processing undertaken on Sundays and public holidays.

The proposed operating hours under the new consent are:

- Arrival of staff and loading of trucks: 06:00 to 07:00, Monday to Saturday
- Site excavation, processing, dump truck, loader and purchasing truck movements: 07:00 to 19:00, Monday to Saturday
- Loading trucks and staff leaving: 19:00 to 20:00, Monday to Saturday.

There will be no activity on site outside of the above times, other than dust control measures from time to time, should these be necessary.

### 2.2.2 Existing quarry support facilities

Existing support facilities located within the quarry include an office building/lunchroom (portacom), car parking (10 spaces), a wash pad, ablutions, diesel tanks and an engineering workshop. **Figure 2** is a photograph of the quarry support facilities.

The potable water is taken from the same bores that provide water for dust suppression and the wash/screening of raw material. Sewage/wastewater is managed by way of on-site storage and is pumped out monthly by Wastetech Services.



**Figure 2: Quarry support facilities**

### 2.2.3 Expansion of the existing quarry

Prior to quarrying commencing on the expansion land, topsoil and any overburden material will be removed and used to construct the perimeter bunds. The overburden is relatively shallow in depth, approximately 0.2 metres.

Quarrying will commence in the southern part of the expansion land and progress north. Aggregate will be transported back to the existing fixed plant. The expanded quarry will be set back 25 m from the boundary with neighbouring rural properties, except for the property to the west (1308 Luggate-Cromwell Road) where quarry will be set back 50 m within the vicinity of the existing dwelling. **Figure 3** presents the proposed Site Plan which includes the proposed setbacks and bunds for the expanded quarry (refer also **Appendix 1**).



**Figure 3:Amisfield Quarry Proposed Site Plan**

### 2.2.4 Extraction and processing aggregate

The quarry operates with a pre-strip, active face and backfill configuration with each strip being up to approximately 50m wide. The surface of the ground is naturally stony, hence there is very little topsoil and overburden. What overburden there is, is used to backfill worked areas of the quarry.

The gravel is extracted by traditional dump truck and shovel techniques. Dump trucks transport the unprocessed gravel from the active face to the fixed plant. **Appendix 1** includes a Site Plan that shows the position of the crushing and washing/screening plant. **Figure 4** is a photograph of the active quarry face and **Figure 5** is a photo of the screening and washing plant.





**Figure 4: Photo of loader and trucks working on the quarry face (Source: Beca Dust Assessment 21/1/2020)**



**Figure 5: Photograph of screening and washing plant with washed aggregate in the foreground (Source: Beca Dust Assessment 21/1/2020)**

At present the quarry is consented to excavate to a maximum depth of 15 m below ground level. The applicant is applying to excavate the gravel resource deeper. The applicant seeks consents to quarry to the maximum depth of the gravel resource, which is estimated to extend 30 m below ground level. Given the proposed increase in the depth of excavation it is likely that groundwater will be intercepted. Where groundwater is intercepted, excavating aggregate involves the use of a mobile dragline machine. The depth of the gravel is anticipated to be approximately 10m below ground water level.

The same methods of extraction and processing will be applied in the expanded quarry. Material from the expanded quarry will be transported back to crushing and washing/screening plant in the existing quarry for processing. There will be no crushing or washing/screening in the expansion area. Activities in the expansion area will be limited to excavation only and transporting of material out to the plant.

### 2.2.5 Vehicle movements

The quarry is accessed from Luggate-Cromwell Road by a sealed access road. Quarried material is transported offsite by trucks departing via the access road. Trucks are loaded by a front-end loader within the stockpiling areas. At present up to 47 trucks service the quarry per day (94 trips/day), and that this is anticipated to increase up to 75 trucks per day (150 trips/day) following the proposed expansion. Currently during the peak hour, up to 20 trucks arrive at the site.

Currently 80% of all trucks arrive at the site from the south, thereby turning right into the site. This will continue. The majority of the employees are also likely to come from Cromwell and hence the directional split of heavy vehicles will apply to light vehicles as well. All vehicles are assumed to leave in the same direction that they arrive from. Following the expansion of the quarry the direction from which vehicles arrive from and leave to is not expected to change.

### 2.2.6 Upgrades to the State Highway roading network

It is proposed that a full length right turning bay is provided in accordance with the New Zealand Transport Authorities (NZTA) design standards. Providing a right turn bay will require seal widening on the western side of Luggate-Cromwell Road where an existing culvert is located, meaning the culvert will also need to be extended. The Give-Way road marking on the Pisa Road/Luggate-Cromwell Road intersection also needs to be shifted back by approximately 1.5m to allow for the extension of the merge taper. The proposed design of the right turn bay and remarking of the Pisa Road/Luggate-Cromwell Road intersection is detailed in the Transport Assessment (**Appendix 3**) and shown below in **Figure 6 and Figure 7**.

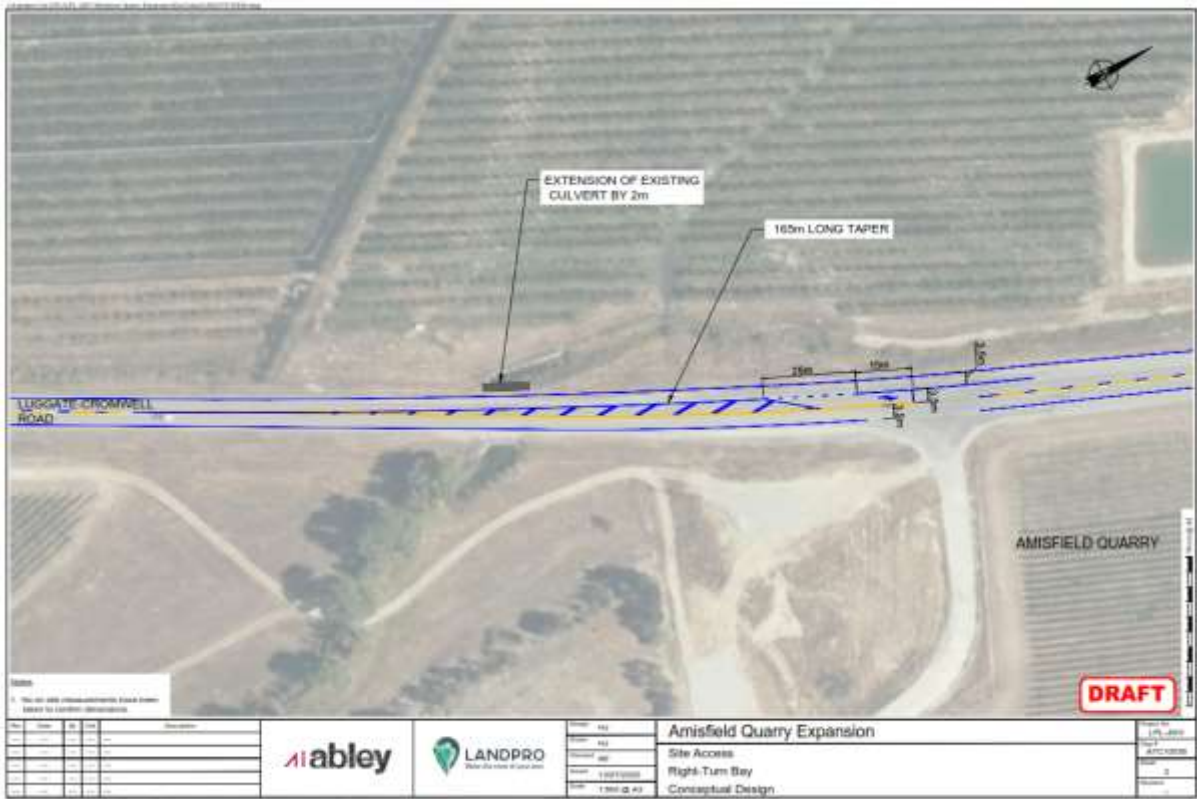


Figure 6: Proposed right hand turn bay and associated widening of the road



Figure 7: Proposed remarking of the Pisa Road/SH 6 intersection

### 2.2.7 Stockpiles

The existing quarry has a number of stockpiling areas that are used to store different grades of processed gravel. The different stockpiling areas are shown in the Site Plan included as **Appendix 1**. While further stockpiling of material could occur as the quarry expands, the location of these stockpiles has not yet been confirmed. The tops of the stockpiles<sup>1</sup> will be kept below the natural level of the surrounding land.

### 2.2.8 Backfilling and rehabilitation

Areas of the quarry which have been worked are backfilled with overburden when it is available, however no topsoil has been overlaid areas that have been backfilled as yet.

The existing consent requires that at least two years prior to ceasing the extraction of material for processing from the quarry, the consent holder shall submit to the Council a 'Closure and Rehabilitation Plan'. The 'Closure and Rehabilitation Plan' is required to provide a framework for returning the site to a natural state, including the removal of all buildings, re-contouring the land and providing for appropriate drainage and other landscape remediation. A similar condition is proposed in relation to this proposal.

### 2.2.9 Water management infrastructure

Washwater from the crushing/screening plant is directed toward the soakage pond, which allows for sediment to be filtered as water is discharged via seepage. Extracted material from the expanded quarry will be processed within the existing quarry and will therefore benefit from the existing water management infrastructure which will cater for the proposed increase in production. No additional water management infrastructure e.g. an additional soakage pond, is considered necessary. Stormwater is not collected and instead discharges directly to ground.

### 2.2.10 Signage

It is proposed to install a free-standing sign 3-5 m<sup>2</sup> in area perpendicular to Luggate-Cromwell Road at the entrance to the quarry. The sign will display the name of the quarry, the quarry's operational hours and contact details.

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<sup>1</sup> Stockpiles refers to stored material associated with active quarrying, and the temporary storage of overburden material associated with the expansion of the quarry.

## 2.2.11 Ancillary roads

### Existing ancillary roads

There are a number of existing ancillary roads within the Amisfield Quarry that allow for the movement of vehicles across the site. All internal roads are maintained by the applicant in good working order. The primary ancillary roads involved in the operation of the Amisfield Quarry, include:

- The main access road – this road provides access from Luggate-Cromwell Road to the quarry support facilities and the wider quarry site.
- Internal quarry roads - these roads link different parts of the quarry, but primarily include the haul roads from the active face being quarried to the crushing and washing/screening plant.

### Proposed ancillary roads

Associated with the proposed expansion of the quarry is the construction of an underpass under an internal access road to link the existing quarry to the expansion area. The internal access road also provides access to neighbouring land (Lots 1 and 2 DP 508108). The underpass will be constructed to provide access to the expansion area without any effects on the access to Lots 1 and 2 DP 508108. **Figure 8** depicts the approximate location of the underpass and identifies the existing access to neighbouring land that will be maintained. Ancillary roads within the proposed expansion area will link the active face to the crushing and screening/washing plant in the existing quarry via the proposed underpass.



**Figure 8: Proposed location of underpass**

### 2.2.12 Discharge of contaminants to air

Associated with the extraction, crushing and handling of aggregate is the discharge of contaminants to air. Discharges of airborne contaminants could result from three main sources:

- Extraction and crushing of aggregates;
- Loading of aggregates and aggregate stockpiles; and
- Vehicle movements on unsealed roads.

The predominant air discharge contaminant from the quarrying operations is particulate matter in the form of dust. The products of combustion, such as sulfur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>) and carbon monoxide (CO), will also be discharged in the emissions from the operation of machinery and vehicles.

The dust generated from quarrying activities is predominantly made up of larger size fractions (ie greater than 10 µm). Some finer particulates (PM<sub>10</sub> and PM<sub>2.5</sub>) from engine emissions will occur but are likely to be small and expected to be well-dispersed prior to reaching any sensitive receptors.

### 2.2.13 Take and use of groundwater

The applicant is authorised under RM16.108.01 to abstract groundwater at a maximum rate of 46 L/s from bores G41/0127 and G41/0456 for use in processing aggregate and suppressing dust. The applicant proposes to increase the rate of abstraction to 70 l/s with a maximum daily take of 3,024 m<sup>3</sup>/day (i.e., 70 L/s for up to 12 hrs per day) and an annual maximum take of 846,720 m<sup>3</sup> (i.e., up to 280 days per year). Water will be used in the expanded quarry to process aggregate and suppress dust, irrigate and as a potable supply. The existing and proposed groundwater take limits are set out in **Table 3**.

**Table 3: Existing and proposed groundwater take limits**

	Current water take limits	Proposed water take limits
Instantaneous rate (L/s)	46	70
Daily rate (m <sup>3</sup> /day)	1,620	3,024
Monthly rate (m <sup>3</sup> /month)	50,220	93,744
Annual rate (m <sup>3</sup> /year)	453,600	846,720

### 2.2.14 Discharge contaminants (sediment) to land

The applicant proposes to discharge contaminants to land in association with washing/ screening aggregate and dust suppression (currently authorised under Resource Consent RM16.108.01). Water that is not lost directly to ground or via evapotranspiration is collected in a soakage pond where fine sediments settle out prior to the water discharging back into the underlying aquifer. Given the increased volume of water to be abstracted, the applicant proposes to discharge the same volume of water (detailed above in Section 2.3.13).

### 2.2.15 Construction of a bore

The excavation of the quarry pit to a depth that intercepts groundwater constitutes the construction of a bore in in the RWP.

## 3. DESCRIPTION OF EXISTING ENVIRONMENT

### 3.1 Existing land use

Land on which the expansion of the quarry is proposed has been cultivated in the past, however, is currently bare, providing no productive value. The application site is otherwise dominated by the use of land for quarrying and processing of aggregate (Amisfield Quarry).

### 3.2 Surrounding land use

The zoning of the land around of the site is also Rural Resource Area. Land uses surrounding the application site include residential lifestyle properties, vineyards, unirrigated grazing land and the Mahaka Katia Scientific Reserve. The Amisfield Burn adjoins the existing quarry to the south and west. Vineyards are located to the north, west and east of the application site. To the north of the existing quarry and west of the proposed expansion is a parcel of land (Lot 2 DP 301379) that is occupied by three buildings, including a dwelling, a small shed and a storage facility. The Mahaka Katia Scientific Reserve is located to the north of the expansion land. **Figure 9** identifies land uses and notable features surrounding the site, including the nearest residential dwellings.



**Figure 9: Land use and notable features surrounding the application site**

### 3.3 Topography

The topography of the surrounding area is dominated by Lake Dunstan and mountain ranges. The quarry is located on an upper terrace of Lake Dunstan. The land drops steeply away to the east and south of the quarry boundary onto a lower terrace. To the west of the quarry, across Luggate-Cromwell Road, the land is generally flat, until it rises steeply towards the Pisa Range. Across Lake Dunstan to the east, the terrain rises steeply towards the Dunstan Mountain Range.

### 3.4 Soils

The Smaps database, illustrated in **Figure 10**, shows that the application site comprises Mataura, Molyneux and Blackmans soils. The key characteristics of each soil type are summarised in **Table 4**.





**Figure 10: Smaps soil classification map**

**Table 4: Description of Soils within the application site**

Smaps sibling name	Soil description
Mataura_7a.2 (Matra_7a.2)	The topsoil typically has loam texture and is moderately stony. The subsoil has dominantly loam textures, with a very gravelly layer from less than 45 cm mineral soil depth to more than 100 cm. Generally the soil is moderately well drained with very low vulnerability of water logging in non-irrigated conditions, and has moderate to low soil water holding capacity. Inherently these soils have a very high structural vulnerability.
Molyneux_8a.1 (Moly_8a.1)	The topsoil typically has sandy loam texture and is moderately stony. The subsoil has dominantly sandy loam textures, with a very gravelly layer from less than 45 cm mineral soil depth to more than 100 cm. Generally the soil is well drained with very low vulnerability of water logging in non-irrigated conditions, and has low soil water holding capacity. Inherently these soils have a very high structural vulnerability.
Blackmans_5a.2 (Black_5a.2)	The topsoil typically has loam texture and is stoneless. The subsoil has dominantly loam textures, with gravel content of more than 3% but below 35% for most part of the soil. Generally the soil is moderately well drained with moderate vulnerability of water logging in non-irrigated conditions, and has moderate to low soil water holding capacity. Inherently these soils have a very high structural vulnerability.

## 3.5 Climate

### 3.5.1 Wind

At present the applicant does not measure meteorological variables on site. Fulton Hogan has supplied the applicant with wind speed and direction data measured on their quarry site located approximately 2 km to the south of the application site. This data is considered to provide a good representation of the wind conditions experienced at the application site.

**Figure 11** includes an aerial photograph of the application site with a windrose diagram overlaid that presents wind speed data from 2019 for the Fulton Hogan quarry site. **Figure 11** shows that wind blows predominantly from the north to northeast and that the strongest winds also come from this direction. Secondary winds blow from the south westerly quarter. Winds from the east and west are rare.

The average wind speed measured at the Fulton Hogan site during 2019 was 2.1 m/s which is relatively low compared to many places in Otago. The percentage of winds which exceed 5 m/s from all directions is 10.2% and the percentage of strong winds exceeding 10 m/s is 0.6%.



**Figure 11: Aerial photograph of site overlaid with wind rose**

### 3.5.2 Rainfall

The annual average rainfall measured at the Cromwell climate station between 2015 and 2019 inclusive is 377 mm. The average number of wet days (days with at least 1mm of rain) is 63 and the average number of rain days (days with at least 0.1 mm of rain) is 98. The rainfall is spread across all months with the highest falls occurring in winter. The annual rainfall and number of rain and wet days are low and indicative of a dry climate.

## 3.6 Hydrology

### 3.6.1 Surface water

The most significant surface water body close to the site is Lake Dunstan which is located 800 m from the location of the applicant's groundwater bores within the existing quarry. The mainstem of the Amisfield Burn and one of its tributaries that was diverted when the quarry was originally set up, are located approximately 130 m and 50 m respectively to the southwest of the applicant's groundwater bores.

Schedules in the RWP provide an indication of the values associated with different waterbodies. Schedule 1AA of the RWP identifies Otago resident native freshwater fish and their threat status. The Amisfield Burn is known to provide habitat for Koaro, which is within this schedule and is identified as having a threat status of 'Declining'.

### 3.6.2 Groundwater

Both of the applicant's groundwater bores are located within the quarry pit approximately 190m apart. The bores are approximately 25-30m deep and are screened within gravel or sandy gravel strata. Static water levels have been recorded at around 13.8 m and 7.1 m below ground level for the two bores, indicating that the piezometric surface lies within the gravel or sandy gravel strata. This information suggests that the aquifer underlying the application site and targeted by the applicant's bores is likely to be unconfined.

Amisfield Burn is not deeply incised, and this information suggests that the stream is decoupled from the groundwater system.

The bores are constructed in the Pisa Groundwater Management Zone which is currently identified as being under-allocated. The Pisa Groundwater Management Zone has been estimated as having a mean annual recharge of 6.5 Million m<sup>3</sup>. It is currently estimated that there is 2.9 Million m<sup>3</sup>/annum available in this aquifer.

## 3.7 Landscape

The landscape alongside Lake Dunstan is highly modified due to horticultural and industrial practices, with evidence of present and past activities readily visible. These include the shade and trellis structures associated with fruit tree orchards, access roads to quarries and vineyards and in the greater landscape, shelter belts and dwellings are also evident. The wider visual landscape surrounding the application site is characterised by rocky outcrops and mountain ranges.

There are no identified landscape values or significant natural features identified within the CODP relating to the application site. However, the Pisa and Dunstan Mountain Ranges form part of the backdrop to the application site and are classified as Outstanding Natural Landscapes.

### 3.8 Roading infrastructure and traffic

The site is accessed via Luggate-Cromwell Road (SH 6), which along the site frontage has a posted speed limit of 100km/h. The carriageway is sealed and consists of one traffic lane in each direction, and near the site access, shoulder widening is provided on both sides of the road to allow vehicles to go past another vehicle waiting or decelerating to turn into the site. **Figure 12** and **Figure 13** are photographs looking left (south) and right (north) from the site access point off Luggate-Cromwell Road (State Highway 6).



**Figure 12: Photograph looking left (south) from the site access point off Luggate-Cromwell Road (State Highway 6)**



**Figure 13: Photograph looking right (north) from the site access point off Luggate-Cromwell Road (State Highway 6)**

The site access is located approximately 120m south of the Mount Pisa Road/ State Highway 6 intersection, which is priority controlled with a Give Way sign and markings on Mount Pisa Road. Mount Pisa Road is classified as a rural local road and serves several vineyards and rural residential properties.

A small office area and an informal unsealed parking area is provided at the front of the site. The formed accessway is approximately 10m wide and approximately the first 75m is sealed. **Figure 14** sets out the location of the car park.



**Figure 14: Location of site parking**

### 3.9 Noise

Other than the quarry and traffic noise from State Highway 6, there are no significant noise producing activities within the vicinity of the application site. Included below is the permitted activity standard in the CODP that applies to activities in the Rural Resource Area:

*(a) All activities shall be conducted so as to ensure the following noise limits are not exceeded at any point within the notional boundary of any dwelling, rest home or hospital, or at any point within any Residential Resource Area or any Rural Settlements Resource Area:*

<i>On any day 7:00am to 10:00pm</i>	<i>55 dBA L10</i>
<i>10:00pm to 7:00am the following day</i>	<i>40 dBA L10</i>
	<i>70 dBA Lmax</i>

The noise limits imposed by the existing resource consent conditions are based on the District Plan permitted activity noise standards for the Rural Zone but have a shorter daytime prescribed timeframe. They include a less stringent noise limit at night than the CODP. Condition 12 of the existing consent is set out below.

12. Sound levels due to quarrying, crushing and ancillary work conducted by the consent holder at the site measured at the notional boundary of any dwelling is not to exceed:

a. on normal working days during the hours of 7.00am and 7.00pm Monday to Saturday, the upper limit of sound exposure (as defined in clause 4.2.2 on New Zealand Standard 6802:1991) of 55 dBA L10.

b. at other times on normal working days, on public holidays and on Sundays, the upper limit of sound exposure (as defined in clause 4.2.2 on New Zealand Standard 6802:1991) shall not exceed 45 dBA L10 and a Lmax of 75 dBA

Essentially the same condition has been adopted to mitigate potential noise effects associated with the proposal.

### 3.10 Ecology

The proposed quarry expansion area is a disturbed site consisting of largely cultivated land that is dominated by exotic plant species, noting that some native plant species are present in small numbers, including the cushion forming scabweed which is classified as 'At Risk – Declining' in the New Zealand Threat Classification System. While the expansion land is not known as a breeding ground for native bird species, during the site visit undertaken to inform the Ecological Assessment, Banded dotterel which is classified as 'Threatened - Nationally Vulnerable', were observed foraging on the proposed quarry expansion area.

The adjacent Mahaka Katia Scientific Reserve has high ecological values due its remnant native plant community. One of the native plant species present in the reserve is classified as 'Threatened - Nationally Critical'. Two plant species present are classified as 'At Risk – Declining'. A lichen species present is classified as "naturally uncommon". The remaining 13 native plant species present are classified 'Not Threatened'. The Mahaka Katia Scientific Reserve is a known breeding site for banded dotterel and South Island pied oystercatchers classified as 'At Risk – Declining'. The cushion plants scabweed and *Scleranthus uniflorus*, are a distinct feature of the vegetation cover of the reserve land, in contrast to the quarry expansion land, where only scabweed is present as a few scattered individual cushions.

### 3.11 Air quality

The site is located in a rural area and is expected to have good air quality. The predominant sources of air discharges in the area, other than the existing quarry, are dust generated from traffic on unsealed roads, agricultural activities and natural sources such as dry unvegetated paddocks. During periods of low rainfall and strong winds, background dust concentrations may be relatively high, due to the natural and agricultural sources in the area.

The quarry is located outside a gazetted airshed as defined in the National Environmental Standards for Air Quality (NESAQ). The nearest gazetted air shed to the site is the Cromwell Air Zone, which is part of Air Zone 1 as defined in the Air Plan and Airshed 1 as gazetted in the NES Air. The northern boundary of Airshed 1 is

approximately 10.5 km to the south of the quarry.

### 3.12 Cultural

Schedule 1D of the RWP identifies the spiritual and cultural beliefs, values and uses associated with water bodies of significance to Kai Tahu. The Amisfield Burn is not identified in this schedule, however the Clutha River/Mata-Au between Alexandra and Lake Wanaka is identified in Schedule 1D as having the following values:

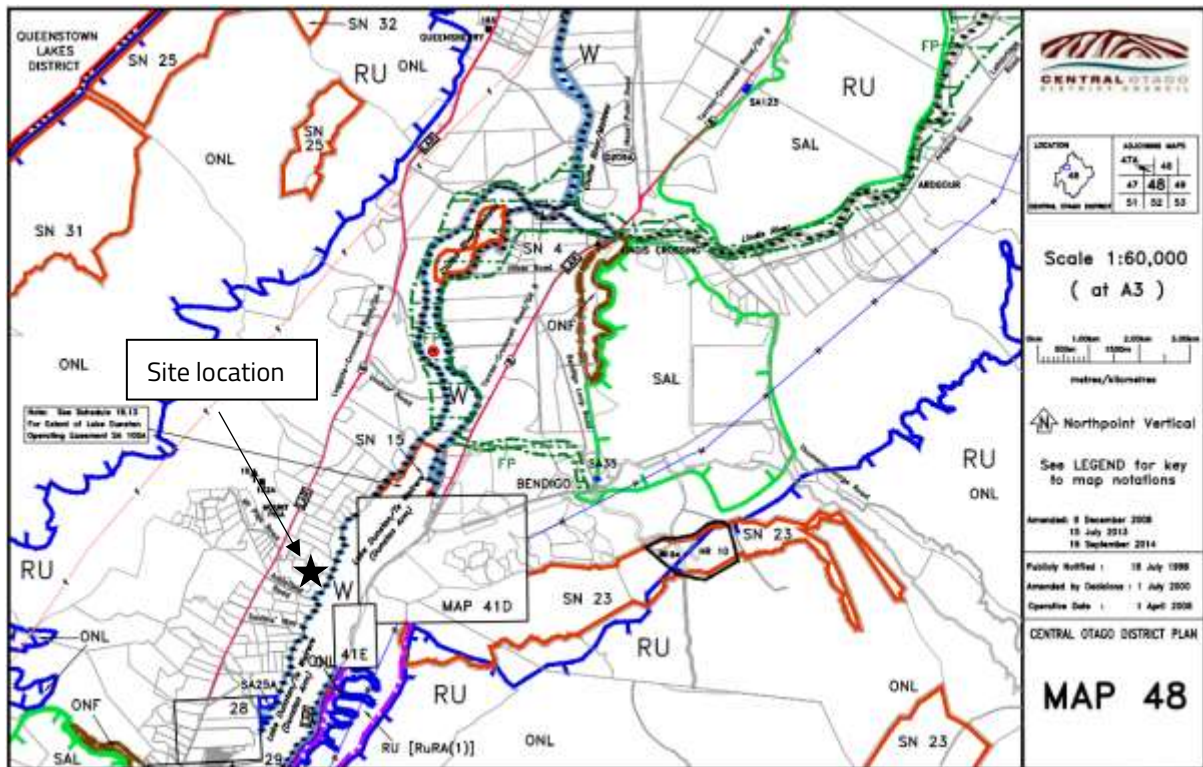
- Kaitiakitanga: the exercise of guardianship by Kai Tahu, including the ethic of stewardship.
- Mauri: life force.
- Waahi tapu and/or Waiwhakaheke: sacred places; sites, areas and values of spiritual values of importance to Kai Tahu.
- Waahi taoka: treasured resource; values, sites and resources that are valued.
- Mahika kai: places where food is procured or produced.
- Kohanga: important nursery/spawning areas for native fisheries and/or breeding grounds for birds.
- Trails: sites and water bodies which formed part of traditional routes, including tauraka waka (landing place for canoes).
- Cultural materials: water bodies that are sources of traditional weaving materials (such as raupo and paru) and rongoa (medicines).

## 4. ACTIVITY CLASSIFICATION

### 4.1 Central Otago District Plan

#### 4.1.1 Zoning

The application site is located within the Rural Zone as shown on Map 48 of the CODP (**Figure 15**). There are no designations, scheduled items or natural hazard limitations identified on Map 48 that relate to the site. Map 48 does identify State Highway 6 and Lake Dunstan/Te Wairere.



**Figure 15: CODP zoning of the application site**

#### 4.1.2 Activity classification

The proposed expansion of the Amisfield Quarry in the Rural Zone is not an activity which is specifically described in the CODP.

Under Rule 4.3.1, any activity that is not listed as a controlled, discretionary (restricted), discretionary, or non-complying activity and that complies with the rules and standards set out in Sections 11 to 15 of the Plan and the standards set out in Rule 4.7.6 is a permitted activity. An assessment of the relevant rules/standards is included in **Table 5**.

**Table 5: Assessment of permitted activity standards**

Standard	Assessment
<b>4.7.6.B (b)(i) Traffic Generation and Characteristics of Activities</b>	<p>The proposed activity does not comply with standard 4.7.6.B (b)(i)</p> <p>The proposed activity involves more than three persons engaged in an activity of an industrial nature.</p> <p>An activity that breaches Standard 4.7.6.B (b)(i) is considered a discretionary activity.</p>
<b>4.7.6.C Tree Planting</b>	<p>The proposed activity complies with standard 4.7.6.C.</p>



	<p>Trees will be planted as a method to screen activities associated with the operation of the expanded quarry. The location of planting (not conifers) will be set back approximately 550 m from the Luggate-Cromwell Road.</p>
<b>4.7.6 D. Visual Effect of Buildings and Structures</b>	<p>The proposed activity complies with standard 4.7.6 D.</p> <p>All buildings will be finished in materials and colours to comply with 4.7.6 D. (i), (ii) and (iii).</p>
<b>4.7.6 E. Noise</b>	<p>The proposed activity does not comply with standard 4.7.6 E.</p> <p>The District Plan permitted noise limits for the Rural Zone will be complied with except for a predicted 4 dB infringement at 1308 Luggate-Cromwell Road between 06:00 and 07:00, Monday to Saturday.</p> <p>The existing consent allows for a 5dB infringement at all receivers.</p>
<b>4.7.6 F. Storage</b>	<p>The proposed activity complies with standard 4.7.6 F.</p> <p>All activities within the expanded quarry will be screened from Luggate-Cromwell Road by bunding and planting. Material to be excavated and stored does not attract animals.</p>
<b>4.7.6 G Provision of Services</b>	<p>The proposed activity complies with standard 4.7.6 G.</p> <p>Sewage/wastewater is managed by way of on-site storage and is pumped out monthly by Wastetech Services. Compliance with Rules 12.7.1 and 12.7.3 is assessed below.</p>
<b>4.7.6. H Signs</b>	<p>The proposed activity does not comply with standard 4.7.6 H.</p> <p>The proposed sign is larger than 3 m<sup>2</sup>.</p> <p>An activity that breaches Standard 4.7.6. H is considered a discretionary (restricted) activity.</p>
<b>4.7.6 J. Earthworks for Access Tracks and Extraction Activities</b>	<p>The proposed activity does not comply with standard 4.7.6 J.</p> <p>The area of the proposed expansion is 8 ha and the volume of material that will be extracted is estimated to be 4,600,000 tones.</p> <p>An activity that breaches Standard 4.7.6. J(b) is considered a discretionary activity.</p>
<b>4.7.6 K. Clearance of Indigenous Vegetation</b>	<p>Standard 4.7.6 K does not apply to the proposed activity.</p>

	The proposed expansion area is not listed in Schedule 19.6.1 or 19.6A.
<b>4.7.6KA Clearance of Indigenous Vegetation</b>	<p>Standard 4.7.6K does not apply to the proposed activity.</p> <p>While indigenous species are proposed to be removed within the proposed expansion area, they are not listed in Rule 4.7.6KA.</p>
<b>12.7.1 Access Standards from Roads</b>	<p>The proposed activity complies with standard 12.7.1.</p> <p>The Transport Assessment provides a detailed assessment of the proposal against Rule 12.7.1. In summary it is noted that existing site access is constructed to an acceptable standard as per the CODP and sight lines are in excess of 280 m.</p>
<b>12.7.2 Parking</b>	<p>The proposed activity does not comply with standard 12.7.2.</p> <p>The vehicle parking area within the site is unsealed, individual parking spaces are not delineated and landscaping requirements are not complied with. It is noted that the requirements set out under 12.7.2 are not necessarily applicable to an activity such as a quarry.</p>
<b>12.7.3 Loading and Manoeuvring</b>	<p>The proposed activity complies with standard 12.7.3.</p> <p>The loading area in the existing quarry varies depending on the product being collected, however is at least 200 m from Luggate-Cromwell Road and easily provides sufficient space for quarry vehicles, including trucks, to enter, load and exit the site safely and efficiently.</p>
<b>12.7.4 Noise</b>	<p>The proposed activity complies with standard 12.7.4.</p> <p>Where required, noise will be measured in accordance with the provisions of <i>NZS 6801:1991 Measurement of Sound</i> and assessed in accordance with the provisions of <i>NZS 6802:1991 Assessment of Environmental Sound</i>.</p> <p>The construction noise will readily comply with the guideline limits of <i>NZS 6803:P1984 The Measurement and Assessment of Noise from Construction, Maintenance, and Demolition Work</i> without any particular mitigation being required.</p>
<b>12.7.5 Signs</b>	<p>The proposed activity complies with standard 12.7.5(v).</p> <p>The proposed sign is not described by 12.7.5 (i)(a)-(h). The proposed sign uses lettering larger than 160 mm, colours different from standard traffic control signs, and is located on a straight stretch of road, at a right angle to the flow of vehicles and is next to the existing quarry access.</p>

<b>12.7.6 Lightspill Standard</b>	<p>The proposed activity complies with standard 12.7.6.</p> <p>Site lighting has been designed to ensure light spill on neighbouring properties will not be greater than 10 lux (horizontal and vertical) at a notional boundary of adjoining residential properties.</p>
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The proposed activities to which the rules/standards listed in **Table 5** apply collectively represent the proposed expansion of the quarry. It is therefore considered appropriate to bundle the activities, meaning the proposal must be processed under the most restrictive activity classification. Resource Consent is therefore sought for the expansion of the quarry as a discretionary activity.

## 4.2 The Regional Plan: Air for Otago

### 4.2.1 Activity classification

Rules 16.3.5.2 and 16.3.5.3 in the Air Plan provide for discharges from the sorting, crushing, screening, conveying and storage of powdered or bulk products and discharges from mineral extraction and processing to be undertaken as a permitted activity provided certain conditions are met. **Table 6** below provides an assessment of the proposed activity against Rules 16.3.5.2 and 16.3.5.3.

**Table 6: Assessment of permitted activity standards that apply to the proposed discharge of contaminants to air**

Rule	Assessment
<p><u>Rule 16.3.5.2 Discharges from the sorting, crushing, screening, conveying and storage of powdered or bulk products</u></p> <p>The discharge of contaminants into air from the sorting, crushing, screening, storage and conveying (including loading and unloading) of fertilisers, grains, berries, coal, coke, wood chips, sawdust, wood shavings, bark, sand, aggregates, and other powdered and bulk products whether in dry or liquid form, where:</p> <p>(1) The total capacity of outside storage of bulk materials is less than 1,000 m<sup>3</sup> if located on a site in Air Zone 1 or 2; and</p> <p>(2) The crushing and screening of bulk materials is at a rate less than 100 tonnes an hour; is a permitted activity, providing any discharge of odour, or particulate matter is not offensive or objectionable at or beyond the boundary of the property.</p>	<p><b>Does not comply.</b></p> <p>The Amisfield Quarry is located in Zone 3 of the Air Plan meaning the clause (1) restriction on the outdoor storage capacity for bulk material does not apply capacity to the quarry.</p> <p>The applicant seeks resource consent for the maximum capacity of their wash plant which is capable of crushing and screening 250 tonnes of material per hour, noting that it generally operates at 150 tonnes per hour.</p>

<p><u>Rule 16.3.5.3 Discharges from mineral extraction and processing</u></p> <p>The discharge of contaminants into air from:</p> <p>(1) The extraction of minerals from the surface or from an open pit at a rate less than 20,000 cubic metres per month and 100,000 cubic metres per year; or</p> <p>(2) The crushing and screening of minerals at a rate less than 200 tonnes an hour; or</p> <p>(3) The drying or heating of minerals from single activities or a combination of activities on one site with equipment that has a heat generation capacity of less than 500 kW; or</p> <p>(4) The making of refractory, bricks or ceramic products at a rate less than 200 kg/hr of products; is a permitted activity, providing:</p> <p>(a) The mineral extraction, crushing and screening activities are located in Air Zone 3; and</p> <p>(b) In the case of equipment installed after 28 February 1998, any chimney complies with Schedule 6 (“Determination of Chimney Heights”); and</p> <p>(c) Any discharge of smoke, odour or particulate matter is not noxious, dangerous, offensive or objectionable at or beyond the boundary of the property.</p>	<p><b>Does not comply</b></p> <p>The proposed annual rate of abstraction is 200,000 cubic metres which exceeds the permitted amount of 100,000 cubic metres.</p> <p>The applicant seeks resource consent for the maximum capacity of its existing wash plant which is capable of crushing and screening 250 tonnes of material per hour, noting that it generally operates at 150 tonnes per hour.</p> <p>No drying or heating of minerals is proposed, nor is the making of refractory, bricks or ceramic products.</p> <p>The discharge of dust will not be noxious, dangerous, offensive or objectionable at or beyond the boundary of the property.</p>
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Noting that the proposed activity does not comply with the relevant permitted activity rules, Rule 16.3.14.1 (included below) applies and resource consent is required as a discretionary activity.

*6.3.14.1 Discretionary activities (general rule)*

*The discharge of contaminants into air from any process or activity on an industrial or trade premises:*

*(1) Excluding any discharge associated with the following activities regulated by the Regional Plan: Waste:*

- (i) A contaminated site;*
- (ii) A facility for the treatment or disposal of hazardous wastes;*
- (iii) A new or operating landfill;*
- (iv) A closed landfill;*
- (v) An offal pit on production land, intensive farm, or industrial or trade premises;*
- (vi) A farm landfill;*
- (vii) Composting or silage production; or*
- (viii) A greenwaste landfill; and*

*(2) Which is not expressly provided for by the rules of this Plan; and*

*(3) Which is not a prohibited activity under Rule 16.3.1.1, 16.3.3.1 or 16.3.12.1;*

## 4.3 Regional Plan: Water for Otago

### 4.3.1 Activity classification

#### 4.3.1.1 Abstraction of groundwater

Rule 12.2.2.2 of the RWP provides for the abstraction of groundwater as a permitted activity subject to a number of conditions. **Table 7** below provides an assessment of the proposed abstraction of groundwater against the conditions of Rule 12.2.2.2.

**Table 7: Assessment of permitted activity standards that apply to the abstraction of groundwater under the RWP**

Rule	Assessment
<p>12.2.2.2 Except as provided for by Rules 12.2.1.1 to 12.2.2.1, the taking and use of groundwater is a permitted activity, providing:</p> <p>(a) No lawful take of water is adversely affected as a result of the taking; and</p> <p>(b) The water is not taken from any aquifer identified in Schedule 2C; and</p> <p>(c) The water is not taken from within 100 metres of any wetland, lake or river; and</p> <p>(d) [Repealed – 1 March 2012]</p> <p>(e) [Repealed – 1 March 2012]</p> <p>(f) The take is for a volume no greater than 50,000 litres per day, at any landholding, from the following aquifers:</p> <p style="padding-left: 20px;">(i) Lower Waitaki Plains Groundwater Protection Zone A (as identified on Maps C15 and C16); and</p> <p style="padding-left: 20px;">(ii) Inch Clutha Gravel (as identified on Maps C26 and C27); and</p> <p>(g) Except as provided by Condition (f) above, the take is for a volume no greater than 25,000 litres per day, at any landholding, elsewhere in Otago; and</p> <p>(h) No back-flow of any contaminated water occurs to the aquifer; and</p> <p>(i) The taking of groundwater is not suspended.</p> <p>The Otago Regional Council may, by public notice, suspend the taking of water under this rule if the taking of water, under a resource consent has had to cease in accordance with Rule 12.2.3.5, for the aquifer from which the taking of water under this rule is occurring.</p>	<p><b>Does not comply</b></p> <p>Bore G41/0127 is located within 100 m of a tributary of the Amisfield Burn (approximately 50 m to the southwest).</p> <p>It is proposed to abstract a maximum of 3,024 m<sup>3</sup> a day which exceeds the 25 m<sup>3</sup> permitted activity limit.</p> <p>In all other respects the proposed abstraction of groundwater complies with the permitted activity standards of Rule 12.2.2.2.</p>

There is no relevant controlled activity rule, and the relevant restricted discretionary rule (Rule 12.2.3.2A) only applies to aquifers for which a restriction is identified in Schedule 4B of the RWP. Therefore, the proposed activity is a discretionary activity under Rule 12.2.4.1:

*Rule 12.2.4.1 (i) Except as provided for by Rules 12.2.1.1 to 12.2.3.5 the taking and use of groundwater is a discretionary activity.*

#### 4.3.1.2 Discharge to land

The discharge of water or contaminants from gravel washing operations is not specifically provided for by any of the permitted activity rules in the RPW. As the discharge will be from an industrial activity, the discharge is a discretionary activity under Rule 12.B.4.1, which relates to the discharge of water or contaminants from an industrial or trade premise to water or to land. Rule 12.B.4.1 is included below:

*Rule 12.B.4.1 The discharge of water (excluding stormwater) or any contaminant from an industrial or trade premises or a consented dam to water or to land is a discretionary activity, unless it is permitted by Rule 12.B.1.6, 12.B.1.7, 12.B.1.10 or 12.B.1.11.*

#### 4.3.1.3 Construction of Bore

Under the RWP the construction of a bore is carried out for the purpose of taking groundwater, or which results in groundwater being taken. It is therefore necessary to authorise the construction of a bore given excavation is proposed to intercept groundwater. Rule 14.1.1.1 of the RWP provides for the construction of a bore as a controlled activity.

*14.1.1.1 The excavation, drilling or other disturbance of land, other than in the bed of any lake or river, for the purpose of creating a bore, is a controlled activity.*

*In granting any resource consent for the excavation, drilling or other disturbance of land in terms of this rule, the Otago Regional Council will restrict the exercise of its control to the following:*

- (a) The location of the bore including its relationship to other bores and other activities; and*
- (b) The planned depth of the bore; and*
- (c) The management of the bore head and maintenance of the bore; and*
- (d) The nature of the bore; and*
- (e) The method of drilling or excavation; and*
- (f) The duration of the resource consent; and*
- g) The information and monitoring requirements; and*
- (h) Any bond; and*
- (i) The review of conditions of the resource consent.*

## 5. ASSESSMENT OF ENVIRONMENTAL EFFECTS

In addition to the application being made in the prescribed forms and manner, Section 88 of the RMA also requires that every application for consent includes an assessment of the effects of the activity on the environment as set-out in Schedule 4 of the RMA.

### 5.1 Positive effects

It is important to consider the positive effects of the proposed quarry expansion. The Central Otago and Queenstown Lakes districts are amongst the fastest growing regions in the country. To support this growth, aggregate is an important component in the construction of housing, commercial and industrial buildings and roading infrastructure.

Amisfield Quarry is well positioned and has been enabling the region's growth for decades. The applicant proposes to lift annual production in order to be able to continue to support regional growth on demand, without delaying supply. Locating the supply of aggregates close to the areas of demand reduces economic, environmental and social costs. Aggregate is particularly sensitive to transport costs and without the quarry, aggregate would need to be supplied from quarries located further away, adding significant transport costs and will subsequently result in higher aggregate prices and also higher carbon emissions.

The quarry will also continue to generate direct employment for on-site staff and indirect employment for workers in the local construction and roading industries, truck drivers, maintenance staff and contractors, for a longer period that would otherwise occur under the existing consents.

A further positive effect will be the construction of a right-hand turning lane into the quarry, providing a vital safety improvement to the high-volume State Highway 6.

Overall, the expansion of the quarry and the other proposed changes will enable local economic wellbeing and will continue to see the efficient use and development of the region's natural resources.

### 5.2 Dust effects

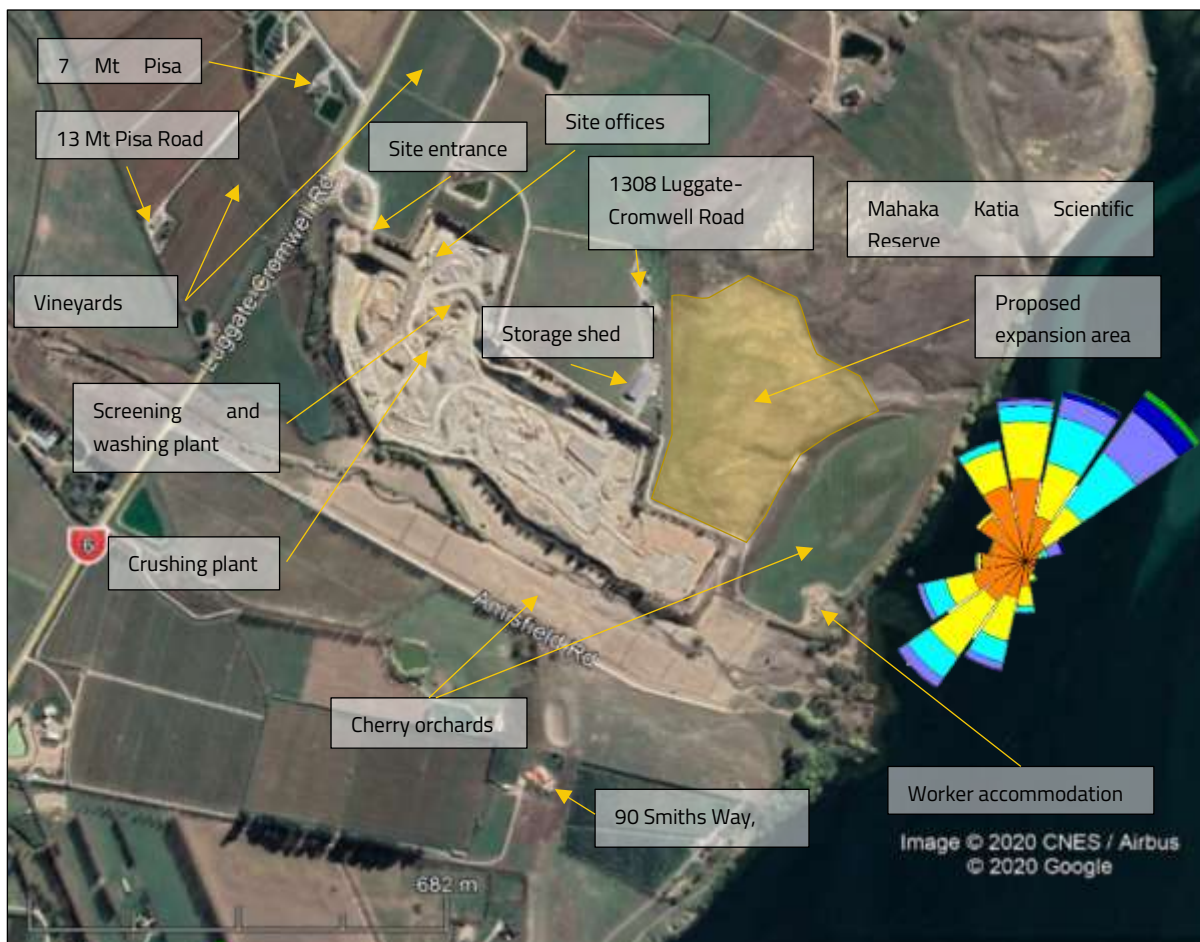
Beca were commissioned to provide an assessment of the potential environmental effects resulting from discharges associated with the expansion of the quarry and its ongoing operation. The relevant report is included as **Appendix 4**. The Dust Assessment provides:

- A brief summary of the current quarrying operation and that proposed, where they relate to discharges to air;
- A description of the nature of the discharges to air resulting from the existing and proposed activities;
- An assessment of the receiving environment in terms of the potential influences on the

environmental effects of the emissions to air from the site;

- A description of the assessment methodology;
- An assessment of the potential effects of the proposed changes on air quality;
- A consideration of the National Environmental Standards for Air Quality (NESAQ); and
- A summary of conclusions and findings of the assessment.

The Dust Assessment notes that for the majority of the sensitive receptors located in the vicinity of the quarry (refer **Figure 16**), the potential for adverse effects resulting from dust emissions associated with the proposed expansion of the quarry and its ongoing operation will be negligible providing appropriate mitigation measures are adopted.



**Figure 16: Aerial photograph of sensitive receiving locations overlaid with windrose diagram**

For the sensitive receptors located within 100m of the site, the Dust Assessment identifies that there is a risk of short-term adverse effects occurring in dry windy conditions when active quarrying activities are taking place within 100m of the boundary of the site. Included in **Table 8** are locations identified in the Dust Assessment as being sensitive to dust and the frequency these locations are downwind of winds fast enough to pick up dust.



**Table 8: Frequency (during the monitoring period) of winds that could deposit dust on sensitive locations**

Sensitive receiving location	Existing quarry	Expanded quarry
Residence at 1308 Luggate-Cromwell Road	1.7%	0.1 %
Rural land at 1308 Luggate-Cromwell Road	1.8 %	7.9 %
Storage shed at 1308 Luggate-Cromwell Road	1.7 %	7.9 %
Vineyard at the Quarry Entrance	1.7 %	NA
Workers accommodation at 1286 Luggate-Cromwell Road	0.1 %	0.1 %
Orchard east of existing and expanded quarry (Lot 1 DP 508108)	1.7 %	1.7 %
Orchard south of existing and expanded quarry (Lot 2 DP 508108)	8.3 %	na
Residence at 7 Mt Pisa Road	0.1 %	na
Vineyards to the west (across Luggate-Cromwell Road)	6.1 %	na
Mahaka Katia Scientific Reserve	na	1.75 %

For the majority of the sensitive receiving locations identified in **Table 8** the frequency of winds likely to result in an effect associated with dust deposition is less than 2%. The locations identified to be most at risk include the orchard south of application site (Lot 2 DP 508108), the rural land and storage shed at 1308 Luggate-Cromwell Road and Vineyards to the west of the existing quarry where the frequency of winds occurring that could pick up dust is 8.3%, 7.9 % and 6.1% respectively. The Dust Assessment concludes that the risk of adverse effects occurring at these locations is low and that the magnitude of potential effects is slight in the case of the orchards and negligible in case of activities at 1308 Luggate-Cromwell Road.

To mitigate any potential for dust generated on site being offensive or objectionable beyond the boundary, the Dust Assessment recommends additional mitigation and monitoring methods to minimise the potential effects of dust from the expanded quarry. The additional mitigation and monitoring methods include permanent continuous on-site monitoring of wind speed and wind direction and continuous monitoring of ambient total suspended particulate matter concentrations when quarrying is taking place within 200m of sensitive receptors located within 100m of the quarry boundary. Windspeed and TSP concentration alert limits are recommended, which if exceeded will require dust control measures on site to be reviewed, together with alarm limits, which will require activities creating dust to cease until wind conditions improve. Proposed mitigation and monitoring is set out in Section 7 of the Dust Assessment.

The applicant is willing to accept a condition which prohibits any offensive or objectionable effects beyond the site boundary. It is considered that any adverse effects of the proposal from discharges to air, including health effects, will be less than minor and the relevant standards and guidelines will not be exceeded.

### 5.3 Landscape and visual amenity effects

Align were commissioned to provide an assessment of the potential landscape and visual amenity effects associated with the proposal. The relevant report is included as **Appendix 5**. The Landscape and Visual Assessment provides:

- A description of the existing landscape, including the visual amenity values it is characterised by;
- An assessment of potential effects on landscape values, including a comparison of the application site from different viewpoints using visual representations generated to give an indication of what the site will look like following the expansion of the quarry; and
- Methods to mitigate the effect on the proposed expansion of the quarry on landscape and visual amenity values.

There are no identified landscape values or significant natural features identified within the CODP relating to the Amisfield Quarry. The closest landscape features scheduled as Outstanding Natural Landscapes in the CODP include the Pisa Range and Dunstan Mountains. Lake Dunstan is located approximately 225 m (at its closest point) from the expansion land.

The degree to which landscape and visual amenity effects are considered adverse depends to a large extent on a landscape's context, including its existing degree of naturalness and/or modification, vegetation patterns, scale, visibility and levels of public appreciation for the landscape and an expectation of what can reasonably be expected to occur in the landscape. The Amisfield Quarry has been an existing feature within the wider landscape since 1992 and prior to the construction of the Clyde Dam, the quarry existed on the terraces of the Clutha River that are now flooded. In addition to the Amisfield Quarry, there are other quarries in the area, including the Parkburn Quarry which adjoins Lake Dunstan 2 km to the south of the application site. The surrounding landscape is also subject to extensive horticulture and viticulture activities and is located close to State Highway 6 which links Cromwell to Wanaka.

The Landscape and Visual Amenity Assessment considers the physical and perceptual effects of the proposal on the landscape to be moderate and low respectively, noting that these effects are mitigated by the existing high levels of horticultural, agricultural and quarrying activity in the general area. Perceptual effects in particular are mitigated by the limited extent to which the quarry is visible from viewing locations in the surrounding environment. Amenity effects are also considered low. Cultural and heritage effects with reference to the landscape are considered very low.

The Landscape and Visual Amenity Assessment includes visual simulations from key viewing locations to assess the visual effects of the proposal. The Landscape and Visual Amenity Assessment considers visual effects to be moderate-low for the viewing location that is representative of views from residences adjacent to and North/West of the application site. The visual effects of the proposal on all the other viewing locations assessed are considered low.

Consistent with other technical assessments submitted in support of this application, the Landscape and Visual Amenity Assessment recommends a set back and bunding. The proposed set back and bunding will have the effect of providing a degree of separation and limiting visual contact from locations adjacent to the proposed quarry expansion. When viewed from more distant locations, the proposed bunding will aid in screening the excavation and create a 'soft edge' to the expanded quarry. Included below in **Figure 17** are simulations that demonstrate the effectiveness of the proposed bund at integrating the expanded quarry into the surrounding landscape.



**Figure 17: Visual representation of the proposed development when viewed from DoC reserve**

Overall the Landscape and Visual Assessment considers the adverse landscape and visual effects of the proposal when viewed from the greater landscape to be low. Moderate low effects apply to limited sites located directly adjacent to the application site. It is considered that the proposal will result in just a slight change to the existing character of the landscape and minimal reduction in the perceived amenity. It is considered that landscape and visual amenity effects are less than minor.

## 5.4 Transport effects

Abley Limited were commissioned to provide an assessment of the transport effects associated with the proposal. The Transport Assessment is included as **Appendix 3**.

The Transport Assessment provides a description of the adjoining roading network, assesses the relevant rules in the CODP, sets out the number of existing and proposed vehicles movements and recommended upgrades to the State Highway roading network to mitigate transport effects.

Associated with the proposed increased rate of production is an increase in the number of heavy vehicle movements to and from the site, this represents an increase in potential adverse effects on the State Highway roading network i.e. a reduction in the ability of the site access to be used safely and efficiently.

The Transport Assessment concludes that it is necessary to install a right turning facility to mitigate effects on the State Highway roading network associated with the increase in heavy vehicle movements. The NZTA Planning Policy Manual (Appendix 5B: Accessway standards and guidelines) notes that accessways that are likely to generate more than 100 equivalent car movements (ecm) per day are required be designed as intersections. One truck and trailer to and from a property equates to ten ecm, which means the anticipated trip generation following the expansion is in the order of 800 ecm. The existing site access is considered to provide adequate provision for vehicles turning left to enter and exit the site.

The proposal complies with all transport related rules of the Central Otago District Plan relating to site access. While the existing onsite parking provisions are largely non-compliant with the corresponding CODP rules, it is noted that these are all existing non-compliances that are not expected to be exacerbated as a result of the potential modest increase in light vehicle parking demand. It is also noted that the parking related rules such as delineating individual parking spaces and provision of landscaping are not necessarily relevant to an activity such as a quarry.

Providing the site access is upgraded in accordance with the appropriate standards as stipulated in the Transport Assessment, as is proposed, Abley consider that the roading network will continue to operate safely and efficiently and there could be some improvement for vehicles turning right into the site.

## 5.5 Noise effects

Styles Group were commissioned to provide an assessment of the noise effects associated with the proposal. The relevant report is included as **Appendix 6**.

The Assessment of Noise Effects provides an overview of the application site and proposed development with respect to noise generation, a summary of relevant noise performance standards, predicted noise levels associated with the operation and construction of the quarry and an assessment of the potential noise effects.

The existing noise environment is largely determined by the operation of the existing quarry, which is managed to comply with the current land use consent. Ongoing compliance with currently consented noise limits is considered to represent an acceptable level of effect (less than minor) for proposed expansion of the quarry. Included below is a summary of effects discussed in the Noise Assessment as they relate construction and operational noise and proposed mitigation measures.

### 5.5.1 Construction noise

The proposed expansion of the quarry will involve the construction of new earth bunds. The use of excavators, trucks and loaders to form the bunds will be similar to the existing operational noise and will only take place between the hours of 07:30 and 18:00, Monday to Saturday. The construction noise will readily comply with the guideline limits of NZS 6803:1984P without any special mitigation being required. This is due to the distance between the proposed construction works and any dwelling that may be occupied during the works. Potential construction noise effects associated with the proposed expansion of the quarry are considered to be negligible to low.

### 5.5.2 Operational noise

The location at which aggregate is processed is not proposed to move. The proposal will instead involve the use of machinery to excavate within the expansion land and to transport aggregate to the processing plant in the existing quarry. Given the proximity of the dwellings to the proposed expansion land, specifically the dwelling at 1308 Luggate-Cromwell Road, noise associated the operation of machinery in the expanded quarry is proposed to be mitigated to ensure effects remain low (less than minor) or negligible.

To reduce the noise levels at the notional boundary of 1308 Luggate-Cromwell Road, earth bunds are proposed to be constructed above the northern boundary of the existing pit to mitigate noise associated with the processing plant and above the western boundary of the expanded area to mitigate noise associated with the operation of machinery in the expanded pit.



Figure 18 shows the location of proposed bunding that will address noise effects.



**Figure 18: Approximate location of proposed bunds to mitigate noise effects**

In addition to the proposed bunding, significant mitigation of noise from the expansion area will be provided by the progression of the excavation works from south to north. Excavation in the expansion area will begin in the south-west corner where the cut will be approximately 7 m. This will continue east towards 1286 Luggate-Cromwell Road and then progress north towards 1308 Luggate-Cromwell Road. All noise from excavation works will therefore be mitigated by the 7 m cut for 1286 Luggate-Cromwell Road and the 7 m cut plus a 3 m high earth bund for 1308 Luggate-Cromwell Road.

While they cannot be relied upon as a mitigation measure, stockpiles within the pit are typically up to 5 m in height and act as internal bunds that further mitigate noise effects. The exact height and location of the stockpiles vary depending on operations, which makes it difficult to accurately represent them in a noise model and consequently stockpiles have not been included in modelling to allow for a worst-case scenario to be assessed. The noise assessment notes that noise levels at the nearest sites will at times be further reduced by the screening from stockpiles by approximately 5 dB to 10 dB.

Providing the proposed mitigations are adopted (as is proposed), the CODP permitted noise limits for the Rural Zone will be complied with except for a predicted 4 dB infringement at 1308 Luggate-Cromwell Road between 06:00 and 07:00, Monday to Saturday. However, an infringement of up to 5 dB at all receivers is

presently enabled by the existing consent. The predicted noise levels for the proposed operation are fully compliant with the consented noise limits for the existing activity. Recommended conditions of resource consent as stated in the Noise Assessment are included below.

1. Before excavation of the expansion area begins, the consent holder must construct earth bunds above the northern boundary of the existing pit and above the western boundary of the expansion area. The heights, specifications and locations of the constructed bunds must be in accordance with the application site plans and the acoustic assessment lodged with the application (prepared by Styles Group dated 1 July 2020)
2. Processing plant must not be operated on site outside the hours of 07:00 to 19:00, Monday to Saturday
3. The noise from the operation of the quarry must comply with the following noise limits at the notional boundary of any site when measured in accordance with NZS 6801:2008 Acoustics – Measurement of environmental sound and assessed in accordance with NZS 6802:2008 Acoustics – Environmental noise.

Day	Time period	Noisie limit
Monday to Saturday	07:00 to 19:00	55 dB LAeq
	At all other times	45 dB LAeq and 75 dB LAmax
Sundays and public holidays	At all times	45 dB LAeq and 75 dB LAmax

## 5.6 Lighting effects

The quarry will operate in low light conditions during the winter and artificial lighting will continue to be required to allow the quarry to operate. Potential light sources include:

- dormant lighting to be used when the site is unoccupied, such as security lights;
- headlights on vehicles operating within and visiting the quarry; and
- lighting towers used to facilitate operations under low visibility conditions.

The only sensitive residential receptor to the potential effects of light spill is the residence at 1308 Luggate-Cromwell Road. Providing lighting towers are oriented inward and the quarry does not operate past 7 pm, the effects associated with light spill are expected to be negligible (less than minor). Lights from vehicles moving to and from the site will generate some light spill effects, however this is not expected to be any greater than light spill from State Highway 6 and will not impact residential dwellings.



## 5.7 Groundwater abstraction effects

Landpro were commissioned to provide an assessment of effects associated with the proposed increase rate of groundwater abstraction. The relevant report is included as **Appendix 7**.

The Assessment of Groundwater Effects provides an overview of the hydrogeological setting, a description of potential effects of the proposed increased rate of groundwater abstraction and modelling to determine the significance of those effects. In summary the assessment confirms that any potential effects on groundwater availability at neighbouring bores would be negligible (less than minor) and effects on surface water are nil.

### 5.7.1 Stream depletion

In the vicinity of the applicant's proposed abstraction, depths to groundwater in neighbouring bores appear to be around 20 m. The Amisfield Burn is not deeply incised, and this information suggests that the stream is decoupled from the groundwater system.

Aquifer testing was undertaken in relation to the previous consent application for the existing water permit, and while the relevant delegated report noted that there could be a stream depletion effect on the Amisfield Burn, based on the available information and test results, it was concluded that drawdown effect would be less than 5 L/s, it can therefore be concluded that effects on surface water bodies are less than minor.

### 5.7.2 Groundwater drawdown in neighbouring bores

Since the consented rate of groundwater abstraction was assessed in 2016, an additional bore (G41/0238) has been installed on a property immediately to the north of the quarry. This bore is closer (230 metres) to G41/0456 than either of the neighbouring bores to the north- west of the property. These bores and their approximate distances are illustrated below in **Figure 19**.



**Figure 19: Location of neighbouring bores relative to the applicant's bores**

To determine the scale of effect on the neighbouring bores, the level of drawdown was modelled based on two scenarios outlined below, results of modelling are summarised in **Table 9**.

Scenario 1 - The majority of water taken is discharged back to the aquifer as recharge i.e. a non-consumptive take.

Scenario 2 - No water taken is discharged back to the aquifer i.e. a consumptive take.

**Table 9: Modelled bore interference drawdown effects**

<b>Bores</b>	<b>Current water permit @600 m<sup>3</sup>/day =6.9 L/s for 360 days</b>	<b>Proposed water permit @1,119 m<sup>3</sup>/day =13 L/s for 280 days</b>	<b>Worst possible scenario @ 3,024 m<sup>3</sup>/day = 35 L/s for 280 days</b>
G41/0238 (230 m)	0.22 m	0.40 m	1.1 m
G41/0321 (320 m) G41/0220 (320 m)	0.19 m	0.34 m	0.92 m

Modelling indicates that the ORC's threshold for significant interference (drawdown of 0.2 m set out in Policy 6.4.10B, Schedule 5B) would be breached under both scenarios modelled. However, without any reference to potential environmental effects and site-specific conditions, the extent to which this threshold provides a useful indication of the scale of effects is limited.

The Groundwater Effects Assessment compares the modelled drawdown with available groundwater depth to better understand the effect of the proposed groundwater abstraction on neighbouring bores. As detailed in the Groundwater Effects Assessment, there is considered to be at least 10 m of groundwater available, meaning even under Scenario 2 (worst case) the column of available groundwater would only reduce by 1.1 m and is more likely to be at or closer to 0.4 m.

Based on methods applied in Canterbury<sup>2</sup> where there has been considerable investment in developing guidelines for determining acceptable bore interference effects, a drawdown of 11% (1.1 m where there is 10 m of groundwater available) would be an acceptable negligible adverse effect and is highly likely to not be noticeable by the neighbouring groundwater users. Generally, a drawdown of more than 20% of the available groundwater resource is considered a significant effect.

### 5.7.3 Cumulative adverse effects

The Pisa Groundwater Management Zone is still considered by the ORC to be significantly under-allocated with (at July 2020) 2,135,128 m<sup>3</sup>/yr available for allocation out of a total of 6,500,000 m<sup>3</sup>/yr (ORC GIS). This strongly indicates that there would be no cumulative adverse effects that would arise from the proposed increase in take and use of water.

## 5.8 Efficiency of water take and use

A portion of the water take is proposed to be used for potable use, dust suppression and irrigation, these uses are generally considered to be consumptive as the water would be taken up by plants or evaporated and would not be returned to the source aquifer. The majority of the water to be abstracted will be used for aggregate washing and will be returned to the source aquifer by way of a soakage pond i.e. is a non-consumptive take. In addition to groundwater being returned to its source aquifer, washing plant has been fitted with fixed sprinklers which limit flow to ensure water use is restricted to what is necessary.

## 5.9 Water quality

Water used for gravel processing and dust suppression that is not lost directly to ground is collected and discharged to a soakage pond where it is returned to the source aquifer. The contaminants in the discharge will be naturally occurring silts and sands from the washing of the gravel, and the majority of the sediment will be removed from the water column by settling in the soakage pond and then by the filtering process as the water moves through the gravels.

Associated with the discharge of contaminated water to land via a soakage pond is the risk that concurrent lowering of groundwater levels through abstraction will induce land surface contaminants to enter the

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<sup>2</sup> Provides protection for groundwater users of 80% of the groundwater level that is exceeded for 80% of the time during proposed water use.

groundwater resource. Given the soakage ponds are at or close to the groundwater level, the existing resource consent requires that quarterly monitoring of suspended sediment concentrations by the applicant at bores G41/0455 and G41/0101, and one upgradient bore for comparison, either G41/0220 or G41/0321.

Since monitoring commenced, levels of suspended sediment in bores G41/0455 and G41/0101 have generally reflected levels in the up-gradient monitoring bore, which suggests the soakage pits are effectively filtering sediment. Providing the applicant continues to maintain the soakage ponds and prevents any overland flow to a surface water body (it is virtually impossible that such flow would occur), any effects of the proposed discharge of contaminants to land will be very low or negligible.

## 5.10 Cultural and heritage values

There are no cultural, heritage or archaeological sites identified in the CODP, Heritage NZ list or the New Zealand Archaeological Association (NZAA) site recording scheme that relate to the Amisfield Quarry. There are a number of sites recorded New Zealand Archaeological Association (NZAA) site recording scheme that exist in the wider environment, including one north of Smiths Way and another north of Gilmore Road. Despite the lack of any identified sites, there remains the potential for undiscovered archaeological evidence to be encountered during the expansion of the quarry. It is therefore considered appropriate that as a condition of resource consent, works are undertaken with an (ADP) in place. Given the risk of encountering archaeological evidence is highly unlikely and providing the works are undertaken with an ADP in place, it is considered that any potential effects on cultural and heritage values are negligible.

## 5.11 Natural ecosystems and habitats

Landpro Senior Ecologist Cees Bevers was commissioned to provide an ecological assessment of the proposal. The relevant report is included as **Appendix 8**.

The Assessment of Ecological Effects describes the ecological value of the proposed expansion land and the adjoining Mahaka Katia Scientific Reserve, assesses the effects of the proposal on these values and sets out appropriate mitigations to ensure the effects are minimal (less than minor).

The Ecological Assessment describes the proposed quarry expansion area as an ecologically disturbed site which is largely cultivated and dominated by exotic plant species, noting that some native plant species are present in small numbers and there is evidence that Banded dotterel forage on the land. As stated in Ecological Assessment, it is considered that the clearance of the plant species found on the proposed quarry expansion area will have no more than minor ecological effect, as the site is already cultivated and dominated by exotic weed species. It is considered that effects of the proposed expansion of the quarry on the ecological values attributed to the expansion land are minimal and do not require mitigation.

The Mahaka Katia Scientific Reserve is considered to have high ecological values due its remnant native plant community and is a known site for the breeding of banded dotterel and South Island pied oystercatchers.

Associated with the proposed operation of the expanded quarry at the boundary of the Mahaka Katia Scientific Reserve are potential environmental effects associated with noise and dust travelling over the boundary and the quarry operation being visible to species foraging on the Mahaka Katia Scientific Reserve. To mitigate these effects, the Ecological Assessment recommends that the expanded quarry is screened along its boundary with the Mahaka Katia Scientific Reserve using an earth bund and that the quarry is operated in accordance with mitigation measures recommended in the technical assessments for dust and noises effects.

Providing appropriate mitigations are adopted to manage noise and dust, it is considered that the ecological values associated with the Mahaka Katia Scientific Reserve will be appropriately protected to ensure effects on natural ecosystems and habitats within the reserve are minimal.

## 5.12 Natural Hazards

The application site is on flat land that is raised above the Amisfield Burn and is not located on or close to any known seismic fault lines. The expansion of the Amisfield Quarry will not give rise to any increase in risk of subsidence on neighbouring land due to setbacks and internal benching. The risk of the quarry being impacted by a natural hazard that results in environmental effects is exceptionally unlikely, it is therefore considered that environmental effects associated with natural hazards are negligible.

## 5.13 Hazardous substances

Industrial sites can become contaminated with hazardous substances where these are not effectively contained and managed. Hazardous substances at the Amisfield Quarry are managed in accordance with the Hazardous Substances and New Organisms Act 1996 (HSNO) e.g. fuel storage cells are bunded. Given the risk of hazardous substance spilling or leaking at the Amisfield Quarry is very unlikely and the Applicant has in the place the appropriate procedures to respond to a spill or leak if one did occur, it is considered that potential adverse effects on environment associated with hazardous substances are very low or negligible.

## 5.14 Summary of adverse effects and proposed mitigations

**Table 10** provides a summary of effects as described above and **Table 11** provides a summary of mitigations to address those effects. It is considered that providing the recommended mitigations adopted, overall the potential adverse environmental effects of the proposal will be less than minor.

**Table 10: Summary of effects associated with proposal**

Effect	Summary of effects of the proposal
Dust	<ul style="list-style-type: none"> <li>▪ While there is a risk of adverse effects associated with dust occurring in dry windy conditions, given the frequency at which these conditions occur and noting the mitigation methods proposed, it is considered that any effect will be minimal (less than minor).</li> </ul>
Landscape and visual amenity	<ul style="list-style-type: none"> <li>▪ It is considered that the proposal will result in just a slight change to the existing character of the landscape and minimal reduction in the perceived amenity. It is considered that landscape and visual amenity effects are less than minor.</li> </ul>
Transport	<ul style="list-style-type: none"> <li>▪ Following the proposed upgrade to the entrance of the quarry in accordance with NZTA standards, it is considered that the roading network will continue to operate safely and efficiently</li> </ul>
Noise	<ul style="list-style-type: none"> <li>▪ The consented noise limits for the operation for existing quarry will be complied with for the expanded quarry.</li> <li>▪ The construction noise from the formation of the earth bunds will comply with the relevant standard.</li> </ul>
Light	<ul style="list-style-type: none"> <li>▪ Providing lighting towers are oriented inward and the quarry does not operate past 7 pm, the effects associated with light spill are expected to be negligible.</li> </ul>
Groundwater	<ul style="list-style-type: none"> <li>▪ No overallocation of the Cromwell Terrace aquifer will result from the proposed increased rate of groundwater abstraction.</li> <li>▪ It is virtually certain that there is no connection between the underlying groundwater and the Amisfield Burn</li> <li>▪ Using the generally accepted method of modelling, the adverse effects on neighboring groundwater users are considered negligible, at a 4% maximum reduction in groundwater levels. This is significantly less than the generally used criterion of a maximum of a 20% reduction in available drawdown.</li> </ul>
Cultural and heritage	<ul style="list-style-type: none"> <li>▪ Given the extent to which the expansion land has been cultivated and the lack of archeological sites close to the site, the risk of encountering archaeological evidence is considered low.</li> <li>▪ Should archaeological evidence be encountered, effects will be a managed in accordance with an ADP.</li> </ul>
Ecological	<ul style="list-style-type: none"> <li>▪ Clearance of the plant species found on the expansion land poses a minimal environmental effect.</li> <li>▪ Providing the proposed dust mitigation measures are adopted, potential effects on the Mahaka Katia Scientific Reserve are considered minimal.</li> </ul>
Natural Hazards	<ul style="list-style-type: none"> <li>▪ The risk of the quarry being impacted by a natural hazard that results in environmental effects is exceptionally unlikely.</li> </ul>
Hazardous substances	<ul style="list-style-type: none"> <li>▪ The risk of environment effects associated with the use and storage of hazardous substances is managed through compliance HSNO and is considered minimal (less than minor).</li> </ul>

**Table 11 :Summary of proposed mitigations to address potential environmental effects**

Effect	Proposed mitigations
Dust	<p>Recommended mitigations to manage dust are described in detail in the Dust Assessment and summarised below:</p> <ul style="list-style-type: none"> <li>▪ Carrying out visual and instrumental monitoring so that wind speed and TSP concentration trigger values (to be included in the DMP) can be applied for reviewing and where necessary temporarily ceasing work.</li> <li>▪ Using water when required to dampen haul roads, stockpiles and yard areas that have the potential to generate dust;</li> <li>▪ Using water on crushing and screening equipment at all times;</li> <li>▪ Locating the crushing equipment on the pit floor as far as practicable;</li> <li>▪ Regularly cleaning paved roads of deposited debris;</li> <li>▪ Limiting vehicle speeds;</li> <li>▪ Keeping unsealed haul roads well maintained with coarse aggregate;</li> <li>▪ Planning potentially dusty activities such as stripping of overburden for days with favourable weather conditions</li> <li>▪ Minimising access to the working area to essential vehicles;</li> <li>▪ Minimising areas of exposed surfaces;</li> <li>▪ Locating stockpiles below ground level as far as practicable;</li> <li>▪ Covering truck loads of fine dusty materials leaving the site where possible.</li> </ul>
Landscape and visual amenity	<p>It is proposed to adopt a minimum 25 m (50 m within the vicinity of the dwelling at 1308 Luggate-Cromwell Road - Lot 2 DP 301379) set back between the boundary of the expansion land (Lot 3 DP 301379) and the edge of the quarry pit and construct bunding approximately 3 m high within the proposed set back. The proposed set back and bunding are included on the Site Plan (<b>Appendix 1</b>).</p> <p>It is proposed to adopt the following condition from the existing land use consent with respect to the eventual closure and rehabilitation of the quarry:</p> <ul style="list-style-type: none"> <li>▪ At least two years prior to ceasing the extraction of material for processing from the quarry, the consent holder shall submit to the Council for the approval of the Chief Executive of the Central Otago District Council a Closure and Rehabilitation Plan for the site. The Closure and Rehabilitation Plan shall provide for: <ul style="list-style-type: none"> <li>(a) Removal of all buildings, other structures and plant from the site</li> <li>(b) Recontouring of the land to provide a stable profile.</li> <li>(c) Management of dust to avoid nuisance beyond the site.</li> <li>(d) Re-establishment of topsoil and grass utilising best practice, supplemented by appropriate irrigation and maintenance for a period of two years.</li> <li>(e) Appropriate drainage of the site, so as to avoid ponding of water and uncontrolled runoff into any water body.</li> <li>(f) Leaving the site in a clean and tidy state</li> </ul> </li> </ul>

	The Closure and Rehabilitation Plan shall be prepared in consultation with adjoining land owners and occupiers and in submitting the Closure and Rehabilitation Plan feedback received from those persons shall be included for the information of the Chief Executive.												
Transport	It is proposed to install a right turning facility on State Highway 6 to facilitate entry to site. The right turning facility will be constructed in accordance with NZTA requirements. A concept design for the right turning facility is included in the Transport Assessment ( <b>Appendix 3</b> ).												
Noise	<p>The Noise Assessment (<b>Appendix 6</b>) recommends that the following conditions are adopted:</p> <ul style="list-style-type: none"> <li>▪ Before excavation of the expansion area begins, the consent holder must construct earth bunds above the northern boundary of the existing pit and above the western boundary of the expansion area. The heights, specifications and locations of the constructed bunds must be in accordance with the application site plans and the acoustic assessment lodged with the application (prepared by Styles Group dated 1 July 2020)</li> <li>▪ Processing plant must not be operated on site outside the hours of 07:00 to 19:00, Monday to Saturday</li> <li>▪ The noise from the operation of the quarry must comply with the following noise limits at the notional boundary of any site when measured in accordance with NZS 6801:2008 Acoustics – Measurement of environmental sound and assessed in accordance with NZS 6802:2008 Acoustics – Environmental noise.</li> </ul> <table border="1"> <thead> <tr> <th>Day</th> <th>Time period</th> <th>Noisie limit</th> </tr> </thead> <tbody> <tr> <td>Monday to Saturday</td> <td>07:00 to 19:00</td> <td>55 dB LAeq</td> </tr> <tr> <td></td> <td>At all other times</td> <td>45 dB LAeq and 75 dB LMax</td> </tr> <tr> <td>Sundays and public holidays</td> <td>At all times</td> <td>45 dB LAeq and 75 dB LMax</td> </tr> </tbody> </table>	Day	Time period	Noisie limit	Monday to Saturday	07:00 to 19:00	55 dB LAeq		At all other times	45 dB LAeq and 75 dB LMax	Sundays and public holidays	At all times	45 dB LAeq and 75 dB LMax
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	At all other times	45 dB LAeq and 75 dB LMax											
Sundays and public holidays	At all times	45 dB LAeq and 75 dB LMax											
Light	It is considered appropriate to adopt the CODC District Plan permitted activity standard for lighting in the Rural Resource Area as a consent condition.												
Groundwater	<p>It is proposed to adopt the following resource consent conditions from the existing water abstraction and discharge permits amended to reflect the need to take and discharge more groundwater.</p> <ul style="list-style-type: none"> <li>▪ (a)The rate of abstraction shall not exceed 23 litres per second from bore G41/0127 and 47 litres per second from bore G41/0456;</li> <li>(b) 3,024 cubic metres per day;</li> <li>(c) 93,744 cubic metres per month;</li> <li>(d) 846,720 cubic metres per year.</li> <li>▪ The volume of water discharged shall not exceed: <ul style="list-style-type: none"> <li>(a) 3,024 cubic metres per day;</li> <li>(b) 93,744 cubic metres per month;</li> <li>(c) 846,720 cubic metres per year.</li> </ul> </li> </ul>												



	<ul style="list-style-type: none"> <li>▪ No contaminants other than silt and sediment shall be discharged into the Pisa Groundwater Management Zone.</li> <li>▪ Settlement ponds shall be maintained in an efficient operating condition at all times, including at least: <ul style="list-style-type: none"> <li>(a) Three monthly inspections of settling ponds; and</li> <li>(b) Pond desludging as necessary.</li> </ul> </li> <li>▪ The consent holder shall ensure that there is no direct discharge to any surface watercourse.</li> </ul>
Cultural and heritage	It is proposed that work be undertaken with an Accidental Discovery Protocol in place.
Ecological	Proposed mitigation measures as they relate to landscape and visual amenity, noise and dust effects, also mitigate effects ecological effects on the Mahaka Katia Scientific Reserve. Pest plants growing on the site will be removed and rabbit control measures adopted i.e. rabbitat fencing along the boundary of the site.
Natural Hazards	The expanded quarry will be constructed in accordance with appropriate design standards.
Hazardous substances	Hazardous substances are managed in accordance with the HSNO and the applicant has in place appropriate procedures to respond to a spill or leak.

## 6. STATUTORY CONSIDERATIONS

Schedule 4 of the RMA requires that an assessment of the activity against the matters set out in Part 2 and any relevant provisions of a document referred to in Section 104 of the RMA is provided when applying for a resource consent for any activity.

### 6.1 Part 2 of the RMA

Section 5 sets out the purpose of the Act as the sustainable management of natural and physical resources, while enabling people and communities to provide for their social, economic and cultural well-being. The proposal provides for an increased rate of production and expansion of the Amisfield Quarry to allow for its continued operation beyond its current expected life. Given the quarry provides employment and an aggregate source for construction projects in Central Otago, confirming its viability into the future will assist those who rely on the quarry for their economic and social wellbeing. Any adverse effects on the environment associated with the proposal will be appropriately avoided, remedied or mitigated to ensure the sustainable management of natural and physical resources.

There are no matters of national importance under Section 6 of the RMA that will be affected by the proposal.

The proposal is considered to be consistent with the requirements of Section 7 of the RMA, which requires particular regard to be given to the efficient use and development of natural and physical resources (Section 7(a)), the maintenance and enhancement of amenity values and the quality of the environment (Sections 7(c) and (d)).

Regarding Section 8, the proposed activity is considered to be not inconsistent with the principles of the Treaty of Waitangi.

## 6.2 Section 104(1)(b) of the RMA

In accordance with Schedule 4 of the RMA, an assessment of the activity against the relevant provisions of a document referred to in 104(1)(b) of the RMA must be included in an application for resource consent. Documents in this section are noted as being:

- (i) a National Environmental Standard;
- (ii) other regulations;
- (iii) a National Policy Statement;
- (iv) a New Zealand Coastal Policy Statement;
- (v) a Regional Policy Statement or Proposed Regional Policy Statement;
- (vi) a plan or proposed plan.

Under the RMA, district plans must give effect to National Policy Statements, National Environmental Standards and Regional Policy Statements. For the purpose of this application, it is considered appropriate to undertake an assessment of the Proposed Otago Regional Policy Statement (proposed RPS), Regional Policy Statement for Otago 1998 (existing RPS), RWP, RAP, Proposed Plan Change 7 (Water Permits) (PC7), CODP, National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NESCS) and National Environmental Standards for Air Quality (NESAQ).

### 6.2.1 Otago Regional Policy Statement

The Otago Regional Policy Statement provides an overview of the resource management issues facing Otago and sets policies and methods to manage Otago's natural and physical resources. The Proposed Regional Policy Statement for Otago (proposed RPS) was publicly notified on 23 May 2015. Appeals are now resolved on several provisions in the proposed RPS. On 12 December 2018, the ORC approved the provisions on which appeals are resolved to become operative from 14 January 2019, these provisions now form the Partially Operative Otago Regional Policy Statement 2019 (partially operative RPS).

For clarity, an assessment of the partially operative RPS has been undertaken and is included in **Table 12**, policies included in the Proposed RPS that have not yet been made operative but are pertinent to the proposal have been assessed in **Table 13**. Several provisions in the Regional Policy Statement for Otago 1998 (existing RPS) remain operative, these are assessed in **Table 14**.

**Table 12: Assessment of the relevant objectives and policies in the Partially Operative Regional Policy Statement for Otago 2019**

<b>PART B Chapter 1 Resource management in Otago is integrated</b>	
<b>Objective</b>	
<p><u>Objective 1.1</u> Otago’s resources are used sustainably to promote economic, social, and cultural wellbeing for its people and communities</p>	
<b>Policy</b>	<b>Assessment</b>
<p><u>Policy 1.1.1 Economic wellbeing</u> Provide for the economic wellbeing of Otago’s people and communities by enabling the resilient and sustainable use and development of natural and physical resources.</p>	<p>The Amisfield Quarry currently directly employs 6 people who live locally and contracts the services of numerous local businesses to provide aggregate for use in small and large scale projects across the Central Otago and Queenstown Lakes districts. The proposed expansion will provide for the continued employment of staff at the Amisfield Quarry and will allow for the continued use of the quarry to support local projects.</p>
<p><u>Policy 1.1.2 Social and cultural wellbeing and health and safety</u> Provide for the social and cultural wellbeing and health and safety of Otago’s people and communities when undertaking the subdivision, use, development and protection of natural and physical resources by all of the following: a) Recognising and providing for Kāi Tahu values; b) Taking into account the values of other cultures; c) Taking into account the diverse needs of Otago’s people and communities; d) Avoiding significant adverse effects of activities on human health; e) Promoting community resilience and the need to secure resources for the reasonable needs for human wellbeing; f) Promoting good quality and accessible infrastructure and public services.</p>	<p>There are no sites of significance to iwi identified within the Amisfield Quarry or the land on which the expansion is proposed. Appropriate conditions are proposed to ensure correct protocols are observed should a discovery of cultural significance be made.</p> <p>Potential effects on human health associated with discharges of dust to air and noise from the quarry have been considered and appropriate mitigations have been proposed to ensure significant effects are avoided.</p>
<b>Objective</b>	
<p><u>Objective 1.2</u> Recognise and provide for the integrated management of natural and physical resources to support the wellbeing of people and communities in Otago</p>	
<b>Policy</b>	<b>Assessment</b>
<p><u>Policy 1.2.1 Integrated resource management</u> Achieve integrated management of Otago’s natural and physical resources, by all of the following:</p>	<p>The proposed expansion of the Amisfield Quarry involves the use and development of different natural and physical resources, including land, air,</p>

<p>a) Coordinating the management of interconnected natural and physical resources;</p> <p>b) Taking into account the impacts of management of one natural or physical resource on the values of another, or on the environment;</p> <p>c) Recognising that the value and function of a natural or physical resource may extend beyond the immediate, or directly adjacent, area of interest;</p> <p>d) Ensuring that resource management approaches across administrative boundaries are consistent and complementary;</p> <p>e) Ensuring that effects of activities on the whole of a natural or physical resource are considered when that resource is managed as subunits.</p> <p>f) Managing adverse effects of activities to give effect to the objectives and policies of the Regional Policy Statement.</p> <p>g) Promoting healthy ecosystems and ecosystem services;</p> <p>h) Promoting methods that reduce or negate the risk of exceeding sustainable resource limits.</p>	<p>water and roading infrastructure, all of which have a value and function that extends beyond the boundary of the application site.</p> <p>Consideration has been given to the way in which the proposal may impact the use and development of natural and physical resources beyond the boundary of the application site. The surrounding land uses are diverse and include vineyards, orchards, residential dwellings and conservation land. Appropriate mitigation measures have been adopted to ensure these land uses, including ecosystems and habitats in the adjoining conservation land, can continue without any significant adverse effect resulting from the proposed quarry expansion. For example set backs and bunding between the boundary of the application site and the proposed active quarry are proposed to manage effects relating to dust and noise.</p>
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**PART B Chapter 2 Kāi Tahu values and interests are recognised and kaitiakitaka is expressed**

**Objective**

Objective 2.2

Kāi Tahu values, interests and customary resources are recognised and provided for.

**Policy**

Policy 2.2.1 Kāi Tahu wellbeing

Manage the natural environment to support Kāi Tahu wellbeing by all of the following:

- a) Recognising and providing for their customary uses and cultural values in Schedules 1A and B; and,
- b) Safe-guarding the life-supporting capacity of natural resources.

**Assessment**

The relationship that Tangata Whenua has with their ancestral lands, water sites, waahi tapu and other taonga has been taken into account through consideration of the Kāi Tahu ki Otago Natural Resource Management Plan 2005.

**Part B Chapter 4 Communities in Otago are resilient, safe and healthy**

**Objective**

Objective 4.6

Hazardous substances, contaminated land and waste materials do not harm human health or the quality of the environment in Otago

**Policy**

**Assessment**

<p><u>Policy 4.6.2 Use, storage and disposal of hazardous substances</u></p> <p>Manage the use, storage and disposal of hazardous substances, by all of the following:</p> <ul style="list-style-type: none"> <li>a) Providing secure containment for the storage of hazardous substances;</li> <li>b) Minimising risk associated with natural hazard events;</li> <li>c) Ensuring the health and safety of people;</li> <li>d) Avoiding, remedying or mitigating adverse effects on the environment</li> <li>e) Providing for the development of facilities to safely store, transfer, process, handle and dispose of hazardous substances;</li> <li>f) Ensuring hazardous substances are treated or disposed of at authorised facilities, in accordance with the relevant regulatory requirements;</li> <li>g) Restricting the location and intensification of activities that may result in reverse sensitivity effects near authorised facilities for hazardous substance bulk storage, treatment or disposal;</li> <li>h) Encouraging the use of best management practices.</li> </ul>	<p>Best management practices have been adopted by the Applicant in accordance with the requirements of the HSNO to ensure the health and safety of individuals working at and visiting the Amisfield Quarry is protected and potential environmental effects associated with the use, storage and disposal of hazardous are appropriately managed.</p>
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**PART B Chapter 5 People are able to use and enjoy Otago’s natural and built environment**

**Objective**

Objective 5.3

Sufficient land is managed and protected for economic production

<b>Policy</b>	<b>Assessment</b>
<p><u>Policy 5.3.1 Rural activities</u></p> <p>Manage activities in rural areas, to support the region’s economy and communities, by:</p> <ul style="list-style-type: none"> <li>a) Enabling primary production and other rural activities that support that production;</li> <li>b) Providing for mineral exploration, extraction and processing;</li> <li>c) Minimising the loss of significant soils;</li> <li>d) Restricting the establishment of incompatible activities in rural areas that are likely to lead to reverse sensitivity effects;</li> </ul>	<p>The Application site is located within the Rural Resource Area as scheduled in the CODP. The proposal involves the exploration, extraction and processing of gravel for use in construction projects.</p> <p>The existing consent requires that at least two years prior to ceasing the extraction of material for processing from the quarry, the consent holder shall submit to the Council a ‘Closure and Rehabilitation Plan’. It is considered appropriate</p>

<p>e) Minimising the subdivision of productive rural land into smaller lots that may result in a loss of its productive capacity or productive efficiency;</p> <p>f) Providing for other activities that have a functional need to locate in rural areas</p>	<p>that should resource consent be granted, a similar condition is attached to the replacement resource consent.</p>
<p><b>Objective</b></p>	
<p><u>Objective 5.4</u> Adverse effects of using and enjoying Otago’s natural and physical resources are minimised</p>	
<p><b>Policy</b></p>	<p><b>Assessment</b></p>
<p><u>Policy 5.4.1 Offensive or objectionable discharges</u> Manage offensive or objectionable discharges to land, water and air by:</p> <p>a) Avoiding significant adverse effects of those discharges;</p> <p>b) Avoiding significant adverse effects of discharges of human or animal waste directly, or in close proximity, to water or mahika kai sites;</p> <p>c) Avoiding, remedying or mitigating other adverse effects of those discharges</p>	<p>The mitigation measures recommended in the relevant technical assessments have been adopted by the Applicant to ensure discharges to land, air and water do not result in significant adverse effects. Mitigation measures are detailed in Section 5 as they relate to potential adverse effects.</p>
<p><u>Policy 5.4.2 Adaptive management approach</u> Apply an adaptive management approach, to avoid, remedy or mitigate actual and potential adverse effects that might arise and that can be remedied before they become irreversible, by both:</p> <p>a) Setting appropriate indicators for effective monitoring of those adverse effects; and</p> <p>b) Setting thresholds to trigger remedial action before the effects result in irreversible damage.</p>	<p>It is proposed to undertake permanent continuous on-site monitoring of wind speed and wind direction and continuous monitoring of ambient total suspended particulate matter concentrations when quarrying is taking place within 200m of sensitive receptors located within 100m of the quarry boundary. Windspeed and TSP concentration alert limits are proposed, which if exceeded will require dust control measures on site to be reviewed, together with alarm limits, which will require activities creating dust to cease until conditions improve.</p> <p>Quarterly monitoring of suspended sediment concentrations by the applicant at bores G41/0455 and G41/0101, and one upgradient bore for comparison, is proposed to assist in managing potential effects on groundwater quality.</p>

**Table 13: Assessment of the relevant objectives and policies in the Proposed Regional Policy Statement for Otago**

<p><i>Note: policies and objectives included in Table 13 include:</i></p> <ul style="list-style-type: none"> <li>▪ <i>Proposed mediation changes that have been approved by the Environment Court, but not yet made operative by Council, are shaded in grey.</i></li> <li>▪ <i>Proposed changes as a result of Environment Court Hearing but still subject to appeal (and so not operative) are shaded in yellow.</i></li> <li>▪ <i>Further additions to the RPS as a result of appeals are shown in dark red and underlined.</i></li> </ul>	
<b>PART B Chapter 3 Otago has high quality natural resources and ecosystems</b>	
<b>Objective</b>	
<p><u>Objective 3.1</u></p> <p>The values (including intrinsic values) of Otago’s ecosystems and natural resources are recognised, and maintained, and or enhanced where degraded</p>	
<b>Policy</b>	<b>Assessment</b>
<p><u>Policy 3.1.1 Fresh water</u></p> <p>Safeguard the life-supporting capacity of fresh water and manage fresh water to:</p> <p>a) Maintain good quality water and enhance water quality where it is degraded, including for:</p> <p>i. Important recreation values, including contact recreation; and,</p> <p>ii. Existing drinking and stock water supplies;</p> <p>b) Maintain or enhance aquatic:</p> <p>i. Ecosystem health;</p> <p>ii. Indigenous habitats; and,</p> <p>iii. Indigenous species and their migratory patterns.</p> <p>c) Avoid aquifer compaction and seawater intrusion;</p> <p>d) Maintain or enhance, as far as practicable:</p> <p>i. Natural functioning of rivers, lakes, and wetlands, their riparian margins, and aquifers;</p> <p>ii. Coastal values supported by fresh water;</p> <p>iii. The habitat of trout and salmon unless detrimental to indigenous biological diversity; and</p> <p>iv. Amenity and landscape values of rivers, lakes, and wetlands;</p> <p>e) Control the adverse effects of pest species, prevent their introduction and reduce their spread;</p> <p>f) Avoid, remedy or mitigate the adverse effects of natural hazards, including flooding and erosion; and,</p>	<p>It is virtually certain that there is no connection between the underlying aquifer and the Amisfield Burn, meaning the potential interference effects on the Amisfield Burn and its tributary associated with the proposed increased rate of groundwater abstraction can be disregarded.</p> <p>It is also virtually impossible for an overland flow of water from the quarry into the Amisfield Burn or its tributary to occur.</p> <p>Consideration of potential effects on water quality is limited to groundwater and is proposed to be appropriately managed by way of a soakage pond. Monitoring of groundwater water quality at the quarry (required by the existing resource consent) suggests that the applicant has successfully mitigated potential effects on groundwater to date and this approach is expected to be successful in the future.</p>

<p>g) Avoid, remedy or mitigate adverse effects on existing infrastructure that is reliant on fresh water.</p>	
<p><u>Policy 3.1.3 Water allocation and use</u>  Manage the allocation and use of fresh water by undertaking all of the following:</p> <p>a) Recognising and providing for the social and economic benefits of sustainable water use;</p> <p>b) Avoiding over-allocation, and phasing out existing over-allocation, resulting from takes and discharges;</p> <p>c) Ensuring the efficient allocation and use of water by:</p> <p>i) Requiring that the water allocated does not exceed what is necessary for its efficient use;</p> <p>ii) Encouraging the development or upgrade of infrastructure that increases efficiency;</p> <p>iii. Providing for temporary dewatering activities necessary for construction or maintenance.</p>	<p>The proposed take and use of groundwater is critical to the operation of the quarry, water is used for the screening and washing of aggregate, dust suppression and irrigation.</p> <p>Pisa Groundwater Management Zone from which groundwater is proposed to be taken is considered by the ORC to be under allocated.</p> <p>The proposed volume of water to be abstracted is based on historic water take records, industry knowledge and best practice. The distribution and application methods are considered to be efficient.</p>
<p><u>Policy 3.1.6 Air quality</u>  Manage air quality to achieve the following:</p> <p>a) Maintain good ambient air quality that supports human health, or enhance air quality where it has been degraded;</p> <p>b) Maintain or enhance amenity values.</p>	<p>Appropriate mitigation measures have been adopted by the applicant to ensure discharges of dust to air do not result in significant adverse effects on air quality. Specific mitigations adopted are set out in Section 5.2 and are include a number of measures that are not currently implemented by the applicant.</p>
<p><u>Policy 3.1.9 Ecosystems and indigenous biological diversity</u>  Manage ecosystems and indigenous biological diversity in terrestrial, freshwater and marine environments to:</p> <p>a) Maintain or enhance:</p> <p>i. Ecosystem health and indigenous biological diversity including habitats of indigenous fauna;</p> <p>ii. Biological diversity where the presence of exotic flora and fauna supports indigenous biological diversity;</p> <p>b) Maintain or enhance as far as practicable:</p> <p>i. Areas of predominantly indigenous vegetation;</p>	<p>The land on which the expansion of the quarry is proposed does not provide any significant value to ecosystems and indigenous biodiversity, being largely cultivated and dominated by exotic species.</p> <p>The Mahaka Katia Scientific Reserve adjoins the expansion land to the north and is considered to have high ecological values. Mitigation measures are proposed to ensure the operation of the expanded quarry does not compromise the health of ecosystems and indigenous biodiversity in the Mahaka Katia Scientific Reserve.</p>



<ul style="list-style-type: none"> <li>ii. Habitats of trout and salmon unless detrimental to indigenous biological diversity;</li> <li>iii. Areas buffering or linking ecosystems;</li> <li>c) Recognise and provide for: <ul style="list-style-type: none"> <li>i. Hydrological services, including the services provided by tall tussock grassland;</li> <li>ii. Natural resources and processes that support indigenous biological diversity;</li> </ul> </li> <li>d) Control the adverse effects of pest species, prevent their introduction and reduce their spread.</li> </ul>	
<b>Objectives</b>	
<p><u>Objective 3.2</u>  Otago's significant and highly-valued natural resources are identified, and protected, or enhanced where degraded</p>	
<b>Policy</b>	<b>Assessment</b>
<p><u>Policy 3.2.2 Managing significant indigenous vegetation and habitats</u>  Protect and enhance areas of significant indigenous vegetation and significant habitats of indigenous fauna, by all of the following:</p> <ul style="list-style-type: none"> <li>a) In the coastal environment, avoiding adverse effects on:....</li> <li>b) Beyond the coastal environment, and in the coastal environment in significant areas not captured by a) above, maintaining those values that contribute to the area or habitat being significant;</li> <li>c) Avoiding significant adverse effects on other values of the area or habitat;</li> <li>c) Remedying when other adverse effects cannot be avoided;</li> <li>d) Mitigating when other adverse effects cannot be avoided or remedied;</li> <li>e) Encouraging enhancement of those areas and values that contribute to the area or habitat being significant;</li> <li>f) Controlling the adverse effects of pest species, preventing their introduction and reducing their spread.</li> </ul>	<p>Mitigation measures are proposed to avoid significant adverse effects and remedy and mitigate other effects that cannot be avoided on significant indigenous vegetation and significant habitats of indigenous fauna in the Mahaka Katia Scientific Reserve.</p>
<b>PART B Chapter 5 People are able to use and enjoy Otago's natural and built environment</b>	

**Objectives**

Objective 5.3\*

Sufficient land is managed and protected for economic production

Policy 5.3.4 Mineral and petroleum exploration, extraction and processing

Recognise the functional needs of mineral exploration, extraction and processing activities to locate where the resource exists.

The existing quarry and proposed expansion are located on land that holds a quality and plentiful source of high quality stone and aggregate.

Policy 5.4.8 Adverse effects from mineral and petroleum exploration, extraction and processing

Minimise adverse effects from the exploration, extraction and processing of minerals and petroleum, by all of the following:

- a) Giving preference to avoiding their location in all of the following:
  - i. Areas of significant indigenous vegetation and significant habitats of indigenous fauna;
  - ii. Outstanding natural features, landscapes and seascapes;
  - iii. Areas of outstanding natural character;
  - iv. Outstanding water bodies;
  - v. Areas subject to significant natural hazard risk;
  - vi. Places or areas containing significant historic heritage.
- b) Where it is not possible to avoid locating in the areas listed in a) above, avoiding significant adverse effects of the activity on those values that contribute to the significant or outstanding nature of those areas;
- c) Avoiding adverse effects on the health and safety of the community;
- d) Avoiding, remedying, or mitigating adverse effects on other values;
- e) Reducing unavoidable adverse effects by
  - i. Staging development for longer term activities; and
  - ii. Progressively rehabilitating the site, where possible.

The existing quarry and the proposed expansion land is not located on land that is valued for its significant indigenous vegetation and significant habitats of indigenous fauna, outstanding natural features, landscapes and seascapes, outstanding natural character, and it is not subject to a significant natural hazard risk and does not contain significant historic heritage.

<p>f) Considering offsetting for residual adverse effects;</p> <p>g) Applying a precautionary approach to assessing the effects of the activity, where there is scientific uncertainty, and potentially significant or irreversible adverse effects.</p>	
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\* Objective 5.3 is included in the Partially Operative Plan.

**Table 14: Assessment of the objectives and policies in the existing Regional Policy Statement for Otago**

<b>Chapter 5 Land</b>	
<b>Objectives</b>	
<p><u>Objective 5.4.1</u></p> <p>To promote the sustainable management of Otago’s land resources in order:</p> <p>(a) To maintain and enhance the primary productive capacity and life-supporting capacity of land resources; and</p> <p>(b) To meet the present and reasonably foreseeable needs of Otago’s people and communities.</p>	
<p>5.4.2 To avoid, remedy or mitigate degradation of Otago’s natural and physical resources resulting from activities utilising the land resource.</p>	
<p><u>Objective 5.4.5</u></p> <p>To promote the sustainable management of Otago’s mineral resources in order to meet the present and reasonably foreseeable needs of Otago’s communities.</p>	
<b>Policy</b>	<b>Assessment</b>
<p><u>Policy 5.5.3</u></p> <p>To maintain and enhance Otago’s land resource through avoiding, remedying or mitigating the adverse effects of activities which have the potential to, among other adverse effects:</p> <p>(a) Reduce the soil’s life-supporting capacity</p> <p>(b) Reduce healthy vegetative cover</p> <p>(c) Cause soil loss</p> <p>(d) Contaminate soils</p> <p>(e) Reduce soil productivity</p> <p>(f) Compact soils</p> <p>(g) Reduce soil moisture holding capacity.</p>	<p>It is proposed that a ‘Closure and Rehabilitation Plan’ is submitted prior to the cessation of quarrying to provide a framework for rehabilitating the application site, including the removal of all buildings, re-contouring the land and providing for appropriate drainage and other landscape remediation measures to ensure the site can be used productively in the future.</p>
<p><u>Policy 5.5.5</u></p> <p>To minimise the adverse effects of land use activities on the quality and quantity of Otago’s water resource through promoting and encouraging the:</p>	<p>Consideration of potential effects on water quality is limited to groundwater and is proposed to be appropriately managed by way of a soakage pond. Monitoring of groundwater water quality at the quarry (required by the existing resource consent)</p>

<p>(a) Creation, retention and where practicable enhancement of riparian margins; and</p> <p>(b) Maintaining and where practicable enhancing, vegetation cover, upland bogs and wetlands to safeguard land and water values; and</p> <p>(c) Avoiding, remedying or mitigating the degradation of groundwater and surface water resources caused by the introduction of contaminants in the form of chemicals, nutrients and sediments resulting from land use activities.</p>	<p>suggests that the applicant has successfully mitigated potential effects on groundwater to date and this is expected to continue to be successful in the future.</p>
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## Chapter 6 Water

### Objectives

#### Objective 6.4.1

To allocate Otago's water resources in a sustainable manner which meets the present and reasonably foreseeable needs of Otago's people and communities.

#### Objective 6.4.2

To maintain and enhance the quality of Otago's water resources in order to meet the present and reasonably foreseeable needs of Otago's communities.

#### Objective 6.4.3

To safeguard the life-supporting capacity of Otago's water resources through protecting the quantity and quality of those water resources.

#### Objective 6.4.4

To maintain and enhance the ecological, intrinsic, amenity and cultural values of Otago's water resources.

### Policies

### Assessment

#### Policy 6.5.3

To promote efficient consumptive water use through:

- (a) Promoting water use practices which minimise losses of water before, during and after application; and
- (b) Promoting water use practices which require less water; and
- (c) Promoting incentives for water users to use less water

The proposed volume of water to be abstracted is based on historic water take records, industry knowledge and best practice. The distribution and application methods are considered to be efficient.

#### Policy 6.5.5

To promote a reduction in the adverse effects of contaminant discharges into Otago's water bodies through:

It is considered that the applicant has adopted best practice to manage potential effects on waterbodies associated with discharge of contaminants.

<p>(a) Adopting the existing water quality of Otago's water bodies as a minimum acceptable standard; and</p> <p>(b) Investigating and where appropriate, enhancing water quality so that as a minimum standard it is suitable for contact recreation and aquatic life where:</p> <p>(i) There is a high public interest in, or use of the water; or</p> <p>(ii) There is a particular Kai Tahu interest in the water; or</p> <p>(iii) There is a particular value to be maintained or enhanced; or</p> <p>(iv) There is a direct discharge containing human sewage or wastes from commercial or industrial activities; and</p> <p>(c) Requiring that all discharges into Otago's water bodies maintain the standard for the receiving waters after reasonable mixing; and</p> <p>(d) Promoting discharges to land where practicable and where there are no significant adverse effects on groundwater or surface water resources, or soil; and</p> <p>(e) Preparing contingency responses for accidental pollution spills; and</p> <p>(f) Investigating and addressing the effects of diffuse source discharges on water quality; while considering financial and technical constraints.</p>	<p>The applicant does not propose to discharge contaminants directly to a waterbody, instead a soakage pond is used to filter sediment prior to water returning to the aquifer from which it was taken.</p> <p>The applicant has in place procedures to allow accidental spills of contaminants to be effectively contained and remediated to avoid any effects on water quality.</p>
<p><u>Policy 6.5.11</u></p> <p>To promote the allocation of groundwater within the sustainable yield of the particular water body having regard to its recharge capability and the possibility of sea water intrusion.</p>	<p>The Pisa Groundwater Management Zone from which groundwater is proposed to be taken is considered by the ORC to be under allocated.</p>
<p><b>Chapter 10 Biota</b></p>	
<p><b>Objectives</b></p>	
<p><u>Policy 10.4.1</u></p> <p>To maintain and enhance the life-supporting capacity and diversity of Otago's biota.</p>	
<p><u>Policy 10.4.3</u></p>	

To maintain and enhance the natural character of areas with significant indigenous vegetation and significant habitats of indigenous fauna.	
Policy	Assessment
<p><u>Policy 10.5.2</u></p> <p>To maintain and where practicable enhance the diversity of Otago's significant indigenous vegetation and the significant habitat of indigenous fauna, trout and salmon which are:</p> <p>(a) Covered under a statute or covenant for protection; or</p> <p>(b) Habitat or vegetation that support the maintenance or recovery of indigenous species that are uncommon or threatened with extinction (rare, vulnerable or endangered) regionally or nationally; or</p> <p>(c) Vegetation that contains associations of indigenous species which are rare or representative regionally or nationally; or</p> <p>(d) Vegetation that contains a substantially intact, uninterrupted ecological sequence of indigenous species which are rare or representative regionally or nationally; or</p> <p>(e) Important for soil and water values or have functions in natural hazard mitigation; and to promote and encourage, where practicable, the retention, enhancement and re-establishment of indigenous ecosystems within Otago.</p>	<p>The land on which the expansion of the quarry is proposed does not provide any significant value to ecosystems and indigenous biodiversity, being largely cultivated and dominated by exotic species.</p> <p>The Mahaka Katia Scientific Reserve adjoins the expansion land to the north and is considered to have high ecological values. Mitigation measures are proposed to ensure the operation of the expanded quarry does not compromise the health of ecosystems and indigenous biodiversity in the Mahaka Katia Scientific Reserve.</p>

### 6.2.2 The Regional Plan: Air for Otago

The Air Plan was made operative on 1 January 2003. Included in **Table 15** are the objectives and policies that relate to proposed discharge of contaminants to air.

**Table 15: Assessment the relevant objectives and policies in the Regional Plan: Air Plan for Otago**

Objectives
<p><u>Objective 6.1.1</u></p> <p>To maintain ambient air quality in parts of Otago that have high air quality and enhance ambient air quality in places where it has been degraded.</p>
<p><u>Objective 6.1.2</u></p>

To avoid adverse localised effects of contaminant discharges into air on:

- (a) Human health;
- (b) Cultural, heritage and amenity values;
- (c) Ecosystems and the plants and animals within them; and
- (d) The life-supporting capacity of air.

Policies	Assessment
<p><u>Policy 7.1.1</u></p> <p>To recognise and provide for the relationship Kai Tahu have with the air resource through procedures that enable Kai Tahu to participate in management of the air resource.</p>	<p>The relationship that Kai Tahu has with air resource has been taken into account through consideration of the Kāi Tahu ki Otago Natural Resource Management Plan 2005.</p>
<p><u>Policy 8.2.3</u></p> <p>In the consideration of any application to discharge contaminants into air, Council will have:</p> <ul style="list-style-type: none"> <li>(a) Particular regard to avoiding adverse effects including cumulative effects on: <ul style="list-style-type: none"> <li>(i) Values of significance to Kai Tahu;</li> <li>(ii) The health and functioning of ecosystems, plants and animals;</li> <li>(iii) Cultural, heritage and amenity values;</li> <li>(iv) Human health; and</li> <li>(v) Ambient air quality of any airshed; and</li> </ul> </li> <li>(b) Regard to any existing discharge from the site, into air, and its effects.</li> </ul>	<p>Appropriate mitigation measures have been adopted by the applicant to ensure discharges of dust to air do not result in significant adverse effects on air quality. Specific mitigations proposed are set out in Section 5.2 and 5.14 and include a number of measures that are not currently implemented by the applicant.</p>
<p><u>Policy 10.1.1</u></p> <p>The Otago Regional Council will encourage:</p> <ul style="list-style-type: none"> <li>(a) People undertaking land use activities to adopt management practices to avoid, remedy or mitigate any adverse effects of dust beyond the boundary of the property; and</li> <li>(b) City and district councils to use land use planning mechanisms and other land management techniques to manage land use activities which have the potential to result in dust beyond the boundary of the property.</li> </ul>	
<p><u>Policy 8.2.4</u></p> <p>The duration of any permit issued to discharge contaminants into air will be determined having regard to:</p>	<p>The proposed duration of the resource consent sought to authorise the discharge contaminants to air is discussed in Section 9 of this document.</p>

<p>(a) The mass and nature of the discharge;</p> <p>(b) The nature and sensitivity of the receiving environment; and</p> <p>(c) Any existing discharge from the site, into air, and its effects.</p>	
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### 6.2.3 The Regional Plan: Water for Otago

The RWP became operative on 1 January 2004, and is the primary document that manages water within the Otago region's boundaries. Included in **Table 16** are the objectives and policies that relate to proposed discharge of contaminants to water.

**Table 16: Assessment the relevant objectives and policies in the Regional Plan: Water Plan for Otago**

Chapter 5 Natural and human use values of lakes and rivers	
Objective	
Objective 5.3.1 To maintain or enhance the natural and human use values, identified in Schedules 1A, 1B and 1C, that are supported by Otago's lakes and rivers.	
Objective 5.3.2 To maintain or enhance the spiritual and cultural beliefs, values and uses of significance to Kai Tahu, identified in Schedule 1D, as these relate to Otago's lakes and rivers.	
Objective 5.3.3 To protect the natural character of Otago's lakes and rivers and their margins from inappropriate subdivision, use or development.	
Objective 5.3.6 To provide for the sustainable use and development of Otago's water bodies, and the beds and margins of Otago's lakes and rivers.	
Policy	Assessment
<p><u>Policy 5.4.2</u></p> <p>In the management of any activity involving surface water, groundwater or the bed or margin of any lake or river, to give priority to avoiding, in preference to remedying or mitigating:</p> <p>(1) Adverse effects on:</p> <p>(a) Natural values identified in Schedule 1A;</p> <p>(b) Water supply values identified in Schedule 1B;</p> <p>(c) Registered historic places identified in Schedule 1C, or archaeological sites in, on, under or over the bed or margin of a lake or river;</p> <p>(d) Spiritual and cultural beliefs, values and uses of significance to Kai Tahu identified in Schedule 1D;</p>	<p>While the Amisfield Burn is listed as a significant water body in Schedule 1A of the plan, it is virtually certain that there is no connection between the underlying aquifer and the Amisfield Burn, meaning the potential interference effects on the Amisfield Burn and its tributary associated with the proposed increased rate of groundwater abstraction can be disregarded. It is also virtually impossible for an overland flow of water from the quarry into the Amisfield Burn or its tributary to occur.</p> <p>Water supply values attributed to Clutha River/Mata-Au identified in Schedule 1B will not be affected.</p>



<p>(e) The natural character of any lake or river, or its margins;</p> <p>(f) Amenity values supported by any water body; and</p> <p>(2) Causing or exacerbating flooding, erosion, land instability, sedimentation or property damage.</p>	<p>In terms of Schedule 1C of the Plan, the application site does not contain any registered historical or archaeological sites.</p> <p>Spiritual and cultural beliefs, values and uses of significance to Kai Tahu identified in Schedule 1D have been taken into account through consideration of the Kāi Tahu ki Otago Natural Resource Management Plan 2005.</p>
<p><u>Policy 5.4.3</u></p> <p>In the management of any activity involving surface water, groundwater or the bed or margin of any lake or river, to give priority to avoiding adverse effects on:</p> <p>(a) Existing lawful uses; and</p> <p>(b) Existing lawful priorities for the use, of lakes and rivers and their margins.</p>	<p>As set out in Section 5.7.2 of this document, it is considered that the availability of groundwater in bores located on neighbouring properties is unlikely to be affected by a drawdown in available water to a degree that is noticeable.</p>
<p><u>Policy 5.4.8</u></p> <p>To have particular regard to the following features of lakes and rivers, and their margins, when considering adverse effects on their natural character:</p> <p>(a) The topography, including the setting and bed form of the lake or river;</p> <p>(b) The natural flow characteristics of the river;</p> <p>(c) The natural water level of the lake and its fluctuation;</p> <p>(d) The natural water colour and clarity in the lake or river;</p> <p>(e) The ecology of the lake or river and its margins; and</p> <p>(f) The extent of use or development within the catchment, including the extent to which that use and development has influenced matters (a) to (e) above.</p>	<p>It is virtually certain that there is no connection between the underlying aquifer and the Amisfield Burn, meaning the potential interference effects on the Amisfield Burn and its tributary associated with the proposed increased rate of groundwater abstraction can be disregarded.</p> <p>Given the volume of water in Lake Dunstan the proposed increased volume of groundwater proposed for abstraction will have no measurable effect on the lake level.</p>
<p><b>Chapter 6 Water Quantity</b></p>	
<p><b>Objectives</b></p>	
<p><u>Objective 6.4.16</u></p>	

<p>In granting resource consents to take water, or in any review of the conditions of a resource consent to take water, to require the volume and rate of take to be measured in a manner satisfactory to the Council unless it is impractical or unnecessary to do so.</p>	
<p><u>Objective 6.3.2A</u> To maintain long term groundwater levels and water storage in Otago’s aquifers.</p>	
<p><u>Objective 6.3.2A</u> To maintain long term groundwater levels and water storage in Otago’s aquifers.</p>	
<p><u>Objective 6.3.3</u> To minimise conflict among those taking water.</p>	
Policies	Assessment
<p><u>Policy 6.4.0A</u> To ensure that the quantity of water granted to take is no more than that required for the purpose of use taking into account: (a) How local climate, soil, crop or pasture type and water availability affect the quantity of water required; and (b) The efficiency of the proposed water transport, storage and application system.</p>	<p>The proposed volume of water to be abstracted is based on historic water take records, industry knowledge and best practice. The distribution and application methods are considered to be efficient.</p>
<p><u>Policy 6.4.0C</u> To promote and give preference, as between alternative sources, to the take and use of water from the nearest practicable source.</p>	<p>The existing bores are positioned close to plant equipment</p>
<p><u>Policy 6.4.1</u> To enable the taking of surface water, by: (a) Defined allocation quantities; and (b) Provision for water body levels and flows, except when:     (i) The taking is from Lakes Dunstan, Hawea, Roxburgh, Wanaka or Wakatipu, or the main stem of the Clutha River/Mata-Au or Kawarau Rivers.     (ii) All of the surface water or connected groundwater taken is immediately returned to the source water body.     (iii) Water is being taken which has been delivered to the source water body for the purpose of that subsequent take.</p>	<p>The proposed take of water will be by way of defined allocation quantities and will be largely immediately returned to the source aquifer by way of discharge to land.</p>

<p><u>Policy 6.4.1A</u></p> <p>A groundwater take is allocated as:</p> <p>(a) Surface water, subject to a minimum flow, if the take is from any aquifer in Schedule 2C; or</p> <p>(b) Surface water, subject to a minimum flow, if the take is within 100 metres of any connected perennial surface water body; or</p> <p>(c) Groundwater and part surface water if the take is 100 metres or more from any connected perennial surface water body, and depletes that waterbody most affected by at least 5 litres per second as determined by Schedule 5A; or</p> <p>(d) Groundwater if (a), (b) and (c) do not apply.</p>	<p>It is virtually certain that there is no connection between the underlying aquifer and the Amisfield Burn, meaning the potential interference effects on the Amisfield Burn and its tributary associated with the proposed increased rate of groundwater abstraction can be disregarded.</p>
<p><u>Policy 6.4.10A1</u></p> <p>Enable the taking of water allocated as groundwater by Policy 6.4.1A, by:</p> <p>(a) Determining the volume available for taking as the maximum allocation limit less the assessed maximum annual take for an aquifer calculated using Method 15.8.3.1; and</p> <p>(b) Applying aquifer restrictions where specified in Schedule 4B.</p>	<p>The Pisa Groundwater Management Zone is still considered by the ORC to be significantly under-allocated with (at July 2020) 2,135,128 m<sup>3</sup>/yr available for allocation out of a total of 6,500,000 m<sup>3</sup>/yr.</p>
<p><u>Policy 6.4.10A5</u></p> <p>In managing the taking of groundwater, avoid in any aquifer:</p> <p>(a) Contamination of groundwater or surface water; and</p> <p>(b) Permanent aquifer compaction.</p>	<p>There are no contaminated sites or consented discharges to land which could contaminate the underlying aquifer as a result of the proposed abstraction.</p>
<p><u>Policy 6.4.10AC</u></p> <p>To avoid aquifer contamination by:</p> <p>(a) Recognising contaminated sites;</p> <p>(b) Identifying areas vulnerable to seawater intrusion;</p> <p>(c) Setting maximum allocation limits;</p> <p>(d) Setting aquifer restriction levels;</p> <p>(e) Restricting takes; and</p> <p>(f) Requiring monitoring of groundwater quality and levels.</p>	<p>There are no contaminated sites or consented discharges to land which could contaminate the underlying aquifer as a result of the proposed abstraction.</p>

<p><u>Policy 6.4.10B</u></p> <p>In managing the taking of groundwater, to have regard to avoiding adverse effects on existing groundwater takes, unless the approval of affected persons has been obtained.</p>	<p>As set out in Section 5.7.2 of this document, it is considered that the availability of groundwater in bores located on neighbouring properties is unlikely to be affected by a drawdown to a degree that is noticeable.</p>
<p><u>Policy 6.4.16</u></p> <p>In granting resource consents to take water, or in any review of the conditions of a resource consent to take water, to require the volume and rate of take to be measured in a manner satisfactory to the Council unless it is impractical or unnecessary to do so.</p>	<p>The applicant would accept conditions of consent requiring the volume of water abstracted from bores G41/0127 and G41/0456 to be accurately measured and reported to council.</p>
<p><u>Policy 6.4.16</u></p> <p>In granting resource consents to take water, to consider requiring the volume and rate of take to be accurately measured.</p>	
<p><u>Policy 6.4.19</u></p> <p>When setting the duration of resource consent to take and use water, to consider:</p> <ul style="list-style-type: none"> <li>(a) The duration of the purpose of use;</li> <li>(b) The presence of a catchment minimum flow or aquifer restriction level;</li> <li>(c) Climatic variability and consequent changes in local demand for water;</li> <li>(d) The extent to which the risk of potentially significant, adverse effects arising from the activity may be adequately managed through review conditions;</li> <li>(e) Conditions that allow for adaptive management of the take and use of water;</li> <li>(f) The value of the investment in infrastructure; and</li> <li>(g) Use of industry best practice.</li> </ul>	<p>The proposed duration of the resource consent sought to authorise the discharge contaminants to air is discussed in the Section 9 of this document.</p>
<p><b>Chapter 7 Water Quality</b></p>	
<p><b>Objective</b></p>	
<p><u>Objective 7.A.1</u></p> <p>To maintain water quality in Otago lakes, rivers, wetlands, and groundwater, but enhance water quality where it is degraded.</p>	
<p><u>Objective 7.A.2</u></p>	

To enable the discharge of water or contaminants to water or land, in a way that maintains water quality and supports natural and human use values, including Kāi Tahu values.

Policy	Assessment
<p><u>Policy 7.B.1</u> Manage the quality of water in Otago lakes, rivers, wetlands and groundwater by:</p> <p>(a) Describing, in Table 15.1 of Schedule 15, characteristics indicative of good quality water; and</p> <p>(b) Setting, in Table 15.2 of Schedule 15, receiving water numerical limits and targets for achieving good quality water; and</p> <p>(c) Maintaining, from the dates specified in Schedule 15, good quality water; and</p> <p>(d) Enhancing water quality where it does not meet Schedule 15 limits, to meet those limits by the date specified in the Schedule; and</p> <p>(e) Recognising the differences in the effects and management of point and non-point source discharges; and</p> <p>(f) Recognising discharge effects on groundwater; and</p> <p>(g) Promoting the discharge of contaminants to land in preference to water.</p>	<p>The applicant recognises the benefits of diffuse discharges to land over a direct discharge to surface water and accordingly manages the discharge of water and contaminants to land through the use and regular maintenance of a soakage pond to return groundwater back to its source aquifer.</p>
<p><u>Policy 7.B.2</u> Avoid objectionable discharges of water or contaminants to maintain the natural and human use values, including Kāi Tahu values, of Otago lakes, rivers, wetlands, groundwater and open drains and water races that join them.</p>	<p>Discharges of water and contaminants will be limited to water containing suspended sediment that will be filtered out prior to the water returning to the source aquifer. No other contaminants will be discharged to land.</p>
<p><u>Policy 7.B.3</u> Allow discharges of water or contaminants to Otago lakes, rivers, wetlands and groundwater that have minor effects or that are short term discharges with short term adverse effects.</p>	<p>As confirmed in Section 5.9 and in the previous assessment of effects that relate to Resource Consent RM16.108.02, effects on groundwater quality are considered negligible.</p>
<p><u>Policy 7.B.4</u> When considering any discharge of water or contaminants to land, have regard to:</p>	

<p>(a) The ability of the land to assimilate the water or contaminants; and</p> <p>(b) Any potential soil contamination; and</p> <p>(c) Any potential land instability; and</p> <p>(d) Any potential adverse effects on water quality; and</p> <p>(e) Any potential adverse effects on use of any proximate coastal marine area for contact recreation and seafood gathering.</p>	
<p>7.B.8 Encourage adaptive management and innovation that reduce the level of contaminants in discharges.</p>	<p>The use of a soakage pond to discharge water containing suspended sediment to land to allow water to be returned to its source aquifer is considered industry best practice.</p>
<p>7.C.2 When considering applications for resource consents to discharge contaminants to water, or onto or into land in circumstances which may result in any contaminant entering water, to have regard to:</p> <p>(a) The nature of the discharge and the sensitivity of the receiving environment to adverse effects;</p> <p>(b) The financial implications, and the effects on the environment of the proposed method of discharge when compared with alternative means; and</p> <p>(c) The current state of technical knowledge and the likelihood that the proposed method of discharge can be successfully applied.</p>	<p>The proposal to discharge water and contaminants to land is limited to suspended sediment and monitoring is proposed (this is currently required by way of resource consent condition) to continue to confirm the use of a soakage pond is successfully filtering sediment prior to water discharging to its source aquifer.</p>
<p>7.C.4 The duration of any new resource consent for an existing discharge of contaminants will take account of the anticipated adverse effects of the discharge on any natural and human use value supported by an affected water body, and:</p> <p>(a) Will be up to 35 years where the discharge will meet the water quality standard required to support that value for the duration of the resource consent;</p> <p>(b) Will be no more than 15 years where the discharge does not meet the water quality</p>	<p>The proposed duration of the resource consent sought to authorise the discharge contaminants to air is discussed in Section 9 of this document.</p>

<p>standard required to support that value but will progressively meet that standard within the duration of the resource consent;</p> <p>(c) Will be no more than 5 years where the discharge does not meet the water quality standard required to support that value; and</p> <p>(d) No resource consent, subsequent to one issued under (c), will be issued if the discharge still does not meet the water quality standard required to support that value.</p>	
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### 6.2.4 Proposed Plan Change 7 (Water Permits)

PC7 was proposed by the ORC to add an objective, policies and rules that manage the replacement of expiring deemed permits and water permits. The plan change was notified in March 2020, but has since been ‘called in’ by the Minister for the Environment and will be renotified by the Environmental Protection Agency. Included in **Table 17** are the objectives and policies that relate to proposed discharge of contaminants to water.

**Table 17: Assessment the relevant objectives and policies in Proposed Plan Change 7 (Water Permits)**

Objectives	
<p><u>Objective 10A.1.1</u></p> <p>Transition toward the long-term sustainable management of surface water resources in the Otago region by establishing an interim planning framework to manage new water permits, and the replacement of deemed permits and water permits to take and use surface water (including groundwater considered as surface water) where those water permits expire prior to 31 December 2025, until the new Land and Water Regional Plan is made operative.</p>	
Policies	Assessment
<p><u>Policy 10A.2.2</u></p> <p>Irrespective of any other policies in this Plan concerning consent duration, only grant new resource consents for the take and use of water for a duration of no more than six years.</p>	<p>It is virtually certain that there is no connection between the underlying aquifer and the Amisfield Burn, meaning the potential interference effects on the Amisfield Burn and its tributary associated with the proposed increased rate of groundwater abstraction can be disregarded.</p> <p>It is considered appropriate that a 20 year term of consent is issued to align with what was previously issued and recognises the investment in the quarry and its anticipated life.</p>

## 6.2.5 Central Otago District Plan

The following policies, which give effect to the plan’s objectives, are relevant to this application for resource consent.

**Table 18:** Assessment of the relevant objectives and policies in the Central Otago District Plan

Section 3: Manawhenua	
Objectives	
<p><u>3.3.1 Objective - Kaitiakitanga (Guardianship)</u></p> <p>To have particular regard to Kai Tahu ki Otago’s concept and spirit of Kaitiakitanga in relation to managing the effects of the use, development, and protection of Central Otago’s natural and physical resources.</p>	
<p><u>3.3.4 Objective - Wai (Water)</u></p> <p>To recognise the significance of wai to Kai Tahu ki Otago’s spiritual beliefs, cultural traditions and practices, and to provide for these where appropriate.</p>	
Policies	Assessment
<p><u>3.4.1 Policy - Kai Tahu Ki Otago - Natural Resource Management Plan (1995)</u></p> <p>To recognise the Kai Tahu Ki Otago - Natural Resource Management Plan (1995) as the principal Kai Tahu ki Otago resource management reference planning document for the Central Otago District and to use this document as a basis for consultation on issues of importance to Kai Tahu ki Otago.</p>	<p>The relationship that Kai Tahu Ki Otago has with their ancestral lands, water sites, waahi tapu and other taonga has been taken into account through consideration of the Kāi Tahu ki Otago Natural Resource Management Plan 2005.</p>
<p><u>3.4.4 Policy - Wai (Water)</u></p> <p>To recognise and provide for the relationship Kai Tahu ki Otago have with the water resource through</p> <p>(a) consulting and working with Kai Tahu ki Otago and the Otago Regional Council on water quality issues that affect Kai Tahu ki Otago</p> <p>(b) promoting the avoidance, remedying or mitigation of significant adverse effects of activities undertaken within riparian margins and on the surface of water, and</p> <p>(c) ensuring the significance of water to Kai Tahu ki Otago spiritual beliefs, cultural traditions and practices are taken into account when considering</p>	



resource consent applications that may have an effect on water quality.	
<b>Section 4: Rural Resource Area</b>	
<b>Objectives</b>	
<u>4.3.1 Objective - Needs of the District's People and Communities</u>	
To recognise that communities need to provide for their social, economic and cultural wellbeing, and for their health and safety at the same time as ensuring environmental quality is maintained and enhanced.	
<u>4.3.3 Objective - Landscape and Amenity Values</u>	
To maintain and where practicable enhance rural amenity values created by the open space, landscape, natural character and built environment values of the District's rural environment, and to maintain the open natural character of the hills and ranges.	
<u>4.3.7 Objective - Soil Resource</u>	
To maintain the life-supporting capacity of the District's soil resource to ensure that the needs of present and future generations are met.	
<u>4.3.8 Objective - Significant Indigenous Vegetation and Habitats of Indigenous Fauna</u>	
To recognise and provide for the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna.	
<b>Policies</b>	<b>Assessment</b>
<u>4.4.2 Policy – Landscape and Amenity Values</u>	
<p>To manage the effects of land use activities and subdivision to ensure that adverse effects on the open space, landscape, natural character and amenity values of the rural environment are avoided, remedied or mitigated through:</p> <p>(a) The design and location of structures and works, particularly in respect of the open natural character of hills and ranges, skylines, prominent places and natural features,</p> <p>(b) Development which is compatible with the surrounding environment including the amenity values of adjoining properties,</p> <p>(c) The ability to adequately dispose of effluent on site,</p> <p>(d) Controlling the generation of noise in back country areas,</p> <p>(e) The location of tree planting, particularly in respect of landscape values, natural features and ecological values,</p> <p>(f) Controlling the spread of wilding trees.</p>	<p>The Application site is located within the Rural Resource Area as scheduled in the CODP. The proposal involves the exploration, extraction and processing of gravel for use in construction projects.</p> <p>Noting that the proposal relates to an existing quarry, specific mitigation measures including, bunding, setbacks and ceasing work under certain conditions are proposed to managed effects associated with noise, dust and the visual impact of the expanded quarry. These mitigation measures are based on the recommendations made by technical experts.</p> <p>Following the completion of quarrying activities on the application site, the original land contour will be reinstated and top soil will be laid to allow for the continued use of the land to support other productive rural uses.</p>

<p>(g) Encouraging the location and design of buildings to maintain the open natural character of hills and ranges without compromising the landscape and amenity values of prominent hillsides and terraces.</p> <p>(h) Strongly discouraging buildings in the Rural Resource Area of the Wooing Tree Overlay Area to ensure a vineyard or treed park-like character with an absence of built form.</p>	
<p><u>4.4.7 Policy – Significant Indigenous Vegetation, Wetlands and Wildlife</u></p> <p>To protect areas of:</p> <p>(a) Significant indigenous vegetation,</p> <p>(b) Significant habitats of indigenous fauna,</p> <p>(c) Significant wetlands,</p> <p>(d) Indigenous vegetation or habitats that support a significant indigenous fresh water fishery, and</p> <p>(e) Habitats of statutorily managed sports fish and game.</p> <p>from the adverse effects of land use activities and subdivision and to promote and encourage, where practicable, the retention, enhancement and reinstatement of indigenous ecosystems within the District.</p>	<p>The land on which the expansion of the quarry is proposed does not provide any significant value to ecosystems and indigenous biodiversity, being largely cultivated and dominated by exotic species.</p> <p>The Mahaka Katia Scientific Reserve adjoins the expansion land to the north and is considered to have high ecological values. Mitigation measures are proposed to ensure the operation of the expanded quarry does not compromise the health of ecosystems and indigenous biodiversity in the Mahaka Katia Scientific Reserve.</p>
<p><u>4.4.8 Policy – Adverse Effects on the Amenity Values of Neighbouring Properties</u></p> <p>To ensure that the effects associated with some activities including (but not limited to):</p> <p>(a) Noise (including noise associated with traffic generation, night time operations), and vibration,</p> <p>(b) The generation of a high level of traffic, in particular heavy vehicles,</p> <p>(c) Glare, particularly from building finish,</p> <p>(d) A reduction in visual amenity due to excessive signage and the storage of goods or waste products on the site,</p> <p>(e) The generation of odour, dusts, wastes and hazardous substances, and</p> <p>(f) The use and/or storage of hazardous goods or</p>	<p>Appropriate mitigation measures have been adopted to ensure any potential effect on amenity values is appropriately mitigated. For example, bunding, setbacks and ceasing work under certain conditions are proposed to manage effects relating to dust, noise and the visual impact of the expanded quarry.</p> <p>To address the proposed daily increase in vehicle movements to and from the site, a right turning bay facility is proposed to be installed to allow vehicles to enter the site safely. Traffic movements will otherwise have no impact on amenity values.</p>

Substances do not significantly adversely affect the amenity values and privacy of neighbouring properties or the safe and efficient operation of the roading network.	Hazardous substances will be appropriately contained in accordance with the HSNO.
<b>Section 12: District Wide Rules and Performance Standards</b>	
<b>Objectives</b>	
<u>12.3.1 Objective - Safe and Efficient Roding Network</u>	
To promote the safe and efficient operation of the District's roading network.	
<u>12.3.2 Objective - Protection from Noise</u>	
To avoid, remedy or mitigate the adverse effects of noise on the District's amenity values and the health and wellbeing of the District's people.	
<u>12.3.3 Objective - Reducing the Adverse Effects of Signs</u>	
To avoid, remedy or mitigate the adverse effects of signs on traffic and the general amenity values of the District while recognising that signs are a necessary adjunct to many activities.	
<u>12.3.4 Objective - Avoidance, Remedying or Mitigation of Nuisances</u>	
To ensure that activities avoid, remedy or mitigate nuisance to adjoining properties from odour, dust, light spill, glare and electrical interference.	
<b>Policies</b>	<b>Assessment</b>
<u>12.4.1 Policy - Parking, Loading and Manoeuvring</u>	With the required upgrades to the existing access to the site (as detailed in the Transport Assessment), it is considered that the roading network will continue to operate safely and efficiently.  The existing site layout provides sufficient space for parking and manoeuvring.
To avoid, remedy or mitigate adverse effects on the safe and efficient operation of the roading network by requiring: (a) Safe and efficient access points to the roading network, and (b) Off-road loading and manoeuvring space and facilities, and (c) Off-street parking, where these are appropriate.	
<u>12.4.2 Policy – Noise</u>	Providing the proposed mitigations are adopted, the CODP permitted noise limits for the Rural Zone will be complied with except for a predicted 4 dB infringement at 1308 Luggate-Cromwell Road between 06:00 and 07:00, Monday to Saturday. However, an infringement of up to 5 dB at all receivers is presently enabled by the existing consent. The predicted noise levels for the proposed operation are fully compliant with the consented noise limits for the existing activity.
To determine the suitability of noise generating activities in any given locality by having regard to: (a) The specific characteristics and amenity values of the locality from which the noise originates, and (b) The sound pressure level of the proposed activity, and (c) The frequency that the noisy activity takes place, and (d) The length of time that the noise continues, and (e) Any special characteristics of the noise, to ensure that the adverse effects of noise on other	

<p>activities and the natural and physical resources of the locality (including cumulative effects) reflect standards acceptable to the community.</p>	
<p><u>12.4.4 Policy – Signs</u></p> <p>To determine the suitability of signs in any given location by having regard to the sign’s effect on the following matters:</p> <p>(a) The safe and efficient operation of the roading network, and</p> <p>(b) The amenities of the locality, and</p> <p>(c) Landscape values, and</p> <p>(d) The character and scale of the building, site or area, and</p> <p>(e) Any heritage, historical or cultural values present.</p>	<p>One sign measuring 3-5 m<sup>2</sup> is proposed at the entrance to the site.</p> <p>The Transport Assessment confirms that the sign will not impact the safe operation of the State Highway 6.</p> <p>The sign is of similar size and design to other signs located on State Highway 6 (including the sign at the entrance to the Parkburn Quarry).</p>
<p><u>12.4.7 Policy - Management of Nuisance Effects</u></p> <p>To encourage resource users to adopt management practices that avoid, remedy or mitigate the adverse effects of:</p> <p>(a) odour,</p> <p>(b) lightspill and glare,</p> <p>(c) dust, and</p> <p>(d) electrical interference,</p> <p>on the use and enjoyment of neighbouring properties.</p>	<p>Appropriate mitigation measures have been adopted by the applicant to ensure discharges of dust to air do not result in significant nuisance effects. Specific mitigations adopted are set out in Section 5.2 and include a number of measures that are not currently implemented by the applicant.</p> <p>Effects associated with light spill are considered negligible and no specific mitigations are necessary beyond limiting operating hours.</p>

### 6.2.1 Resource Management (National Environmental Standards for Air Quality) Regulations 2004

The National Environmental Standards for Air Quality (NESAQ) came into force on 1 September 2005 and have since been amended with the latest revision coming into effect in 2011. The NESAQ standards are designed to protect public health and the environment of New Zealand by, among other things, setting concentration limits for criteria air pollutants.

The contaminant relevant to this application is PM10. NESAQ Regulations 13 and 17 relate to PM10. Regulation 13 sets a standard for PM10 that allows a maximum of one exceedance per year of a PM10 concentration of 50 µg/m<sup>3</sup> (24-hour average). Regulation 17 restricts the granting of resource consent for discharges of PM10 if the following apply:

- The discharge would be likely to increase 24-hour average PM10 concentrations in a “polluted” airshed by more than 2.5 µg/m<sup>3</sup>; and
- The PM10 emissions to be authorised by the proposed consent exceed those authorised by an existing consent for the same activity.

The site is not located within an airshed that is classified as a “polluted” airshed under Regulation 17. Hence, Regulation 17 does not apply to this application.

The mitigation measures proposed to control larger particles of dust from the quarry will also effectively control the discharge of finer particulates. Providing these mitigation measures are carried out effectively, it is expected that any health effects resulting from the discharge of fine particulate matter from the quarry will be negligible and concentrations of PM10 will not exceed the relevant standards and guideline values.

## 6.3 Other relevant policy documents

### 6.3.1 Kāi Tahu ki Otago Natural Resource Management Plan 2005

Iwi planning documents are not statutory instruments, but they do have statutory weight under the RMA in relation to the plan preparation process. The Regional Policy Statement must consider any relevant planning document recognised by an Iwi authority, however, iwi management plans retain their ability to address concepts from a Māori paradigm without constraint from the RMA. The Kāi Tahu ki Otago Natural Resource Management Plan 2005 (KTKO NRMP) is the principal planning document for Kāi Tahu ki Otago, describing in detail Kāi Tahu values, knowledge and perspectives on natural resource and environmental management issues.

The proposed expansion of the Amisfield Quarry is considered generally consistent with the relevant policies of the KTKO NRMP, including: Policy 10.2.3 (included below) of that relates to land use and gravel extraction Clutha/Mata-au Catchment.

*Land use:*

*9. To encourage the adoption of sound environmental practices, adopted where land use intensification occurs.*

*10. To promote sustainable land use in the Clutha/Mata-au Catchment.*

*11. To encourage all consents related to subdivision and lifestyle blocks are applied for at the same time including, land use consents, water consents, and discharge consents.*

*12. To require reticulated community sewerage schemes that have the capacity to accommodate future population growth.*

*Gravel Extraction:*

*13. To require all gravel take applications include information on the following:*

*i. cumulative effects and*

*ii. replenishment rates and*

*iii. effects on aquatic ecosystems and*

*iv. effects on indigenous fisheries and*

*v. proposed timing of works and*

*vi. effects on cultural values of Kā Papatipu Rūnaka 103.*

*14. To require gravel extractors to comply with the Pounamu Management Plan 104*

## 7. CONSULTATION

In March 2020, the applicant wrote to owners/occupiers of the properties surrounding the application site who were identified by the applicant as being potentially interested in the proposal. The letter included a brief description of the proposal and a draft site plan, and comments were invited. Feedback was received in person and over the phone from the owners of three properties. Feedback informed design mitigations, for example adopting an underpass to provide access to the expansion land and limiting the height of bunds to limit their potential impact on visual amenity values.

Further to the initial consultation undertaken, the same property owners (excluding properties south of Amisfield Road and north of Mt Pisa Road) were provided with a draft AEE and supporting technical reports on 14 September 2020 to provide more information as to the proposal, and to provide assurance that any effects on those properties had been assessed. The draft AEE was also provided to the Department of Conservation and Aukaha for comment on 15 September 2020.

A written approval was subsequently provided by Lindsey Moore (refer **Appendix 9**) who owns, and part owns Lot 1 Deposited Plan 384908 and Lot 2 Deposited Plan 384908 respectively. Feedback was also received from an individual representing the owners of the land at Lot 1 Deposited Plan 508108 and Lot 2 Deposited Plan 508108).

At the time of lodging, the applicant had not received feedback from DoC or Aukaha, however the applicant will continue to engage with those organisations to confirm whether they have any comments on the proposal.

Consultation has been undertaken with NZTA in relation to State Highway 6, as described in Section 6 of the Transport Assessment, and the design of the right turning bay addresses the feedback received from NZTA.

## 8. NOTIFICATION ASSESSMENT

This section provides an assessment as to whether the application requires public or limited notification in accordance with the RMA. Sections 95A-95G of the RMA set out the steps for determining whether public notification or limited notification of a resource consent application is required.

## 8.1 Public Notification

Section 95A of the RMA sets out the steps which must be followed by a consent authority when determining whether to publicly notify applications for resource consent. These have been summarised below.

<p><b>Step 1</b></p>	<p>Mandatory public notification in certain circumstances.</p> <p>An application must be publicly notified if any of the following criteria are met:</p> <ul style="list-style-type: none"> <li>▪ the applicant has requested public notification; or</li> <li>▪ public notification is required under section 95C; or</li> <li>▪ the application is made jointly with an application to exchange recreation reserve land.</li> </ul>
<p><b>Step 2</b></p>	<p>If notification is not required by step 1, public notification is precluded in certain circumstances.</p> <p>An application cannot be publicly notified if either of the following criteria are met:</p> <ul style="list-style-type: none"> <li>▪ the application is for one or more activities and each activity is subject to a rule or NES that precludes notification; or</li> <li>▪ the application is for a resource consent for 1 or more of the following but no other activities: <ul style="list-style-type: none"> <li>– a controlled activity</li> <li>– a restricted-discretionary, discretionary or non-complying activity but only if the activity is a boundary activity.</li> </ul> </li> </ul>
<p><b>Step 3</b></p>	<p>If not precluded by step 2, public notification is required in certain circumstances.</p> <p>Public notification is required if:</p> <ul style="list-style-type: none"> <li>▪ the application is for a resource consent for 1 of more activities, and any of those activities is subject to a rule or NES which requires public notification; or</li> <li>▪ the consent authority decides, in accordance with s95D, that the activity will have, or is likely to have, adverse effects on the environment that are more than minor.</li> </ul> <p>Under Section 95D, a consent authority that is deciding whether an activity will have or is likely to have adverse effects on the environment that are more than minor:</p> <ul style="list-style-type: none"> <li>(a) must disregard any effects on persons who own or occupy— <ul style="list-style-type: none"> <li>(i) the land in, on, or over which the activity will occur; or</li> <li>(ii) any land adjacent to that land; and</li> </ul> </li> <li>(b) may disregard an adverse effect of the activity if a rule or national environmental standard permits an activity with that effect; and</li> <li>...</li> <li>(d) must disregard trade competition and the effects of trade competition; and</li> <li>(e) must disregard any effect on a person who has given written approval to the relevant application.</li> </ul>

<b>Step 4</b>	<p>Public notification in special circumstances</p> <p>If notification is precluded under step 2, or isn't required under step 3, consideration must be given to whether special circumstances exist that warrant public notification of the application. If no such circumstances exist, the application must not be publicly notified but the consent authority must determine whether to give limited notification of the application under Section 95B.</p>
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In terms of Step 1 of s95A, the applicant does not request public notification and public notification is not required under s95C. In terms of Step 2, public notification is not precluded by a rule or NES. In terms of Step 3, public notification is not required because a rule or NES does not require public notification, and based on the technical assessments undertaken it has been determined that the activity will not have adverse effects on the environment that are more than minor. In terms of step 4, "special circumstances" are those that are unusual or exceptional, but they may be less than extraordinary or unique<sup>3</sup>. No such circumstances exist in relation to this proposal, therefore public notification of the application is precluded. Consideration must then be given to Section 95B.

## 8.2 Limited Notification

Where a consent authority determines that public notification is not required by Section 95A, it must then follow the relevant steps to determine if limited notification is required under Section 95B:

<b>Step 1</b>	<p>Certain affected groups and affected persons must be notified.</p> <p>If the consent authority determines that certain people or groups are affected, these persons/groups must be given limited notification:</p> <ul style="list-style-type: none"> <li>▪ affected protected customary rights groups</li> <li>▪ affected customary marine title groups (in the case of an application for a resource consent for an accommodated activity)</li> <li>▪ an affected person under section 95E to whom a statutory acknowledgement is made (if the proposed activity is on or adjacent to, or may affect, land that is the subject of a statutory acknowledgement).</li> </ul>
<b>Step 2</b>	<p>If not required by step 1, limited notification is precluded in certain circumstances.</p> <p>An application cannot be limited notified if either of the following criteria are met:</p> <ul style="list-style-type: none"> <li>▪ the application is for a resource consent for 1 or more activities, and each activity is subject to a rule or national environmental standard that precludes limited notification; or</li> <li>▪ the application is for a controlled activity (but no other activities) that requires a resource consent under a district plan (other than a subdivision of land).</li> </ul>

<sup>3</sup> Peninsula Watchdog Group (Inc) v Minister of Energy [1996] 2 NZLR 529 (CA) at 536



<b>Step 3</b>	<p>If not precluded by step 2, certain other affected persons must be notified.</p> <ul style="list-style-type: none"> <li>▪ In the case of a boundary activity, an owner of an allotment with an infringed boundary; and</li> <li>▪ In the case of any other activity, determine whether a person is an affected person in accordance with Section 95E.</li> </ul>
<b>Step 4</b>	<p>Further notification in special circumstances.</p> <p>If the consent authority determines special circumstances exist that warrant limited notification of the application to any other persons not already determined to be eligible for limited notification (excluding persons assessed under section 95E as not being affected persons), the council must give limited notification to those persons.</p>

None of the groups identified in Step 1 are affected and none of the circumstances in Step 2 apply. In terms of Step 3 it is considered that there are no adversely affected persons in terms of Section 95E. Step 4 does not apply as there are not considered to be any special circumstances which would warrant limited notification under Section 95B(10).

## 9. CONSENT DURATION, REVIEW AND LAPSE

A five year consent lapse period is considered appropriate to apply to the replacement land use consent sought. If granted it is sought to apply in perpetuity to reflect what is consented under RC150052.

The same 20 year consent term that applies to the existing resource consents to abstract groundwater and discharge contaminants to water and land, is proposed to apply to the replacement regional resource consents and the resource consents sought to discharge contaminants to air and construct a bore. As noted in **Table 17** it is not considered to be appropriate to apply Policy 10A.2.2 that requires new water permits to be issued for no more than 6 years. The proposed groundwater take is not connected to surface water and circumstances surrounding the take of water require a longer term of consent to provide confidence in the financial investment required to expand the quarry.

## 10. CONCLUSION

Resource consents are sought for the deepening and expansion of the existing Amisfield Quarry. A decision to grant resource consents for this proposal, pursuant to Section 104B of the RMA under delegated authority, can be made on the basis that:

- a) The quarry has been in operation since 1994, providing Cromwell and the surrounding area with aggregate and employment to support the region's economic growth, the proposal will secure this situation into the future;
- b) The proposal is appropriately located in the rural zone, where mineral extraction is anticipated. It

will enable the continued, efficient use of existing infrastructure and continuation of aggregate supply within close proximity to the local market;

- c) The technical assessments undertaken have determined that the adverse effects of the proposal can be effectively mitigated and accordingly this AEE considers effects to be less than minor.
- d) The proposal is consistent with the requirements of the RMA, the objectives policies of the relevant regional and district plans, and other relevant matters; and
- e) Granting of the consents sought is consistent with the purpose of the RMA, for the reasons explained within this report.

## **Appendix 1:**

## Appendix 2:

## Appendix 3:

## Appendix 4:

## Appendix 5:

## Appendix 6:



## Appendix 7:

## Appendix 8:

## Appendix 9:



**LANDPRO**

Make the most of your land

23 October 2020

Landpro Reference: 19474

Otago Regional Council  
70 Stafford Street,  
Private Bag 1954,  
**Dunedin 9054**

Central Otago District Council  
PO Box 122,  
**Alexandra 9340**

Attention: Consent Managers

**Re: Application by Cromwell Certified Concrete to replace Discharge Permit - RM16.108.02 (ORC), Water Permit -RM16.108.01 (ORC) and Land use consent - RC150052 (CODC) and seek resource consent for the discharge of contaminants to air to authorise the operation and expansion of the Amisfield Quarry**

Please find enclosed the above consent applications for your consideration. The AEE attached to this application relates to resource consents sought from the Central Otago District Council and Otago Regional Council.

The required deposit fee will be paid online under reference Amisfield 19474.

If you have any questions in relation to this application, please do not hesitate to contact me directly (details below).

Yours Sincerely

Matt Curran  
Senior Planner

13 Pinot Noir Drive | PO Box 302 | Cromwell 9342  
P 03 445 9905  
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L:\19474 - Cromwell Certified Concrete Limited - Permit applications for expansion of the Amisfield Quarry\CAD\19474\_01\_QUARRY PLAN\_REV B.dwg Plotted: 19.08.2020

Client  
**CROMWELL CERTIFIED CONCRETE LTD**

NOTES  
 - All dimensions shown are in metres unless otherwise shown  
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 - Check any electronic data against the hardcopy plan to ensure it is the latest version  
 - If this plan is being used as part of sale and purchase agreement then it is done so on the basis that it is preliminary only, final dimensions and areas may vary on final survey

**SITE PLAN**

Rev.	Date	Revision Details	By	Surveyed	Signed	Date	Job No.	Drawing No.
A	21.7.20	50m setback around neighbouring dwelling	slb				19474	01
B	22.7.20	setback area expanded	slb					
			Drawn		Signed	Date	Scale	
			SLB			4.6.20	1:1500 @ A1	
			Designed		Signed	Date	Datum & Level	Rev.
							NZTM 2000 & MSL	



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**RECORD OF TITLE  
UNDER LAND TRANSFER ACT 2017  
FREEHOLD  
Search Copy**



  
R.W. Muir  
Registrar-General  
of Land

**Identifier** 5965  
**Land Registration District** Otago  
**Date Issued** 27 August 2001

**Prior References**  
2412

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**Estate** Fee Simple  
**Area** 9.8655 hectares more or less  
**Legal Description** Lot 3 Deposited Plan 301379  
**Registered Owners**  
Cromwell Certified Concrete Limited

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**Interests**

Subject to Section 8 Mining Act 1971  
Subject to Section 5 Coal Mines Act 1979  
Appurtenant hereto is a right to convey water created by Transfer 833094 - 2.7.1993 at 9:24 am  
5041663.1 Gazette Notice (2001/1044) declaring adjoining road (S.H.No. 6) to be limited access road - 11.5.2001 at 9:31 am  
5057370.4 Notice pursuant to Section 91 Transit New Zealand Act 1989 - 10.7.2001 at 2:30 pm  
5074990.2 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 27.8.2001 at 9:00 am  
Appurtenant hereto are rights of way specified in Easement Certificate 5074990.15 - 27.8.2001 at 9:00 am  
Subject to a right of way over part marked A on DP 301379 specified in Easement Certificate 5074990.15 - 27.8.2001 at 9:00 am  
The easements specified in Easement Certificate 5074990.15 are subject to Section 243 (a) Resource Management Act 1991  
Land Covenant in Deed 5074990.16 - 27.8.2001 at 9:00 am  
Subject to a right to convey water, telecommunications and electricity over part marked A on DP 301379 specified in Easement Certificate 5079130.1 - 6.9.2001 at 9:00 am  
Appurtenant hereto are rights to convey water, telecommunications and electricity specified in Easement Certificate 5079130.1 - 6.9.2001 at 9:00 am

**MEMORANDUM OF EASEMENTS**

Purpose	Shown	Serv Ten	Dom Ten
Right of Way	(A)	Lot 3	Hereon
Right of Way	(B)	Lot 2	Hereon
Right of Way	(C)	Lot 5	Hereon
Right of Way	(D)	Lot 7	Hereon

**Schedule of Existing Subject Easements to be Retained**

Purpose	Shown	Serv Ten	Creating Document
Right of Way	(E)	Lot 9 Hereon	150111093

Diagram C - Not to Scale

Diagram A - Not to Scale

Diagram B - Not to Scale

Diagram D - Not to Scale

**Approvals**

PURSUANT TO SEC 37(1)(a) LOCAL GOVERNMENT ACT 1974, THE CENTRAL OTAGO DISTRICT COUNCIL, BY RESOLUTION PASSED ON 20th DECEMBER 2000 IS SATISFIED THAT ADEQUATE ACCESS IS PROVIDED FOR LOT 9 HEREON BY WAY OF A RIGHT OF WAY AND THAT SECTION 32(1) SHALL NOT APPLY.

AUTHORISED OFFICER: *[Signature]*

I HEREBY CERTIFY THAT THIS PLAN WAS APPROVED BY THE CENTRAL OTAGO DISTRICT COUNCIL PURSUANT TO SEC 223 OF THE RESOURCE MANAGEMENT ACT 1991 ON THE 21st DAY OF JANUARY 2001 SUBJECT TO THE AMALGAMATION CONDITIONS SET OUT HEREON THAT LOTS 1, 6, 10 AND 11 HEREON BE HELD IN THE SAME CERTIFICATE OF TITLE (SEE CSN REQUEST 2208)\* THAT LOTS 5 AND 8 HEREON BE HELD IN THE SAME CERTIFICATE OF TITLE (SEE CSN REQUEST 2208)\* THAT LOTS 2 AND 7 HEREON BE HELD IN THE SAME CERTIFICATE OF TITLE (SEE CSN REQUEST 2208)\* AND SUBJECT TO THE GRANTING OR RESERVING OF THE EASEMENTS SET OUT IN THE MEMORANDUM HEREON

AUTHORISED OFFICER: *[Signature]*

**Class III Survey**

**Title Allocations**

Lots 1, 6, 10 & 11 - 5963  
 Lots 2 & 7 - 5964  
 Lot 3 - 5965  
 Lot 4 - 5966  
 Lots 5 & 8 - 5967  
 Lot 9 - 5968

Total Area 84,621.7 ha

Comprised in CT 241215 (A) 11  
 CT 1867333 (A) 11

I, PETER ANDERSON, DYADEK, being a person entitled to practice as a registered surveyor, certify that -  
 (a) The surveys to which this consent relates are accurate and comply with the requirements of the Survey Act 1986 and the Survey Regulations 1986.  
 (b) This consent is accurate, and has been created in accordance with the provisions of those Regulations.

Field Book: *[Blank]*  
 Reference Plans: *[Blank]*  
 Examined: *[Blank]*

Approved as to Survey: *[Signature]* Chief Surveyor  
 25.1.5.01  
 Deposited this 27th day of August, 2001

Registrar-General of Land  
 File: *[Blank]*  
 Received: 27/8/01  
 Instructions: *[Blank]*

DP 301379

LAND DISTRICT Otago  
 SURVEY BLK. & DIST. 1 Wakefield  
 NZMS 261 SHT  
 RECORD MAP No

LOTS 1-11 BEING A SUBDIVISION  
 OF LOT 1 DP24589 & LOT 3 DP300388

TERRITORIAL AUTHORITY Central Otago Dist.  
 Surveyed by Paterson Pitts Partners Ltd  
 Scale 1:5000 Date Feb 2001



**RECORD OF TITLE  
UNDER LAND TRANSFER ACT 2017  
FREEHOLD  
Search Copy**



  
R.W. Muir  
Registrar-General  
of Land

**Identifier** 5967  
**Land Registration District** Otago  
**Date Issued** 27 August 2001

**Prior References**  
2412 OT16C/333

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**Estate** Fee Simple  
**Area** 19.1265 hectares more or less  
**Legal Description** Lot 5, 8 Deposited Plan 301379  
**Registered Owners**  
Cromwell Certified Concrete Limited

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**Interests**

Subject to Section 8 Mining Act 1971  
Subject to Section 5 Coal Mines Act 1979  
Appurtenant hereto is a right to convey water created by Transfer 833094 - 2.7.1993 at 9:24 am  
Mining Permit embodied in Register OT9D/526 - 27.9.1995 at 9.26 am (affects Lot 8)  
Fencing Covenant in Transfer 906998.1 - 3.5.1996 at 9.08 am (affects Lot 8)  
906998.2 Mortgage of Lot 8 to ANZ Banking Group (New Zealand) Limited - 3.5.1996 at 9.08 am  
5041663.1 Gazette Notice (2001/1044) declaring adjoining road (S.H.No. 6) to be limited access road - 11.5.2001 at 9:31 am  
5057370.4 Notice pursuant to Section 91 Transit New Zealand Act 1989 - 10.7.2001 at 2:30 pm  
Subject to a right of way over part marked C on DP 301379 created by Transfer 5074990.12 - 27.8.2001 at 9:00 am  
The easement created by Transfer 5074990.12 is subject to Section 243 (a) Resource Management Act 1991  
Subject to Section 241(2) and Section 242(1) Resource Management Act 1991(affects DP 301379)  
Subject to a right (in gross) for telecommunication purposes over part marked B DP 307266 in favour of Telecom New Zealand Limited created by Transfer 5979884.1 - 26.4.2004 at 9:00 am  
Subject to a right (in gross) to convey electricity over and through the soil of part marked B DP 307266 in favour of Aurora Energy Limited created by Transfer 5979884.2 - 26.4.2004 at 9:00 am  
Land Covenant in Easement Instrument 7613283.3 - 13.11.2007 at 9:00 am  
10230594.2 Bond pursuant to Section 108(2)(b) Resource Management Act 1991 - 4.12.2015 at 10:59 am  
Subject to a right (in gross) to convey electricity over part Lot 8 DP 301379 marked AC and DC and subject to a right to transform electricity over part Lot 8 DP 301379 marked AC all on DP 511453 in favour of Aurora Energy Limited created by Easement Instrument 10883381.2 - 7.5.2018 at 4:27 pm



**MEMORANDUM OF EASEMENTS**

Purpose	Shown	Serv Ten	Dom Ten
Right of Way	(A)	Lot 3	Heron
Right of Way	(B)	Lot 2	Heron
Right of Way	(C)	Lot 5	Heron
Right of Way	(D)	Lot 7	Heron

13. SHEETS (TITLE SHEET)  
 12. SHEETS (GENERAL INFORMATION SHEETS)  
 06610: 110190208

**Schedule of Existing Subject Easements to be Retained**

Purpose	Shown	Serv Ten	Creating Document
Right of Way	(E)	Lot 9 Heron	150111093

**Approvals**

PURSUANT TO SEC 37(1)(a) LOCAL GOVERNMENT ACT 1974, THE CENTRAL OTAGO DISTRICT COUNCIL, BY RESOLUTION PASSED ON 20th DECEMBER 2000 IS SATISFIED THAT ADEQUATE ACCESS IS PROVIDED FOR LOT 9 HEREON BY WAY OF A RIGHT OF WAY AND THAT SECTION 32(1) SHALL NOT APPLY.

AUTHORISED OFFICER: *[Signature]*

I HEREBY CERTIFY THAT THIS PLAN WAS APPROVED BY THE CENTRAL OTAGO DISTRICT COUNCIL PURSUANT TO SEC 223 OF THE RESOURCE MANAGEMENT ACT 1991 ON THE 21st DAY OF JANUARY 2001 SUBJECT TO THE AMALGAMATION CONDITIONS SET OUT HEREON THAT LOTS 1, 6, 10 AND 11 HEREON BE HELD IN THE SAME CERTIFICATE OF TITLE (SEE CSN REQUEST 2208)\* THAT LOTS 5 AND 8 HEREON BE HELD IN THE SAME CERTIFICATE OF TITLE (SEE CSN REQUEST 2208)\* THAT LOTS 2 AND 7 HEREON BE HELD IN THE SAME CERTIFICATE OF TITLE (SEE CSN REQUEST 2208)\* AND SUBJECT TO THE GRANTING OR RESERVING OF THE EASEMENTS SET OUT IN THE MEMORANDUM HEREON

AUTHORISED OFFICER: *[Signature]*

**Class III Survey**

**Title Allocations**

- Lots 1, 6, 10 & 11 - 5963
- Lots 2 & 7 - 5964
- Lot 3 - 5965
- Lot 4 - 5966
- Lots 5 & 8 - 5967
- Lot 9 - 5968

Total Area 84.6217 ha

Comprised in CT 24121(a)(1)  
 CT 1867333, (a)(1)

I, PETER ANDERSON, DYADEK, being a person entitled to practice as a registered surveyor, certify that -  
 (a) The surveys to which this document relates are accurate and have been created in accordance with the Survey Act 1986 and the Survey Regulations 1986.  
 (b) This document is accurate, and has been created in accordance with the Survey Act 1986 and the Survey Regulations 1986.

Field Book: Zwersa Book P  
 Reference Plans: Correct  
 Examined: Correct

Approved as to Survey: *M. H. Warburton*  
 Chief Surveyor  
 Deposited this 21st day of August, 2001

File: DP 301379  
 Received: 27/8/01  
 Instructions: R. Registrar-General of Land

**Diagram C - Not to Scale**

**Diagram A - Not to Scale**

**Diagram B - Not to Scale**

**Diagram D - Not to Scale**

LAND DISTRICT Otago  
 SURVEY BLK. & DIST. 1 Wakefield  
 NZMS 261 SHT

RECORD MAP No

LOTS 1-11 BEING A SUBDIVISION  
 OF LOT 1 DP24589 & LOT 3 DP300388

Surveyed by Paterson Pitts Partners Ltd  
 Scale 1:5000 Date Feb 2001

TERRITORIAL AUTHORITY Central Otago Dist

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# Amisfield Quarry Expansion

## Transport Assessment

**Prepared for:** Cromwell Certified Concrete Ltd.  
**Job Number:** LPL-J001  
**Revision:** A  
**Issue Date:** 11 September 2020  
**Prepared by:** Ravindu Fernando, Senior Transportation Engineer  
**Reviewed by:** Jeanette ward, Technical Director

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## 1. Introduction

Cromwell Certified Concrete Ltd. commissioned Abley Limited (Abley) to provide transport planning advice in regard to a resource consent application to expand the existing Amisfield Quarry in Mount Pisa (1248 Luggate -Cromwell Road, Mount Pisa).

This report provides an assessment of the proposed changes against the transport related rules of the Central Otago District Plan and further assesses any potential transport related impacts on the existing site environment and the adjacent transport network.

## 2. Existing Site Information

### 2.1 Locality

The site is located on the east side of State Highway 6 (Luggage-Cromwell Road), just south of the SH6/ Mount Pisa Road intersection. The location of the site in context of the wider area is shown in **Figure 2.1**.



**Figure 2.1** Amisfield quarry location

The land use in the vicinity of the site is rural, with majority of the land being occupied by vineyards.

## 2.2 Zoning

According to the Central Otago District Plan, the site sits within the “Rural Resource Area”. The land in the immediate vicinity of the site has the same zoning.

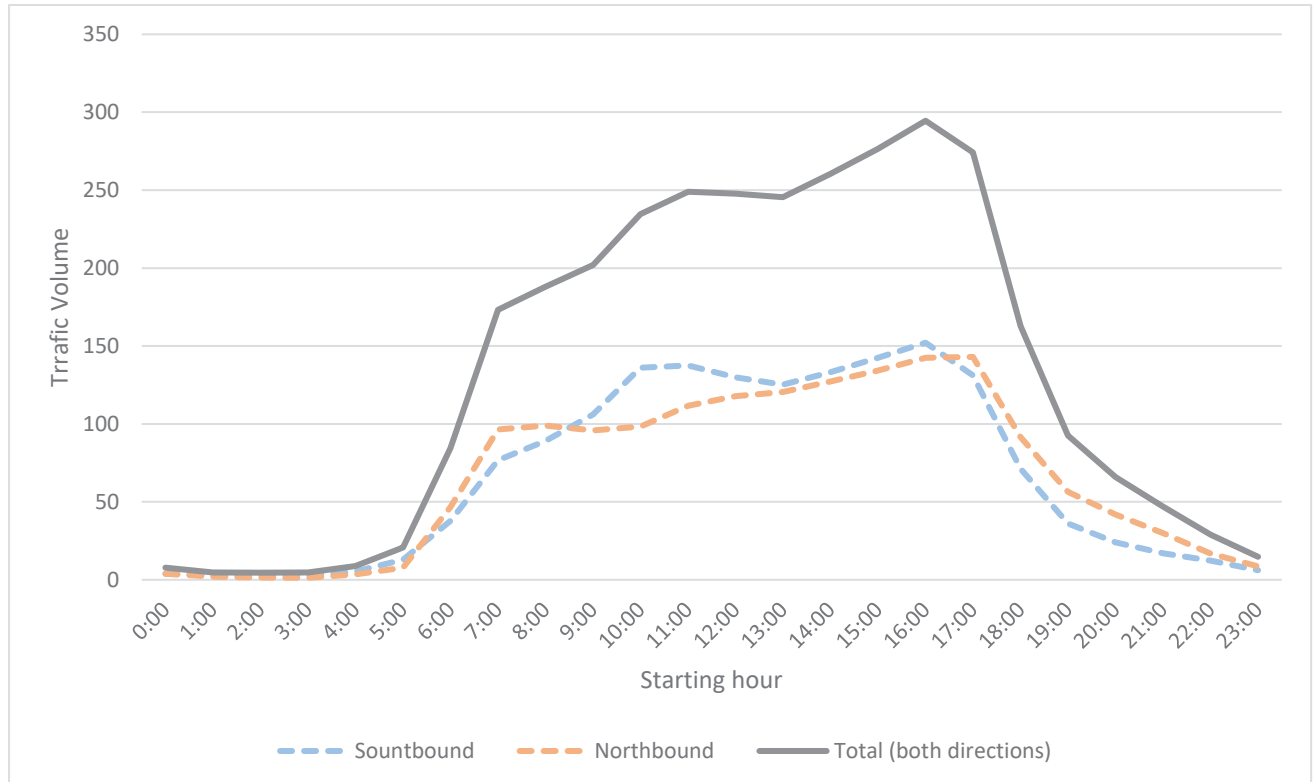
## 2.3 Adjoining Road Network

The site is accessed via SH 6, which along the site frontage has a posted speed limit of 100km/h. The carriageway is sealed and consists of one traffic lane in each direction, and near the site access, shoulder widening is provided on both sides of the road to allow vehicles to go past another vehicle waiting or decelerating to turn into the site.

The site access is located approximately 120m south of the Mount Pisa Road/ SH6 intersection, which is priority controlled with a Give Way sign and markings on Mount Pisa Road. Mount Pisa Road is classified as a rural local road and serves several vineyards and rural residential properties.

Existing traffic flows on SH6 was sourced from the NZ Transport Agency’s (NZTA) Traffic Monitoring System (TMS). The nearest traffic count stations to the site are, one in Lowburn, approximately 9km south of the site and another approximately 11km north of the site, close to the intersection of SH6/ Gladsmuir Road. Traffic counts at the northern count station are assumed to be more representative of the traffic flows along the site frontage given that there is minimal active land uses and major intersecting roads between this and the site when compared with the southern count station.

Neither of these count stations are telemetry sites, which means continuous daily traffic count data is not available and only periodic data is available. As such, all available traffic count data between January 2019 and February 2020 (data was available for the periods; 09 Jan – 05 Feb, 12 April – 18 April, 01 Aug – 07 Aug and 02 Oct – 08 Oct, 2019) has been averaged to obtain an hourly traffic profile on SH6 as shown in **Figure 2.2**. The average daily traffic volume for the period noted above is 3,193 vehicles/ day (ranges between 2,170 and 4,240 vehicles per day). Traffic count data is not available for Mount Pisa Road, however given that it does not connect to any other roads, the relatively short length and the rural land use along the road, it is evident that Mount Pisa Road is a low volume rural road.



**Figure 2.2** SH 6 hourly traffic counts

## 2.4 Existing Activity

The site currently accommodates a quarry along with associated heavy machinery for aggregate production. A small office area and an informal unsealed parking area is provided at the front of the site. The site is accessed from SH6. The formed accessway is approximately 10m wide and roughly the first 75m is sealed. As noted within the **Section 2.3**, near the site access shoulder widening is provided on SH6 to allow vehicles go past trucks or other vehicles waiting or decelerating to turn into the site.

## 3. Road Safety

In order to review the existing safety performance on the road network near the site, crashes recorded within the past five years, i.e., 2015 – 2019 inclusive and any crashes available for 2020, were obtained from the NZTA’s Crash Analysis System (CAS). The search area included SH6, 250m to either side of the site access and a 50m buffer at the Mount Pisa Road/ SH6 intersection. Only one crash was recorded in the past five years, which was a non-injury crash, approximately 70m south of the site access resulting from a dog running across the road in front of a vehicle.

On the basis of the historical crash records, it is evident that there are no underlying safety concerns along SH6 near the site and at the Mount Pisa Road/ SH 6 intersection.

## 4. Proposed Activity

The proposal includes expanding the quarry operations to an adjoining site north east of the existing quarry. The expansion area is shown in **Figure 4.1**.



**Figure 4.1** Proposed quarry expansion area

The key matter to consider from a traffic and transportation perspective is the increased trip generation as a result of the site expansion, particularly the anticipated increase in the heavy commercial vehicle movements, which has an impact on the site access arrangements. The location and the layout of the formed site accessway, the office area and associated parking area is not proposed to undergo any changes from the existing layout. Accordingly, the subsequent sections of this Transport Assessment focus on the site access arrangements, particularly in relation to the adequacy of the existing provisions on SH6 to facilitate safe and efficient turning of heavy vehicles to and from the site.

## 5. Appraisal of Transport Effects

### 5.1 Trip Generation

The quarry manager at the Amisfield Quarry advised that at present up to 47 trucks service the quarry per day (94 trips/day), and that this is anticipated to increase up to 75 trucks per day following the proposed expansion. It was also advised that during the peak rush hour, up to 20 trucks arrive at the site. Assuming the existing ratio between the peak hour and daily truck movements will be retained, a maximum of 32 trucks are expected to service the quarry during the peak hour following the proposed expansion. It is conservatively assumed that the same number of trucks enter and leave the site during the peak hour, i.e., 32 arrivals and 32 departures. However, Cromwell Certified Concrete Ltd. has noted that with the increased trip generation, truck arrivals are likely to be more spread out through the day than it currently is. Accordingly, the aforementioned hourly trip generation rates are highly conservative and presents a worst-case scenario and has been used for the subsequent analysis of the access arrangement to ensure a robust assessment.

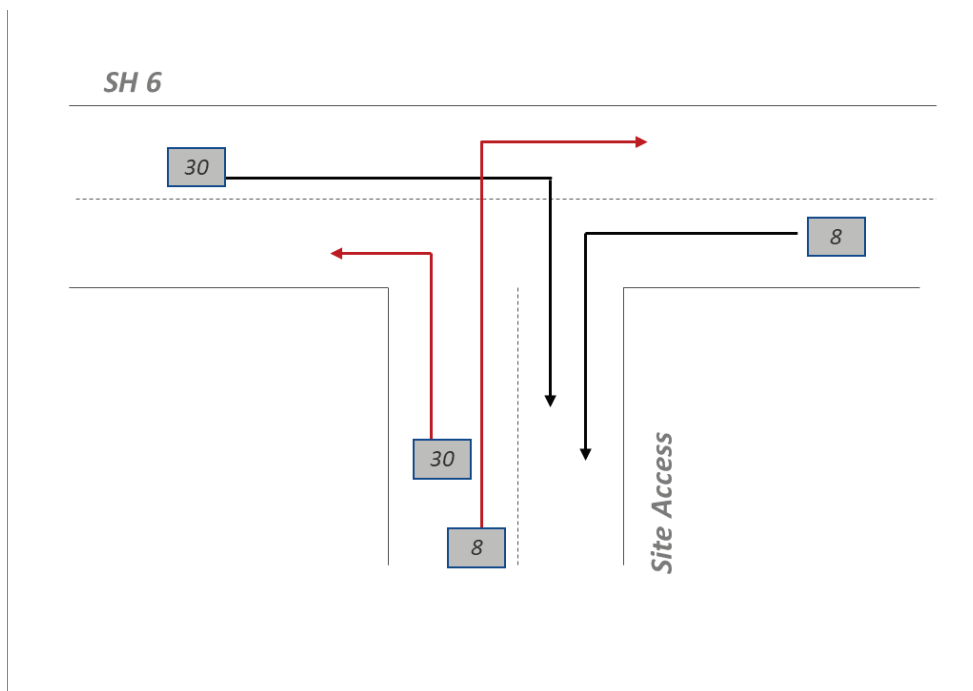
In addition to this, approximately 10 light vehicles arrive and leave the site daily at present. (10 arrivals and 10 departures) This is not expected to increase as part of the proposed quarry expansion. If it is assumed that all employees arrive or leave the site within a single hour, this will result in a maximum of 10 vehicle trips during the peak commute hours.

In terms of the overall hourly trips, the peak employee arrivals or departures are unlikely to coincide with the hour that the truck movements will be at its highest. As such it is assumed that 50% of the light vehicles will arrive and leave the site during the same hour that the truck movements peak. **Table 5.1** outlines the projected trip generation of the site following the proposed quarry expansion.

	Heavy Vehicles (trips/ hour)	Light Vehicles (trips/hour)	Total
Vehicle trips/ day	150 (75 arrivals + 75 departures)	20 (10 arrivals + 10 departures)	182
Maximum vehicle trips/ hour	64 (32 arrivals + 32 departures)	10 (5 arrivals + 5 departures)	80

### 5.2 Trip Distribution

The vehicle arrival and departure directions have been determined through assessment of truck logs for the past year, which identified that 80% of all trucks arrive at the site from south, thereby turning right into the site. Majority of the employees are also likely to come from Cromwell and hence the directional split of heavy vehicles noted above is assumed to be applicable to light vehicles as well. All vehicles are assumed to leave in the same direction that they arrive from. On this basis, the distribution of the trips at the site access during the peak hour is shown in **Figure 5.1**.



**Figure 5.1** Peak hour trip distribution at the site access

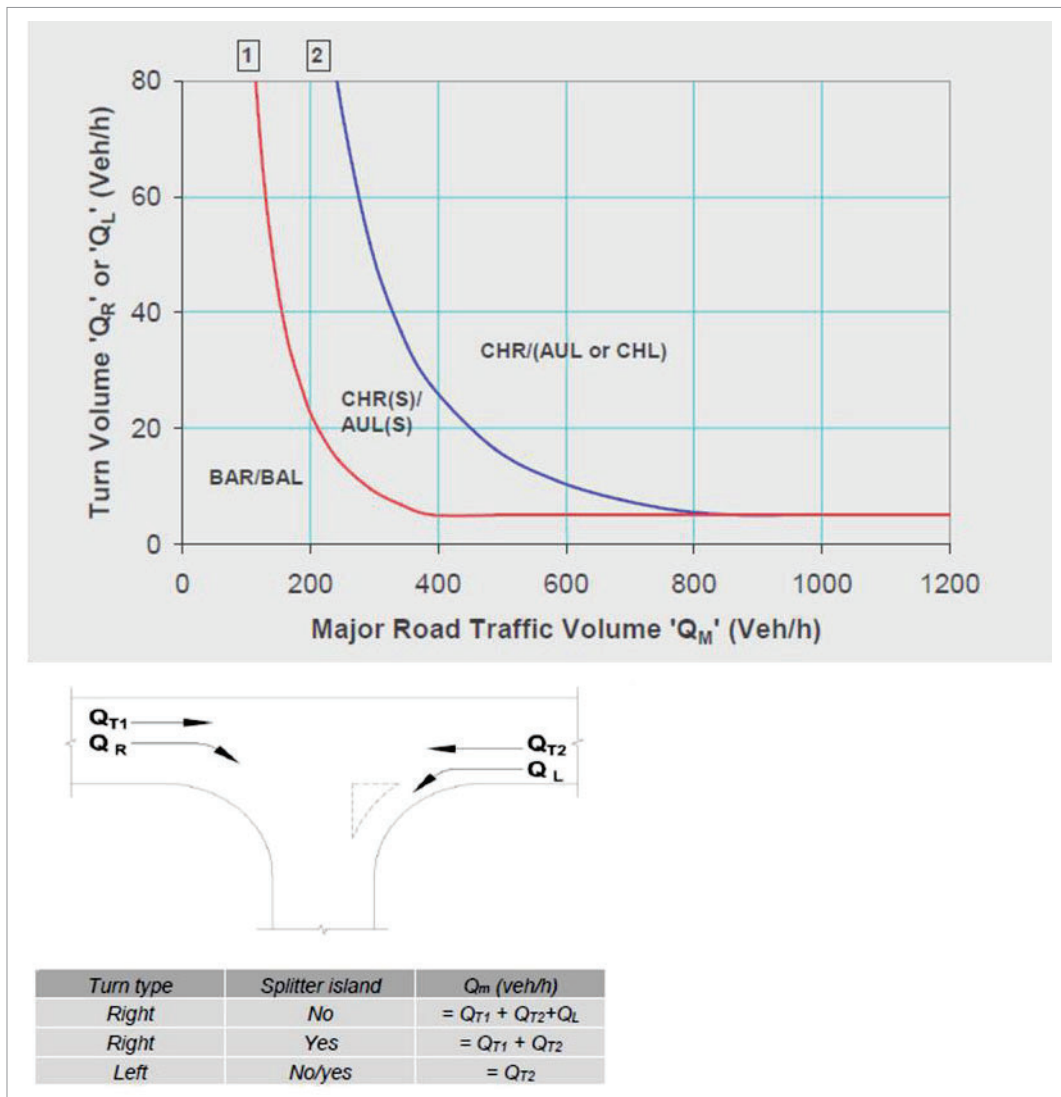
## 5.3 Access Arrangement

### Turn Treatments on SH6

As noted previously within this report, currently only a basic turn treatment, i.e. shoulder widening on the frontage road, is currently provided at the site access. A key focus of this Transport Assessment is to determine whether the existing turn treatment is adequate to cater for the increased usage of the site access and if not, to identify and design an appropriate higher order turning treatment to facilitate safe and efficient usage of the access.

The Central Otago District Plan states that vehicle accesses on State Highways should be in accordance with NZTA standards. NZTA Planning Policy Manual (Appendix 5B: Accessway standards and guidelines) notes that accessways that are likely to generate more than 100 equivalent car movements (ecm) per day<sup>[1]</sup> are required be designed as intersections. However, there is no specific guidance within the NZTA intersection design guidelines that clearly outlines the thresholds for different right and left turning treatments. As such, Austroads Guidelines (Guide to Road Design Part 4: Intersections and Crossings – General) was referred to in order to determine what turning facility the increased access usage would warrant. The nature of the required turning facility depends on the peak hour turning volumes, peak hour major road traffic volume and the speed environment as shown in **Figure 5.2**.

<sup>[1]</sup> 1 truck and trailer to and from a property equates to 10 ecm, which means the anticipated trip generation following the expansion is in the order of 800 ecm



**Figure 5.2** Warrants for turn treatments on major roads at unsignalled intersections - Design Speed of 100km/h or more (Source: Austroads Guide to Road Design Part 4: Intersections and Crossings – General)

**Figure 5.3** and **Figure 5.4** provides an assessment of the left and right turning treatments required at the site access following the proposed expansion, as per the methodology outlined above.



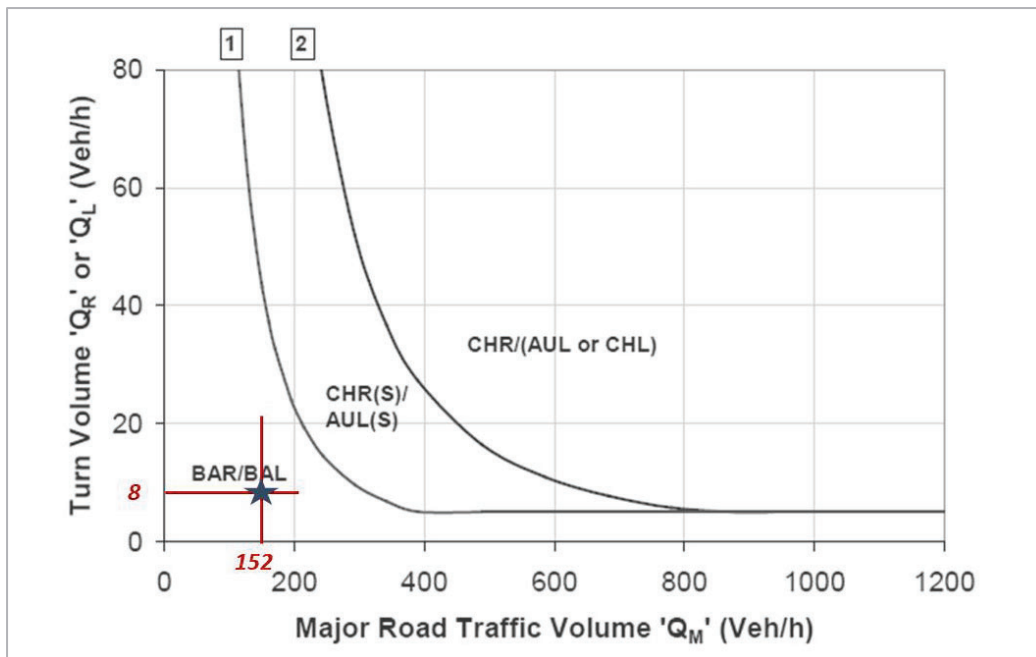


Figure 5.3 Left turn treatment requirement on SH 6

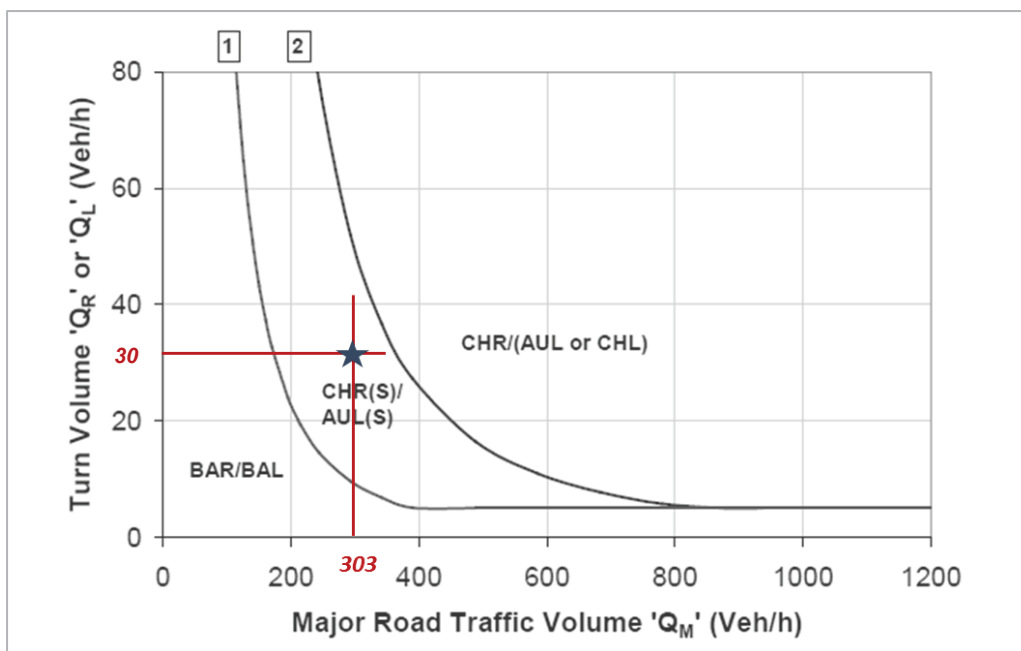


Figure 5.4 Right turn treatment requirement on SH 6

As noted in **Figure 5.3**, a basic left turning treatment, i.e. shoulder widening, is sufficient to cater the increased left turning traffic.

With regard to the right turning treatment, **Figure 5.4** indicates that the existing shoulder widening is inadequate and at least a short length channelised right turning facility (right turn bay) needs to be provided. However, the New Zealand design standards does not specifically provide for short length right turning bays. As such, it is proposed that a full length right turning bay is provided in accordance with the design standards noted within the NZTA Manual of Traffic Signs and Markings (MOTSAM – Section 3, Intersection and Pavement Markings). The proposed design of the right turn bay is provided in **Appendix A**. (please note that consultation was undertaken with NZTA and the current design addresses

the feedback from NZTA)

As seen in the plans, providing a right turn bay will require some level of seal widening on the eastern side of the road and an existing culvert just south of the site access will need to be widened. The new edge line will not extend beyond the existing culvert, but the clearance from the southbound lane will be reduced by approximately 1m. Since this can be a safety concern in a high-speed environment, it is proposed that the existing culvert is widened by approximately 2m. The site access as well is proposed to be widened to facilitate smoother vehicle turning.

As the road widening to accommodate the right turn bay happens on the eastern side of the road, the new alignment of the southbound lane encroaches on the existing shoulder widening for left turning vehicles. However as shown in the concept plans in **Appendix A**, new shoulder widening will be provided to the same length and width as the existing.

## Sight Distance

**Figure 5.5** and **Figure 5.6** shows the available sight distance to the left and the right of the site access, respectively. SH6 has a straight alignment in the vicinity of the site, and accordingly the horizontal road alignment does not result in any sight distance obstruction. However as seen in **Figure 5.6**, a vertical curve south of the site access dictates the available sight distance to the left. The crest of the curve is approximately 290m from the site access and accordingly the available sight distance to the left of the access is 290m. Sight distance to the right of the access is unobstructed.

Since the road widening needed to accommodate the right turn bay is proposed to occur on the eastern side of the road, the location where the site access intersect the road will be shifted back towards the site by 3m. This however will not change the sight distance availability.

The proposed right turn bay and the associated tapers will not change the existing sight distance availability.



**Figure 5.5** Sight distance available to the left of the accessway



**Figure 5.6** Sight distance available to the right of the accessway

## 6. NZ Transport Agency Feedback

NZTA was consulted regarding the overall proposal and the proposed changes on the State Highway corridor in March 2020. Comments were received from NZTA in July 2020.

Please note that NZTA provided the following comments on the first design which included the road widening to accommodate the right turning bay occurring completely on the western side of SH6, i.e. on the opposite side of the road from the quarry. The current design outlined in **Appendix A** and described in Section 5 is a second iteration of the design where the road widening occurs completely on the eastern side of the State Highway.

***The applicant needs to confirm whether the proposed widening and upgrade can be accommodated within the Highway Reserve and will not encroach on neighbouring land.***

The proposed road widening under the updated design can be fully accommodated within the road reserve.

***The applicant should confirm that the irrigation raceway is not within the clear zone requirements for the site as stipulated in Austroads Table 4.1, or else, sufficient mitigation measures need to be proposed.***

As per the updated design, road widening does not occur on the opposite side of the road from the quarry where the irrigation swale is located. Accordingly, the northbound traffic lane will not get any closer to the irrigation swale than it currently is.

***The Right Turn Bay should start 6m from the centreline of the existing access. As per Motsam Part II Section 3.***

The right turn bay starts 8m from the centreline of the site access to be able to accommodate the turning manoeuvre into the site. A 6m separation means a 23m truck and trailer turning right into the site may struggle to complete the manoeuvre in a single turn. This means even if a 6m separation is provided, the drivers in practise will not position the truck at the front of the right turn bay. Accordingly, the 8m separation identified as appropriate through the tracking assessment is recommended.

***The applicant conducts queuing analysis for the right turn bay to ensure there is sufficient stacking distance before commencing with the detailed design.***

A maximum of 24 trucks are anticipated to turn right into the site during the peak hour. This on average corresponds to one truck per 2.5 minutes. The opposing through volume (southbound) on SH6 as well is relatively low at 152 vehicles/ hour. As such the possibility of a truck already waiting at the right turning bay, when a second truck arrives is extremely minimal. To further substantiate the queuing effects, a SIDRA intersection model was set up for the site access. The modelling results clearly show that the 95-percentile queueing does not exceed one vehicle (note that in setting up the modal, the default gap acceptance values were increased to reflect that majority of turning vehicles are heavy commercial vehicles which generally require more time to complete a turning manoeuvre than a light vehicle). Sidra Modelling results are outlined in **Appendix C**.

***The access radius north of the access needs to be upgraded to a 15m radius.***

This cannot be physically achieved due to the extent of the land parcel owned by the applicant. The implication is that a vehicle turning left into the site will be obstructed by a vehicle waiting to turn out of the site. (Note that this is not an issue for vehicles turning right into the site). This is an existing situation that is being managed safely at present. It is further noted that the possibility of a conflicting situation arising is extremely low due to the low volume of left turning traffic. Only 20% of all trucks into site arrive from north, turning left. During the peak hour, this only accounts for 6 trucks turning left into the site. The tracking assessment has been undertaken with the largest truck anticipated to service the site. In practice, most trucks servicing the site would be smaller and hence the truck manoeuvring is unlikely to be as restrictive as the tracking assessment indicates.

Notwithstanding the low possibility of conflict, as potential mitigation, we propose to establish a sign on the accessway, approximately 20m back from the road, advising drivers to look for vehicles approaching from right prior to proceeding. Note that the vehicle tracking we have undertaken confirms that two vehicles can pass each

other with no obstruction at 20m down the accessway (see tracking assessment in **Appendix B**). It is also noted that since land north of the access is a vineyard, the sightline of a driver 20m back from the road and looking to the right for approaching vehicles is unobstructed. Since the access at present as well cannot support simultaneous vehicle entry and exit, the aforementioned protocol already informally happens at the site. The proposed sign would simply formalise this protocol and significantly mitigate the possibility of a conflicting situation. Overall, we believe the measure proposed above will sufficiently mitigate the potential conflict arising from not providing a 15m radii at the northern side of the site access.

**Aspiring highways notes that there is existing cracking and potholing in the shoulder in front of the access. This needs to be resealed as part of the access upgrade.**

This will be actioned during construction

The concept plans for the updated access design (shown in **Appendix A**) was provided to NZTA in August 2020 along with the reasoning for not being able to provide a 15m radius at the northern end of the site access and the proposed mitigation for the resulting potential conflict. No formal response had been received to date, however during verbal correspondences, NZTA has indicated that the updated design appropriately addresses their key concerns with the initial design and that they do not have any fundamental concerns with the current design.

## 7. District Plan Assessment

An assessment of the proposed quarry expansion has been undertaken against the transport related rules of the Central Otago District Plan. The results of this assessment are summarised in **Table 7.1**.

The rules are summarised in the first column, an assessment of the proposal is described in the second and the resulting status is listed in the third column.

**Table 7.1** CODC District Plan Assessment

District Plan Rule	Assessment	Compliance Status
12.7.1 Access Standards from Roads		
<b>Construction and Maintenance</b>		
a) Access should be able to be used in all weather conditions.	Access is currently used in all weather conditions with no recorded issues.	Unchanged from the existing provisions (Compliant)
b) Accesses have no adverse impact upon road drainage system.	The site access is already existing, and no changes are proposed to the access design or layout. The proposal will only result in an increased use of the access.	Unchanged from the existing provisions (Compliant)
c) Stormwater and detritus (including gravel and silt) do not migrate on to the road.	Approximately the first 75m of the accessway is sealed.	Unchanged from the existing provisions (Compliant)
d) Accessways intersect with the property boundary within 15 degrees of a right angle.	The accessway is perpendicular to the SH6 road alignment.	Unchanged from the existing

		provisions (Compliant)
<b>Sight Distance</b>		
Where the frontage road is a State Highway with a speed limit of 100km/h, a minimum sight distance of 280m is required.	As discussed within Section 5.3.	Compliant
<b>Access to Rural State Highways and Arterial Roads</b>		
a) The access shall be sealed to the same standard as the adjacent road carriageway.	Approximately the first 75m of the accessway is sealed.	Unchanged from the existing provisions (Compliant)
b) Where the speed limit is 100 kph, spacing between accesses shall be not less than 200 metres (regardless of the side of road on which they are located), and no vehicle access shall be constructed within 100 metres of road intersections AND spacing between intersections (i.e. road intersections) shall be not less than 800 metres	The nearest other access is that to the vineyard immediately north of the site. This access is approximately 350m north of the quarry access.  The nearest intersection to the site access is the SH6/ Mount Pisa Road intersection which is approximately 120m north of the site access.	Compliant
c) Except as provided for in (d) below, width of vehicular access ways at the property boundary are to be no greater than 6 metres.	Not Applicable, clause (d) noted below applies.	N/A
d) Heavy vehicular accesses shall be designed and constructed to: <ul style="list-style-type: none"> <li>i) A minimum width of nine metres.</li> <li>ii) Carry the volume and weight of traffic likely to use the access.</li> <li>iii) Ensure heavy vehicles do not have to cross the road centre line when making a left turn.</li> <li>iv) Ensure the surface is constructed to the same standard as the adjacent road carriageway.</li> <li>v) Have sufficient width to accommodate the swept path of the largest vehicle anticipated to use it.</li> </ul>	<ul style="list-style-type: none"> <li>i) The width of the formed accessway is 10m.</li> <li>ii) The access is designed to be able to carry the volume and the weight of the trucks that will access the quarry.</li> <li>iii) The largest vehicle to service the quarry is a 23m truck and full-trailer<sup>[2]</sup> Tracking assessment for this is provided in <b>Appendix B</b> and shows that left turning trucks from the quarry will not encroach on to the opposite lane. (note as per the tracking assessment the vehicles cross the road centreline on to the right turn bay when making a left turn out. However, this is inconsequential since a left turning vehicle will not encroach on the opposite lane as a right turn bay is provided at the site access. If there is a vehicle turning left out and right in at the same time, the vehicle turning in has priority. As such there will be no conflict – the vehicle turning out will still be able to use the space of the right turn bay to complete the exit manoeuvre.)</li> </ul>	Compliant

<sup>[2]</sup> <https://www.nzta.govt.nz/assets/resources/hpmv-proforma/docs/23m-truck-full-trailer.pdf>

	iv) The existing accessway is retained. No further construction changes are proposed. v) Tracking assessment provided in <b>Appendix B</b>	
e) Driveways shall not be parallel to and level with roads within 20 metres of the road reserve.	The accessway is perpendicular to and level with the road at least for the first 50m	Compliant
f) Figures 12.2 and 12.3 on pages 12:32 and 12:33 establish the minimum design standards for access determined by activity type.	NZTA design standards apply as the frontage road is a State Highway	N/A
g) Access to State Highways shall be to Transit New Zealand design specifications	As discussed within Section 5.3.	Compliant

The vehicle parking area within the site is unsealed and individual parking spaces are not delineated as seen in **Figure 7.1**. Compliance with regard to other built form standards of the District Plan, such as landscaping is not achieved. However, these are existing non-compliances that have not resulted in any safety or operational issues. Furthermore, these standards are generally irrelevant in the context of the type of this activity. It is also noted that the parking areas will typically only be used by the employees who are familiar with the site layout and any constraints. There is almost no public access to the site apart from an occasional visitor.

In terms of the parking demand, as noted within Section 5.1, the proposed quarry expansion is not anticipated to result in any notable increase in light vehicle movements. It is also noted that the office area within the site will not undergo any expansion as part of this proposal. As seen in **Figure 7.1**, the existing parking area has sufficient capacity to accommodate significantly more parking than it currently does. Accordingly, any increase in the parking demand resulting from the quarry expansion can be easily accommodated within the existing parking area of the site. Whilst the district plan outlines minimum parking requirements for a range of activities, quarries or any comparable activity type is not listed. The assessment concludes that the district plan standards associated with parking are not necessarily relevant in the context of an activity such as a quarry.

On the basis of the matters noted above, a detailed assessment of the site against the parking standards of the Central Otago District Plan is not considered necessary and has not been undertaken.



**Figure 7.1** Informal parking area within the site

## 8. Conclusion

Cromwell Certified Concrete Ltd. proposes to expand the operations of the Amisfield quarry to an adjoining site north east of the existing quarry. The existing site access (location), associated office spaces and the parking area are not proposed to be changed as part of the proposal.

The proposed expansion is expected to generate up to 30 additional vehicle trips per hour of which 50% would be arrivals and 50% would be departures. Assessment of the truck logs confirmed that approximately 80% all trucks to the site arrive from south. Since most employees as well arrive from Cromwell, the 80%/ 20% directional split is assumed to be applicable for light vehicles as well.

Currently shoulder widening is provided on both sides of SH6 near the site access to allow vehicles to go past another vehicle waiting or decelerating to turn into the site. The NZTA Planning Policy Manual requirements are that this access operates as an intersection. An assessment of the appropriate turn treatments concluded that a higher order right turning facility is required to support the increased turning movements at the site access following the proposed expansion. However, for the left turning movement, the existing provisions were determined to be sufficient. Accordingly, it is proposed that a right turn bay is provided on SH6 at the site access in accordance with the NZTA design standards.

The right turn bay will require some level of seal widening on the eastern side of the road, and an existing culvert just south of the site access will need to be widened. Although the new edge line will not extend beyond the existing culvert, the clearance from the northbound lane will be reduced by approximately 1m. Since this can be a safety concern in a high-speed environment, it is proposed that the existing culvert is widened by approximately 2m.

The proposal complies with all transport related rules of the Central Otago District Plan relating to site accesses. While the existing onsite parking provisions are largely non-complaint with the corresponding District Plan rules, it is noted that these are all existing non-compliances that are not expected to exacerbate as a result of the potential modest increase in light vehicle parking demand. It is also noted that the parking related rules such as delineating individual parking spaces and provision of landscaping are not necessarily applicable to an activity such as a quarry.

Overall, the proposed quarry expansion and the associated roading improvements can be supported from a traffic and transport perspective as any noticeable effect on the wider transport network will be minimal. Accordingly, it is considered that there are no traffic and transport related reasons to preclude the resource consent being granted for the proposal.

## Appendix A: Right Turn Bay Design





**NOTES**

- 1. DESIGNED IN ACCORDANCE TO MOTSAM PART 2.

Rev	Date	By	Chk	Description
A	06/08/2020	HJ	RF	Design Revised As Per NZTA Feedback

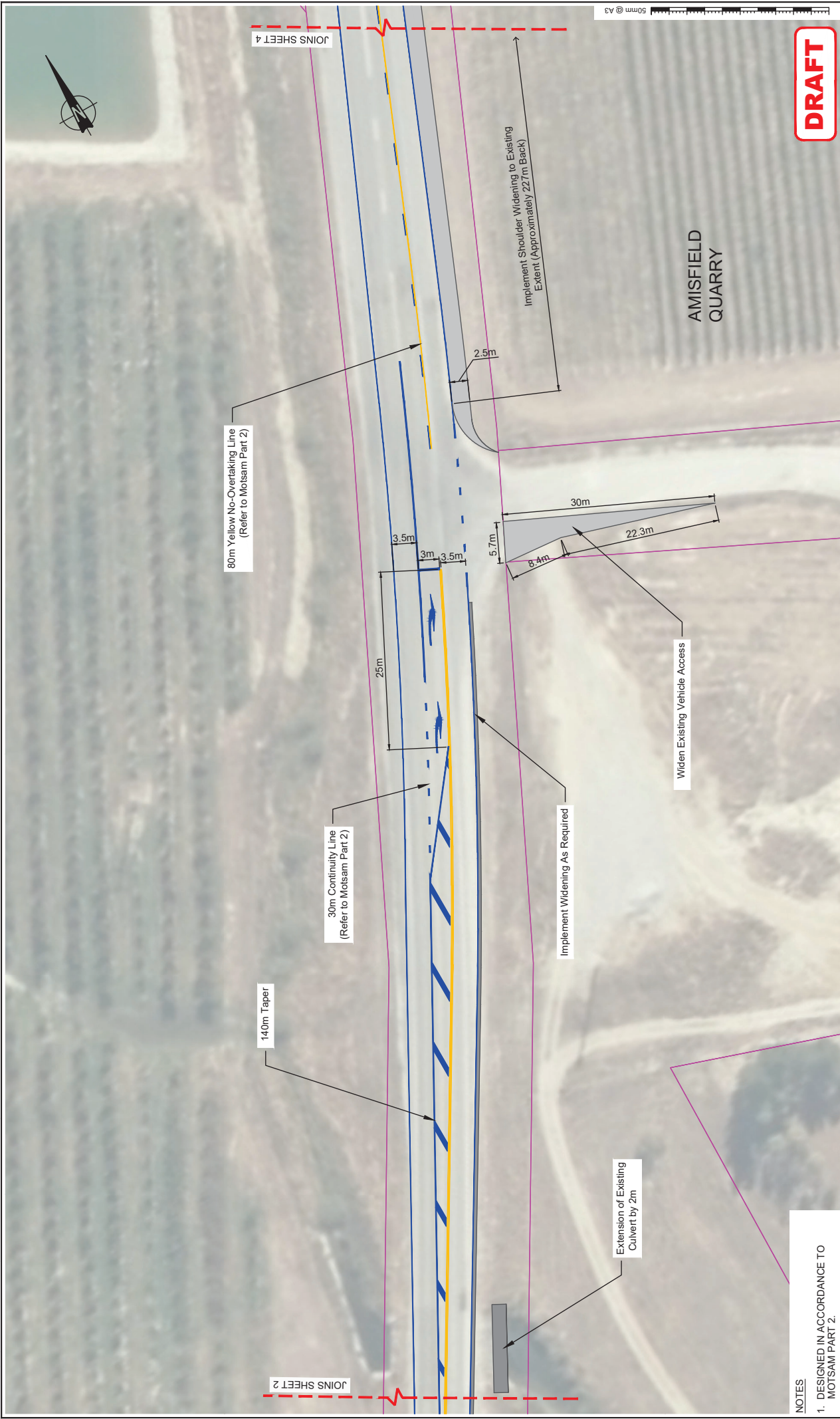
Design	HJ
Drawn	HJ
Checked	RF
Issued	11/08/2020
Scale	1:2000 @ A3

**Amisfield Quarry Expansion**  
 Site Access  
 Proposed Right-Turn Bay on SH-6  
 Conceptual Design -Overview

Project No	LPL-001
Dwg #	ATC10536
Sheet	1
Revision	A

**DRAFT**





**DRAFT**

Project No	LPL-001
Dwg #	ATC10536
Sheet	3
Revision	A

**Amisfield Quarry Expansion**  
**Site Access**  
**Proposed Right-Turn Bay on SH-6**  
**Conceptual Design**

Design	HJ
Drawn	HJ
Checked	RF
Issued	11/08/2020
Scale	1:500 @ A3



**NOTES**  
**1. DESIGNED IN ACCORDANCE TO MOTSAM PART 2.**

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**NOTES**

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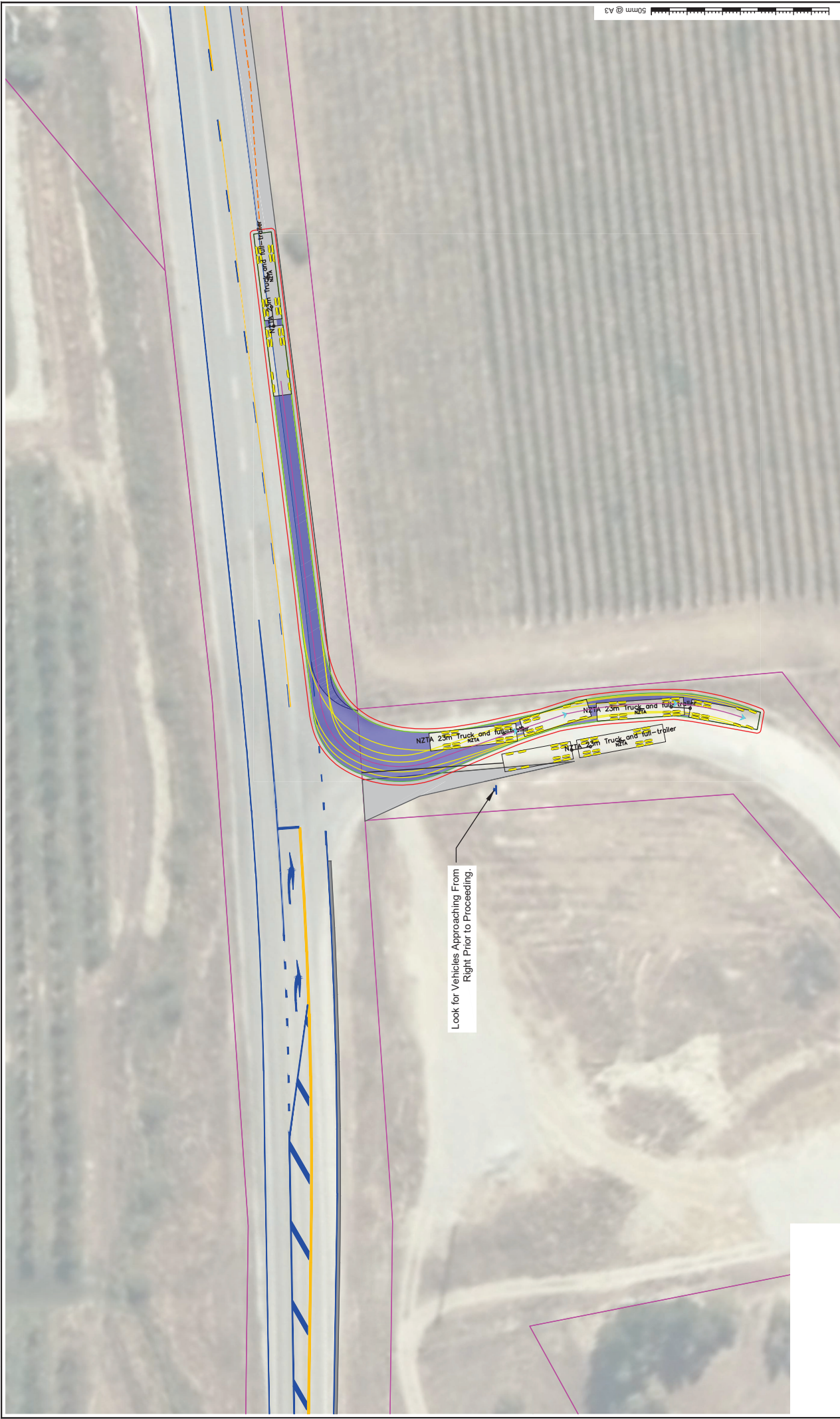
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**Amisfield Quarry Expansion**  
Site Access  
Proposed Right-Turn Bay on SH-6  
Conceptual Design

Project No	LPL-001
Dwg #	ATC10536
Sheet	4
Revision	A

## Appendix B: Tracking Assessment



Rev	Date	By	Chk	Description
A	06/08/2020	HJ	RF	Design Revised As Per NZTA Feedback

Design	HJ
Drawn	HJ
Checked	RF
Issued	10/09/2020
Scale	1:500 @ A3

Project No	LPL-1001
Dwg #	ATC10536
Sheet	1
Revision	A

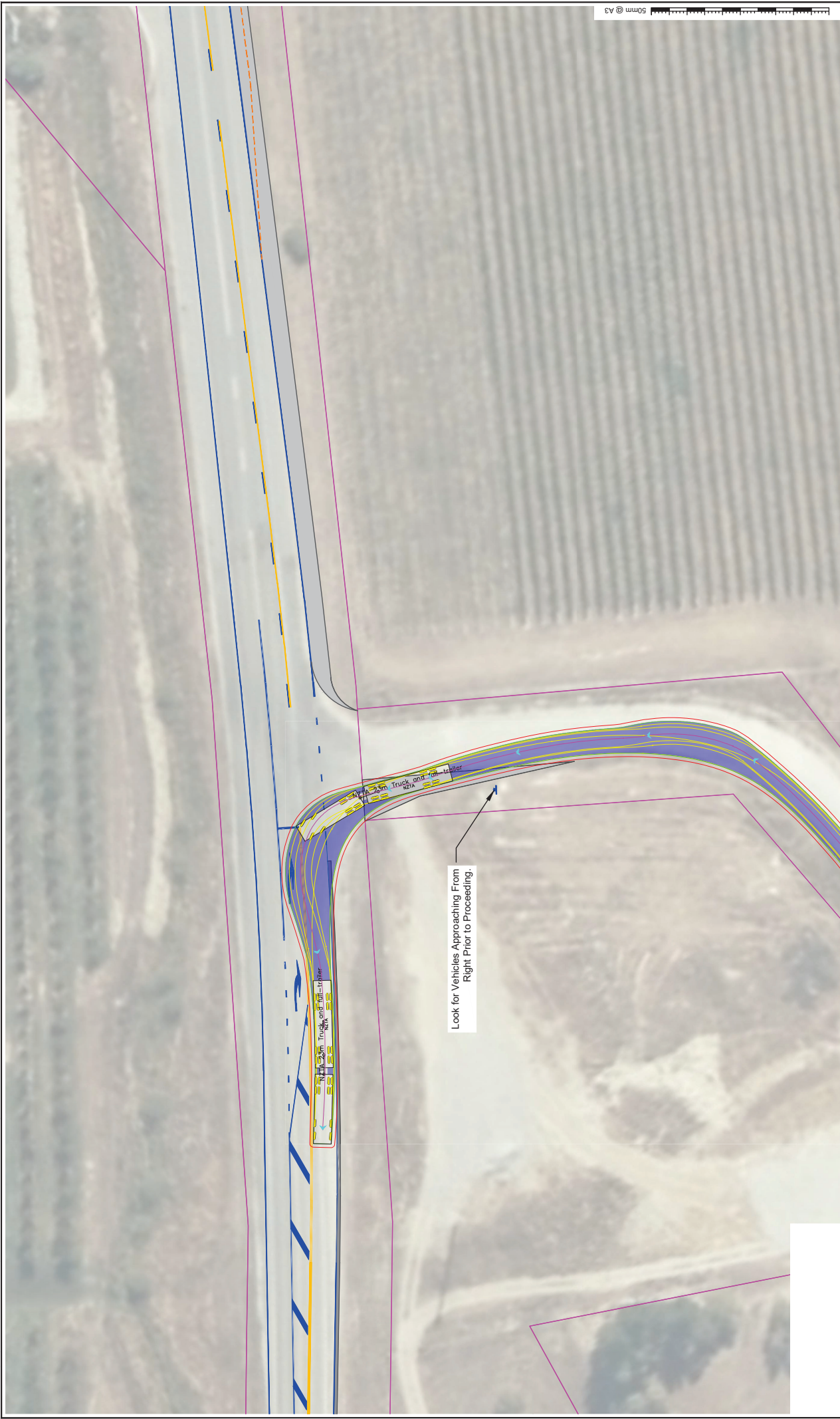
**Amisfield Quarry Expansion**

**Site Access**

**Proposed Right-Turn Bay on SH-6**

**NZTA 23m Truck and Full Trailer - Swept Path (Left turn In)**





Rev	Date	By	Chk	Description
A	06/08/2020	HJ	RF	Design Revised As Per NZTA Feedback

Design	HJ
Drawn	HJ
Checked	RF
Issued	10/09/2020
Scale	1:500 @ A3

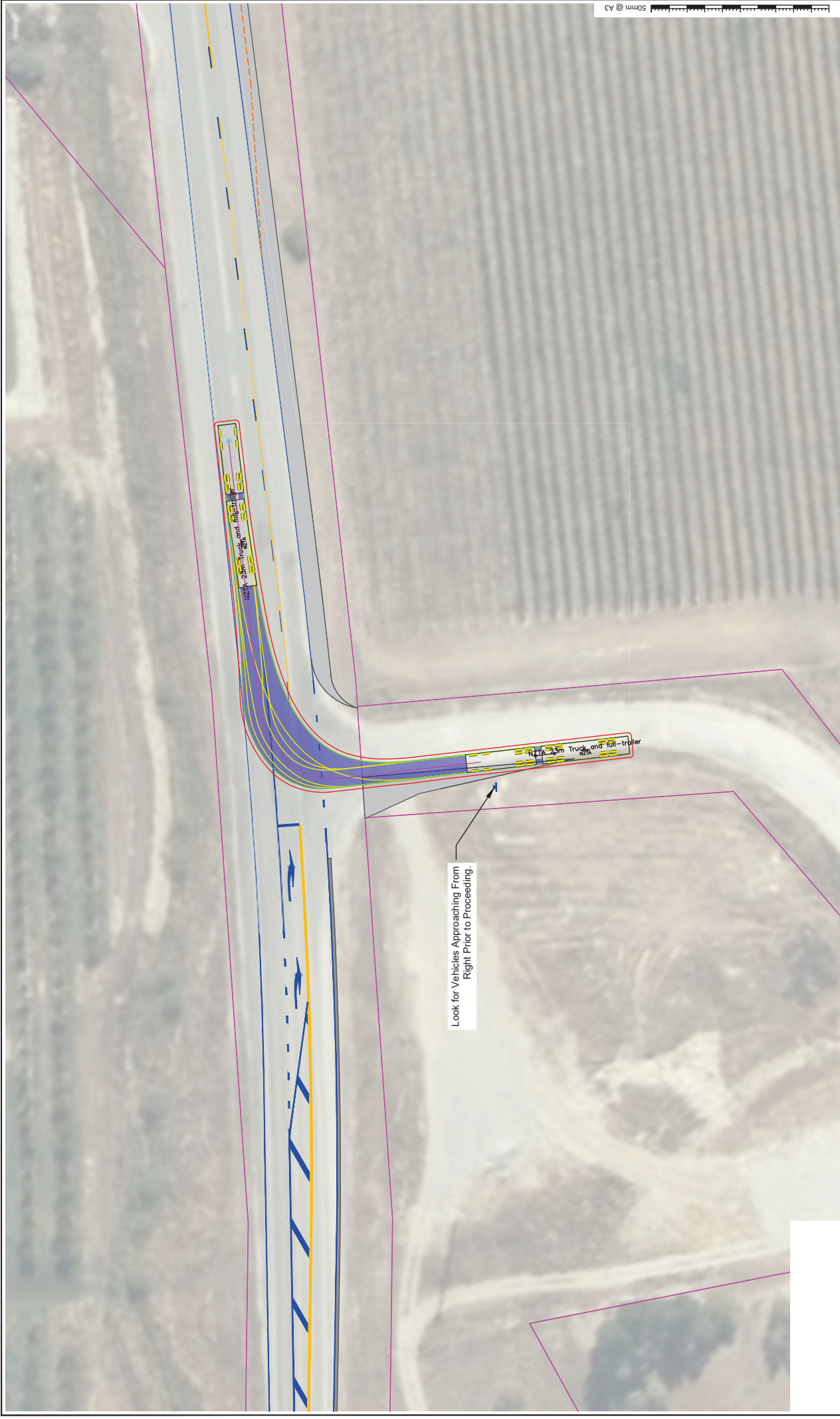
  

Project No	LPL-1001
Dwg #	ATC10536
Sheet	2
Revision	A

**Amisfield Quarry Expansion**  
**Site Access**  
**Proposed Right-Turn Bay on SH-6**  
**NZTA 23m Truck and Full Trailer - Swept Path (Left Turn Out)**





Rev	Date	By	Chk	Description
A	06/08/2020	HJ	RF	Design Revised As Per NZTA Feedback

Design	HJ
Drawn	HJ
Checked	RF
Issued	10/09/2020
Scale	1:500 @ A3

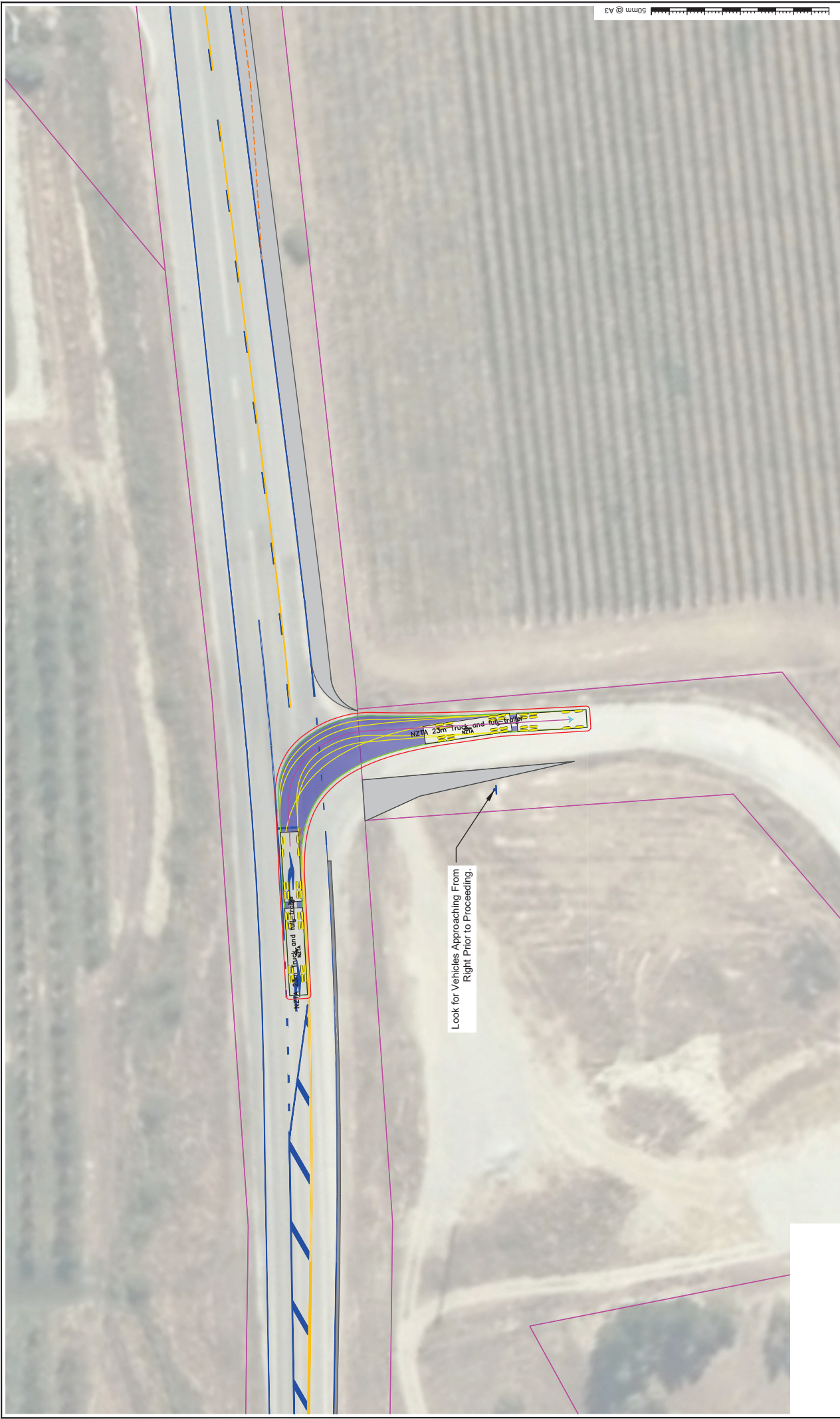
Project No	LPL-1001
Dwg #	ATC10536
Sheet	3
Revision	A

**Amisfield Quarry Expansion**  
**Site Access**  
**Proposed Right-Turn Bay on SH-6**  
**NZTA 23m Truck and Full Trailer (Right Turn Out)**







Rev	Date	By	Chk	Description
A	06/08/2020	HJ	RF	Design Revised As Per NZTA Feedback

Design	HJ
Drawn	HJ
Checked	RF
Issued	10/09/2020
Scale	1:500 @ A3

Project No	LPL-1001
Dwg #	ATC10536
Sheet	4
Revision	A

**Amisfield Quarry Expansion**

Site Access  
Proposed Right-Turn Bay on SH-6  
NZTA 23m Truck and Full Trailer - Swept Path (Right Turn In)



## Appendix C: Site Access – Sidra Modelling outputs

# MOVEMENT SUMMARY

Site: 101 [Amisfield Quarry Access]

New Site  
 Site Category: (None)  
 Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: SH6												
2	T1	151	4.9	0.079	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
3	R2	34	81.2	0.096	14.7	LOS B	0.5	6.2	0.61	0.69	0.61	39.7
Approach		184	18.9	0.096	2.7	NA	0.5	6.2	0.11	0.13	0.11	84.6
East: Site Access												
4	L2	34	81.2	0.095	3.8	LOS A	0.4	4.7	0.48	0.52	0.48	34.3
6	R2	8	75.0	0.095	24.8	LOS C	0.4	4.7	0.48	0.52	0.48	34.8
Approach		42	80.0	0.095	8.0	LOS A	0.4	4.7	0.48	0.52	0.48	34.4
North: SH6												
7	L2	8	75.0	0.091	9.7	LOS A	0.0	0.0	0.00	0.03	0.00	44.9
8	T1	160	5.3	0.091	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	97.7
Approach		168	8.8	0.091	0.5	NA	0.0	0.0	0.00	0.03	0.00	94.3
All Vehicles		395	21.1	0.096	2.3	NA	0.5	6.2	0.10	0.13	0.10	80.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# Amisfield Quarry - Technical Assessment of Potential Effects of Dust Discharges

Prepared for Landpro

Prepared by Beca Limited

22 October 2020



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## Appendices

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### Appendix A – IAQM Risk Assessment

## Revision History

Revision N°	Prepared By	Description	Date
A	Prue Harwood	Draft for client review	5 March 2020
B	Prue Harwood	2 <sup>nd</sup> draft for client review	16 March 2020
C	Prue Harwood	Final draft	5 June 2020
D	Prue Harwood	Final for legal review	19 August 2020
E	Prue Harwood	Final	22 October 2020

## Document Acceptance

Action	Name	Signed	Date
Prepared by	Prue Harwood		22 October 2020
Reviewed by	Mathew Noonan		22 October 2020
Approved by			22 October 2020
on behalf of	Beca Limited		

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This report has been prepared by Beca on the specific instructions of our Client. It is solely for our Client's use for the purpose for which it is intended in accordance with the agreed scope of work. Any use or reliance by any person contrary to the above, to which Beca has not given its prior written consent, is at that person's own risk.

## Executive Summary

---

Cromwell Certified Concrete Limited (CCC) operates the Amisfield Quarry located to the north of Cromwell on the Luggate Cromwell Road (State Highway 6). CCC plans to expand the quarry into a new area to the east of the current quarry site and to increase the annual production rate from 70,000 m<sup>3</sup> to 200,000 m<sup>3</sup> per year. The quarry has been operating at this site for 25 years.

The discharges to air from the existing quarry are classified as a permitted activity as the annual extraction rate does not exceed the extraction rate limit in Rule 16.3.5.3 of the Regional Plan: Air for Otago (Air Plan) of 100,000 m<sup>3</sup>/year. The proposed expansion of the quarry will exceed the limit included in Rule 16.3.5.3, hence a consent for a discretionary activity will be required for discharges to air.

Landpro Limited (Landpro) has commissioned Beca Limited (Beca), on behalf of CCC, to prepare a technical assessment of the effects of the discharges to air from the expanded quarry to accompany an application to Otago Regional Council (ORC) for resource consent to discharge contaminants to air.

The quarry is located in a predominantly rural area, with some isolated rural residential dwellings and horticultural activities, which may be adversely affected by dust from the quarry.

CCC utilises industry good practice methods to control the discharge of dust from the site and plans to continue to do so.

The assessment of the potential effects of the quarry described in the report concludes that for the majority of the sensitive receptors located in the vicinity of the quarry, the risk of adverse effects resulting from dust generated on the site and the scale of those effects will be negligible. For the sensitive receptors located within 100m of the site, the assessment has identified that there is a risk of short-term adverse effects occurring in dry windy conditions when active quarrying activities are taking place within 100m of the boundary of the site. To mitigate the risk of dust generated on site being offensive or objectionable beyond the boundary, this report recommends some additional mitigation and monitoring methods to minimise the potential effects of dust from the expanded quarry.

The additional mitigation and monitoring methods include permanent continuous on-site monitoring of wind speed and wind direction and continuous monitoring of ambient total suspended particulate matter concentrations when quarrying is taking place within 200m of sensitive receptors located within 100m of the quarry boundary. Windspeed and TSP concentration alert limits are recommended, which if exceeded will require dust control measures on site to be reviewed, together with alarm limits, which will require activities creating dust to cease until conditions improve.

Providing CCC continues to utilise the current dust control methods and implements the recommended additional mitigation and monitoring, the risk of dust discharges beyond the boundary of the site being offensive or objectionable is considered to be low and any adverse effects, including health effects will be minimal and the relevant standards and guidelines will not be exceeded.



# 1 Introduction

---

## 1.1 Background

Cromwell Certified Concrete Limited (CCC) operates the Amisfield Quarry located to the north of Cromwell on the Luggate Cromwell Road (State Highway 6). CCC plans to expand the quarry into a new area to the east of the current quarry site and to increase the annual production rate from 70,000 m<sup>3</sup> to 200,000 m<sup>3</sup> per year.

The quarry extracts and processes aggregates for use in local infrastructure projects. The quarry uses truck and shovel methods to extract the raw materials and crushes and screens the materials to produce a range of finished products of varying grades.

The discharges to air from the existing quarry are classified as a permitted activity as the annual extraction rate does not exceed the extraction rate limit in Rule 16.3.5.3 of the Regional Plan: Air for Otago (Air Plan) of 100,000 m<sup>3</sup>/year. The proposed expansion of the quarry will exceed the limit included in Rule 16.3.5.3, hence a consent for a discretionary activity will be required for discharges to air.

## 1.2 Purpose of Report

Landpro Limited (Landpro) has commissioned Beca Limited (Beca), on behalf of CCC, to prepare a technical assessment of the effects of the discharges to air from the expanded quarry to accompany an application to Otago Regional Council (ORC) for resource consent to discharge contaminants to air and an application to Central Otago District Council (CODC) for land use. This report has been prepared in accordance with sections 88 and the Fourth Schedule of the Resource Management Act (RMA) and the relevant provisions of the Air Plan. This report contains the following information:

- A brief summary of the current quarrying operation and that proposed, where they relate to discharges to air;
- A description of the nature of the discharges to air resulting from the existing and proposed activities;
- An assessment of the receiving environment in terms of the potential influences on the environmental effects of the emissions to air from the site;
- A description of the assessment methodology;
- An assessment of the potential effects of the proposed changes on air quality;
- A consideration of the National Environmental Standards for Air Quality (NESAQ); and
- A summary of conclusions and findings of the investigation.

## 1.3 Limitations

This report has been prepared by Beca for Landpro. Beca has relied upon the information provided by Landpro on behalf of the Applicant in completing this document. Unless otherwise stated, Beca has not sought to independently verify this information as provided. This report is therefore based upon the accuracy and completeness of the information provided and Beca cannot be held responsible for any misrepresentations, incompleteness, or inaccuracies provided within that information. Should any new or additional information become available, this report will need to be reviewed accordingly.

## 2 Environmental Setting

### 2.1 Site and Locality Description

#### 2.1.1 Site

The Amisfield Quarry is located on the Luggate Cromwell Highway approximately 11 km to the north of Cromwell and approximately 250 m to the west of Lake Dunstan. Figure 2-1 is an aerial photograph showing the location and layout of the site and the proposed expansion.

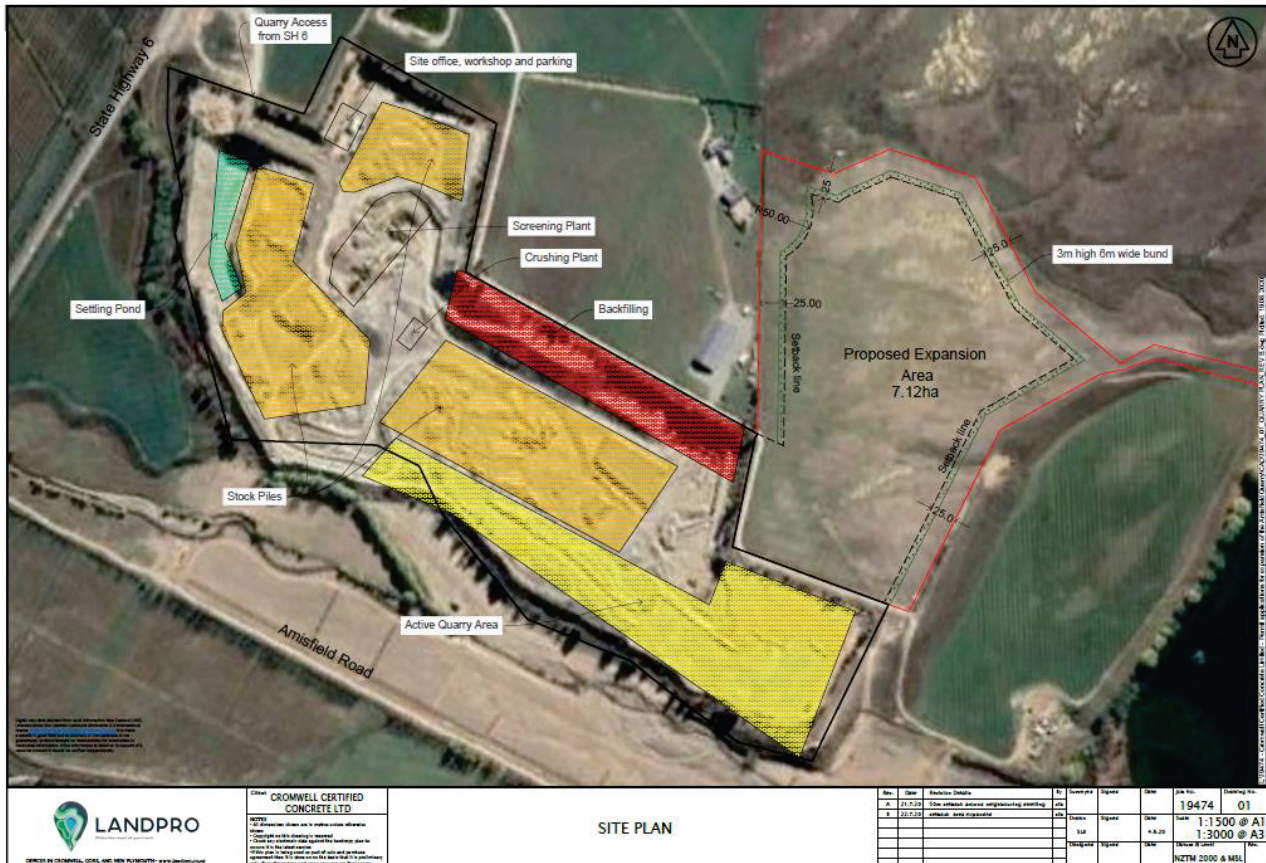


Figure 2-1 Aerial photograph showing the location of the existing and proposed quarry areas and the layout of the site (figure provided by Landpro).

The current quarry is approximately 19 ha and the proposed expansion area is approximately 8 ha in area. The site is predominantly flat and sits on an elevated terrace above Lake Dunstan. The quarry property is setback from the Luggate Cromwell Highway and is accessed via a sealed access way. The site cannot be seen from the road.

#### 2.1.2 Locality

The area surrounding the quarry is predominantly rural with a mixture of vineyards, orchards and unirrigated grazing land. The site, and all the surrounding area, is zoned Rural in the Central Otago District Plan.

To the north of the existing quarry is a property owned by the Clarks. The property includes land used for grazing and a storage business. The Clark residence is located approximately 220 m north of the northern boundary of the existing quarry and approximately 30 m to the west of the boundary with the proposed expansion area. The Clarks have a shed on their property which is used for a storage business. It is located

approximately 35 m north of the northern boundary of the existing quarry and approximately 20 m west of the western boundary of the proposed expansion area.

To the north of the proposed expansion area is a Department of Conservation (DoC) reserve in which rare plants are found. Figure 2-2 is a photograph of one of the plants found in the reserve. The photograph also illustrates the sparse vegetation found on the site and the stony nature of the ground.



Figure 2-2 Photograph of one of the rare plants found in the DoC reserve (21/1/2020).

To the east of the proposed expansion area and to the south of the existing quarry is a property owned by the Littles. The Littles have established a cherry orchard on a lower river terrace to the east of the expansion area and to the south of the existing quarry. Located on the Little's eastern cherry orchard there are some buildings which are understood to be used for temporary worker accommodation. These buildings are located approximately 160m east of the existing quarry and 140 m southeast of the southern boundary of the proposed expansion area.

There is a residence located at 90 Smiths Way which is approximately 360 m to the south of the southern boundary of the existing quarry and to the south of Amisfield Road.

To the west of the quarry across Luggate Cromwell Road and to the north of the quarry entrance are established vineyards. There is a residence located approximately 100 m to the northwest of the quarry entrance at 7 Mt Pisa Road and another located approximately 270 m west of the western extent of the working area of the existing quarry.

Amisfield Road, which is located to the south of the Little's southern orchard is a small gravelled road which provides access to Lake Dunstan and the Little properties.

Approximately 2 km to the south of the Amisfield Quarry are two large quarries operated by Downer and Fulton Hogan.

Figure 2-3 is an aerial photograph showing the location of the site and the immediate neighbours.



Figure 2-3 Aerial photograph showing the location of the quarry and the immediate neighbours.

## 2.2 Topography

The topography of the area is dominated by Lake Dunstan and the surrounding mountain ranges. The quarry is located on an upper terrace of Lake Dunstan. The land drops steeply away to the east and south of the quarry boundary onto a lower terrace on which the Clark’s orchard is located. To the west of the quarry, across Luggate-Cromwell Road, the land is generally flat, until it rises steeply towards the Pisa Range. Across Lake Dunstan to the east, the terrain is steep.

## 2.3 Meteorology

### 2.3.1 Wind

CCC do not measure meteorological variables on site at present. However, Fulton Hogan has supplied CCC with wind speed and direction data measured on their site located approximately 2 km to the south. This data is expected to provide a good representation of the wind conditions experienced on the CCC site.

Figure 2-4 is a windrose for 2019 for the Fulton Hogan site, which shows that winds blow predominantly from the north to northeast and that the strongest winds also come from this direction. Secondary winds blow from the southwesterly quarter. Winds from the east and west are rare.

The average wind speed measured during the monitoring period was 2.1 m/s which is relatively low compared to many places in Otago. The percentage of winds which exceed 5 m/s, the critical windspeed for pickup of dust from unconsolidated surfaces, from all directions is 10.2% and the percentage of strong winds exceeding 10 m/s is 0.6%.

Figure 2-5 is an aerial photograph of the site overlaid with the Fulton Hogan windrose.

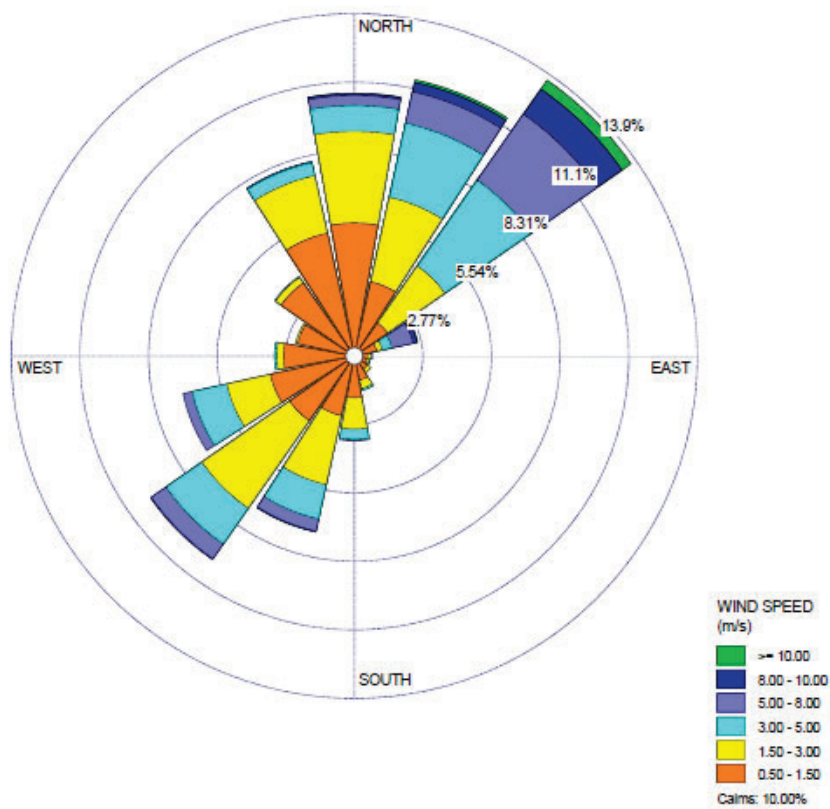


Figure 2-4 Annual windrose of hourly average windspeed and direction measured at Fulton Hogan's Parkburn Quarry (data supplied by Fulton Hogan)



Figure 2-5 Aerial photograph of site overlaid with the Fulton Hogan windrose.

### 2.3.2 Rainfall

The annual average rainfall measured at the Cromwell climate station between 2015 and 2019 inclusive is 377mm. The average number of wet days (days with at least 1mm of rain) is 63 and the average number of rain days (days with at least 0.1 mm of rain) is 98<sup>1</sup>. The rainfall is spread across all months with the highest falls occurring in winter. The annual rainfall and number of rain and wet days are low and indicative of a dry climate, which is conducive to the generation of dust.

## 2.4 Background Air Quality

There is no information available on ambient air quality for the site and surrounding area. Consequently, information gathered in other similar environments must be relied upon to assess the air quality in the area.

The site is located in a rural area and is expected to have good air quality. The predominant sources of air discharges in the area, other than the existing quarry, are dust generated from traffic on unsealed roads, agricultural activities and natural sources such as dry unvegetated paddocks. During periods of low rainfall and strong winds, background dust concentrations may be relatively high, due to the natural and agricultural sources in the area.

The quarry is located outside a gazetted airshed as defined in the National Environmental Standards for Air Quality (NESAQ). The nearest gazetted air shed to the site is the Cromwell Air Zone, which is part of Air Zone 1 as defined in the Air Plan and Airshed 1 as gazetted in the NES Air. The northern boundary of Airshed 1 is approximately 10.5 km to the south of the quarry.

<sup>1</sup> Data sourced from NIWA Cliflo database for Cromwell climate station.

The Ministry for the Environment (MfE) *Good Practice Guide for Assessing and Managing Dust* (GPG Dust)<sup>2</sup> describes typical background concentrations of deposited dust for different environments. These are usually less than 1 g/m<sup>2</sup>/30 days for rural areas but for areas such as Central Otago, the background dust concentration can be up to 10 times this amount, especially during prolonged dry periods.

There is only a limited amount of data available relating to ambient concentrations of total suspended particulate (TSP) levels in New Zealand. The GPG Dust reports that background TSP levels in clean environments are about 10-20 µg/m<sup>3</sup>. TSP concentrations in the area of the quarry are expected to be of this order as there are no large sources of particulate in the area such as industries or urban developments.

## 2.5 Sensitivity to Dust

The sensitivity of locations to dust depends on the characteristics of the land use, including the time of day and the reason that people are at a particular location. The GPG Dust provides guidance on the sensitivity of different receiving environments to dust. The GPG Dust notes that in rural areas, a low population density means there is a decreased risk of people being adversely affected by dust and that people living and visiting rural areas generally have a high tolerance for rural activities, but may have a “moderate to high” sensitivity to other activities such as industrial activities, especially if they are exposed at all times of the day and night. In this case, all the closest dwellings to the quarry are likely to have a “moderate to high” sensitivity to dust and the surrounding rural areas, that are not used for horticultural purposes, will have a “low” sensitivity. The commercial area of the Clark property that is used for storage has been assigned a “moderate” sensitivity as the activity is considered to be less sensitive to dust than a dwelling, but more sensitive than the rural land that surrounds it.

The adjacent orchards and vineyards have been assigned a “moderate to high” sensitivity to recognise the potential effects that dust may have on the crops at particular times of the year and also to acknowledge that the environment is naturally dusty and horticultural activities are also a source of dust.

The United Kingdom Institute of Air Quality Management (IAQM)<sup>3</sup> also provides some guidance on the sensitivity of receptors to ecological effects. The IAQM recommends a sensitivity rating of “medium” for locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown and for nationally designated sites where the designated feature may be affected by dust deposition. This rating is considered applicable to the DoC reserve.

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<sup>2</sup> Ministry for the Environment (November 2016) “*Good Practice Guide for Assessing and Managing Dust*”

<sup>3</sup> United Kingdom Institute of Air Quality Management “*Guidance on the Assessment of Mineral Dust Impacts for Planning*” May 2016.

## 3 Project Description

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### 3.1 Overview

CCC has been operating an aggregate quarry at the site since 1995. At present, the quarry produces approximately 70,000 m<sup>3</sup> of material. Annual production is expected to increase to approximately 200,000 m<sup>3</sup> due to customer demand.

CCC plans to meet the demand for more product by increasing the depth of the current quarry and extending the quarry into the adjacent property as shown in Figure 2-1 and Figure 2-3.

The quarry produces a range of different grades of aggregate including sand.

### 3.2 Site Activities

The current quarry has an area of approximately 19 ha and the proposed new area is approximately 8ha. The activities within the quarry which are relevant to the generation of dust include:

- Excavation and stripping of overburden;
- Extraction of gravel;
- Overburden stockpiling;
- Raw and finished material stockpiling;
- Loading and unloading of materials;
- Vehicle movements;
- Crushing and screening of gravel; and
- Backfilling of worked areas.

#### 3.2.1 Extraction and Processing

The quarry operates with a pre-strip, active face and backfill configuration. The surface of the ground is naturally stony, hence there is very little topsoil and overburden. What overburden there is, is used to backfill worked areas of the quarry.

The gravel is extracted by traditional truck and shovel techniques (see Figure 3-1). Trucks transport the unprocessed gravel from the active face to the mobile crushing plant, which is located close to the working area of the quarry on the pit floor and well away from the quarry boundaries. The crushed gravel is transported to the fixed screening and washing plant by truck, which is located towards the northwestern end of the quarry as shown in Figure 2-3. At present, the quarry is consented to quarry to a maximum depth of 15 m below ground level. CCC is applying to quarry to the maximum depth of the gravel resource, which is estimated to extend 30 m below ground level. No blasting occurs on site.

Figure 3-2 is photograph of the crushing plant and Figure 3-3 is a photo of the screening and washing plant.

The active working area of the proposed expansion area of the quarry will be set back from the boundary of the site by a distance of at least 25 m where the quarry adjoins land used for non-residential purposes and 50 m in the vicinity of the Clark residence. Bunds will also be constructed along these boundaries which will be 3 m high by 6 m wide.





Figure 3-1 Photo of loader and trucks working on the quarry face (21/1/2020)



Figure 3-2 Photograph of mobile crushing plant operating on the quarry floor (21/1/2020).



Figure 3-3 Photograph of screening and washing plant with washed aggregate in the foreground (21/1/2020)

### 3.3 Vehicle Movements

The mine is accessed from Luggate Cromwell Road by a sealed access road. Internal haul roads are unsealed.

Two dump trucks transfer materials between the working face and the processing plants. Up to 50 truck movements arrive and leave the site each day.

### 3.4 Stockpiles

Stockpiles of raw and processed materials are located throughout the site. The tops of the stockpiles are kept below the natural level of the surrounding land.

### 3.5 Backfilling

To date, no rehabilitation of the site has been able to be carried out as the whole of the site is currently being actively used for quarrying and storage of materials. Areas of the quarry which have been worked are backfilled with overburden, when it is available.

## 4 Discharges to Air and Mitigation Methods

### 4.1 Overview

The predominant air discharge contaminant from the quarrying operations is particulate matter in the form of dust. The products of combustion, such as sulfur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>) and carbon monoxide (CO), will also be discharged in the emissions from the operation of machinery and vehicles.

The dust generated from quarrying activities is predominantly made up of larger size fractions (ie greater than 10 µm). Some finer particulates (PM<sub>10</sub> and PM<sub>2.5</sub>) from engine emissions will occur but are likely to be relatively minor and expected to be well-dispersed prior to reaching sensitive receptors. The finer material is commonly referred to as total suspended particulate (TSP). This assessment of effects of the discharges to air from the quarry therefore focuses primarily on the effects of the larger settleable particulates.

#### 4.1.1 Sources of Dust Emissions

There are a number of potential sources of dust (particulate) discharges at the quarry. These include the following:

- Excavation;
- Extraction of gravel;
- Stockpiles;
- Loading and unloading materials;
- Vehicle movements, roads and yard areas;
- Crushing and screening plants; and
- Dust generated by the wind from dry exposed surfaces.

To control the dust from the quarrying operations, CCC uses recognised industry standard dust mitigation techniques recommended in the GPG Dust, Environment Australia<sup>4</sup>, and the IAQM<sup>5</sup>. The methods used by CCC to control dust emissions are summarised in the sections below. Further description of the dust mitigation measures used on site is included in the Dust Management Plan (DMP) prepared for the site, a copy of which is attached as **Appendix 2**. The DMP is part of an overall Environmental Management Plan for the site.

### 4.2 Factors which Influence Dust Generation

The major factors that influence dust emissions from quarrying activities are:

- Wind speed across the surfaces of exposed soil, excavations or material stockpiles – the critical wind speed for pickup of dust from surfaces is 5 m/s; above 10 m/s pickup increases rapidly<sup>6</sup>
- The percentage of fine particles in the material on the surface;
- Moisture content of the material on the surface;

<sup>4</sup> Environment Australia “*Best Practice Environmental Management in Mining Dust Control*” 1998

<sup>5</sup> United Kingdom Institute of Air Quality Management “*Guidance on the Assessment of Mineral Dust Impacts for Planning*” May 2016

<sup>6</sup> Air and Waste Management Association “*Air Pollution Engineering Manual*” 2<sup>nd</sup> edition edited by Wayne T Davis, 2000.

- The area of exposed surfaces;
- Mechanical disturbances such as traffic movements, excavation, loading and unloading of materials; and
- Vehicle speeds.

The greater the area of exposed material, the greater the potential there is for dust emissions. The smaller the particle size on an exposed surface, the more easily the particles can be picked up and entrained in the wind.

Vehicles travelling over exposed surfaces tend to pulverise any surface particles. Particles are lifted and dropped from rolling wheels and the road surface is exposed to strong air currents due to turbulence between the wheels and the surface. Dust is also sucked into the turbulent wake created behind moving vehicles.

Moisture binds particles together preventing them from being disturbed by wind or vehicle movements.

### 4.3 Extraction of Aggregate

Aggregate extraction takes place below natural ground level at varying depths; hence the majority of the extraction activity takes place within the quarry pit. The pit walls shelter the working areas from the wind and reduce the wind speeds at the excavation surface. Consequently, most dust generated from the extraction and loading activities is contained within the confines of the pit. The gravel is naturally damp when it is extracted, which also minimises the generation of dust from this source.

CCC uses a water cart within the pit to dampen the haul roads and the working areas if required. No blasting occurs at the site.

### 4.4 Stripping of Overburden, Stockpiling and Backfilling

Machinery stripping overburden and disturbing the surface of stockpiles which contain fine materials has the potential to generate dust during windy conditions. Inactive stockpiles tend to develop a crusty surface that effectively minimises dust emissions. When the aggregate in the stockpiles is disturbed during reclaim activities, the crust on the surface will be broken and the aggregate within the stockpile will be exposed to the wind and dust may result if the material is dry. Stockpiles of washed materials do not contain fines and are therefore not a significant source of dust.

Other activities such as backfilling also generate dust if not carefully controlled.

CCC controls dust from these activities by:

- Minimising access to the working area to essential vehicles;
- Minimising areas of exposed surfaces;
- Planning potentially dusty activities such as stripping for days when weather conditions are favourable;
- Locating stockpiles below ground level as far as practicable; and
- Using water as a dust suppressant on stockpiles and working areas to keep exposed or disturbed surfaces damp as required.

### 4.5 Loading and Unloading of Materials

The loading and unloading of materials are potential sources of dust due to the turbulence induced by dropping materials from a height. CCC controls dust from these activities by:

- Using water sprays on the falling materials if required;
- Minimising drop heights as far as practicable; and
- Undertaking loading and unloading activities below ground level as far as practicable.

## 4.6 Aggregate Processing

Conveyance, crushing and screening of aggregate have the potential to generate significant quantities of dust if not properly controlled. CCC uses water sprays throughout the crushing and screening plants to control the moisture content of the materials and limit dust production. The crushing plant is located on the pit floor, which shelters the area from the wind and contains any dust produced within the pit walls.

## 4.7 Vehicles, Roads and Yard Areas

Dust from vehicles on haul roads and traffic coming to and from the quarry on the quarry entrance road all have the potential to be significant sources of dust if not controlled adequately.

CCC controls dust from these activities by:

- Minimising access to the working areas to essential vehicles;
- Imposing vehicle speed limits on site and access roads;
- Keeping unsealed site and access road surfaces damp with water from fixed and moveable sprays and a water truck;
- Covering loads of fine dusty materials leaving the site where practical;
- Maintaining unsealed internal haul roads and access roads by grading and the laying of fresh gravel; and
- Regularly removing deposited debris from the sealed entrance road to the quarry.

## 4.8 Supply of Water for Dust Suppression

Some dust mitigation measures used by CCC depend on the use of water as a dust suppressant. A sufficient and reliable water supply must therefore be available at the site. The GPG Dust recommends that an application rate of 1 l/m<sup>2</sup>/hr of water may be needed for areas requiring dust control. This application rate does not need to be applied over every square metre of ground for every hour of every day, but sufficient water should be available for application as required.

CCC has two bores on site which they utilise for dust suppression with a combined capacity of 45 litres per second. CCC is also applying to increase the existing water take to 70 litres per second. The current water supply is sufficient to apply the recommended water application constantly to an area of 16 ha and, if granted, a supply of 70 litres per second would be sufficient to water an area of 25 ha. The working area of the quarry, which requires dust suppression is estimated by CCC to be approximately 3 ha. The available water supply on site is therefore sufficient for dust suppression.

## 4.9 Shelterbelts

Shelterbelts are commonly used at locations that are potential sources of dust as an effective means of reducing the discharge of dust beyond the boundaries of a site. Well designed and maintained shelterbelts provide shelter to a site, which reduces wind speeds and the potential for dust to be generated. Trees also act as a filter to remove dust from an air stream travelling through the foliage<sup>79</sup>. At the Amisfield Quarry, the establishment of a shelterbelt around the perimeter of the quarry may not be practicable due to the dry climate and also because new shelterbelts may adversely affect the visual amenity of the environment. For

<sup>7</sup> Tiwary A et al “*Modelling the size-dependent collection efficiency of hedgerows for ambient aerosols*”, Journal of Aerosol Science 37 (2205) 990-1015

<sup>8</sup> Doley D “*Airborne particulates and vegetation: Review of physical interactions*”, Clean Air and Environmental Quality Volume 40 No.2 May 2006.

<sup>9</sup> Cowherd C., Grelinger MA “*Development of an Emission Reduction Term for Near-Source Depletion*”, Midwest Research Centre, for US Army Construction Engineering Research Laboratory, 2004.

these reasons, the establishment of shelterbelts around the perimeter of the quarry boundary has not been included in this assessment as a potential method for mitigating dust emissions.

## 5 Assessment Criteria

### 5.1 Deposited Dust

There are no New Zealand-specific ambient air quality standards or guidelines for deposited dust. However, the GPG Dust recommends a “trigger” level for deposited dust of no more than 4 g/m<sup>2</sup>/30-days above background levels. The GPG Dust notes that deposition rates of more than these trigger levels, in some industrial and sparsely populated areas, may not cause a nuisance. Conversely in sensitive residential areas deposition rates, in the order of 2 g/m<sup>2</sup>/30-days, may cause a nuisance. The area around the quarry is not densely populated, or likely to be especially sensitive to dust except for the nearby dwellings. The orchards and vineyards in the vicinity are considered to have a moderate to high sensitivity to dust as they are likely to be more sensitive to dust than pasture but less sensitive than a dwelling. Hence, assessment criteria for non-horticultural rural areas surrounding the quarry of 4 g/m<sup>2</sup>/30days above background level and 2 g/m<sup>2</sup>/30-days above background level, in the vicinity of the residences are considered appropriate. An intermediate value of 3 g/m<sup>2</sup>/30-days has been assigned to the horticultural areas.

### 5.2 Total Suspended Particulates

Similarly, there are no New Zealand-specific ambient air quality standards or guidelines for total suspended particulates (TSP). The GPG Dust recommends “trigger” levels for TSP concentrations (24-hour average), of 60 µg/m<sup>3</sup> (24-hour average) for sensitive areas and 100 µg/m<sup>3</sup> (24-hour average) for insensitive areas such as sparsely populated rural areas. Hence, an assessment criterion of 60 µg/m<sup>3</sup> (24-hour average) in the vicinity of the houses, 80 µg/m<sup>3</sup> (24-hour average) in the vicinity of the horticultural areas and a limit of 100 µg/m<sup>3</sup> (24-hour average) for non-horticultural rural areas are considered appropriate.

The GPG Dust also recommends a short term 5 min average trigger level for TSP of 250 µg/m<sup>3</sup> for areas with a high sensitivity such as residences.

### 5.3 Health Effects Criteria

#### 5.3.1 PM<sub>10</sub>

The National Environmental Standards for Air Quality (NESAQ) came into force on 1 September 2005 and have since been revised with the latest revision coming into effect in 2011. The NESAQ standards are designed to protect public health and the environment of New Zealand by, among other things, setting concentration limits for criteria air pollutants. The contaminant relevant to this application is PM<sub>10</sub>.

#### 5.3.2 NESAQ Regulations 13 and 17, PM<sub>10</sub>

Regulation 13 sets a standard for PM<sub>10</sub> that allows a maximum of one exceedance per year of a PM<sub>10</sub> concentration of 50 µg/m<sup>3</sup> (24-hour average).

Regulation 17 restricts the granting of resource consent for discharges of PM<sub>10</sub> if the following apply:

- The discharge would be likely to increase 24-hour average PM<sub>10</sub> concentrations in a “polluted” airshed by more than 2.5 µg/m<sup>3</sup>; and
- The PM<sub>10</sub> emissions to be authorised by the proposed consent exceed those authorised by an existing consent for the same activity.

The site is not located within an airshed that is classified as a “polluted” airshed under Regulation 17. Hence, Regulation 17 does not apply to this application.

### 5.3.3 PM<sub>2.5</sub>

There is currently no NESAQ limit for ambient concentrations of PM<sub>2.5</sub>. There is however, a reporting guideline of 25 µg/m<sup>3</sup> (24-hour average).

The MfE released in February 2020 a consultation document on some proposed amendments to the NESAQ which includes a recommendation for a new daily average standard for PM<sub>2.5</sub> of 25 µg/m<sup>3</sup> (three or fewer exceedances allowed in a 12 month period) and an annual average standard for PM<sub>2.5</sub> of 10 µg/m<sup>3</sup>.

### 5.3.4 Respirable Crystalline Silica

There are no New Zealand environmental standards or guideline values for respirable crystalline silica (RCS).

The Ministry for the Environment's *Good Practice Guide for Assessing Discharges to Air from Industry*<sup>10</sup>, (GPG Industry) recommends the use of OEHHA guidelines for assessing the effects of long-term impacts, such as those that can result from exposure to RCS, where there are no national criteria. The OEHHA guideline concentrations are levels of airborne contaminants at which there would be no significant human health risk to individuals indefinitely exposed to that level. The OEHHA guideline concentration for RCS is 3 µg/m<sup>3</sup> (annual average)

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<sup>10</sup> Ministry for the Environment "Good Practice Guide for Assessing Discharges to Air from Industry", November 2016.



## 6 Effects of Discharges to Air

### 6.1 Current Effects

CCC does not carry out any monitoring of the effects of discharges to air from the existing quarry other than regular visual surveillance of the site. CCC has advised that they have not received any complaints regarding dust from any of the neighbouring residential properties or adjacent orchards.

### 6.2 Potential Effects of Discharges to Air

#### 6.2.1 Overview

The potential adverse effects from the discharge of dust (particulate matter) include:

- Health effects generally associated with exposure to contaminants associated with dust;
- Health effects from exposure to inhalable dust (PM<sub>10</sub> and PM<sub>2.5</sub> as these finer particles can penetrate the nose and mouth if inhaled and can enter the lungs and respiratory tract);
- Nuisance effects generally associated with deposited dust and the coarser fraction of TSP such as soiling, effects on amenity and visibility; and
- Effects on ecosystems.

Dust discharges from quarry activities typically produce larger particle sizes, generally referred to as 'deposited particulates'. As a class of material, deposited particulates have only minimal physical health impacts (due to limited penetration into the respiratory tract). However, they may cause nuisance or amenity effects in sensitive areas due to soiling of clean surfaces.

#### 6.2.2 Positive Effects

The quarry provides aggregates for local projects such as roading and construction. Sourcing aggregate locally avoids the need for trucking long distances from more remote locations. The proximity of the quarry to local projects reduces transport costs, heavy vehicle movements and greenhouse gas emissions.

#### 6.2.3 Potential for Dust Generation at the Quarry

In general, although quarrying activities can generate dust with a wide range of particle sizes, it is the larger dust particles that tend to be associated with discharges to air from quarries. The larger the particle size, the less distance it will travel in light to moderate winds. The GPG Dust states:

*"When dust particles are released into the air, they tend to fall back to ground at a rate proportional to their size. This is called the settling velocity. For a particle 10 micrometres in diameter, the settling velocity in calm conditions is about 0.5 cm/sec, while for a particle 100 microns in diameter it is about 45 cm/sec in still air. To put this into a practical context, consider the generation of a dust cloud at a height of one metre above the ground. Any particles 100 microns in size will take just over two seconds to fall to the ground, while those 10 microns in size will take more than 200 seconds. In a 10-knot wind (5 m/sec), the 100 micrometre particles would only be blown about 10 metres away from the source while the 10 micrometre particles have the potential to travel about a kilometre. Fine particles can therefore be widely dispersed, while the larger particles simply settle out in the immediate vicinity of the source".*

Dust particles generated by quarrying activities generally fall into the larger size fractions, with an aerodynamic diameter of 100 micrometres or greater. In steady wind conditions, with average wind speeds of less than 10 m/s (typical of the Cromwell area), and without vehicle movements, such particles would travel only a few tens of metres from the source. However, this theoretical calculation takes no account of re-entrainment of dust, or of the effects of turbulent airflow.

As a general rule, based on the discussion regarding particles size in the GPG Dust and the results of research into dust entrainment, dust deposition is unlikely to occur to any significant degree beyond a distance of approximately 100 - 200 m from significant dust sources in most circumstances. Dust nuisance is more likely to occur within such proximity of a significant dust source.<sup>11</sup>

Local environmental conditions may influence the potential range of dust deposition. High average wind speeds, a high frequency of strong winds or complex local topography may increase the potential range over which dust deposition may occur. The degree of vegetative cover in the area will also have an impact on the distance dust is likely to travel. Vegetation such as trees act as an effective dust barrier and filter, thus reducing the distance dust can travel downwind.

The terrain in the area is complex, which may increase the potential for some dust deposition to occur at greater distances. However, the average wind speed measured in the last 12 months is 2.1 m/s (which is relatively light) and winds which exceed 5 m/s occurred for approximately 10% of time. There are few trees in the area and vegetation on uncultivated areas is sparse.

Hence for the quarry, which is infrequently subject to high wind speeds in an area with complex topography it is expected that areas within no more than 200 m of quarrying activities may be potentially affected by dust. This assumes worst case weather conditions and that appropriate mitigation measures are not implemented and is considered conservative given that much of the quarrying activity takes place below ground level.

## 6.3 Potential for Dust to Cause Adverse Effects

### 6.3.1 Introduction

Dust deposition is the settling of dust onto surfaces. The effects of dust deposition can be subjective and is dependent on the sensitivity of the receiving environment. Some people will not be annoyed by dust, others will be annoyed, and some may find it objectionable or offensive. Dust fallout on a road or rural farmland may not be a nuisance even at relatively high deposition rates.

Typically, the most common areas of concern from dust deposition arise at residential properties (or similar sensitive locations such as retail premises or schools) and include the visual soiling of clean surfaces, such as cars, window ledges, and household washing; and dust deposits on vegetation.

### 6.3.2 FIDOL Factors

The GPG Dust<sup>12</sup> notes that the potential for a dust discharge to cause an objectionable or offensive effect depends on the following characteristics of the dust fallout:

- The frequency of dust nuisance events;
- The intensity of events, as indicated by dust quantity and the degree of nuisance;
- The duration of each dust nuisance event;
- The offensiveness of the discharge having regard to the nature of the dust; and
- The location of the dust nuisance, having regard to the sensitivity of the receiving environment.

These factors are known as the FIDOL factors and are used to consider whether a dust discharge has caused an offensive or objectionable effect. Essentially, whether a dust discharge leading to dust deposition

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<sup>11</sup> Etymezian V et al “*Deposition and Removal of Fugitive Dust in the Arid Southwestern United States: Measurements and Model Results*”, Journal of the Air & Waste Management Association, Volume 54 September 2004

<sup>12</sup> Ministry for the Environment: “*Good Practice Guide for Assessing and Managing Dust*” 2016.

causes an offensive or objectionable effect depends on how frequent it is, the sensitivity of the receiving environment and how much dust is deposited.

### 6.3.3 IAQM Risk Assessment

The IAQM<sup>13</sup> has developed a risk assessment method based on the FIDOL factors, which uses a series of semi quantitative matrices to estimate the likelihood of dust reaching receptors based on the distance between the source and the receptor and the frequency of winds which blow in the direction of the receptor and combines these with the scale of the operation and the sensitivity of the receptor to produce an estimate of the potential risk of adverse effects arising. A risk assessment of the potential nuisance effects of dust from the quarry using the IAQM method has been carried out for each sensitive receptor. The results of the risk assessment for each of the closest properties are summarised in the following sections. The risk assessment matrices for each specific receptor are included in **Appendix A**.

### 6.3.4 Assessment methodology

To assess the potential effects of dust on each of the identified receptors, a combination of the FIDOL factors and the IAQM risk assessment methods have been used.

## 6.4 Potential Effects on Clark Residence

### 6.4.1 Effects from expansion area

The Clark residence is located approximately 30 m to the west of the boundary with the proposed quarry expansion area and 80 m from the proposed working area of the quarry (assuming a 50 m setback for the quarry from the boundary in the vicinity of the house). The house will be downwind of the new quarry area in winds from the east through to south southeast. The frequency of winds from these directions, for all windspeeds, and those that exceed 5 m/s is less than 0.1% which is infrequent. The IAQM method assesses the risk of adverse effects occurring as “negligible” and the magnitude of potential effects to be “negligible”. However, due to the very close proximity of the house to the quarry, there is a risk that the residence may be impacted by short term dust events and it is therefore recommended that when the quarry is operating within 200 m of the house, that additional mitigation and monitoring is implemented by CCC to minimise the potential for adverse effects occurring. The recommended additional mitigation and monitoring are discussed in Section 7.3.

### 6.4.2 Effects from existing quarry

The Clark residence is located approximately 210 m from the northern boundary of the existing quarry area. The house is downwind of the existing quarry in winds from the west through to the south southeast. Winds which exceed 5 m/s from these directions occur for 1.7% of time. The IAQM method assesses the risk of adverse effects occurring as “negligible” and the magnitude of any adverse dust effects to also be “negligible” due to the low frequency of winds, which may blow dust towards the house and the distance between the house and the existing quarry. Providing the dust controls are carried out as described in this assessment, any adverse effects on the Clark residence of dust from the existing quarry area should be adequately mitigated to the extent that the effects will be negligible.

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<sup>13</sup> Institute of Air Quality Management “*Guidance on the Assessment of Mineral Dust Impacts for Planning*” May 2016.

## 6.5 Potential Effects on Clark's Rural Land

### 6.5.1 Effects from expansion area

The Clark's rural land will be located 25 m from the working area of the proposed quarry area and will be downwind of the quarry in winds from the east northeast through to south southeast. Winds from these directions which exceed 5 m/s occur for 7.9% of time which is moderately frequent. Due to the low sensitivity of the area and the moderate frequency of winds which may blow dust from the quarry towards the land, the risk of adverse effects occurring is assessed as being "low" and "negligible" effects are expected.

### 6.5.2 Effects from existing quarry.

The Clark's rural land is located approximately 15 m north of the northern boundary of the existing quarry and is downwind of existing quarry in winds from the south southeast through to north northwest. Winds from these directions which exceed 5 m/s occur for 1.8% of time which is infrequent. The level of dust impact risk and the scale of effects are assessed as being "negligible" due to the low sensitivity of the land to dust and the low frequency of winds which blow towards the area.

## 6.6 Potential Effects on Clark's Storage Shed

### 6.6.1 Effects from expansion area

The Clark's storage shed is located approximately 30 m to the west of the boundary with the proposed expansion area and 55 m from the proposed working area of the quarry (assuming a 25 m setback). The shed will be downwind of the new quarry area in winds from the north northeast through to south southeast. The frequency of winds from these directions that exceed 5 m/s is estimated to be 7.9%. The IAQM method assesses the risk of adverse effects occurring as "low" and the magnitude of potential effects to be "negligible" due to the medium sensitivity of the activity and moderate frequency of winds that may blow dust towards the shed. It is considered however, that there is a potential for short term adverse effects to result on the shed and surrounding area, which is used for outdoor storage of boats and caravans, if the additional dust mitigation measures recommended in this report are not implemented, especially during northeasterly wind conditions.

### 6.6.2 Effects from existing quarry.

The Clark's storage shed is located approximately 45 m from the northern boundary of the existing quarry. The shed is downwind of the quarry in winds from the south southeast through to northwest wind directions. Winds from these directions which exceed 5 m/s occur for approximately 1.7% of time. Due to the low frequency of winds that are likely to blow dust from the existing quarry towards the shed and the medium sensitivity of the shed and surrounding area, the IAQM risk assessment classifies the risk of adverse effects occurring and the scale of potential effects to be "negligible".

## 6.7 Potential Effects on Vineyard at the Quarry Entrance.

### 6.7.1 Effects from expansion area

The vineyard located at the quarry entrance is at least 250 m from the proposed expansion area and beyond the distance that any adverse effects due to dust are expected to occur.

### 6.7.2 Effects from existing quarry

The vineyard at the quarry entrance is located approximately 20 m west of the site offices and yard area and 20 m north of the main entrance to the quarry. This vineyard is downwind of the existing quarry in winds from the southwest through to west southwest. Winds from these directions which exceed 5 m/s occur for approximately 1.7% of time. The IAQM method assesses the risk of adverse effects occurring and the

magnitude of any potential effects to be “negligible” due to the low frequency of winds that may blow dust towards the vineyard. It is noted that due to the close proximity of the vineyard to the main entrance to the quarry, that it is important that the sealed entrance way is kept clear of deposited debris from trucks and unsealed sections of the haul road are kept damp to control dust. It is also recommended that all truckloads of fine dusty materials are covered when they leave the site wherever practicable.

## **6.8 Potential Effects on 90 Smiths Way**

### **6.8.1 Effects from expansion area**

The residence at 90 Smiths Way is located at least 500 m to the south of the expansion area and beyond the distance that adverse effects due to dust are expected to occur.

### **6.8.2 Effects from existing quarry**

The residence at 90 Smiths Way is located approximately 360 m from the existing quarry and beyond the distance that adverse effects due to dust are expected to occur.

## **6.9 Potential Effects of Little’s Temporary Worker Accommodation**

### **6.9.1 Effects from expansion area**

The Little’s temporary worker accommodation is located approximately 190 m east of the proposed expansion area and is downwind of the proposed expansion in winds from the north northwest to west north west. Winds from these directions that exceed 5 m/s occur for less than 0.1% of time. Due to the low frequency of winds which are likely to blow dust towards the accommodation and the distance between the quarry and the accommodation, the IAQM method assesses the risk of adverse effects occurring and the magnitude of any adverse effects to be “negligible”.

### **6.9.2 Effects from existing quarry**

The Little’s temporary worker accommodation is located approximately 150 m east of the existing quarry boundary and is downwind of the quarry in winds from the northwest through to west. Winds from these directions that exceed 5 m/s occur for less than 0.1% of time. Due to the low frequency of winds which are likely to blow dust towards the accommodation and the distance between the quarry and the accommodation the IAQM method assesses the risk of adverse effects occurring and the magnitude of any adverse effects to be “negligible”.

## **6.10 Little’s Eastern Orchard**

### **6.10.1 Effects from expansion area**

The Little’s eastern orchard is located approximately 40 m east of the eastern boundary of the proposed expansion area and approximately 65 m from the proposed working area of the expansion area (assuming a 25 m setback). The orchard will be downwind of the proposed expansion area in winds from the northwest through to the south southwest. Winds from these directions that exceed 5 m/s occur for approximately 1.7% of the time. Due to the low frequency of winds that have the potential to blow dust towards the orchard the IAQM method assesses the risk of adverse effects occurring and the magnitude of any effects to be “negligible”. It is noted, however that if strong winds blow towards the orchard during dry conditions there is a potential for fruit to be damaged if adequate dust controls are not implemented including the recommended additional mitigation measures described in Section 7.3.

### 6.10.2 Effects from existing quarry

The Little's eastern orchard is located approximately 40 m east of the existing quarry and is downwind of the quarry in winds from the southwest to west. Winds from these directions that exceed 5 m/s occur for approximately 1.7% of time. Due to the low frequency of winds that have the potential to blow dust towards the orchard, the IAQM method assesses the risk of adverse effects occurring and the magnitude of any effects to be "negligible". It is noted, however that if strong winds blow towards the orchard during dry conditions there is a potential for fruit to be damaged if adequate dust controls are not implemented including the recommended additional mitigation measures described in Section 7.3.

## 6.11 Little's Southern Orchard

### 6.11.1 Effects from expansion area

The Little's southern orchard is located at least 250 m to the south of the expansion area and beyond the distance that adverse effects due to dust are expected to occur.

### 6.11.2 Effects from existing quarry

The Little's southern orchard is located approximately 70 m south of the southern boundary of the existing quarry. The orchard is downwind of the existing quarry in winds from the east northeast through to west northwest. Winds from these directions that exceed 5 m/s occur for approximately 8.3% of time. The IAQM method assesses the level of risk of adverse effects occurring as "low" and the magnitude of effects as a "slight adverse effect". When strong winds are blowing towards the Little's southern orchard in dry conditions it is important that the quarry diligently implements the recommended dust control methods, including the additional methods recommended in Section 7.3. Providing these dust control methods are implemented, any residual dust should be adequately mitigated to the extent that it will not be offensive or objectionable and any adverse effects will be minimal.

## 6.12 7 Mt Pisa Road

The dwelling located at 7 Mt Pisa Road is located approximately 200 m north of the quarry entrance. The residence is downwind of the quarry in winds from the southeast to southerly directions. Winds from these directions that exceed 5 m/s occur for less than 0.1% of time. Due to the distance between the residence and the quarry and the low frequency of winds, which have the potential to blow dust towards the residence, the risk of adverse effects occurring is "negligible" and is beyond the distance at which adverse effects are expected to occur.

## 6.13 13 Mt Pisa Road

The dwelling at 13 Mt Pisa Road is located approximately 280 m east of the western quarry boundary and is beyond the distance at which adverse effects are expected to occur.

## 6.14 Western Vineyards

The vineyards located to the west of the existing quarry across Luggate Cromwell Road are approximately 70 m from the western boundary of the quarry. The vineyards are downwind of the quarry in winds from the north east to south southeast. Winds from these directions that exceed 5 m/s occur for approximately 6.1% of time. The IAQM method assesses the risk of adverse effects occurring to be "low" and the magnitude of effects to be "slight".

It is noted that due to the close proximity of the vineyards to the main entrance to the quarry that it is important that the sealed entrance way is kept clear of deposited debris from trucks and unsealed sections of the haul road are kept damp to control dust. It is also recommended that truckloads of fine dusty materials

leaving the site are covered wherever practicable. Providing these dust control methods are implemented, any residual dust should be adequately mitigated to the extent that it will not be offensive or objectionable and any effects minimal.

## **6.15 DoC Reserve**

### **6.15.1 Effects from expansion area**

The DoC Reserve abuts the northern boundary of the proposed expansion area of the quarry. The quarry will be set back from the boundary by 25 m. The reserve will be downwind of the expansion area of the quarry in winds from the southeast through to the northwest. The frequency of winds from these directions that exceed 5 m/s is 1.75%. The IAQM method assesses the level of risk of adverse effects occurring and the magnitude of any effects as “negligible”. However, it is recommended that particular care is taken by CCC to control dust in dry conditions when winds are blowing towards the reserve, to minimise the deposition of dust onto the rare plants that are located within the reserve. Providing the mitigation measures recommended in this report are implemented the discharge of dust should be minimised to the extent that any increase in dust deposition levels above background levels on the reserve should be negligible.

## 6.16 Summary of IAQM Assessment

Table 6-1 provides a summary of the inputs and results of the IAQM risk assessment for each receptor. The background matrices used for the assessment are included in **Appendix A**.

Table 6-1 Summary of IAQM Assessment

Receptor details and location	Location relative to nearest dust source	Frequency of winds >5m/s (%)	Residual source emissions	Pathway effectiveness	Dust impact risk	Receptor sensitivity	Magnitude of dust effect
Clark's residence	30 m west of boundary with expansion area and 80 m from workings	0.1	Medium	Ineffective	Negligible	High	<b>Negligible adverse effect</b>
Clark's residence	210 m north of existing quarry	1.7	Medium	Ineffective	Negligible	High	<b>Negligible adverse effect</b>
Clark's rural land	25 m northwest, west and southwest from workings	7.9	Medium	Moderately effective	Low	Low	<b>Negligible adverse effect</b>
Clark's rural land	15 m north of existing quarry	1.8	Medium	Ineffective	Negligible	Low	<b>Negligible adverse effect</b>
Clarks storage shed	30 m west of boundary with expansion area and 80m from workings	1.8	Medium	Moderately effective	Low	Medium to high	<b>Negligible adverse effect</b>
Clarks storage shed	45 m from boundary with existing quarry	1.8	Medium	Ineffective	Negligible	Medium to high	<b>Negligible adverse effect</b>



Receptor details and location	Location relative to nearest dust source	Frequency of winds >5m/s (%)	Residual source emissions	Pathway effectiveness	Dust impact risk	Receptor sensitivity	Magnitude of dust effect
Clark's vineyard at entrance	20 m west of site offices and yard area and 20 m north of main haul road entrance	1.7	Medium	Ineffective	Negligible	Medium to high	<b>Negligible adverse effect</b>
Residence at 90 Smiths Way	360 m south of workings	7.3	Medium	Ineffective	Negligible	High	<b>Negligible adverse effect</b>
Little's worker accommodation	150 m south east of expansion area	0.06	Medium	Ineffective	Negligible	High	<b>Negligible adverse effect</b>
Little's worker accommodation	190 m east of existing quarry boundary	0.01	Medium	Ineffective	Negligible	High	<b>Negligible adverse effect</b>
Little's eastern orchard	40 m east of expansion area and 65m east of workings	1.7	Medium	Ineffective	Negligible	Medium to high	<b>Negligible adverse effect</b>
Little's eastern orchard	40 m east and southeast of existing quarry and 65m southeast of workings	1.7	Medium	Ineffective	Negligible	Medium to high	<b>Negligible adverse effect</b>
Little's southern orchard	70 m south, south east and southwest of existing workings	8.3	Medium	Moderately effective	Low	Medium to high	<b>Slight adverse effect</b>
7 Mt Pisa Road	200 m north of quarry entrance	0.06	Medium	Ineffective	Negligible	High	<b>Negligible adverse effect</b>

Receptor details and location	Location relative to nearest dust source	Frequency of winds >5m/s (%)	Residual source emissions	Pathway effectiveness	Dust impact risk	Receptor sensitivity	Magnitude of dust effect
13 Mt Pisa Road	280 m west to northwest of quarry	0.07	Medium	Ineffective	Negligible	High	<b>Negligible adverse effect</b>
Western vineyards	70 m west of eastern quarry boundary	6.1	Medium	Moderately effective	Low	Medium to high	<b>Slight adverse effect</b>
DoC Reserve	25 m from northern quarry boundary	1.8	Medium	Ineffective	Negligible	Medium	<b>Negligible adverse effect</b>

### 6.17 Potential Health Effects from Inhalable Particulate Matter

A proportion of the particulate matter generated on the site will be fine particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>) and this is likely to contain a proportion of crystalline silica. Fine particulate matter and crystalline silica particles that are small enough to be inhaled deep into the lungs, (known as respirable crystalline silica or RCS), have the potential to cause adverse health effects if people are exposed to concentrations above recommended guideline values for extended periods of time.

The major sources of fine particulates at the quarry will be vehicle exhausts and the abrasion of surface materials on roads by vehicle movements. The crushing and processing of gravel is also a source of fine particulates at quarries.

The discharge of fine particulates from vehicle exhausts will be spread across a large area and the contaminants will be well dispersed and diluted prior to reaching the closest houses. Any effects resulting from vehicle exhaust emissions on the health of nearby residences are therefore expected to be negligible.

Environment Canterbury commissioned Mote Limited (Mote) to carry out a study over the 2017/2018 summer to investigate the ambient concentrations of PM<sub>10</sub>, PM<sub>2.5</sub> and RSC in the vicinity of a number of quarries in Yaldhurst near Christchurch<sup>14</sup>, all of which are larger than the Amisfield Quarry. Mote measured the concentrations of PM<sub>10</sub>, PM<sub>2.5</sub> and RSC at 8 sites located between 50 m and 650 m from the quarries, as well as at 2 background sites, for a period of 4 months.

The concentrations of PM<sub>10</sub> were compared to the 24-hour average NESAQ and the MfE trigger levels for dust nuisance and the concentrations of PM<sub>2.5</sub> were compared to the MfE reporting guideline of 25 µg/m<sup>3</sup> (24-hour average).

The concentrations of RCS measured by Mote were compared with the California Office of Environmental Health Hazard Assessment Guideline of 3 µg/m<sup>3</sup> (annual average) (OEHHA guideline). The Ministry for the Environment’s *Good Practice Guide for Assessing Discharges to Air from Industry*<sup>15</sup>, (GPG Industry) recommends the use of OEHHA guidelines for assessing the effects of long-term impacts, such as those that

<sup>14</sup> Mote “Yaldhurst Air Quality Monitoring, Summary Report: 22 December – 21 April 2018”, prepared by Environment Canterbury, June 2018.

<sup>15</sup> Ministry for the Environment “Good Practice Guide for Assessing Discharges to Air from Industry”, November 2016.

can result from exposure to RCS. The OEHHA guideline concentrations are levels of airborne contaminants at which there would be no significant human health risk to individuals indefinitely exposed to that level.

The results of the Mote study of concentrations of PM<sub>10</sub>, PM<sub>2.5</sub> and RCS in the vicinity of the quarries are summarised as follows:

- There were 13 exceedances of the GPG Dust PM<sub>10</sub> nuisance trigger level of 150 µg/m<sup>3</sup> (1-hour average) recorded at the five main monitoring sites in Yaldhurst during the monitoring period, except at the background location.
- Maximum 1-hour average PM<sub>10</sub> concentrations measured in Yaldhurst were significantly higher than those measured at the background sites.
- There were no exceedances of the 24-hour average NESAQ for PM<sub>10</sub> measured by reference<sup>16</sup> methods at two locations.
- 24-hour average PM<sub>10</sub> concentrations measured by non-reference<sup>17</sup> methods above the NESAQ were recorded at all sites including the background location.
- The data suggested that the non-reference methods over read actual PM<sub>10</sub> levels when compared with the reference method.<sup>18</sup>
- The highest 1-hour average and 24-hour average PM<sub>10</sub> concentrations were measured at sites located less than 100 m downwind of the quarries.
- PM<sub>2.5</sub> levels were generally low with no recorded exceedances of the MfE reporting 24-hour guideline of 25 µg/m<sup>3</sup>.
- Only two results out of a total of 20 samples recorded measurements of RCS above the level of detection of the measurement method. Both of these measurements were recorded at Site 3, which is located 50 m downwind from a quarry in the prevailing winds. No RCS was recorded at all other monitoring sites; and
- The average concentration of RCS measured at Site 3 was 0.4 µg/m<sup>3</sup>, which is 13% of the OEHHA guideline concentration.

The Yaldhurst study demonstrates that PM<sub>10</sub> concentrations downwind of a quarry can be elevated above background concentrations and highlights the need for effective dust control to be carried out, especially when the quarry is operating within 100 m of residences located downwind.

The Clark's residence is located within 100 m of the quarry and is the closest residence. As discussed in Section 6.4, the Clark residence is downwind of the quarry for less than 0.1% of time and hence the risk of PM<sub>10</sub> discharges from the quarry causing adverse health effects on the residents of this property is considered to be negligible. The residences on Mt Pisa Road and the Clark's worker accommodation are also downwind of the quarry infrequently and are at least 190m from the quarry. Any effects on the residents of these properties due to PM<sub>10</sub> discharges are also considered to be negligible.

The residence at 90 Smiths Way is downwind of the quarry for 50% of time for all windspeeds but only for 7.3% of time for winds which exceed 5 m/s. The residence is located 360 m from the quarry. Due to the distance between the quarry and the residence and the low frequency of winds which are likely to carry particulate matter as far as the house, the risk of the discharges of PM<sub>10</sub> from the quarry causing adverse

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<sup>16</sup> Reference monitoring methods comply with Schedule 2 of the NESAQ, which means the results can be directly compared to the NESAQ for PM<sub>10</sub>

<sup>17</sup> Non-reference monitoring methods are instruments that do not comply with Schedule 2 of the NESAQ, which means the results cannot be directly compared to the NESAQ for PM<sub>10</sub>.

<sup>18</sup> The maximum 24-hour PM<sub>10</sub> concentrations were reported to be 23 - 27% higher for co-located non-reference instruments compared to reference instruments

health effects on the residents is considered to be negligible, providing the recommended mitigation measures are carried out consistently.

The results of the Mote study demonstrate that concentrations of RCS at a distance of 50 m from quarries that use similar equipment and undertake similar operations to CCC, but on a much larger scale, are well below the concentrations at which adverse health effects are likely to occur. The risk of adverse health effects occurring to people living in the vicinity of the Amisfield quarry due to discharges of RCS are therefore considered to be negligible.

The mitigation measures proposed by CCC and recommended in this report to control larger particles of dust from the quarry will also effectively control the discharge of finer particulates. Providing these mitigation measures are carried out effectively, it is expected that any health effects resulting from the discharge of fine particulate matter and RCS from the quarry will be negligible and concentrations of PM<sub>10</sub>, PM<sub>2.5</sub> and RCS will not exceed the relevant standards and guideline values.

## 6.18 Potential Effects on Vegetation

Excessive dust has the potential to adversely affect vegetation by interfering with plant photosynthesis, promoting weed or disease incidence and impacting on the application of pesticides or fertilisers. Excessive dust can also make pasture unpalatable to stock. The nature and degree of effects of dust deposition on plants is dependent on the chemical characteristics of the dust, the particle size of the dust and the species of plant. However, there is very little quantitative information available on the levels of dust deposition that may lead to adverse effects on vegetation.

The vegetation surrounding the quarry is a mixture of sparsely vegetated dry pasture, the DoC reserve, which is also very sparsely covered but includes some rare dry land plants, orchards and vineyards. The IAQM risk assessment method takes into account the potential effects of dust on vegetation. The results of the assessment described in Section 6 are that at most, a “slight adverse effect” may result on the vineyards located to the west of the quarry and that the risk of adverse effects occurring on the DoC reserve, and the surrounding orchards is negligible.

However, it is recommended, that in order to avoid and mitigate the potential for adverse effects to result from the operation of the quarry, the additional dust control and monitoring methods described in Section 7.3 are implemented when quarry operations are located within 100 m of the boundary with orchards, vineyards and the DoC Reserve.

## 6.19 Summary of Effects

The assessment of the potential nuisance effects from dust deposition from the existing and proposed expansion areas of the quarry have been assessed to be at most a “slight adverse effect” due to the infrequency of winds which exceed 5m/s and blow towards the most sensitive receptors and the distance between most receptors and the quarry. Any adverse effects on vegetation located within the DoC Reserve are expected to be minimal providing the recommended mitigation measures are implemented.

The potential health effects of discharges of PM<sub>10</sub>, PM<sub>2.5</sub> and RCS, on the residents of the nearby dwellings, are also assessed as being negligible.

In summary, providing CCC proactively manages dust on site using the methods used currently and those recommended in this report, any increase in dust from the site can be adequately avoided and mitigated so that dust discharges beyond the boundary of the site will not be offensive or objectionable and any adverse effects, including health effects, will be minimal and the relevant standards and guidelines will not be exceeded.

## 7 Proposed Mitigation and Monitoring

### 7.1 Current Mitigation and Monitoring

The mitigation measures currently used at the quarry should continue to be implemented including:

- Using water when required to dampen haul roads, stockpiles and yard areas that have the potential to generate dust;
- Using water on crushing and screening equipment at all times;
- Locating the crushing equipment on the pit floor as far as practicable;
- Regularly cleaning paved roads of deposited debris;
- Limiting vehicle speeds;
- Keeping unsealed haul roads well maintained with coarse aggregate;
- Planning potentially dusty activities such as stripping of overburden for days with favourable weather conditions
- Minimising access to the working area to essential vehicles;
- Minimising areas of exposed surfaces;
- Locating stockpiles below ground level as far as practicable; and
- Covering truckloads of fine dusty materials leaving the site where possible.

### 7.2 Dust Management Plan

CCC has prepared a DMP for the site. It is recommended that the DMP should include the following information:

- A description of the dust sources on site;
- The methods used for controlling dust at each source, including extraction, transport, processing of aggregate, stockpiles, loading and unloading activities, haul and access roads and unsealed yard areas;
- A system of training for employees and contractors to make them aware of the requirements of the DMP;
- Identification of staff responsible for implementing and reviewing the DMP;
- A method for recording and responding to complaints from the public;
- Procedures for managing dust when staff are not on site;
- Contingency methods for controlling dust in the event of equipment failure or exceptional weather conditions;
- The methods to be used to visually monitor dust emissions from the site and weather conditions; and
- The methods to be used to instrumentally monitor the concentrations of TSP and wind speed and direction.

### 7.3 Additional Mitigation and Monitoring

Although the risk of adverse effects from dust from the quarry, on the majority of properties located in the vicinity of the quarry is low, for some properties located within 100 m of the proposed quarrying activity, there is a risk that short term adverse effects may result, especially in dry windy conditions. To avoid and mitigate this risk, it is recommended that the following visual and instrumental monitoring is carried out and that wind speed and TSP concentration trigger values for reviewing and temporarily ceasing work are included in the DMP. The windspeed and TSP trigger values are based on levels recommended in the GPG Dust and are summarised in the following tables.

### 7.3.1 Windspeed and TSP trigger values

Table 7-1 Trigger values TSP concentrations for works taking place within 200 m of residential receptors located within 100 m of the quarry boundary

Trigger methods	Trigger Values (measured at the on-site monitoring station)	Actions
TSP Alert	TSP concentration (5 min average) measured on site exceeds <b>200 µg/m<sup>3</sup></b> or TSP concentration (1- hour average) <b>170 µg/m<sup>3</sup></b> , or TSP concentration (24-hour average) <b>exceeds 50 µg/m<sup>3</sup></b>	Dust sources and dust control measures within 200 m of downwind residential receptors located within 100 m of the project boundaries will be reviewed and additional dust control methods shall be implemented if necessary.
TSP Alarm	TSP concentration (5 min average) measured on site exceeds <b>250 µg/m<sup>3</sup></b> or TSP concentration (1-hour average) <b>exceeds 200 µg/m<sup>3</sup></b> or TSP concentration (24-hour average) <b>exceeds 60 µg/m<sup>3</sup></b>	Contributing dust generating activities will cease within 200m of downwind residential receptors located within 100m of the project boundaries except for dust control activities.

Table 7-2 Trigger values for wind speed

Trigger methods	Trigger Values (measured at the on-site monitoring station)	Actions
Wind Speed Alert	Hourly average wind speeds exceed <b>5 m/s</b> as measured on site and winds are blowing towards sensitive receptors located within 100 m of the boundary of the project boundaries.	Dust sources and dust control measures within 200 m of downwind sensitive receptors located within 100 m of the project boundaries will be reviewed and additional dust control methods shall be implemented if necessary.
Wind Speed Alarm (note this does not apply during rain events)	<ul style="list-style-type: none"> <li>Gust wind speeds (two-minute average or less) exceed <b>10 m/s</b> as measured on site during two consecutive ten minute periods and winds are blowing towards sensitive receptors within 100m of the project boundaries.</li> <li>Works may recommence when wind gusts (two minute average or less) are <b>less than 7.5 m/s</b> as measured at Site 6.63 (Met Station/Office) during the previous two consecutive ten minute periods.</li> </ul>	Contributing dust-generating activities will cease within 200 m of sensitive receptors located within 100 m of the project boundaries except for dust control activities.

Note: For the purposes of the wind speed trigger limits, a sensitive receptor includes residential properties, commercial properties (including the Clark’s storage shed), orchards, vineyards and the DoC Reserve.

### 7.3.2 Instrumental monitoring

It is recommended that the instrumental monitoring for TSP and windspeed utilises continuous real time instruments. The outputs from the instruments should be able to be monitored remotely at one or more locations and should be able to produce an alarm when TSP concentrations or wind speeds approach trigger values. It is recommended that a permanent meteorological monitoring station is established on site in a location that is unobstructed by large structures or stockpiles.

It is also recommended that the TSP instrument is able to be relocated as the active working area of the quarry moves, i.e. when the quarry is working within 100 m of a sensitive receptor such as the Clark’s residence, the instrument is located between the quarry and the residence (or any other residence that may be built in the future) and is therefore able to directly monitor the impact of the quarry on the receptor. At times, it may be necessary for there to be more than one TSP monitor on site, depending on the location of quarrying on site and the locations of dwellings.

### 7.3.3 Visual monitoring

It is recommended that the DMP includes requirements for visual monitoring of dust discharges to be carried on site to promote proactive management of dust and to provide a detailed description of the areas of the site which need to be regularly monitored for dust emissions. Table 7-3 lists the recommended visual monitoring requirements.

Table 7-3 Visual monitoring requirements

Monitoring Activities	Frequency
Check weather forecasts for strong winds and rainfall	Daily
Inspect site entrance and paved areas for the presence of soil deposits	Twice daily
Observe weather conditions as measured by the onsite weather station and in particular wind speed.	Daily and as conditions change.
Visually inspect all exposed unstable surfaces for dampness and review the use of the water cart or sprinklers if necessary.	Daily and as conditions change.
Visually inspect stockpiles of potentially dusty materials to ensure dampness and stabilisation.	Daily and as conditions change.
Visually inspect unpaved yard areas and haul roads to ensure surfaces are covered in coarse material or are damp.	Daily and as conditions change.
Visually inspect all dust generating activities to ensure dust is effectively controlled and review water application rates.	Daily and as new conditions begin. Hourly in winds exceeding 5m/s.
Visually inspect the crushing and screening plants to check that dust is effectively controlled.	Twice daily when plants are operating.

## 8 Conclusion

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CCC is planning to increase the area and production of the Amisfield Quarry. The increase in production and area of the quarry has the potential to increase dust discharges from the site with subsequent offsite impacts.

The assessment of effects described in this report has concluded that, providing CCC continues to carry out the current dust control measures and implements the additional monitoring and mitigation that are recommended in this report, dust discharges beyond the boundary of the site will not be offensive or objectionable and any adverse effects, including health effects, will be minimal and the relevant standards and guidelines will not be exceeded.



A

## IAQM Risk Assessment

### Introduction

The following information describes the IAQM risk assessment that was carried out for each receptor.

### Residual Source Emissions

The IAQM method categorises the scale of the activity using a series of criteria which are described below.

#### A Site Preparation/Restoration

Medium working area (site prep of new area site <10ha >2.5 ha, 100,000 tpa movement, minimal seeding, material of moderate dust potential. Overall **Medium**

#### B Mineral Extraction

Medium area >20 ha <100 ha, Low energy extraction methods, medium dust potential material, low extraction rate <200,000 tpa. Overall **Medium**

#### C Materials Handling

Medium number of heavy plant <10>5, large bare surface, medium distance to boundary activities >50<100m of boundary, material of medium dust potential (low percentage of fines), overall **Medium**

#### D On site transportation

Use of unpaved haul roads >100 <250 movements per day – medium, road surface of high dust potential – large, medium length of haul roads >500m with maximum speed limit of <24 km/hr – medium, overall **Medium**

#### E Mineral Processing

Medium dust potential raw material, medium dust potential end product, low dust potential processing plant-effective dust control, low volume of material processed - <200,000 tpa, overall **Medium**

**Overall Rating Medium Residual Source Emissions**

### Categorisation of Frequency of Potentially Dusty Winds

Frequency Category	Criteria
Infrequent	Frequency of winds (>5 m/s) from the direction of the dust source on dry days are less than 5%
Moderately frequent	Frequency of winds (>5 m/s) from the direction of the dust source on dry days are between 5% and 12%
Frequent	Frequency of winds (>5 m/s) from the direction of the dust source on dry days are between 12% and 20%
Very frequent	Frequency of winds (>5 m/s) from the direction of the dust source on dry days are > 20%

## Categorisation of Receptor Distance from Source

Frequency Category	Criteria
Distant	Receptor is between 200 m and 400m from the dust source
Intermediate	Receptor is between 100 m and 200 m from the dust source
Close	Receptor is less than 100 m from the dust source

## Pathway Effectiveness

		Frequency of potentially dusty winds			
		Infrequent	Moderately frequent	Frequent	Very frequent
Receptor Distance Category	Close	Ineffective	Moderately effective	Highly effective	Highly effective
	Intermediate	Ineffective	Moderately effective	Moderately effective	Highly effective
	Distant	Ineffective	Ineffective	Moderately effective	Moderately effective

## Individual Receptor Pathway Effectiveness

Receptor details and location	Location relative to nearest dust source	Distance from source	Frequency downwind in winds >5 m/s	Frequency category	Pathway effectiveness
Clark's residence	30m west to south of boundary with expansion area and 80m from proposed workings.	Close	0.1%	Infrequent	Ineffective
Clark's residence	210m north of existing quarry	Distant	1.7%	Infrequent	Ineffective
Clark's rural land	25m northwest, west and southwest from workings. Close	Close	7.9	Moderate	Moderately effective
Clark's rural land	15m north of existing quarry	Close	1.8	Infrequent	Ineffective
Clark's storage shed	30m west of boundary with expansion area and 80 m from proposed workings	Close	7.8	Moderate	Moderately effective
Clark's storage shed	40m north of existing quarry	Close	1.8	Infrequent	Ineffective
Vineyard at quarry entrance	20m west of site offices and yard area and 20m north of main haul road entrance	Close	1.7	Infrequent	Ineffective
Residence at 90 Smiths Way	360m south of workings	Distant	7.3	Moderate	Ineffective
Little's worker accommodation	150m south east of expansion area	Intermediate	0.06	Infrequent	Ineffective

Little's worker accommodation	190m east of existing quarry boundary	Intermediate	0.01	Infrequent	Ineffective
Little's eastern orchard	40m east and south east of boundary of expansion area and 65m east and southeast of proposed workings	Close	1.7	Infrequent	Ineffective
Little's eastern orchard	40m east and southeast of boundary of existing quarry	Close	1.7	Infrequent	Ineffective
Little's southern orchard	70m south, south east and southwest of boundary of existing quarry	Close	8.3	Moderate	Moderately effective
7 Mt Pisa Road	200m north of quarry entrance	Distant	0.06	Infrequent	Ineffective
13 Mt Pisa Road	280m west to northwest of workings	Distant	0.07	Infrequent	Ineffective
Western vineyards	70m west of eastern quarry boundary	Close	6.1	Moderate	Moderately effective
DoC Reserve	25m north of northern boundary of expansion area	Close	1.75	Infrequent	Ineffective

## Estimation of Dust Impact Risk

Residual Source Emissions					
		Small	Medium	Large	
Pathway Effectiveness	Highly effective pathway	Low risk	Medium risk	High risk	
	Moderately effective pathway	Negligible risk	Low risk	Medium risk	
	Ineffective pathway	Negligible risk	Negligible risk	Low risk	

## Descriptors for Magnitude of Dust Effects

Dust Impact Risk	Receptor Sensitivity			
		Low	Medium	High
High Risk		Slight adverse effect	Moderate adverse effect	Substantial adverse effect
Medium Risk		Negligible effect	Slight adverse effect	Moderate adverse effect
Low Risk		Negligible effect	Negligible effect	Slight adverse effect
Negligible Risk		Negligible effect	Negligible effect	Negligible effect

## Assessments for Each Receptor

Receptor details and location	Location relative to nearest dust source	Residual source emissions	Pathway effectiveness	Dust impact risk	Receptor sensitivity	Magnitude of dust effect
Clark's residence	30m west of boundary with expansion area and 80m from workings	Medium	Ineffective	Negligible	High	<b>Negligible adverse effect</b>
Clark's residence	210m north of existing quarry	Medium	Ineffective	Negligible	High	<b>Negligible adverse effect</b>
Clark's rural land	25m northwest, west and southwest from workings	Medium	Moderately effective	Low	Low	<b>Negligible effect</b>
Clark's rural land	15m north of existing quarry	Medium	Ineffective	Negligible	Low	<b>Negligible effect</b>
Clark's storage shed	30m west of boundary with expansion area and 80m from workings	Medium	Moderately effective	Negligible	Medium	<b>Negligible effect</b>
Clark's storage shed	45m from boundary with existing quarry	Medium	Ineffective	Negligible	Medium	<b>Negligible adverse effect</b>
Vineyard at quarry entrance	20m west of site offices and yard area and 20m north of main haul road entrance	Medium	Ineffective	Negligible	Medium to high	<b>Negligible effect</b>
Residence at 90 Smiths Way	360m south of workings	Medium	Ineffective	Negligible	High	<b>Negligible adverse effect</b>
Little's worker accommodation	150m south east of expansion area	Medium	Ineffective	Negligible	High	<b>Negligible adverse effect</b>

Little's worker accommodation	190m east of existing quarry boundary	Medium	Ineffective	Negligible	High	<b>Negligible adverse effect</b>
Little's eastern orchard	40 m east of expansion area	Medium	Ineffective	Negligible	Medium to high	<b>Negligible adverse effect</b>
Little's eastern orchard	40m east and southeast of existing quarry	Medium	Ineffective	Negligible	Medium to high	<b>Negligible adverse effect</b>
Little's southern orchard	70 m south, south east and southwest of existing workings	Medium	Moderately effective	Low	Medium to high	<b>Slight adverse effect</b>
7 Mt Pisa Road	200 m north of quarry entrance	Medium	Ineffective	Negligible	High	<b>Negligible effect</b>
13 Mt Pisa Road	280m west to northwest of quarry	Medium	Ineffective	Negligible	High	<b>Negligible effect</b>
Western vineyards	70m west of eastern quarry boundary	Medium	Moderately effective	Low	Medium to high	<b>Slight adverse effect</b>
DoC Reserve	25 m from northern quarry boundary	Medium	Ineffective	Negligible	Medium	<b>Negligible effect</b>

Amisfield Quarry Extension  
Cromwell Certified Concrete

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# Landscape and Visual Impact Assessment



Prepared for Landpro Limited

October 2020

Align 

Prepared by Align Limited

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#### DOCUMENT DETAILS

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# 1 Introduction

## 1.1 **Scope:**

This Landscape and Visual Impact Assessment (LVIA) report has been prepared for the client and can be relied upon as an attachment to the land use consent application. This report provides an expert Landscape and Visual Impact Assessment with regards to the proposed activities on the application site as defined within this report. The report has been prepared using plans and documents supplied by Landpro and Cromwell Certified Concrete, as well as information gathered during site visits carried out on 21<sup>st</sup> and 22<sup>nd</sup> January 2020 and with reference to the relevant objectives and policies of the Central Otago District Plan.

### 1.1.a **Project description**

The applicant, Cromwell Certified Concrete, operates the existing Amisfield quarry on Lot 8 DP 301379. The existing quarry was approved by way of land use consent granted in 2015, however a quarry has operated on that site since 1994. Cromwell Certified Concrete seeks resource consents to deepen the existing quarry and to expand the existing operations onto land directly adjacent the existing quarry (Lot 3 DP 301379) which was purchased for that purpose in 2018. The extent of the proposed quarry within Lot 3 DP 301379 is 7.12ha, with active working areas to be offset by 25m from the boundary, with a 6m wide, 3m tall perimeter bund. The bunding will be designed with consideration to views from neighbouring properties (both with regards to maintaining views to the greater landscape, as well as obscuring the quarry activities – which will largely be below ground level). At the north-west corner of the expansion area, this buffer will be increased to 50m. From a landscape and visual effects perspective, the operation will be similar to the current one – although the applicant is seeking to increase the daily/annual production as well as going deeper than the existing consented pit floor. The proposed expansion area is referred to as ‘the site’ for the purposes of this report.



## 1.2 Landscape issues

The site is zoned Rural Resource Area. The quarry operation is classified as a discretionary activity. This landscape and visual impact assessment has a focus on landscape and visual effects, related specialist issues such as ecology, noise and dust effects are to be addressed by specialists in their respective fields. The report also considers the broader statutory and planning context as outlined below:

RMA provision	Landscape Issue
S5 purpose and principles	
S7(c) amenity values	Effects on landscape character Effects on streetscape Effects on recreational experience in a park Effects on landscape context of an historical site Effects on views Effects on visual amenity from private property Temporary visual effects during construction
S7(f) quality of the environment	Effects on landforms Effects on vegetation
Central Otago District Plan	Landscape Issue
<u>Section 4: Rural Resource Area</u> 4.3.3 Objective - Landscape and Amenity Values 4.4.2 Policy - Landscape and Amenity Values 4.4.8 Policy - Adverse Effects on the Amenity Values of Neighbouring Properties.	Effects on landforms (refer to Physical effects) Effects on landscape character (refer to Perceptual effects section) Effects on visual amenity from private property (refer to Amenity and Visual Effects section) Temporary visual effects during construction (refer to Visual effects section)

**Table 1:** Policy context

There are no identified landscape values or significant natural features identified within the CODP relating to the application site. However, the Pisa and Dunstan Mountain Ranges form part of the backdrop to the application site and are classified as Outstanding Natural Landscapes.

## 1.3 Viewing audiences

### 1.3.a Private

There are several existing dwellings which are close to the site of both the existing quarry and the proposed extension. The property directly to the north of the existing quarry and south of the proposed expansion (Lot 2 DP 301379 – 1308 Luggate-Cromwell road) has a dwelling (Clark residence) which will be directly adjacent the northernmost extremity of the proposed quarry expansion.

### 1.3.b Public

The expansion site itself is not readily visible from the Luggate - Cromwell Road (State Highway 6), so users of this road are unlikely to have any views of the proposed quarry itself – other than the presence of dust due to the quarry operations and the entrance to the site. The expansion site (together with the existing quarry area) is visible from the Tarras – Cromwell Road (State Highway 8), but difficult to detect due to the site's low elevation and often interrupted views from the State Highway (due to intervening trees and landform) as well as the distance to the site. The road users travelling along the Tarras – Cromwell Road (State Highway 8) would be able to see the site from some locations, this is of relevance to the Bendigo camping area and the Crippletown boat ramp – both of which have areas where the quarry can be seen across Lake Dunstan (approximately 1km distant).

The Mount Koinga and Bendigo areas to the east of the Tarras – Cromwell Road (State Highway 8) are an elevated landscape that includes a network of walking tracks, as well as some vehicular access. From the west facing slopes of the Dunstan Mountains there will be views of the quarry and proposed expansion, so walkers and cyclists in this area would also have views of the quarry, albeit at a significant distance (1 – 4km).

## 1.4 Methodology

The site and surrounding area were visited on the 21<sup>st</sup> and 22<sup>nd</sup> of January 2020, to assess the proposal and its effects on the greater landscape. The site visit explored the Mount Pisa area to the west of the applicant site as well as the Crippletown and Bendigo areas to the east (on the opposite side of Lake Dunstan, lower slopes of the Dunstan Mountains). The site visits also included a meeting to familiarise all consultants with the project, history of the existing operation and the extent of the proposed expansion.

The landscape and visual effects are assessed and graded according to the 7-point scale of effects table (see Table 2, page 5).

Table 2 - Scale of effects (7 point)<sup>1</sup>

The below seven-point scale is used to describe effects.

- Very High: Total loss to the key attributes of the receiving environment and/or visual context amounting to a complete change of landscape character
- High: Major change to the characteristics or key attributes of the receiving environment and/or visual context within which it is seen; and/or a major effect on the perceived amenity derived from it.
- Moderate-High: A moderate to high level of effect on the character or key attributes of the receiving environment and/or the visual context within which it is seen; and/or have a moderate-high level of effect on the perceived amenity derived from it.
- Moderate: A moderate level of effect on the character or key attributes of the receiving environment and/or the visual context within which it is seen; and/or have a moderate level of effect on the perceived amenity derived from it. (Oxford English Dictionary Definition: Moderate: adjective-average in amount, intensity or degree).
- Moderate-Low: A moderate to low level of effect on the character or key attributes of the receiving environment and/or the visual context within which it is seen; and/or have a moderate to low level of effect on the perceived amenity derived from it.
- Low: A low level of effect on the character or key attributes of the receiving environment and/or the visual context within which it is seen; and/or have a low level of effect on the perceived amenity derived from it. (Oxford English Dictionary Definition: Low: adjective-below average in amount, extent, or intensity).
- Very Low: Very low or no modification to key elements/features/characteristics of the baseline or available views, i.e. approximating a 'no-change' situation.

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<sup>1</sup> Goodman, de Lambert, Dawson, McMahon & Rackham (2000). Impact of development on rural landscape values. Ministry for the Environment.

<https://www.epa.govt.nz/assets/FileAPI/proposal/NSP000039/Applicants-proposal-documents/813efb09d1/NSP000039-NCI-Vol-3-08-Landscape-and-Visual-Appendix-A-Landscape-and-visual-effects-assessment-methodology.pdf>

Adapted from NZILA Best Practice Guide 10.1 Landscape Assessment and Sustainable Management

## 2 Existing Landscape

### 2.1 *Landscape*

The NZILA charter defines landscape as ‘The cumulative expression of natural and cultural elements, patterns and processes in a geographical area’. To this end, the site has been assessed with reference to the cultural aspects as well as the aesthetic and biophysical. That definition is adopted for the purpose of this assessment.

### 2.2 *Description*

The site is situated at approximately 12 kilometres to the north west of Cromwell along the Luggate – Cromwell Road (State Highway 6), and 4 kilometres to the north of the Pisa Moorings housing subdivision.

The site is located in a river valley with Lake Dunstan to the east and Mount Pisa to the west, which rises to 1964 metres above sea level. The site is situated on a small plain in the valley floor that extends from the shore of Lake Dunstan to the base of Mount Pisa, and ultimately extends to Wanaka to the north west. The land use immediately adjacent the site includes Cherry orchards, vineyards and the Department of Conservation Mahaka Katia scientific reserve (to the north), with open farmland also being a dominant feature within the context of the valley. The expansion site itself is an empty paddock with no existing structures or buildings other than the post and wire fencing that divides the paddocks.

The Amisfield Burn runs alongside the existing quarry site, and starts as a reasonably defined bed, which spreads to become a shingle fan with less definition as it meets Lake Dunstan.

The landscape is relatively open in the immediate vicinity of the site, although the greater landscape extends to mountains on all sides, which gives the impression of being in a large basin. The broad valley floor also allows the impression of scale in the landscape – with the mountains appearing in the distance and providing a spacious quality to the environment.



**Figure 3:** Looking across the site to the west, from within the site.



**Figure 4:** General landscape – Looking south (towards Cromwell) from the existing quarry boundary.

The landscape patterns here are defined by the long, straight road and horticultural forms such as shade structures and the post and wire trellis support for vines or trees. The roadside has stands of hardy drought tolerant exotic tree species such as *Eucalyptus spp*, *Pinus spp*, as well as some native species. The other prevalent plants include exotic wildflowers such as *Echium plantagineum* (purple vipers-bugloss) and *Silene coronaria* (Rose Campion) growing along the roadside.





**Figure 5:** View looking in the opposite direction to figure 4, into the quarry itself.

### 2.2.a Biophysical

Central Otago is an area known for extremes of temperature, and low rainfall. The landscape here reflects these extremes and as such the vegetation is generally adapted to dry conditions – these conditions, combined with a history of grazing, results in a rocky, open landscape typical of the central Otago area. The site visit on 21<sup>st</sup> and 22<sup>nd</sup> January 2020 revealed a very dry site with little notable vegetation, in fact the site was observed to be primarily stones and some dry grass. The surrounding landscape did have some greener areas, which by observation seemed to be due to irrigation – but the greater landscape was generally subtle grey browns with wildflowers providing a sprinkling of colour in the roadsides, contrasted with the blues of the lakes and sky (when clear).

The landform is dominated by the combination of natural geology with hydroelectricity schemes, with the roading patterns often being influenced by the need to navigate the topography and localised landforms. There is a contrast between the road patterns in the broad valley floor, which are generally long and straight (as is the case of the Luggate – Cromwell Road) and the landscape to the west, where the mountains provide a dramatic skyline and a sense of scale – with the road following this topography along the edge of Lake Dunstan.



**Figure 6:** A representative view across Lake Dunstan showing the dramatic landform of the Pisa Range.

### 2.2.b Sensory qualities

The area surrounding the site is described earlier in this report as mixed use, with horticultural activities and other more industrial activities such as quarrying, meaning there is consistently evidence of human intervention observed in the landscape.

However, the generally spacious landscape means that it is easy to find a sense of solitude here – often with the sounds of industry heard from the distance. The clear air and wide-open spaces also give views into the distance, which allows an enhanced appreciation of the scale of the landscape. The qualities outlined above attract international and domestic visitors to the recreational opportunities provided by the surrounding landscape, as well as an important thoroughfare for those travelling to other parts of the country and experiencing transient views along the Tarras-Cromwell Road.

## 2.3 Characterisation

The site as outlined above is part of a broader natural landscape, which is best described as mixed use. The landscape in which the site is located has dramatic geology, with rocky outcrops and mountain ranges providing a sense of drama and wilderness, and the Pisa and Dunstan Mountain Ranges form part of the backdrop to the application site and are classified as Outstanding Natural Landscapes. This landscape is a picturesque area that is visited by tourists and holiday makers, with the hydroelectrical scheme extending down the Clutha river providing a variety of recreational activities. Lake Dunstan is popular for waterborne activities, such as boating and fishing and is located adjacent to the proposed extension.

The extremes of climate and geology make this an uncompromising landscape, with a very distinctive colour palette and flora. The area is also known for the lighting quality due to low humidity and clear air – which enhances the sense of distance and colours.

The landscape on the level land alongside Lake Dunstan is highly modified due to horticultural and industrial practices, with evidence of present and past activities readily visible. These include the shade and trellis structures associated with fruit tree orchards, access roads to quarries and vineyards, and in the greater landscape shelter belts and dwellings are also evident – adding a layer of agricultural character.

In the wider landscape, the mining heritage of the region has also left a historic layer of human intervention aside of the agricultural and horticultural practices. The evidence of this is visible in areas from the main highways and are part of the visitor experience. An example of this is the Quartz Reef Point tailings – a heritage site, located 7km South along Tarras-Cromwell Road side of lake Dunstan from the site. The present-day quarrying activities are evidenced on the opposite side of Lake Dunstan from the tailing site, with the Parkburn Quarry located between Amisfield and the Quartz Reef Point tailings.



Figure 7: The Quartz reef Point tailings (image credit -www.tripadvisor.co.nz)

## 2.4 Evaluation

The site is located in a mixed-use area as described, zoned Rural Rural Resource Area, with high levels of horticultural and agricultural uses evident as a primary land use, as well as several quarries in the surrounding landscape. The general area is well known for fruit production – with the extreme climate supporting stone fruit, other fruit trees and grape vines (the low humidity and harsh winters helping to prevent fungus and other plant disease).

The landscape as defined above has a distinct horticultural, agricultural and industrial (mining / quarrying etc) layer, which exists within a greater 'sublime' landscape, as indicated by the ONL status applied to part of the surrounding landscape. These can be separated by the topography – the lower level ground being the most developed, with elevated areas generally classified ONL (as identified in

the district plan, Map 48). In evaluating this landscape, both of these factors need to be taken into account – as the applicant site is highly modified, and influenced by human activity within local landscape, set within the greater natural landscape.

The greater landscape here is covered in the above sections, with the general character being described as 'dramatic' and 'picturesque' – it is appreciated by visitors and highly valued by those that live in the Central Otago district, as identified by the ONL status of the surrounding landforms.

## 3 Landscape condition and effects

### 3.1 **Landscape Effects**

As defined in the previous section, the landscape is an expression of natural and cultural features, patterns and processes that exist in an area. Landscape is about the physical components of a place; the way people perceive a place; and those key associations they have with a particular place. The combination of these physical, perceptual and associative aspects combines to form 'landscape character' and have been assessed by analysing the following physical, perceptual and amenity values.

#### 3.1.a **Physical Effects**

Quarrying activities are already occurring in this environment, and there are high levels of horticultural, agricultural and quarrying activity in the general area. The activities are (in places) historic and have come to form part of the character of the general area – in some places these activities have been part of the local landscape for over 100 years.

The site on which the quarry is proposed to expand is located immediately adjacent to the existing quarry, which has been in operation since the early 1990's.

The quarry expansion will by nature create significant physical change on the site, which can be measured by comparing the existing operations with the current state of the site. The expansion has been assessed on the basis that the existing quarry forms part of the landscape, however an assessment of the cumulative physical effects of the proposed quarry expansion on the landscape has also been undertaken. While the site will progressively be quarried in a northerly direction, the following rating, along with that of the photomontages are representative of the stage where the whole site is open under quarrying operation.

The adverse physical effects of the proposed quarry expansion on the site itself are assessed as **moderate**.

#### 3.1.b **Perceptual Effects**

The sensory qualities and character of this landscape are outlined above and provide a baseline for the assessment of perceptual effects. The perception of this landscape is closely related to the physical attributes, including dramatic landforms, a spacious quality, and the patterns of human intervention (roads, fences and other structures).

The proposed quarry expansion will expand an existing element of human intervention in the greater landscape and will be visible from some distance. The activities will not significantly alter the perception of this landscape as the visual evidence is not unique and makes up part of a greater pattern of historical development. The site, as mentioned above, is not visible from the Luggate-Cromwell Road, nor does it have public access, so the perceptual effects are more relevant to the perception from locations within the greater landscape. These effects are assessed within the overall landscape context, with focus given to the sites that overlook the quarry site from a distance – as these are locations from which the site will be most visible. The perception of the expanded quarry operations is likely to remain unchanged in this context, with the only likely change coming at the

north and north east boundaries to the expansion area – where the neighbouring properties adjoin the applicant site.

The adverse perceptual effects of the proposed quarry expansion are assessed as **low**.

### 3.1.c Amenity Effects

The amenity effects are closely related to the perceptual effects assessed above. The primary amenity values of this site would be the visual amenity as assessed and experienced from the greater landscape.

The adverse amenity effects of the proposed quarry expansion are assessed as **low**.

### 3.1.d Cultural / Heritage Effects

A cultural assessment, including assessing Tangata Whenua values, has not been carried out as part of this Landscape and Visual impact assessment.

The site features no existing structures or buildings other than the fencing that divides the paddocks, and the groundcover is sparse vegetation. There was no evidence of any previous buildings on site, and desktop research could find no specific records of there being any items of historical significance on the site.



**Figure 8:** The site as viewed from the Department of Conservation Mahaka Katia scientific reserve.

Based upon the available information, the adverse heritage and cultural effects of the proposed quarry expansion are assessed as **very low**.

## 3.2 Visual Effects

The visual effects of the proposed quarry expansion were assessed during the site visit by visiting 11 specific sites (informed by the desktop analysis) as well as an exploration of the general area to assess the visual impact of the proposal on the receiving environment. The viewpoints were then further analysed to choose points which represented the most significant areas of visual influence – the photographs were then used to create ‘before and after’ montages that accurately represent the appearance of the proposed quarry expansion, in order that effects could be assessed. The assessment considered both the separate and cumulative impacts of the expansion, in the context of each viewpoint and the extent of visibility from these locations as defined in the following sections.

### 3.2.a Visibility Analysis

The site is flat and open and is difficult to detect from the Luggate – Cromwell Road (SH 6). It is positioned on a river terrace that is visible from the Tarras – Cromwell Road (SH 8), meaning that the site is intermittently visible to road users, albeit any views will be for a very short duration as they travel along the road, from over 1km distance (the opposite side of Lake Dunstan). User of the camping areas and boat ramps along the eastern shoreline of Lake Dunstan will also have varied views of the site, dependent on vegetation and topography.

The existing quarry and the expansion area is directly adjacent to one dwelling (Clark residence), and within 400 meters of a second (which has been built since the site map was produced – see map below and position marked 20c), which makes these dwellings those with the closest views of the proposed expansion area.



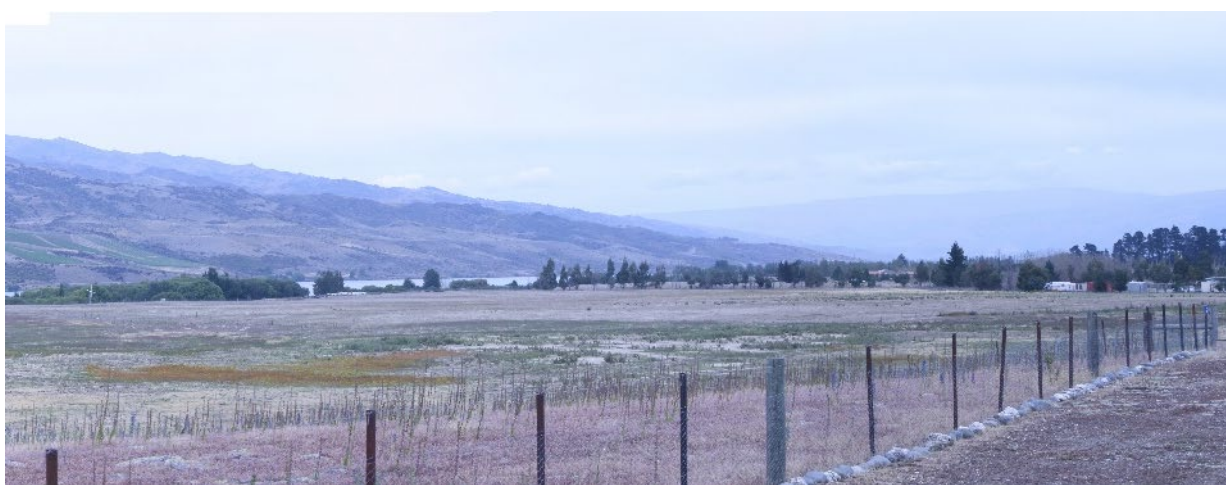
Figure 9: Local area and most nearby dwellings.

### 3.2.b Nature and sensitivity

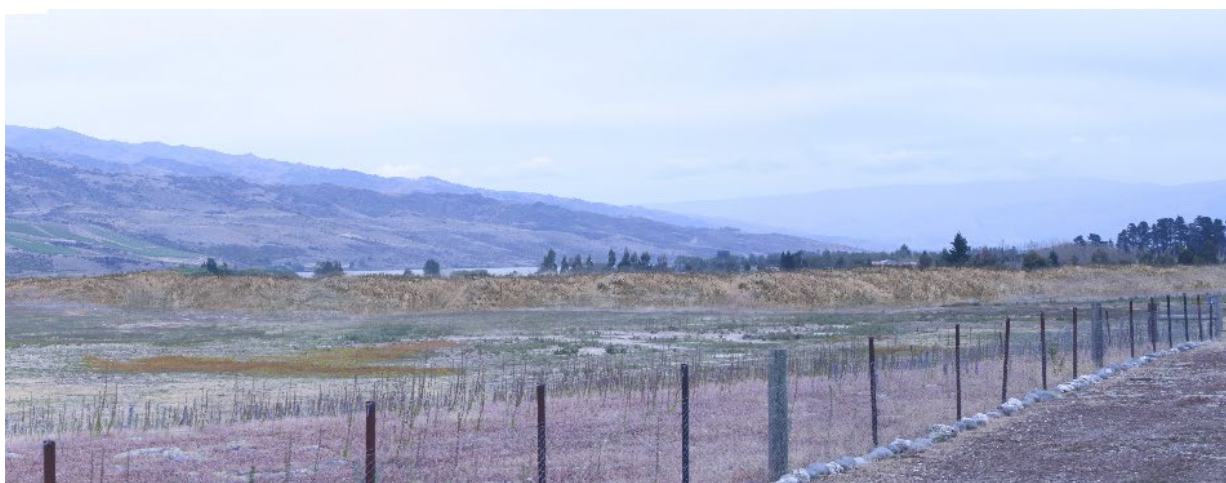
The visual effects of the proposed quarry expansion have been assessed from specific viewpoints chosen during site visits as mentioned above. These viewpoints have been assessed as key points from where there will be a direct view to the site. See Appendix 1 for images formatted as per the NZILA best practice guide.

#### 3.2.b.i Viewpoint 1

Viewpoint one, which is directly adjacent to the expansion site, is representative of the views from residences North/West of the site (in close proximity to the proposed quarry extension), on the relatively level ground on between Lake Dunstan and the State Highway. The view looks across the DOC reserve, towards the proposed bunding around the periphery of the site. This viewpoint is the one with the closest proximity to the proposal.



**Figure 10:** Viewpoint 1 – Current view of the site from the Department of Conservation Mahaka Katia reserve, looking to the south east.



**Figure 11:** Viewpoint 1 – Post development. Showing bunding visible.

The point is close to the boundary of the nearby dwelling (see figure 9 position 20c) The adverse visual effects from this viewpoint are rated as **moderate - low**.



### 3.2.b.ii Viewpoint 2

This location on Mount Pisa Road is indicative of the views down from higher ground on the South side of Lake Dunstan looking north to the existing quarry site. The elevated position allows views into both the existing quarry and the proposed expansion area, as well as across the surrounding landscape. It is likely that movement and any associated dust will be visible within the proposed extension from this viewpoint – judging by the landform and activity currently visible in the existing quarry and surrounding mixed/production landscapes. Viewpoint 2 is approximately 2.5km away, at a higher elevation at the base of the Pisa Range.



**Figure 12:** Viewpoint 2 – Current view from Mount Pisa Road down from higher ground on the South side of Lake Dunstan looking north to the existing quarry site.



**Figure 13:** Viewpoint 2 - Post development, with the extent of the proposed extension shown in the centre of the image, below the visible waters of Lake Dunstan, to the upper left of the existing Quarry.

The bunding proposed is such that views of the lake are largely uninterrupted. As can be seen from the existing quarry extent, the colours of the extension will be subtle and consistent with the surrounding landscape. The varied forms within the quarry are in contrast with the existing level pasture area, although this contrast is mitigated by the viewing distance.

The adverse visual effects of the proposal from this viewpoint are rated as **low**.

### 3.2.b.iii Viewpoint 3

Viewpoint 3 is an elevated viewpoint located on the North side of Lake Dunstan. This viewpoint is representative of the transient views of the site by people partaking in recreational and agricultural activities on the Dunstan Mountains.



Figure 14: Viewpoint 3 – Current view looking across Lake Dunstan to the site.



Figure 15: Viewpoint 3 – Post development: The site showing bunding.

This viewpoint is chosen as representative of general views from the lower slopes of the Dunstan Mountains as not all walking tracks were individually assessed – this viewpoint is the most direct, elevated viewpoint accessible from the Tarras-Cromwell Road (State Highway 8). The viewing audience would usually be transient walkers, possibly mountain bikers or people involved in the land's management or visiting the Bendigo Winery.

These viewers will have varied levels of familiarity with the surrounding landscape, with those familiar with the site more likely to register the change. However due to similar reasons listed for VP02, the colours and scale of the landscape are consistent with the surrounding character of this view, but the forms and level of visible activity are a change for the site. Those visiting for recreational walking may be doing so for the views from the elevated location – views which will change with the introduction of the proposed extension and associated activities. It must be noted that due to landform and viewing angles that opportunities to overlook the proposed quarry expansion would be varied along these tracks, including locations where views are constrained by the topography.

The adverse visual effects from this viewpoint are rated as **low**.

### 3.2.b.iv Viewpoint 4

Viewpoint four is located along State Highway 8 (Bendigo Picnic area) and on the western bank of Lake Dunstan, looking directly across the lake to the proposed site above the existing terrace. This

view was selected to represent the views across the lake from the lakeside of the state highway as will be experienced by those travelling down the road, or those stopped at the picnic area.



**Figure 16:** Viewpoint 4 – Current view, looking across the lake, the proposed extension site is central to the image, partially obscured by existing willows (*Salix* spp) growing on the waterfront.



**Figure 17:** Viewpoint 4 – Post development, showing the bunding surrounding.

This image shows that the bund will be of a similar proportion/scale as the existing terrace down to Lake Dunstan and will repeat the terraced form down to the lake, sympathetic to the existing landscape.

The adverse landscape and visual effects from this viewpoint are rated as **low**.

### 3.2.c Visual Influences

The proposed quarry extension creates landscape and visual effects that are largely cumulative, and the ratings applied recognise this. The quarrying activities are also not entirely out of context with land use in the greater landscape yet are isolated enough to prevent the cumulative effects from creating major landscape and visual change.

The proposed bunding aids in disguising the excavation and creates a 'soft edge' to the actual quarrying activities. The proposed quarry site is generally only visible from some distance and in specific locations – as shown in the chosen viewpoints 2, 3 and 4. These viewpoints demonstrate that the proposed quarry extension would have **low** adverse landscape and visual effects, due to the context mentioned above and the effect of distance (the closest of these sites is 1km from the applicant site)

Viewpoint 1 represents the effects the proposed quarry extension will have on the nearby dwellings, as well as the adjacent Department of Conservation Mahaka Katia scientific reserve. The effects here are more significant due to the proximity of the proposed quarry extension – although as mentioned above are cumulative due to the existing quarry activities. The adverse and visual effects here are rated as **moderate-low**.

## **4 Change management:**

### **4.1 Values**

#### **4.1.a Enhancement**

The proposed quarry extension does not present obvious opportunities for enhancement – although some limited opportunities for planting on the bunding may be explored (although it is acknowledged that the harsh conditions will have a strong influence on the viability of this as enhancement). There are no proposed planting treatments allowed for in this report.

### **4.2 Landscape Effects**

The adverse landscape effects of the proposed quarry extension are assessed overall as being low. At end of the extraction process, the site will be closed in accordance with a 'closure and rehabilitation plan' which will provide a framework for returning the site to a natural state, including the removal of all buildings, re-contouring the land and providing for appropriate drainage and other landscape remediation. The lack of fill available means that backfilling is likely to be limited in extent however it is anticipated that the site would be shaped to resemble a natural landform.

### **4.3 Visual Effects**

As can be seen from the visual montages, the proposed bund will be a key for screening views of the proposed quarry extension. The orientation of the bunding and the site to the existing quarry extent contribute to mitigating the cumulative effects of the quarry as it limits the expanse of visible change. As above, there is no additional screening measures proposed in this report.

The mitigation of onsite activities is also aimed at adverse effects such as noise and dust suppression. Specific mitigation measures in relation to dust are addressed in the Beca report.

## 5 Conclusion

The proposed quarry extension as outlined in this Landscape and Visual Impact Assessment (LVIA) has been assessed in the context of the existing landscape, and the views of the site. Cumulative landscape and visual impacts have also been considered.

It is important to view the proposed quarry expansion in the wider landscape context, and this has been a major influence when applying the ratings. The existing and historic mining and quarrying activities are a part of the features and patterns in the landscape – the need to balance these activities within the greater landscape to maintain the landscape character must be considered. To this end the scale of the expansion is an important consideration when rating assessing effects, as larger scale developments may adversely alter the broader landscape patterns.

The scale of the proposed quarry expansion is such that it will not affect the broader landscape patterns, as demonstrated by the photomontage images presented in Appendix 1. The bunding also serves to help the excavation to be absorbed into the greater landscape.

Overall, the assessment of the adverse landscape and visual effects of the proposal when viewed from the greater landscape are **low**. The assessment of these effects on the sites directly adjacent the proposed quarry expansion are **moderate-low**, with these effects considered to be limited due to the isolated nature of the site.



# ASSESSMENT OF NOISE EFFECTS

AMISFIELD QUARRY  
1248 LUGGATE-CROMWELL ROAD, MOUNT PISA

**PREPARED FOR**  
Cromwell Certified Concrete Ltd

**DATE**  
19 October 2020



Assessment prepared by Styles Group for Cromwell Certified Concrete Ltd.

#### REVISION HISTORY

Rev:	Date:	Comment:	Version:	Prepared by:	Reviewed by:
3	19/10/20		Final	Jamie Exeter, MASNZ, Assoc. NZPI Senior Consultant Styles Group	Kelly Leemeyer, MASNZ Consultant Styles Group

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## Appendices

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## 1.0 Introduction

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Cromwell Certified Concrete Ltd has engaged Styles Group to assess the potential noise effects of the proposed expansion of the quarry at 1248 Luggate-Cromwell Road, Mount Pisa (the Site). The current quarry operations include the use of fixed processing plant and mobile crushers. The locations of the crushers will not change under the proposed operation. Activities in the expansion area will involve excavators and dump trucks. Resource consent is sought for the proposed expansion of the quarry.

This report comprises an assessment of the proposed expansion from an acoustics perspective, including:

- Noise level predictions prepared using Brüel & Kjær Predictor computer noise modelling software
- An assessment of the noise emissions from the site in accordance with the Central Otago District Plan (the District Plan), section 16 of the Resource Management Act (the Act) and the relevant New Zealand noise standards
- Recommended noise management measures and conditions based on our findings.

This report should be read in conjunction with the Assessment of Environmental Effects. A glossary of acoustical terms used within this document is attached as Appendix A.

## 2.0 The existing quarry and the proposed expansion

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The quarry and all surrounding sites are within the Rural Zone of the District Plan. To the east and north of the existing quarry are dwellings at 1286 and 1308 Luggate-Cromwell Road, respectively. These sites and the expansion area are illustrated in Figure 1 overleaf.

The consented operation includes activity on site from 06:00 to 19:00, Monday to Saturday. There is no processing undertaken on Sundays and public holidays.

The operating hours will be the same under the new consent and will include the following activities:

- Arrival of staff and loading trucks: 06:00 to 07:00, Monday to Saturday
- Site excavation, processing, dump truck, loader and purchasing truck movements: 07:00 to 19:00, Monday to Saturday
- Loading trucks and staff leaving: 19:00 to 20:00, Monday to Saturday.

There will be no activity on site outside of the above times.

There will be no processing or loading undertaken in the expansion area at any time.

New earth bunds will be constructed above the existing excavated pit and along the western boundary of the expansion area to screen 1308 Luggate-Cromwell Road from noise generated on site.



**Figure 1: Proposed Amisfield Quarry layout and nearest dwellings**

## 3.0 Noise performance standards

This section sets out the framework for the assessment of noise from the proposed construction and operation of the expanded quarry.

### 3.1 Existing resource consent noise limits

The noise limits imposed by the existing resource consent conditions are based on the District Plan permitted noise standards for the Rural Zone but have a shorter daytime prescribed timeframe. They include a less stringent noise limit at night than the District Plan but they preclude works on Sundays. Condition 12 of the existing consent is set out below.

12. Sound levels due to quarrying, crushing and ancillary work conducted by the consent holder at the site measured at the notional boundary of any dwelling is not to exceed:
- a. on normal working days during the hours of 7.00am and 7.00pm Monday to Saturday, the upper limit of sound exposure (as defined in clause 4.2.2 on New Zealand Standard 6802:1991) of 55 dBA L10.
  - b. at other times on normal working days, on public holidays and on Sundays, the upper limit of sound exposure (as defined in clause 4.2.2 on New Zealand Standard 6802:1991) shall not exceed 45 dBA L10 and a Lmax of 75 dBA.

## 3.2 District Plan permitted noise standards

The permitted construction and operational noise limits of the District Plan are set out below.

### 3.2.1 Construction noise limits

Section 12.7.4 (ii) of the District Plan requires construction noise, which is ancillary to the principal use of the site, to comply with the provisions of the New Zealand construction noise standard NZS 6803P:1984 *The Measurement and Assessment of Noise from Construction, Maintenance and Demolition Work*. The guideline  $L_{A10}$  and  $L_{Amax}$  noise limits stated in this standard for times between 07:30 and 18:00 on Monday to Saturday, and where the works are between 15 days and 18 weeks in duration, are as follows:

- 75 dB  $L_{A10}$  and 90 dB  $L_{Amax}$  measured at 1 m from the façade of any occupied building in a residential area
- 75 dB  $L_{A10}$  measured at 1 m from the façade of any occupied building in an industrial or commercial area.

The *construction work*, as defined by NZS 6803:1984P, to build the earth bunds before excavation works start in the expansion area will not take place on Sundays or public holidays and will only be undertaken between 07:30 and 18:00. The above permitted construction noise limits will be applicable at 1 m from the façade of the nearest dwellings. However, if all construction works required to build the bunds can be completed within 15 calendar days, the limits above can be relaxed by up to 5 dB.

### 3.2.2 Operational noise limits

The District Plan permitted limits for noise between sites in the Rural Zone are set out in Section 4.7.6(E), as below.

All activities shall be conducted so as to ensure the following noise limits are not exceeded at any point within the notional boundary of any dwelling, resthome or hospital, or at any point within any Residential Resource Area or any Rural Settlements Resource Area:

On any day 7:00am to 10:00pm	55 dBA L10
10:00pm to 7:00am the following day	40 dBA L10 70 dBA Lmax

Provided that the above noise limits shall not apply to:

1. any temporary activity (as defined)
2. devices used to protect crops from birds or frost (see (b)-(c) below)
3. sirens associated with emergency service activities.

“Notional boundary” is defined as a line 20 metres from part of any living accommodation or the legal boundary where this is closer to the living accommodation.

### 3.2.3 New Zealand environmental noise standards

Section 12.7.4 (i) of the District Plan requires operational noise to be measured and assessed in accordance with the New Zealand Standards NZS 6801:1991 *Measurement of Sound* and NZS 6802:1991 *Assessment of Environmental Noise*. Our assessment has been undertaken in accordance with these standards.

Section 4.3 of NZS 6802:1991 states that when noise has special audible characteristics, such as tonality or impulsiveness, it is likely to arouse adverse community response at lower levels than noise without such characteristics. Where a noise source is deemed to have special audible characteristics, the relevant performance standard may be reduced by 5 dB.

We do not consider that any noise sources on site will qualify for such an adjustment. Vehicles and plant used in the new expansion area may be fitted with tonal reverse alarms. However, these are very unlikely to be audible at the nearest notional boundaries due to the acoustic screening provided by the cut and earth bund discussed further in this report.

Section 4.5 of NZS 6802:1991 provides provisions for averaging noise over the day to derive a single figure for comparison with the permitted noise limit. Some noise sources on site, such as loading trucks and the feed bin, will be intermittent between 07:00 and 19:00 so averaging has been applied. The use of fixed and mobile plant could potentially be used over the entire day, so no averaging has been applied to these sources. In accordance with NZS 6802:1991, no single sample will exceed the permitted noise limit by more than 5 dB and no averaging has been applied to any noise at night (i.e. between 06:00 and 07:00).

The  $L_{A10}$  metric and the 1991 versions of the NZS 6801 and NZS 6802 standards have largely been outdated in environmental acoustics by the  $L_{Aeq}$  descriptor and the 2008 versions of the standards. The  $L_{Aeq}$  provides a better representation of the average noise level experienced over a given period than the  $L_{A10}$  statistical metric. Our assessment is in terms of the noise standards used in the existing consent and the operative District Plan, but we have recommended conditions and noise limits in terms of the current standards. The  $L_{Aeq}$  and 2008 standards are widely regarded as more appropriate for the measurement and assessment of environmental noise and their adoption is in accordance with best practice. Changing between the standards will not give rise to any additional noise effects.

### 3.3 The Resource Management Act 1991

The overarching requirement for noise from the quarry is compliance with Section 16(1) of the Act, which states:

Every occupier of land (including any premises and any costal marine area), and every person carrying out an activity in, on, or under a water body or the costal marine area, shall adopt the best practicable option to ensure that the emission of noise from that land or water does not exceed a reasonable level.

## 4.0 Construction noise

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The proposed expansion will involve the construction of new earth bunds along the northern boundary of the existing pit and along the western boundary of the new expansion area to screen 1308 Luggate-Cromwell Road.

The use of excavators, trucks and loaders to form the bunds will be similar to the operational noise and will only take place between the hours of 07:30 and 18:00, Monday to Saturday. The construction noise will readily comply with the guideline limits of NZS 6803:1984P without any special mitigation being required. This is due to the distance between the proposed construction works and any dwelling that may be occupied during the works

For example, the construction noise level from a 35 t excavator and a dump truck working in the nearest part of the site to 1308 Luggate-Cromwell Road when constructing the new earth bund will be 66 dB  $L_{A10}$  at 1 m from the façade of the dwelling. This is compliant with the most stringent of the daytime construction noise limits applicable under NZS 6803:1984P. We do not consider any conditions or further assessment of the construction noise is required because the construction noise will readily comply without mitigation.

## 5.0 Operational noise

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Noise level predictions have been prepared using sophisticated noise modelling software. This enables the accurate prediction of noise levels across large areas of land, at multiple receivers and under a wide range of meteorological and operational conditions. The computer noise model is three-dimensional and takes into account physical factors such as topography, buildings, ground coverage and the physical attributes of the sound sources.

We have constructed separate noise models for early morning activity and for general operation between 07:00 and 19:00. The daytime model has been prepared based on the busiest production periods expected where the fixed and mobile plant will be used simultaneously all day between 07:00 and 19:00. We understand that typical busy operation will only involve the crushers running between 08:00 and 18:00. The operational noise models used in our assessment are as follows:

**Model A – 06:00 to 07:00 (also representative of 19:00 to 20:00):**

- i. One loader filling three purchasing trucks on site in an hour.

**Model B – 07:00 to 19:00:**

- i. Operation of the fixed processing plant
- ii. Two mobile crushers operating simultaneously within the existing pit
- iii. Four front end loaders operating within the existing pit, loading crushers and trucks
- iv. One excavator excavating and loading a dump truck in the nearest part of the expanded site to 1308 Luggate-Cromwell Road
- v. One excavator excavating and loading a dump truck in the nearest part of the expanded site to 1286 Luggate-Cromwell Road.
- vi. Twenty purchasing truck movements on site per hour for four peak hours.

Items (iv) and (v) in Model B will not take place simultaneously. They have both been included in the model to provide a conservative worst case scenario for the two nearest noise receivers.

This following parts of this section set out the methodology and results of our operational noise level predictions including the reference noise levels, mitigation measures and model input parameters.

### 5.1 Reference noise levels

Styles Group has visited the existing quarry site to undertake measurements of the existing processing plant and obtain reference noise levels for our modelling. The measurements were performed in accordance with NZS 6801:2008 using a Brüel & Kjær 2250 Type 1 sound level meter. They include octave band data and sound recording. The full set of data,

meteorological conditions and instrument serial numbers and calibration details are available on request.

The reference levels used in our noise modelling are displayed in Table 1. We have included the sound power levels derived from the results of our measurements of the existing plant for completeness and for comparison with future noise levels. The sound power level for the front end loaders is derived from our measurements at other Winstone Aggregates quarries. All sound power levels stated in this report are based on measurements using the  $L_{A10}$  metric for consistency with the District Plan and existing consent conditions. Purchasing trucks accessing the site are included in the model as a line source ( $\text{dB } L_{WA}/\text{m}$ ). All other noise sources are represented in the model by point sources.

**Table 1: Reference sound power levels**

Activity on site	Sound power level
Truck movements based on 20 movements per hour and travelling at 10 – 30 km/hr	78 dB $L_{WA}/\text{m}$
24 t front end loader loading a truck	115 dB $L_{WA}$
35 t excavator	103 dB $L_{WA}$
Excavator loading mobile cone crusher and screen	125 dB $L_{WA}$
Loader loading mobile jaw crusher and screen	125 dB $L_{WA}$
Fixed processing plans, screens and conveyors	117 dB $L_{WA}$
Articulated dump truck loading feed bin	124 dB $L_{WA}$
Articulated dump truck idling on site	106 dB $L_{WA}$

The loudest noise sources on site are the fixed and mobile processing plant and the feed bin for the fixed plant being loaded.

The daytime noise model includes truck movements on the site but not on the public road.

The  $L_{Amax}$  noise level between 06:00 and 07:00 will be set by trucks being loaded. Based on our measurements, the  $L_{Amax}$  will be approximately 10 dB higher than the predicted  $L_{A10}$  at the nearest receiving sites.

## 5.2 Noise mitigation

The proposed operation will include the following mitigation measures:

- Processing using the fixed and mobile plant will only take place between the hours of 07:00 and 19:00, Monday to Saturday



- Earth bunds will be constructed above the northern boundary of the existing pit (2 m – 3 m high above the existing ground level) and above the western boundary of the expanded area (3 m high above the existing ground level) to reduce the noise levels at the notional boundary of 1308 Luggate-Cromwell Road
- Significant mitigation of the noise from the expansion area will be provided by the progression of the excavation works from south to north. Excavation in the expansion area will begin at the south-west corner where the cut will be approximately 7 m. This will continue east towards 1286 Luggate-Cromwell Road and then progress north towards 1308 Luggate-Cromwell Road. All excavation works will therefore be mitigated by the 7 m cut for 1286 Luggate-Cromwell Road and the 7 m cut plus a 3 m high earth bund for 1308 Luggate-Cromwell Road
- Stock piles on site are typically up to 5 m in height and screen some of the operations from the nearest dwellings. The exact height and locations of the stock piles vary depending on operations which makes it difficult (and unreliable) to accurately represent them in a noise model. We have not included this screening in our modelling to allow for a worst case scenario to be assessed. It should be noted though that the noise levels at the nearest sites will at times be further reduced by the screening from stock piles by approximately 5 to 10 dB.

### 5.3 Noise model parameters

We have used Brüel & Kjær Predictor computer noise modelling software to prepare noise level predictions, based on the International Standard ISO 9613-1/2. The noise level predictions assume meteorological conditions that slightly enhance propagation in all directions. The Brüel & Kjær Predictor software is globally recognised and has been successfully implemented on a large number of projects throughout New Zealand.

Terrain contours, land parcels and building footprints for the model were acquired from online geospatial data services and confirmed during our site visit. The topographical contours encompass the entire site and the surrounding land. We have ensured the integrity of the noise model by careful scrutiny of the final three-dimensional model.

We have used point receivers in the model to determine the noise level at the notional boundaries and for calibrating the model. These are independent of the noise contour grid and provide precise predictions. The noise model outputs have been verified by manual calculations during our internal review process.

The input parameters for the noise model are set out in Table 2.

**Table 2: Noise model input parameters**

Parameters/calculation settings	Details
Software	Brüel & Kjær Predictor V2020
Calculation method	ISO 9613.1/2
Meteorological parameters	Single value, C0 = 0
Ground attenuation over land	General method. Ground factor: 0.8 (grass, vineyards, farm land) Ground region inserted over quarry site: 0.3 (mixture of excavated land, stock piles and truck access)
Air temperature	293.15K
Atmospheric pressure	101.33kPa
Air humidity	60%
Receiver heights (relative)	1.5 m above local ground level
Source heights (relative)	Front end loaders: 1.5 m Trucks: 1.5 m Excavator: 1.5 m Mobile crushers: 2.0 m Fixed plant: 2.0 m

## 5.4 Operational noise level predictions

The predicted noise levels for the 06:00 – 07:00 and 07:00 – 19:00 periods are displayed in Table 3 overleaf. All predicted noise levels are at the notional boundaries of the nearest receiving sites in accordance with the District Plan and the existing consent requirements.

Activity on site from 19:00 – 20:00 will be similar to activity from 06:00 – 07:00 (no processing, loading up to three trucks and staff arrival / departure). However, the District Plan permitted noise limit in the evening is much less stringent and will be complied with by a considerable margin.

All sites not listed in Table 3 are separated from the proposed activity by a much greater distance. The noise rating levels at the more distant sites will be lower and will readily comply with the District Plan permitted noise limits.

**Table 3: Operational noise level predictions with expansion area**

Receiving site	Time period	Predicted noise level (dB L <sub>A10</sub> )	District Plan Permitted noise limit (dB L <sub>A10</sub> )	Resource consent noise limit (dB L <sub>A10</sub> )
1308 Luggate-Cromwell Rd	06:00 – 07:00	44 dB	40 dB	45 dB
	07:00 – 19:00	53 dB	55 dB	55 dB
1289 Luggate-Cromwell Rd	06:00 – 07:00	38 dB	40 dB	45 dB
	07:00 – 19:00	51 dB	55 dB	55 dB

The calculated noise levels, based on site and equipment specific measurements, demonstrate that the proposed operation of the expanded quarry will comply with the noise limits that are already consented at the nearest potentially affected sites.

Based on our measurements, the L<sub>Amax</sub> noise levels between 06:00 and 07:00 will be approximately 10 decibels higher than the L<sub>A10</sub> noise levels. The predicted levels therefore range from approximately 48 dB to 54 dB L<sub>Amax</sub>. The noise in the early morning will comply with the District Plan permitted noise limit of 70 dB L<sub>Amax</sub> by a considerable margin due to the separation distance and the screening provided by earth bunds.

## 6.0 Assessment of noise effects

It is our opinion that the noise emissions from the expanded operation of the quarry, including the proposed mitigation measures, will be reasonable in terms of section 16 of the Act. We have considered the potential effects of the noise from proposal in the context of the District Plan permitted noise limits and the noise levels already authorised by the existing consent that form part of the existing environment.

The District Plan permitted noise limits are 40 dB L<sub>A10</sub> and 70 dB L<sub>Amax</sub> between 06:00 and 07:00 and 55 dB L<sub>A10</sub> between 07:00 and 22:00. The noise limits during the night time period under the existing consent for the quarry are slightly less stringent at 45 dB L<sub>A10</sub> and 75 dB L<sub>Amax</sub>. These limits all apply at the notional boundary of any neighbouring dwelling when measured in accordance with NZS 6802:1991.

The District Plan permitted noise limits for the Rural Zone will be complied with except for a predicted 4 dB infringement at 1308 Luggate-Cromwell Road between 06:00 and 07:00, Monday to Saturday. However, an infringement of up to 5 dB at all receivers is presently enabled by the existing land use consent, for which we understand there is no expiry date. The predicted noise levels for the proposed operation are fully compliant with the consented noise limits for the existing activity.

The noise levels have been predicted based on a worst case scenario when excavation is nearest to each receiver in the new expansion area. The noise will be further mitigated at times by screening from stock piles of up to approximately 5 m in height. Significant

screening is provided by the 7 m cut that will be formed during the excavation process. New earth bunds will also be constructed before excavation works start in the expansion area to reduce the noise levels for 1308 Luggate-Cromwell Road. The construction noise from the formation of the earth bunds will readily comply with the permitted construction noise limits at the nearest occupied dwellings.

The noise levels generated by the proposed expansion area will be no greater than what is currently enabled by the existing consent. This is due to the physical mitigation (earth bunds and 7 m cut) proposed as part of the application.

## 7.0 Recommended conditions of consent

We recommend the following conditions of consent are imposed. These are in addition to the standard condition requiring compliance with the application documents as lodged (including this report):

1. Before excavation of the expansion area begins, the consent holder must construct earth bunds above the northern boundary of the existing pit and above the western boundary of the expansion area. The heights, specifications and locations of the constructed bunds must be in accordance with the application site plans and the acoustic assessment lodged with the application (prepared by Styles Group dated 1 July 2020)
2. Processing plant must not be operated on site outside the hours of 07:00 to 19:00, Monday to Saturday
3. The noise from the operation of the quarry must comply with the following noise limits at the notional boundary of any site when measured in accordance with NZS 6801:2008 *Acoustics – Measurement of environmental sound* and assessed in accordance with NZS 6802:2008 *Acoustics – Environmental noise*.

Day	Time period	Noise limit
Monday to Saturday	07:00 to 19:00	55 dB L <sub>Aeq</sub>
	At all other times	45 dB L <sub>Aeq</sub> and 75 dB L <sub>Amax</sub>
Sundays and public holidays	At all times	45 dB L <sub>Aeq</sub> and 75 dB L <sub>Amax</sub>

## 8.0 Conclusion

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Styles Group has prepared an assessment of the proposed expansion of the Amisfield Quarry at 1248 Luggate-Cromwell Road. We have prepared noise level predictions for the construction and operational stages using computer noise modelling software. Our noise modelling is based on site, plant and activity specific noise measurements.

It is our opinion that the noise emissions from the expanded operation of the quarry, including the proposed mitigation measures, will be reasonable in terms of section 16 of the Act. We have considered the potential noise effects of the proposal in the context of the noise levels already authorised by the existing consent that form part of the existing environment.

The District Plan permitted noise limits for the Rural Zone will be complied with at all times except for a predicted 4 dB infringement at 1308 Luggate-Cromwell Road between 06:00 and 07:00, Monday to Saturday. However, an infringement of up to 5 dB at all surrounding receivers is presently enabled by the existing consent. The predicted noise levels from the proposed operation are therefore within what is anticipated and provided for by the existing resource consent.

The proposed operation of the quarry compared with the conditions for the existing operation does not involve any additional hours of noise or any greater noise levels. The potential noise effects of the proposal are therefore no greater than what has already been considered reasonable and enabled by the existing resource consent.

We have recommended conditions of consent for the expanded operation based on our findings.

## Appendix A Glossary of terms

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<b>Noise</b>	<p>A sound which serves little or no purpose for the exposed persons and is commonly described as 'unwanted sound'.</p> <p>The definition of noise includes vibration under the Resource Management Act.</p>
<b>dB (decibel)</b>	<p>The basic measurement unit of sound. The logarithmic unit used to describe the ratio between the measured sound pressure level and a reference level of 20 micropascals (0 dB).</p>
<b>A-weighting</b>	<p>A frequency filter applied to the full audio range (20 Hz to 20 kHz) to approximate the response of the human ear at lower sound pressure levels.</p>
<b>L<sub>Aeq(t)</sub> (dB)</b>	<p>The A-weighted equivalent sound pressure level with the same energy content as the measured varying acoustic signal over a sample period (t). The preferred metric for sound levels that vary over time because it takes into account the total sound energy over the time period of interest.</p>
<b>L<sub>A10</sub> (dB)</b>	<p>A statistical noise descriptor. The A-weighted sound level which is just exceeded for 10% of the measurement period (t). Sometimes referred to as the average maximum noise level. This metric has largely been outdated by the L<sub>Aeq</sub> descriptor for the measurement and assessment of construction and environmental noise sources.</p>
<b>L<sub>Amax</sub> (dB)</b>	<p>The maximum A-weighted sound pressure level recorded during the measurement period using a fast time-weighting response.</p>
<b>L<sub>WA</sub> (dB)</b>	<p>Sound power level (LWA) is the acoustical energy emitted by a sound source. It is an absolute value and is not affected by distance or the environment. The LWA is used in computer noise modelling to calculate the sound pressure level (e.g. L<sub>Aeq</sub>) at a given distance.</p>
<b>ISO 9613-1/2</b>	<p>International Standard ISO9613-1/2 Attenuation of sound during propagation outdoors</p>
<b>Notional Boundary</b>	<p>A line 20 m from any side of a building containing an activity sensitive to noise, or the legal boundary where this is closer to the building</p>



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# **Assessment of the effects of increased water take at Amisfield Quarry**

Prepared for Cromwell Certified Concrete

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## QUALITY INFORMATION

**Reference:** L:\19474 - Cromwell Certified Concrete Limited - Permit applications for expansion of the Amisfield Quarry\Docs\Technical\Groundwater abstraction\181020 19474 Amisfield Water take summary report final.docx

**Date:** 19 October 2020

**Prepared by:** **Mike Freeman**

**Reviewed by:** **Matt Cullen & Tim Muller**

**Client Review:** **Tyler Sharratt**

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# 1. INTRODUCTION

## 1.1 Background

Landpro Ltd (Landpro) has been engaged by Cromwell Certified Concrete to carry out a technical assessment of the proposed increase in the take and use of water for a proposed increase in quarrying activities at the Amisfield Quarry approximately 12 km northeast of Cromwell. The current take and use of water at the quarry are authorised under Otago Regional Council (ORC) water permit RM16.108.01 which provides for a maximum take of 46 L/s from two bores (G41/0127 and G41/0456) for gravel washing and dust suppression. A copy of that water permit is attached as Appendix A.

The purpose of this report is to provide a brief assessment of the effects of the proposed additional water take.

The site location is shown below illustrating the two existing bores on-site and the locations of bores in the immediate area. Bore G41/0101 (Southern boundary) is on the ORC records but was never drilled. ORC has been requested to remove the bore from its database or update the information.



**Figure 1 Location diagram showing location of two current abstraction bores on the property**

The proposed increase in quarrying will result in a need to increase the total amount of water taken to a maximum instantaneous take of 70 L/s with a maximum daily take of 3,024 m<sup>3</sup>/day (i.e., 70 L/s for up to 12 hrs per day, equivalent to a daily average of 35 L/s) and an annual maximum take of 846,720 m<sup>3</sup> (i.e., up to 280 days per year). The water would be used for gravel washing, dust suppression and irrigation of landscaping.

**Table 1 current and proposed groundwater take limits**

	Current water take limits	Proposed water take limits
Instantaneous rate (L/s)	46	70
Daily rate (m <sup>3</sup> /day)	1620	3,024
Monthly rate (m <sup>3</sup> /month)	50,220	93,744
Annual rate (m <sup>3</sup> /year)	453600	846,720

## 2. Initial hydrogeological modelling

The existing water abstraction(s) was assessed in some detail as part of the current water permit application in 2016 and assessed against the relevant Regional Plan: Water for Otago (RWP) guidance. The key groundwater resource effects are stream depletion, bore interference and aquifer allocation.

To avoid repetition, a copy of the Section 42A report on the 2016 application is attached as Appendix B. The information in that report is considered to be an accurate description of the hydrogeological situation. The only change in the location settings is the new adjacent bore.

### 2.1 Potential adverse effects of the proposed take on the Amisfield Burn

At the time of the assessment in 2016, stream depletion and aquifer allocation effects were considered to be insignificant. That situation will not change as a consequence of the proposed increase in abstraction. The evidence that the vertical distance between the Amisfield Burn and the underlying groundwater surface is approximately 20 metres has not changed. Therefore, this means that it is virtually certain that there is no connection between the underlying groundwater and the Amisfield Burn.

### 2.2 Potential adverse effects of increasing the take from existing bores

The bore interference effects (0.19 m drawdown) for the original applications were considered to be just below the "significant interference" drawdown threshold of 0.2 m identified via RWP Policy 6.4.10B, Schedule 5B.

Since the application was assessed in 2016 an additional bore (G41/0238) has been installed on a property immediately to the north of the quarry (owned by Manukau Fifty Ltd, which is owned by Kevin & Sara

Joyce). This bore is closer (230 metres) to G41/0456 than either of the neighbouring bores to the north-west of the property. These bores and their approximate distances are illustrated below.



**Figure 2 Location map showing distances from neighbouring bores**

The effects on groundwater at the three closest bores have been assessed using two approaches.

Firstly, using the approach accepted in 2016, that because the water is used on-site and the majority of that water will recharge groundwater, based on this approximately 30% (actually 37%) of the daily take is used to estimate drawdown. It is possible that this assumption may underestimate the effect (for both the original modelling and this modelling). However, a significant counter to that will be the highly likely influence of the lake to recharge groundwater through the permeable aquifer.

Secondly, a worst-case scenario is assessed that assumes all the water taken has a full drawdown effect.

The estimated drawdown effects using aquifer characteristics previously accepted as representative by ORC are outlined below together with applying the same approach to the proposed take and as a worst possible case scenario comparison is also made on the basis that no water would be returned to the aquifer. The worst possible scenario is virtually certain to not be possible given the proximity of the lake but is included as an illustration.

These scenarios also assume that the full amount would be taken from one bore only and that bore is the closest to the neighbouring bore. The results are outlined below, and the detailed data is included in Appendix C.

**Table 2 Modelled bore interference drawdown effects**

<b>Bores</b>	<b>Current water permit @600 m<sup>3</sup>/day =6.9 L/s for 360 days</b>	<b>Proposed water permit @1,119 m<sup>3</sup>/day =13 L/s for 280 days</b>	<b>Worst possible scenario @ 3,024 m<sup>3</sup>/day = 35 L/s for 280 days</b>
G41/0238 (230 m)	0.22 m	0.40 m	1.1 m
G41/0321 (320 m) G41/0220 (320 m)	0.19 m	0.34 m	0.92 m

These assessments indicate that the groundwater drawdown associated with the proposed increased abstraction would exceed the ORC criteria of significance (0.2 m). However, it is important to appreciate that the RPW definition of significance does not indicate what the potential adverse effects would be for individual situations. An assessment of the potential effects needs to take account of the available groundwater drawdown and the location-specific characteristics.

Bore logs and available information in this area have been assessed using the ORC GIS system and compared against the normal criteria considered when assessing the effects of drawdown<sup>1</sup>. This is summarised in the following table.

<b>Drawdown interference criteria</b>	<b>Assessment</b>
<ul style="list-style-type: none"> <li>The available drawdown, i.e., what depth of groundwater is available</li> </ul>	The depth to groundwater in this area is usually 22 to 24 m deep with bores drilled to 35 to 45 m depth. Therefore, there is usually at least a 10 m 'thickness' of groundwater available.
<ul style="list-style-type: none"> <li>Seasonal groundwater level fluctuations</li> </ul>	There is limited information on groundwater level changes. However, anecdotal information (Smiths Way monitoring bore) and information from aquifer tests strongly indicate that groundwater levels do not change by more than one metre during a year. The level of nearby (controlled) Lake Dunstan varies by about 1 m during the year.
<ul style="list-style-type: none"> <li>Depth of neighbouring bores</li> </ul>	Bore depths are between 33 – 44 m deep below the natural ground surface.
<ul style="list-style-type: none"> <li>Depth of screen and pumps</li> </ul>	Screens and pumps are in the bottom three metres of bores.
<ul style="list-style-type: none"> <li>Self-induced drawdown</li> </ul>	There is limited information available, but aquifer test information indicates that this is likely to be relatively small.
<ul style="list-style-type: none"> <li>Other factors that might affect assumptions inherent in Theis<sup>2</sup> modelling</li> </ul>	Proximity to the lake, about 800 m, means that drawdown will be lessened by water moving in from the lake.

<sup>1</sup> Freeze R & Cherry J (1979) Groundwater, 604 pages, Prentice-Hall.

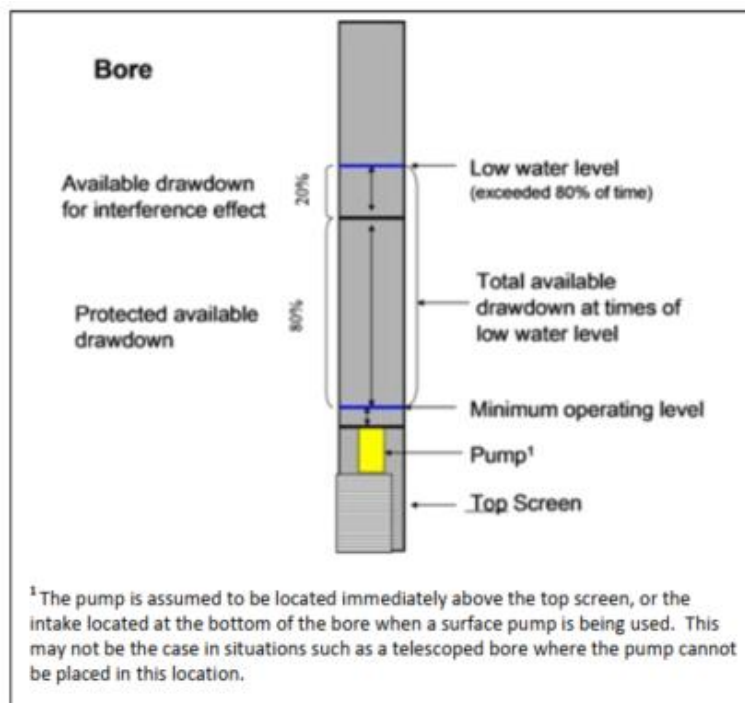
<sup>2</sup> The Theis solution was developed in the 1930s and is used to model the drawdown of groundwater in response to pumping

This summary indicates that using the same methodology as that used in 2016 the maximum bore interference effect would be 0.4 m drawdown for bore G41/0238. This should be compared against the available groundwater depth, i.e., a reduction of approximately 4%. Another way of describing this would be that instead of 10 m depth of groundwater available there could be 9.6 m.

The natural variability of groundwater levels at this location is likely to be approximately 0.5 – 0.7 m, based on the reported levels of groundwater variability in the nearby Cromwell Terrace Aquifer<sup>3</sup> and the variability of the level of Lake Dunstan<sup>4</sup>.

Even at an extreme (virtually certain to not occur) worst-case scenario, the maximum drawdown would still only be 1.1m or 11% reduction in the available drawdown.

As a comparison, in Canterbury where there has been considerable investment in developing guidelines for determining acceptable bore interference effects, a concept has been developed that identifies the “protected available drawdown”. This provides protection for groundwater users of 80% of the groundwater level that is exceeded for 80% of the time during proposed water use. This is illustrated below. Or, put another way, an acceptable drawdown of 20% of the groundwater level that is available for 80% of the time. The same approach to a definition of acceptable adverse interference effects is used in the Proposed Southland Water and Land Plan (Appendix L.3 Interference effects).



**Figure 3 Copy of a representation of ‘protected available groundwater’. From Schedule 12 of the**

<sup>3</sup> Rekker J (2012) Cromwell Terrace Aquifer Study, ORC report, October 2012

<sup>4</sup> <https://www.orc.govt.nz/managing-our-environment/water/water-monitoring-and-alerts/upper-clutha/lake-dunstan-at-cromwell>

## Canterbury Land and Water Regional Plan

Compared to this established criterion a groundwater drawdown of 4% would be an acceptable negligible adverse effect and would not be noticeable by the neighbouring groundwater users in the context of natural groundwater level variability.

The Otago Regional Plan Water for Otago (RPW) identifies guidance (Schedule 5B) on notification identifies 0.2 m as a reference point. The Schedule 5B is not incorporated into a policy or rule and does not appear to have been reviewed since its incorporation into the RPW in 2004. This approach does not recognise the depth of the underlying unconfined groundwater, is not consistent with more recent approaches taken in many other regions and we do not consider it to be a robust approach.

### 2.3 Potential cumulative adverse effects and allocation

The Pisa Groundwater Management Zone is still considered by the ORC to be significantly under-allocated with (at July 2020) 2,135,128 m<sup>3</sup>/yr available for allocation out of a total of 6,500,000 m<sup>3</sup>/yr (ORC GIS).

This means that there would be no cumulative adverse effects that would arise from the proposed increase in take and use of water.

## 3. Conclusions

Conservative modelling of the effects of the proposed increased abstraction has been undertaken and the only potential adverse effects that could plausibly occur are on neighbouring bore groundwater levels. Using the generally accepted method of modelling, the adverse effects on neighbouring groundwater users would be negligible at a 4% maximum reduction in groundwater levels. This is significantly less than the generally used acceptable threshold of a 20% reduction in available drawdown. A 4% reduction in the context of existing natural variability means that this effect is insignificant.

## Appendix A Copy of current water permit RM16.108.01

Our Reference: A919731

Consent No. RM16.108.01

### WATER PERMIT

Pursuant to Section 104C of the Resource Management Act 1991, the Otago Regional Council grants consent to:

Name: Cromwell Certified Concrete Limited

Address: Wright Stephenson House, 585 Great South Road, Penrose, Auckland

To take and use ground water

for the purpose of gravel washing and dust suppression

For a term expiring 21 July 2036

Location of Point of Abstraction: Cromwell, approximately 360 metres east northeast of the intersection of Luggate-Cromwell Road (State Highway 6) and Amisfield Road

Cromwell, approximately 500 metres east northeast of the intersection of Luggate-Cromwell Road (State Highway 6) and Amisfield Road

Legal Description of land at point of abstraction: Lot 8 DP 301379

Legal Description of land (s) where water is to be used: Lot 8 DP 301379 and other land as advised in writing to the Consent Authority

Map Reference at point of abstraction: NZTM 2000 E1305397 N5017068

NZTM 2000 E1305502 N5017223

#### Conditions

#### Specific

1. This permit shall not commence until Water Permit 2004.294.V1 has been surrendered or expired.





2. If this consent is not given effect to within a period of two years from the date of commencement of this consent, this consent shall lapse under section 125 of the Resource Management Act 1991.
3.
  - (a) The rate of abstraction shall not exceed 15 litres per second from bore G41/0127 and 31 litres per second from bore G41/0456;
  - (b) 1,620 cubic metres per day;
  - (c) 50,220 cubic metres per month;
  - (d) 453,600 cubic metres per year.
4. This permit shall be exercised in conjunction with Discharge Permit RM16.108.02.
5. This permit shall be exercised or suspended in accordance with any Council approved rationing regime that applies to the Pisa Groundwater Management Zone.

#### **Performance Monitoring**

6.
  - (a) The consent holder shall install a water meter to record the water take, within an error accuracy range of +/- 5% over the meter's nominal flow range, and a telemetry compatible datalogger with at least 24 months data storage and a telemetry unit to record the rate and volume of take, and the date and time this water was taken.
  - (b) The datalogger shall record the date, time and flow in litres per second.
  - (c) Data shall be provided once daily to the Consent Authority by means of telemetry. The consent holder shall ensure data compatibility with the Consent Authority's time-series database.
  - (d) The water meter shall be installed in a straight length of pipe, before any diversion of water occurs. The straight length of pipe shall be part of the pump outlet plumbing, easily accessible, have no fittings and obstructions in it. There shall be a straight length of pipe on either side of the water meter: on the upstream side there shall be a distance that is 10 times the diameter of the pipe and on the downstream side there shall be a distance of 5 times the diameter of the pipe.
  - (e) The consent holder shall ensure the full operation of the water meter, datalogger and telemetry unit at all times during the exercise of this consent. All malfunctions of the water meter and/or datalogger and/or telemetry unit during the exercise of this consent shall be reported to the Consent Authority within 5 working days of observation and appropriate repairs shall be performed within 5 working days. Once the malfunction has been remedied, a Water Measuring Device Verification Form completed with photographic evidence must be submitted to the Consent Authority within 5 working days of the completion of repairs.
  - (f) The installation of the water meter, datalogger and telemetry unit shall be

completed to full and accurate operation within 1 month of the exercise of the consent. The consent holder shall forward a copy of the installation certificate to the Consent Authority within one month of installing the water meter datalogger and telemetry unit.

- (g) (i) If a mechanical insert water meter is installed it shall be verified for accuracy each and every year from the first exercise of this consent.
- (ii) Any electromagnetic or ultrasonic flow meter shall be verified for accuracy every five years from the first exercise of this consent.
- (iii) Each verification shall be undertaken by a Consent Authority approved operator and a Water Measuring Device Verification Form shall be completed and submitted to the Consent Authority with receipts of service within 5 working days of the verification being performed, and at any time upon request.

### **General**

7. The consent holder shall take all practicable steps to ensure that:
  - (a) there is no leakage from pipes and structures;
  - (b) there is no run off of irrigation water either on site or off site.
  - (c) a back flow preventer device is fitted to prevent any contaminants from being drawn into the source of the water.
  
8. The Consent Authority may, in accordance with Sections 128 and 129 of the Resource Management Act 1991, serve notice on the consent holder of its intention to review the conditions of this consent for the purpose of imposing aquifer restriction levels, if and when an operative regional plan sets aquifer restriction levels.
  
9. The Consent Authority may, in accordance with Sections 128 and 129 of the Resource Management Act 1991, serve notice on the consent holder of its intention to review the conditions of this consent within 3 months of each anniversary of the commencement of this consent for the purpose of:
  - (a) adjusting the consented rate or volume of water under condition 3, should monitoring under condition 5 or future changes in water use indicate that the consented rate or volume is not able to be fully utilised; or
  - (b) determining whether the conditions of this consent are adequate to deal with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage; or
  - (c) ensuring the conditions of this consent are consistent with any National Environmental Standards Regulations, relevant plans and/or the Otago Regional Policy Statement; or;
  - (d) adjusting or altering the method of water take data recording and transmission.
  
10. Copies of the results of any water quality analyses performed on the groundwater shall be forwarded to the Consent Authority within two weeks of the analysis being undertaken.



### **Notes to Consent Holder**

1. *If you require a replacement permit upon the expiry date of this permit, any new application should be lodged at least 6 months prior to the expiry date of this permit. Applying at least 6 months before the expiry date may enable you to continue to exercise this permit until a decision is made, and any appeals are resolved, on the replacement application.*
  
2. *The water meter, datalogger and telemetry unit should be safely accessible by the Consent Authority and its contractors at all times.*

Issued at Dunedin this 20<sup>th</sup> day of July 2016.

Christopher P. Shaw  
**Manager Consents**



## Appendix B Copy of the original Section 42A report

### ORC STAFF RECOMMENDING REPORT

File No: A915744  
Application No: RM16.108.01-02  
Report No: 2016/0921  
Prepared for: Staff Consents Panel  
Prepared by: Ralph Henderson – Senior Consents Officer  
Date: 20/07/2016

**Subject:** Application Numbers RM16.108.01 and RM16.108.02  
Application by Cromwell Certified Concrete Limited for a Water Permit (RM16.108.01) to take groundwater and for a Discharge Permit (RM16.108.02) to discharge water to land for the purpose of gravel washing.

#### 1. Purpose

To report and make recommendations on the determination of the above application under the non-notified provisions (Section 95A) of the Resource Management Act 1991 (the Act).

#### 2. Background Information

**Applicant:** Cromwell Certified Concrete Limited

**Activities:** Water Permit Application RM16.108.01: to take groundwater  
Discharge Permit Application RM16.108.01: - to discharge water used to wash gravel to land

**Location:** Between State Highway 6 and Lake Dunstan, approximately 15 kilometres north of Cromwell, Central Otago.

**Reason:** To undertake gravel washing at an aggregate quarry

#### 2.1 Description of the Proposed Activity

The applicant, Cromwell Certified Concrete Limited (CCCL) currently operates a quarry on the subject site (Figure 1 below) that extracts aggregate for use in construction.

Due to the growth in construction in the Central Otago and Lakes Districts the quarry can no longer meet demand based on the current water take. CCCL obtained consent for an additional bore (RM15.243.01) in 2015 to access additional water capacity to enable increased production and to enable operation in a different part of the quarry. The current proposal is to increase the water take from the Pisa Groundwater Management Zone to enable operations to expand and to discharge water to land after use.

CCCL operate under consents to take groundwater for the purpose of aggregate washing, dampening aggregate prior to crushing, dust suppression, irrigation of landscaping and to supply potable water to staff facilities (2004.294.V1); and discharge water to land for the purpose of disposing water used for aggregate washing and dampening aggregate prior to crushing (2004.295).



Water Permit 2004.294.V1 and Discharge Permit 2004.295 are due to expire on 31 August 2018.

The current proposal is to renew Water Permit 2004.294.V1 to take up to 15 Litres/second (L/s) from bore G41/0127 and to seek consent to take an additional 31 L/s from bore G41/0455 (recently consented by RM15.243.01). The combined take will be up to 46 L/s. This equates to a maximum daily take of 1,620 cubic metres / day ( $m^3/d$ ) and an annual take of 453,600  $m^3/d$ . The quarry operates for 280 days a year. The applicant has expressed some uncertainty regarding the volume of water that will be needed operationally and this will to some extent be determined once the larger water take becomes operation.



Figure 1: Subject site

CCCL seek a discharge permit for a similar volume of water to the proposed water take. The applicant considers the water take to be largely non-consumptive as the water is returned to the aquifer through the quarry pond. The discharge water is contaminated with the sediment washed from the gravel mine on site. No other contaminants are proposed to be discharged. As this material is natural to that found on the subject site the applicant considers the effects of this discharge will be minimal. Fine sediments will settle out in the soakage pond and the water is filtered by the sediments between the bottom of the mine pond and the groundwater.

The existing Water Permit was granted in 2004 (2004.294.V1) and expires in 2018. The applicant has requested a maximum term of 35 years.



## 2.2 Description of the Environment

The subject site is located in an area known as Mount Pisa approximately 12 km north of Cromwell.

The surrounding area is generally used for extensive farming. The property is on the lower slopes of terraces dropping down from the Lowburn Face of the Pisa Range in the west.

The nearest surface water body is a tributary of the Amisfield Burn which has been diverted around the subject site, and the main branch of the Amisfield Burn which is located immediately to the south of the site. Lake Dunstan is approximately 800m to the east of the applicants bores. The site overlies the Pisa Groundwater Management Zone.

The water will be entirely used on the land owned by the applicant. The location of point of take, discharge and use are shown on Figure 2 below.



**Figure 2: Location of the point of take and irrigation areas**

The applicant has stated that Bore G41/0127 will be retired once Bore 41/0455 is fully established as the older bore is no longer functioning fully as there is the need to excavate gravel in the area of the new bore. However at the time of processing the applicant is still seeking the ability to actively use both takes, and as no firm period has been established around when such a reduction may occur, the assessment has been undertaken on the basis that both takes may be drawn upon fully.

**2.2.1 Groundwater**

The proposed take is from Bores G41/0127 and G41/0455 (constructed under Land Use consents 94388 and RM15.243.01 respectively). Both bores were constructed with a 2.5 millimetre (mm) stainless steel screen.

Both bores are located within the area of excavation of the quarry and are located approximately 190m apart. The bores are approximately 25-30m deep and are screened within gravel or sandy gravel strata. Static water levels have been recorded at around 13.8 m and 7.1 m below ground level for the two bores, indicating that the piezometric surface lies within the gravel or sandy gravel strata. This information suggests that the aquifer targeted by the Applicant's bores is likely to be unconfined.



Note, as the bores are located within areas of excavation the depth to groundwater does not equate to the depth below ground level (bgl).

Bore	Depth (m)	Screened Interval (m bgl) <sub>1</sub>	Screened Lithology	Depth to Groundwater (m bgl) <sub>1</sub>
G41/0127	26	22.9 – 25.9	Sandy Gravel	13.8
G41/0455	28.8	25.9 – 28.9	Gravel	7.1

The bores are constructed in the Pisa Groundwater Management Zone which is currently identified as under-allocated. The Pisa Groundwater Management Zone has been estimated as having a mean annual recharge of 6.5 Million m<sup>3</sup>. It is currently estimated that there is 2.9 Mm<sup>3</sup>/annum available in this aquifer. Lake Dunstan is located approximately 800m to the east of the applicants bores.

An eight hour constant rate test was completed on G41/0455 following drilling in 2015. During the test, groundwater was pumped from the Applicant's bore at a rate of approximately 2,203 m<sup>3</sup>/day (25 L/s). Water levels were monitored in the Applicant's bore throughout the test. A one hour recovery test was completed following the constant rate test. Drawdown stabilised at 2.2 m after around 5.5 hours of pumping, and remained at this level throughout the remainder of the test. One minute into the recovery test, drawdown in the pumped bore recovered to within 4 cm of the starting static water level.

The application has been assessed by Pattle Delamore Partners Limited (PDP) on behalf of Council's Resource Science Unit (RSU). The maximum daily rate of take sought by the applicant is 1,620m<sup>3</sup>/day. PDP have conservatively estimated that 30% (approximately 600m<sup>3</sup>/day) of the take abstracted and through consumptive uses is not returned to the aquifer. The remaining 70% (approximately 1000 m<sup>3</sup>/day) is returned to the aquifer.

PDP have assessed the data and calculated transmissivity values of 1,200 m<sup>2</sup>/day and 1,100 m<sup>2</sup>/day using the Logan formula and Theis Recovery methods respectively. Such transmissivities are consistent with the gravel strata encountered. The latter transmissivity value has been utilised in this assessment.

Data from ORC indicates that there are 54 bores within a 3 km radius of the Applicant's bores that are not owned by the Applicant. The closest bores of similar depth are G41/0220 and G41/0321, which are around 300 m away. Table 2 summarises the distance of these bores from the Applicant's bores and construction details. Both of these neighbouring bores are located west of the Applicant's quarry.

Bore	Depth (m)	Screened Interval (m bgl)	Depth to Groundwater (m bgl)	Distance from G41/0127 (m)	Distance from New G41/0455 (m)	Calculated Drawdown (m)
G41/0220	36.6	33.5 – 36.6	22.2	319	356	0.19
G41/0321	31.8	29 – 31.8	20.7	338	316	0.19



Potential effects on nearby bores of a similar depth have been conservatively estimated using the Theis solution and principle of superposition, with parameter values used in

accordance with Schedule 5B of the Regional Plan: Water for Otago. Based on a transmissivity of 1,100 m<sup>2</sup>/day and a storativity of 0.1 (typical of an unconfined aquifer), after 360 days pumping at 600 m<sup>3</sup>/day (assumed 300 m<sup>3</sup>/day from each bore), drawdown in each of the closest bores of similar depth will likely be around 0.19 m. This effect is a conservative estimate because Amisfield Burn and Lake Dunstan will act as recharge boundaries, buffering any drawdown effects.

Policy 6.4.10B and Schedule 5B of the Regional Plan: Water for Otago state that an acceptable magnitude of drawdown interference is less than 0.2 m for an unconfined aquifer. The above calculation shows that drawdown in the closest bores (0.19 m) is less than that the 0.2 m which constitutes significant interference as detailed in Policy 6.4.10B. Effects on nearby bores are therefore expected to be less than minor.

### 2.2.2 Schedule 3 of the Regional Plan: Water

Schedule 3 of the RPW identifies the uses of groundwater from particular aquifers in Otago, and the location of some groundwater takes for the purpose of community supply. The Pisa Groundwater Management Zone is not identified as having any values and no Water Supplies are sourced from this aquifer.



Figure 3: Aerial photo of quarry workings and existing bores

### 2.2.3 Surface Water

The most significant surface water body near to the site is Lake Dunstan, which lies 800 m to the east. The main stem of the Amisfield Burn lies 130 m south-west of G41/0127 and 315 m south-west of G41/0455. As noted in Section 2.1 of this report a tributary of the Amisfield Burn was diverted when the quarry was originally set up, and flows approximately 50m from G41/0127 and approximately 200m from G41/0455.

Stream depletion at the Amisfield Burn to the south of the Applicant's bore were calculated using the Jenkins equation, as stipulated in Schedule 5A of the Regional Plan: Water for Otago. PDP observed that using the Jenkins solution, and the mean annual abstraction rate of 460 m<sup>3</sup>/day, stream depletion after 365 days pumping is approximately 100 % (6.9 L/s). A pumping test has been conducted on the Applicant's bore and flattening of the drawdown curve was observed 5.5 hours into the test. PDP consider that this could be caused by leakage from overlying surface water bodies. This could be sourced from the Amisfield Burn, the soakage ponds, Lake Dunstan or a combination of the three.





Such stream depletion effects mean this abstraction should be treated as a part surface water take and part groundwater take in terms of allocation in accordance with Policy 6.4.1A of the Regional Plan: Water for Otago, and as such a depletion effect of over 5L/s is considered potentially more than minor.

However, Schedule 5A of the Otago Regional Water Plan states that stream depletion is unlikely if the stream is separated from the underlying water table by an unsaturated zone that could decouple the interaction between surface water and groundwater.

In the vicinity of the Applicant's proposed abstraction, depths to groundwater in neighbouring bores appear to be around 20 m. Amisfield Burn is not deeply incised, and this information suggests that the stream is decoupled from the groundwater system.

Whilst there could be a stream depletion effect on the Amisfield Burn, based on the available information and reduction in the length of pumping period (and annual volume) we consider this will be < 5 L/s, it can therefore be concluded that effects on surface water bodies are less than minor.

Groundwater levels in bores adjacent to the lake are much closer to the surface (3.5 m at G41/0340) suggesting that the aquifer and Lake Dunstan are well connected. The calculated depletion effect (if real) is perhaps most likely to be predominantly sourced from Lake Dunstan. The applicant has observed rises and falls in level of the mine pit pond correspond to rises and falls in the level of Lake Dunstan.

As noted in Policy 6.4.1 of the Regional Plan: Water for Otago, allocation quantities and minimum flows do not apply to water takes from Lake Dunstan and as such it is considered that overall the effect of this surface water depletion will be no more than minor.

#### **2.2.4 Schedule 1 of the Regional Plan: Water**

Schedule 1A of the Regional Plan: Water for Otago (RPW) outlines the natural and human use values of Otago's surface water bodies. The Amisfield Burn is identified as having the following values:

- Absence of aquatic pest plants identified in the Pest Plant Management Strategy for the Otago Region.
- Presence of a significant habitat for koaro

Schedule 1AA identifies Otago resident native freshwater fish and their threat status. The Amisfield Burn is known to provide habitat for Koaro, which is within this schedule and is identified as having a threat status of 'Declining'.

Schedule 1B of the RPW identifies water takes used for public supply purposes (current at the time the RPW was notified in 1998), while Schedule 1C identifies registered historic places which occur in, on, under or over the beds or margins of lakes and rivers. There are no Schedule 1B and 1C values in the RPW listed in close proximity to the proposed activity.

Schedule 1D identifies the spiritual and cultural beliefs, values and uses associated with water bodies of significance to Kai Tahu. The Amisfield Burn is not identified in



this schedule however the Clutha River/Mata-Au between Alexandra and Lake Wanaka is identified as having the following values:

- **Kaitiakitanga:** the exercise of guardianship by Kai Tahu, including the ethic of stewardship.
- **Mauri:** life force.
- **Waahi tapu and/or Waivhakaheke:** sacred places; sites, areas and values of spiritual values of importance to Kai Tahu.
- **Waahi taoka:** treasured resource; values, sites and resources that are valued.
- **Mahika kai:** places where food is procured or produced.
- **Kohanga:** important nursery/spawning areas for native fisheries and/or breeding grounds for birds.
- **Trails:** sites and water bodies which formed part of traditional routes, including tauraka waka (landing place for canoes).
- **Cultural materials:** water bodies that are sources of traditional weaving materials (such as raupo and paru) and rongoa (medicines).

The location of the bores are approximately 800m from the lake and as noted above the RPW considers the allocation quantities and minimum flows do not apply to water takes from Lake Dunstan and as such it is considered that overall the effect of this surface water depletion will be no more than minor.

### 2.2.5 Regionally Significant Wetlands

There are no Regionally Significant Wetlands in the vicinity of the activity.

## 3. Status of Applications

### Groundwater Take

The proposed groundwater take exceeds the volumes permitted by Rule 12.2.2.2 of the RPW. The taking of groundwater and the use of that groundwater is a **restricted discretionary** activity under Rule 12.2.3.2A of the RPW, if:

- (a) The volume sought is within:
  - (i) The maximum allocation limit identified in Schedule 4A; or
  - (ii) 50% of the mean annual recharge calculated under Schedule 4D, for any aquifer not identified in Schedule 4A; or
  - (iii) That volume specified in an existing resource consent where the assessed maximum annual take of the aquifer exceeds its maximum allocation limit; and
- (b) It is subject to any aquifer restriction identified in Schedule 4B; and
- (c) Where the rate of surface water depletion is greater than 5 L/s, as calculated using Schedule 5A:
  - (i) Primary surface water allocation is available; and
  - (ii) For the Waitaki catchment, allocation to activities set out in Table 12.1.4.2 is available.

The volume sought by this application is within 50% of the calculated mean annual recharge for the Pisa Groundwater Management Zone and rates of surface water depletion will be less than 5 L/s and as such meets the requirement to be considered as a **restricted discretionary** activity under Rule 12.2.3.2A.



### Discharge

The discharge from gravel washing operations is not specifically provided for by any of the permitted activity rules in the RPW. As the discharge will be from an industrial activity, the discharge is a **discretionary** activity under Rule 12.B.4.1, which relates to

the discharge of water or contaminants from an industrial or trade premise to water or to land.

The Council may grant or decline the application, but if granted may impose conditions under Section 108 of the Act for matters over which discretion has been restricted. The matters to which the Council has restricted the exercise of its discretion are set out in Rule 12.2.3.4, and are discussed in Sections 2, 4, 5 and 6 of this report.

#### **4. Non-Notification and Written Approvals**

As the effects of the proposed activities are considered to be minor (see Section 5 of this report), a provisional decision was made to process these applications under non-notified consent procedures, subject to the written approval of affected parties.

As the take is largely non-consumptive and the majority of the water is returned to the Pisa Groundwater Management Zone downstream of the take, and as the discharge is to land, there will be no downstream water users or instream values that may be adversely affected by the proposed activity. The only people who will be affected by these applications are the landowners with bores located within 100 metres of the applicant's point of take. According to the Council's database there is one bore located 100 metres distant, this is however owned by McNulty Transport Limited (the applicant). Since there are no other bores (other than the applicants) within this zone of more than minor interference and the nearest other bores are located over 300m away, no written approvals have been sought.

As there are not considered to be any affected parties to this application the requirements of the decision not to publicly notify this application have been met.

#### **5. Assessment of Environmental Effects**

##### **5.1 Allocation Status**

###### Groundwater take

Maximum allocation volumes (and aquifer restriction levels, discussed in Section 5.2, below) are a means of managing the cumulative effects of groundwater takes on long-term storage of an aquifer and on outflows to surface water bodies, while avoiding contamination of groundwater and surface water resources, and permanent aquifer compression.

Non-consumptive water takes are not specifically provided for in the RPW and are considered to be discretionary activity under Rule 12.2.4.1. In order for a take to be non-consumptive, the take and use needs to be in accordance with the definition in the Measurement and Reporting of Water Takes Regulations 2010, being that:

- (a) The same amount of water is returned to the same water body at or near the location from which it was taken; and*
- (b) There is no significant delay between the taking and returning of the water.*

The activity undertaken on the subject site has previously been assessed as being non-consumptive. However the assessment of this application by PDP on behalf of RSU indicates that losses of groundwater during the industrial processing could occur from one or more of the following processes:

- Evaporation from soakage pond;
- Evaporation from washed vehicles, stockpiles, road, or in the processing plant;
- Groundwater held within the washed aggregate when it is exported from the site, or by dust when groundwater is used for dust suppression; and



- Water lost through inefficient application.

While an estimate of the above losses has not been provided within the application, PDP have conservatively estimated that approximately 30 % of the water abstracted for industrial use is lost and not returned to the aquifer. The majority of the water is used for dampening the aggregate prior to crushing and for aggregate washing and this is likely to be non-consumptive as it is discharged to the settling pond (Figure 3).

As not all the abstracted water will be returned to the Pisa Groundwater Management Zone the take is not considered to be non-consumptive.

### 5.2 Minimum and Residual Flows/Aquifer Restriction Levels

No restriction levels have yet been set in Schedule 4B of the RPW for the Pisa Groundwater Management Zone. The Council may review any consent under Section 128(1)(b) of the Act when a regional plan sets rules relating to minimum levels in aquifers. It is recommended that such a review condition is imposed.

### 5.3 Discharge Water Quality

The contaminants in the discharge will be naturally occurring silts and sands from the washing of the gravel, and the majority of the sediment will be removed from the water column by settling in the pond and then by the filtering process as the water moves through the gravels.

Based on the information that the Applicant has sent through, the soakage pit appears to be at groundwater level and discharged water will be discharged directly to groundwater. This will mean that fine sediments within the process water maybe unable to settle out, and it is therefore possible that turbid water could migrate horizontally into the aquifer. This means that water quality effects (in terms of turbidity) could be more than minor.

The closest down gradient bores not owned by the Applicant are G41/0346 and G41/0340, located around 900 m south-east of the soakage pit. In the initial assessment by PDP, it was advised that it may be necessary to install two monitoring bores to monitor water quality effects. However, based on additional information provided by the applicant, PDP consider that the installation of new bores for monitoring is not necessary if the existing bores on site have been properly constructed.

PDP recommend conditions on consent requiring quarterly monitoring of suspended sediment concentrations by the applicant at bores G41/0455 and G41/0101, and one up-gradient bore for comparison, either G41/0220 or G41/0321. The Applicant should be requested to provide details of the bores construction, including filter pack and development. The sampling method should be non-intrusive, e.g. hydrosleeve or low flow, to ensure that sediment is not re-suspended during sampling or down-gradient clean water, that could cause dilution, is not brought into the bore.

The applicant proposes to undertake 3 monthly monitoring and regular maintenance of the settling pond, including the pond de-sludging as necessary. This will ensure the pond does not overtop. There will be no discharge into any surface watercourse. Conditions requiring such maintenance of the settling pond are recommended.

If necessary, mitigation measures will be required to be put in place, such as installation of a second settling pond or increasing the size of the settling pond to allow for a longer retention time, if necessary. This is recommended as a condition of consent.



As shown in Figure 2 and Figure 3 the settling ponds are located within the quarry pit. Consequently there can be no discharge to surface water. To further mitigate against the possibility of sediment from the settling pond entering the river, recommended consent conditions stipulate that the discharge point must be located at least 10 metres from the watercourse and that there shall be no direct discharge to the watercourse.

#### **5.4 Efficiency of Water Use**

A portion of the water take is used for potable use, dust suppression and irrigation of surrounding landscaping these uses are generally considered to be likely to be consumptive as the water would be taken up by plants or evaporated and would not be returned to the water to the aquifer. The majority of the water is used for dampening the aggregate prior to crushing and for aggregate washing and this is likely to be non-consumptive as it is discharged to the settling pond (Figure 3). These uses are considered appropriate as they are directly associated with the proposed activity undertaken, contributing to either the mitigation of the activity through landscaping or dust suppression or for use by staff operating the facility.

The nature of the gravel determines the amount of water needed to screen the gravel into the various grades. It is possible that more than one cubic metre of water may be required to screen one cubic metre of gravel. The amount can only be determined at the time of screening and will vary from one load of gravel to the next. However, this is considered a non-consumptive use of the water and is returned to the Pisa Groundwater Management Zone through the settling pond.

Therefore, the Council has no concerns about the efficiency of use of the groundwater taken.

#### **5.5 Effects on Other Water Users**

Effects on other water users are considered in section 2.2.1 of this report. As noted in that section the drawdown in the closest bores (0.19 m) is less than that the 0.2 m which constitutes significant interference as detailed in Policy 6.4.10B. Consequently the effects of the proposed water take on nearby bores are therefore expected to be less than minor.

Based on the information provided by the Applicant, it appears that the soakage pit is at or close to groundwater level and discharged water will be discharged directly to groundwater. This will mean that fine sediments within the process water may be unable to settle out, and it is therefore possible that turbid water could migrate horizontally into the aquifer. This means that water quality effects (in terms of turbidity) could be more than minor.

The closest down gradient bores not owned by the Applicant are G41/0346 and G41/0340, located around 900 m south-east of the soakage pit. In the initial assessment by PDP it was advised that it may be necessary to install two monitoring bores to monitor water quality effects. However, based on additional information provided by the applicant this PDP determined that the installation of new bores for monitoring is not necessary if the existing bores on site have been properly constructed and onsite monitoring is undertaken.

Recommended conditions to monitor potential changes in water quality include:

- The Applicant should be requested to provide details of their construction, including filter pack and development.



- The Applicant should conduct quarterly monitoring of suspended sediment concentrations at their new bore (G41/0455) and G41/0101 and one up-gradient bore for comparison.
- The sampling method should be non-intrusive, e.g. hydro-sleeve or low flow, to ensure that sediment is not re-suspended during sampling or down-gradient clean water, that could cause dilution, is not brought into the bore.
- The up-gradient should be G41/0220 or G41/0321.

#### **5.6 Effects on Instream Values**

The potential effects of the proposal on surface water bodies near the subject site have been discussed in Section 2 of this report and as noted in the assessment undertaken by PDP the proposed groundwater take or discharge to land should have no more than minor effects on the Amisfield Burn or Lake Dunstan.

#### **5.7 Monitoring of the Water Take**

Compliance with consent conditions relating to the instantaneous take rate, monthly and seasonal volumes cannot be assessed unless the water take is monitored. There are many benefits in monitoring water take compliance, including:

- Better compliance with consent requirements (i.e. illegal or excessive takes will be deterred).
- More efficient use of water as the actual volume of water irrigated per hectare can be compared against application rates recommended by irrigation experts.
- The identification of "under users" or "non users" of water, which will allow Council to reduce the level of over-allocation in various catchments or aquifers.
- The improved ability of Council to assess flows of surface water bodies or the capacity of an aquifer, which is vital for water allocation purposes, in particular for catchments with water allocation committees (where it will help in the design and management of rostering schedules).

Recommended consent conditions require the take to be metered. To ensure the accurate and regular reading of the water meter it is recommended that a datalogger is installed (to achieve this a "pulse" water meter is required). A number of recommended consent conditions relate to achieving required technical specifications for accurate meter and datalogger installation and ongoing operation. The datalogger will require regular downloading (estimated at about twice a year although the exact frequency will depend on the type of datalogger purchased), and the data sent electronically to Council. It will need to be consistent with the format and specifications of Council's databases. "Comma separated value" (csv) format is considered the simplest and most widely compatible file type for this purpose.

Any consent granted should be subject to a review in accordance with Sections 128 and 129 of the Act, to allow Council to adjust the amount or rate of abstraction of water allowed by each consent, should monitoring indicate that the allocation is more than required for efficient ongoing use, and to ensure that the consent specifications regarding water take data recording and transmission can be kept up-to-date as required.

While it is accepted that the requirement for these systems will be an expense incurred by the consent holders, when this cost is averaged over the recommended consent period and weighed against the benefits obtained from use of a public resource, then



the cost is not considered excessive. The applicant is currently monitoring water use in accordance with these requirements.

#### **5.11 Review Conditions**

The right of the Council to review consent conditions under Sections 128 and 129 of the Act is reserved for the following reasons:

- adjusting the consented rate or volume should monitoring or future changes in water use indicate that the consented rate or volume is not able to be fully utilised;
- determining whether the conditions of consent are adequate to deal with any adverse effect on the environment that may arise from the exercise of the consent;
- ensuring that the conditions of this consent are consistent with any National Environmental Standards; and
- allowing the method of data recording and reporting to be altered should the need arise.

#### **5.12 Consideration of Alternative Methods**

Quarrying activity has been conducted on the on the subject site for well over a decade with no observed adverse effects on water quality from the bores located down gradient from the proposed activity. The proposed increase in activity on the subject site may increase the likelihood of adverse effects and appropriate monitoring conditions are proposed. In the event that adverse effects are observed additional methods may be required to ensure adequate filtration of sediment laden water.

### **6. Statutory Considerations**

Section 104 of the Act sets out the matters to be considered when assessing an application for a resource consent. Those matters which should be considered for this application are:

#### **6.1 Part 2 of the Act**

The proposed activities are consistent with the purpose and principles of the Act, as outlined in Section 5. The water take and subsequent discharge will have a minor effect on downstream waterways ability to meet the reasonably foreseeable needs of future generations, or on the life-supporting capacity of the waterways or any ecosystems associated with them. Recommended consent conditions will avoid, remedy or mitigate adverse effects.

The applications are also consistent with the requirements of Sections 6-8 of the Act. There are no matters of national importance under Section 6 of the Act that will be affected by this application. Particular regard has been given to maintenance and enhancement of amenity values, in respect of Section 7 of the Act. The proposed take is consistent with these matters, provided recommended consent conditions are adopted. In regards to Section 8 of the Act, the proposed activity is not inconsistent with the principles of the Treaty of Waitangi.

Overall, the application is considered to be consistent with Part 2 of the Act, given the minor nature of the activity and the proposed conditions of consent.

#### **6.2 Section 104(1) of the Act**

The remaining matters of Section 104(1) to be considered when assessing an application for a resource consent are as follows:



- (a) any actual and potential effects on the environment of allowing the activity; and
- (b) any relevant provisions of
  - (i) a national environmental standard;
  - (ii) other regulations;
  - (iii) a national Policy statement;
  - (iv) a New Zealand coastal Policy statement;
  - (v) a regional Policy statement or proposed regional Policy statement;
  - (vi) a plan or proposed plan; and
- (c) any other matter the consent authority considers relevant and reasonably necessary to determine the application.

These matters are discussed in the following sections.

#### **6.2.1 National Policy Statement Freshwater Management**

The NPS for Freshwater Management 2011 was superseded by the NPS for Freshwater Management 2014 on 1 August 2014. The NPS supports improved freshwater management in New Zealand. It does this by directing regional councils to establish objectives and set limits for fresh water in their regional plans. It requires regional councils to recognise the national significance of fresh water for all New Zealanders and Te Mana o te Wai (the mana of the water). It directs regional councils to:

- safeguard fresh water's life supporting capacity, ecosystem processes, and indigenous species including their associated ecosystems
- manage freshwater bodies so people's health is safeguarded
- maintain or improve the overall quality of fresh water within a region
- protect the significant values of wetlands and outstanding freshwater bodies
- require more efficient use of fresh water by end users
- avoid the over allocation of water takes and inputs of contaminants, and to phase out existing over allocation
- set freshwater objectives according to a specified process (the national objectives framework) to meet community and tāngata whenua values which include the compulsory values of ecosystem health and human health for recreation
- use a specified set of water quality measures (attributes) to set the freshwater objectives (an objective can only be set below national bottom lines in specified circumstances)
- set limits which allow freshwater objectives to be met
- put in place measures to account for water takes and sources of contaminants, and monitor achievement towards meeting objectives
- take a more integrated approach to managing fresh water and coastal water
- fully implement the National Policy Statement by 2025

The Council considers that the current and proposed policies in the RPS and RPW meet the requirements of the NPS. Consideration of these documents in light of the activities proposed is given below.

#### **6.2.2 Environmental Effects**

The actual and potential environmental effects of the proposed activities were considered in Section 5 of this report. Recommended conditions of consent will ensure that any adverse effects are avoided, remedied or mitigated.





### 6.2.3 Regional Policy Statement

The provisions of Section 6 (Water) of the RPS are relevant to these applications. The taking of water and discharge of contaminants to water is consistent with the policies of the RPS, provided that it is done in a conservative manner that does not adversely affect the instream biota, natural character, or other lawful water users.

Policy 5.5.5 is of particular relevance to the application as it seeks to minimise the adverse effects of landuse activities on the quality and quantity of Otago's water resource by avoiding, remedying or mitigating the degradation of groundwater and surface water resources caused by the introduction of contaminants such as sediments resulting from landuse activities. The effects of the discharge have been discussed in Section 2 and Section 5 of this report and the adoption of recommended conditions of consent will ensure that any adverse effects are avoided, remedied or mitigated.

The proposed Regional Policy Statement (pRPS) was notified on 23 May 2015. Submissions have been heard and a decision is to be released shortly. The pRPS needs to be given consideration and weighting principles apply. The relevant provisions of the pRPS include:

- taking the principles of Te Tiriti o Waitangi into account (Policy 1.1.2)
- managing the natural environment to support Kāi Tahu wellbeing (Policy 1.2.1)
- recognising and protecting important sites and values of cultural significance to Kāi Tahu (Policy 1.2.2 and 1.2.3)
- managing for freshwater values including
  - support healthy ecosystems in all Otago's rivers, lakes, wetlands, and their margins
  - retain the range and extent of habitats provided by freshwater
  - protect outstanding water bodies and wetlands
  - protect migratory patterns of freshwater species, unless detrimental to indigenous biodiversity
  - maintain good water quality or enhance it where it has been degraded
  - maintain or enhance the natural functioning of rivers, lakes, and wetlands and their riparian margins
  - retain the quality and reliability of existing drinking water supplies
  - protect Kāi Tahu values
  - provide for other cultural values
  - protect important recreational values
  - maintain the aesthetic and landscape values of rivers, lakes and wetlands
  - avoid the adverse effects of pest species, prevent their introduction and reduce their spread
- applying an integrated management approach among resources and within a resource (Policy 2.3.1 and 2.3.2)
- applying an integrated management approach for freshwater catchments (Policy 2.3.3)
- recognising natural and physical environmental constraints (Policy 3.1.1)
- ensuring efficient water allocation and use including
  - requiring that the volume of water allocated does not exceed what is necessary for the purpose of use;
  - requiring that development or upgrade of infrastructure that increases use efficiency;
  - encouraging collective coordination and rationing of take and use of water when river flows or aquifer levels are lowering, to avoid breaching any minimum flow or aquifer level restriction;
  - enabling water harvesting and storage, to reduce pressure on water bodies during period of low flows.
- avoiding objectionable discharges (Policy 4.5.1)
- applying an adaptive management approach (Policy 4.5.2)



- managing adverse effects from mineral and gas exploration, extraction and processing (Policy 4.5.6)

The taking of water and discharge of contaminants to water is generally consistent with the policies of the pRPS, subject to the adoption of recommended conditions of consent to manage potential adverse effects.

#### **6.2.4 Regional Plan: Water for Otago**

Relevant policies from the RPW (including relevant plan change provisions) are considered below:

*Policy 5.4.8 States particular regard will be given to topography (including the setting and drawdown of the lake or river), flow characteristics, natural lake water levels and fluctuation, water colour and clarity, ecology, and the extent of use or development within the catchment, when considering adverse effects on their natural character.*

Neither the Amisfield Burn nor the Pisa Groundwater Management Zone have any specific values identified in Schedules 1A 1AA, 1B, 1C and 1D of the RPW.

Lake Dunstan does have identified values, however it is considered that the effects on Lake Dunstan will be minimal and as noted in Policy 6.4.1 of the RPW, allocation quantities and minimum flows do not apply to water takes from Lake Dunstan and as such it is considered that as the effects will be minimal and are anticipated by the RPW the proposal is consistent with these policies.

As discussed in Section 2 and Section 5 of this report, the proposal will not adversely affect any other lawful water users. There are no identified amenity, aesthetic, recreational or heritage values in immediate area of the subject site which has operated as aggregate quarry for a number of decades.

*Policy 5.4.4 Recognises Kai Tahu's interests in Otago's lakes and rivers by promoting opportunities for their involvement in resource consent processing.*

As the proposed groundwater take has been assessed as not having minimal effect on surface water resources in the area it is not considered to have impacted on any statutory acknowledgement areas. As noted in Policy 6.4.1 of the RPW, water takes from Lake Dunstan are not subject to allocation quantities and minimum flows. In addition, regard has been given to the Kai Tahu ki Otago 2005 Natural Resource Management Plan (see Section 6.2.5).

*6.4.12 To promote, establish and support appropriate water allocation committees to assist in the management of water rationing and monitoring during periods of water shortage.*

*6.4.12C Where appropriate, to include in water permits to take water a condition that consent holders comply with any Council approved rationing regime.*

*6.4.13 To restrict the taking of water in accordance with any Council approved rationing regime.*



The Pisa Groundwater Management Zone is currently under-allocated and there are no water management groups in the area. A standard condition of consent is recommended providing for water management should these become established at a future date.

*6.4.1A A groundwater take is allocated as:*

- (a) Surface water, subject to a minimum flow, if the take is from any aquifer in Schedule 2C; or*
- (b) Surface water, subject to a minimum flow, if the take is within 100 metres of any connected perennial surface water body; or*
- (c) Groundwater and part surface water if the take is 100 metres or more from any connected perennial surface water body, and depletes that water body most affected by at least 5 litres per second as determined by Schedule 5A; or*
- (d) Groundwater if (a), (b) and (c) do not apply.*

The assessment by PDP indicated that although a tributary of the Amisfield Burn is within 100m of the proposed takes the Amisfield Burn is not connected to groundwater in this location. Consequently the take entirely allocated as a groundwater.

*6.4.10A2 Define the maximum allocation limit for an aquifer as:*

- (a) That specified in Schedule 4A; or*
- (b) For aquifers not in Schedule 4A, 50% of the mean annual recharge calculated under Schedule 4D.*

As noted in Section 2 of this report the proposed take does not exceed 50% of the mean annual recharge of the Pisa Groundwater Management Zone and is therefore consistent with policy 6.4.10A2.

*6.4.15 To ensure that the quantity of water granted under a resource consent for the taking of water is no more than that required for the intended use of that water having regard to the local conditions.*

*6.4.16 In granting resource consents to take water, to consider requiring the volume and rate of take to be accurately measured.*

The rate and volume of water applied for is not considered unreasonable for the purpose of gravel washing. The current takes for the proposed activity are metered and this approach will be applied to the new takes.

*6.4.19 When setting the duration of resource consent to take and use water, to consider:*

- (a) The duration of the purpose of use;*
- (b) The presence of a catchment minimum flow or aquifer restriction level;*
- (c) Climatic variability and consequent changes in local demand for water;*
- (d) The extent to which the risk of potentially significant, adverse effects arising from the activity may be adequately managed through review conditions;*
- (e) Conditions that allow for adaptive management of the take and use of water;*
- (f) The value of the investment in infrastructure; and*
- (g) Use of industry best practice.*



The applicant has identified a clear need for additional water capacity to increase operations but also uncertainty regarding the actual volume of water that will be required going forward. The Pisa Groundwater Management Zone is currently under allocated but is an area experiencing growth pressure. Given the current availability of water in this location, but identified uncertainty regarding the actual volume of the resource required, it is considered appropriate to grant consent for the volume sought but for a shorter duration than that sought by the applicant to enable capacity beyond what is actually required to be reallocated to other potential users. This will encourage the efficient use of the resource and provide flexibility to respond to changes in local demand for water.

- 7.B.1 Manage the quality of water in Otago lakes, rivers, wetlands and groundwater by recognising the differences in the effects and management of point and non-point source discharges; defining in Schedule 15 characteristics indicative of good water quality, setting receiving water numerical limits and targets; maintaining good quality water, enhancing water quality where it does not meet Schedule 15 limits, recognising discharge effects on groundwater and promoting the discharge of contaminants to land in preference to water.*
- 7.B.2 Avoid objectionable discharges of water or contaminants to maintain the natural and human use values, including Kāi Tahu values, of Otago lakes, rivers, wetlands, groundwater and open drains and water races that join them.*
- 7.B.3 Allow discharges of water or contaminants to Otago lakes, rivers, wetlands and groundwater that have minor effects or that are short term discharges with short term adverse effects.*
- 7.B.4 In considering the discharge of any contaminant to land, to have regard to the ability of the land to assimilate the water or contaminants; any potential for soil contamination; any potential for land instability; any potential adverse effects on water quality; and any potential adverse effects on use of any proximate coastal marine area for contact recreation and seafood gathering.*
- 7.B.6 When assessing any consent to discharge contaminants to water, consider the need for and the extent of any zone for physical mixing within which water will not meet the characteristics and limits described in Schedule 15 by taking account of: the sensitivity of the receiving environment; the natural and human use values; the natural character of the water body; the amenity values supported by the water body; the physical processes acting on the discharge; the particular discharge including contaminant type, concentration and volume; the provision of cost effective community infrastructure; and good water quality as described in Schedule 15.*
- 7.B.8 Encourages adaptive management and innovation that reduce the level of contaminants in discharges.*
- 7.C.1 When considering applications to discharge contaminants to water, to have regard to opportunities to enhance the existing water quality of the receiving water body at any location for which the existing water quality can be considered degraded in terms of its capacity to support its natural and human use values.*



- 7.C.2: *When considering applications for resource consents to discharge contaminants to water, or onto or into land in circumstances which may result in any contaminant entering water, to have regard to: the nature of the discharge and the sensitivity of the receiving environment to adverse effects; the financial implications, and the effects on the environment of the proposed method of discharge when compared with alternative means; and the current state of technical knowledge and the likelihood that the proposed method of discharge can be successfully applied.*
- 7.C.3 *When considering any resource consent to discharge a contaminant to water, to have regard to any relevant standards and guidelines in imposing conditions on the discharge consent.*
- 7.C.4 *The duration of any new resource consent for an existing discharge of contaminants will take account of the anticipated adverse effects of the discharge on any natural and human use value supported by an affected water body, and will be up to 35 years where the discharge will meet the water quality standard required to support that value for the duration of the resource consent; will be no more than 15 years where the discharge does not meet the water quality standard required to support that value but will progressively meet that standard within the duration of the resource consent; will be no more than 5 years whether the discharge does not meet the water quality standard required to support that value; and no resource consent, subsequent to one issued under above will be issued if the discharge still does not meet the water quality standard required to support that value.*

The discharge of sediment is a function of the gravel washing process. The sediment is derived from material originating on site but could affect ground or surface water quality. The assessment of effects has indicated that, subject to the adoption of recommended conditions the effects on water quality will be no more than minor. It is a recommended condition of consent that provision is made for review of the consent under Section 128 of the Act. Should monitoring indicate effects are greater than anticipated there is scope for additional measures to be adopted implemented to address these effects. As the gravel washing process creating the discharge is dependent upon the proposed water take the duration of discharge consent should correspond to the duration of water take.

Overall, it is considered that the application is consistent with the relevant policies of the RPW.

#### **6.2.5 Other Matters**

The following policies of the Kai Tahu ki Otago Natural Resource Management Plan 2005 (NRMP) are relevant to these applications:

- To require that resource consents applications seek only the amount of water actually required for the purpose specified in the application.
- To require that all water takes are metered and reported on, and information be made available upon request to Kai Tahu ki Otago.
- To require land disposal of contaminants, the consideration of alternatives, monitoring of the discharge, management plans, maintenance and service of the discharge system, and groundwater monitoring for discharges.
- To oppose the granting of water take consents for 35 years.



The granting of this consent with the recommended terms and conditions is generally consistent with these requirements. Water use on the subject site is already metered and reported on. The discharge of contaminants is inherent to the proposed activity undertaken on the subject site but consists of natural material derived from the immediate area and recommended conditions of consent include monitoring and maintenance.

There are no other matters that the Consent Authority considers relevant and reasonably necessary to determine the application.

### **6.3 Section 105(1) of the Act**

Section 105(1) of the Act states that where an application is for a discharge permit to do something that would otherwise contravene Section 15 or Section 15B, “the consent authority must, in addition to the matters in section 104(1), have regard to –

- (a) *the nature of the discharge and the sensitivity of the receiving environment to adverse effects; and*
- (b) *the applicant’s reasons for the proposed choice; and*
- (c) *any possible alternative methods of discharge, including discharge into any other receiving environment.”*

The above have been considered in Section 2 and 5 of this report. The discharge will comprise silt and sediment generated from gravel washing. There is not expected to be any adverse effects from the discharge and there are no alternatives. The application has been considered in terms of the sensitivity of the receiving environment. It is noted that the receiving environment is not considered to be sensitive in terms of the matters identified in the RPW. The applicant’s choice of method of disposal is based on historical experience in operating a gravel quarry on the site. The recommended conditions of consent include monitoring of discharge and enable a review of conditions if required.

### **6.4 Section 107 of the Act**

Section 107(1) of the Act states that a discharge permit shall not be granted (with certain exceptions) if, after reasonable mixing, the contaminant or water discharged is likely to give rise to all or any of the following effects in the receiving waters:

- (c) *The production of any conspicuous oil or grease films, scums or foams, or floatable or suspended material;*
- (d) *Any conspicuous change in the colour or visual clarity;*
- (e) *Any emission of objectionable odour;*
- (f) *The rendering of fresh water unsuitable for consumption by farm animals;*
- (g) *Any significant adverse effects on aquatic life.*

The discharge is not expected to cause any of the effects listed under Section 107(1) of the Act after reasonable mixing, provided the recommended consent conditions are imposed.

### **7. Recommendation**

That Otago Regional Council grants to Cromwell Certified Concrete Limited, a water permit to take water and a discharge permit to water, for the purpose of gravel washing, subject to the terms and conditions of the attached draft consents.



### 7.1 Reasons for Recommendation

- (a) That it is expected that the adverse effects on the environment will be minor, and can be adequately addressed through the recommended consent conditions.
- (b) That the application is within the non-notification provisions of Section 95A of the Act.
- (c) That the proposed activity is consistent with the requirements of the Act and Council policy.

### 8. Term of the Consent

Policy 6.4.19 of the RPW states that when considering the duration of a resource consent to take and use water the following are considered:

- *The duration of the purpose of use;*
- *The presence of a catchment minimum flow or aquifer restriction level;*
- *Climatic variability and consequent changes in local demand for water;*
- *The extent to which the risk of potentially significant adverse effects arising from the activity may be adequately managed through review conditions;*
- *Conditions that allow for the adaptive management of the take and use of water;*
- *The value of the investment in infrastructure; and*
- *Use of industry best practice.*

Policy 7.C.4 of the RPW states that when considering the duration of a resource consent to discharge contaminants the following are considered:

*The duration of any new resource consent for an existing discharge of contaminants will take account of the anticipated adverse effects of the discharge on any natural and human use value supported by an affected water body, and will be up to 35 years where the discharge will meet the water quality standard required to support that value for the duration of the resource consent; will be no more than 15 years where the discharge does not meet the water quality standard required to support that value but will progressively meet that standard within the duration of the resource consent; will be no more than 5 years whether the discharge does not meet the water quality standard required to support that value; and no resource consent, subsequent to one issued under above will be issued if the discharge still does not meet the water quality standard required to support that value.*

The applicant has requested a term of 35 years. As discussed in Section 6.2.4 of this report, after due consideration of Policy 6.4.19 and 7.C.4 of the RPW, it is recommended that a reduced term of consent is appropriate. It is recommended that the term of the consent granted is 20 years. No significant adverse effects on the environment are anticipated as a result of the proposed water take and discharge, and review conditions will allow the Council to address any unforeseen adverse effects of the proposed water take or discharge during the duration of the consent.

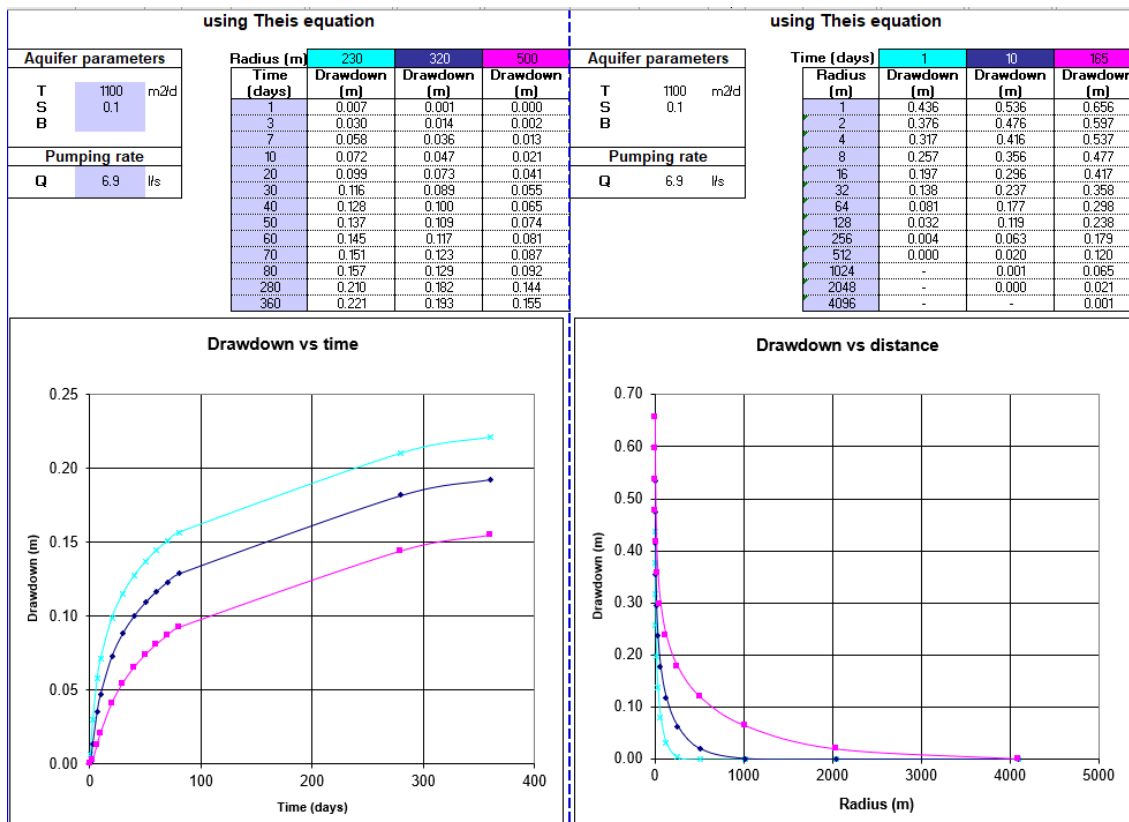


Ralph Henderson  
Senior Consents Officer

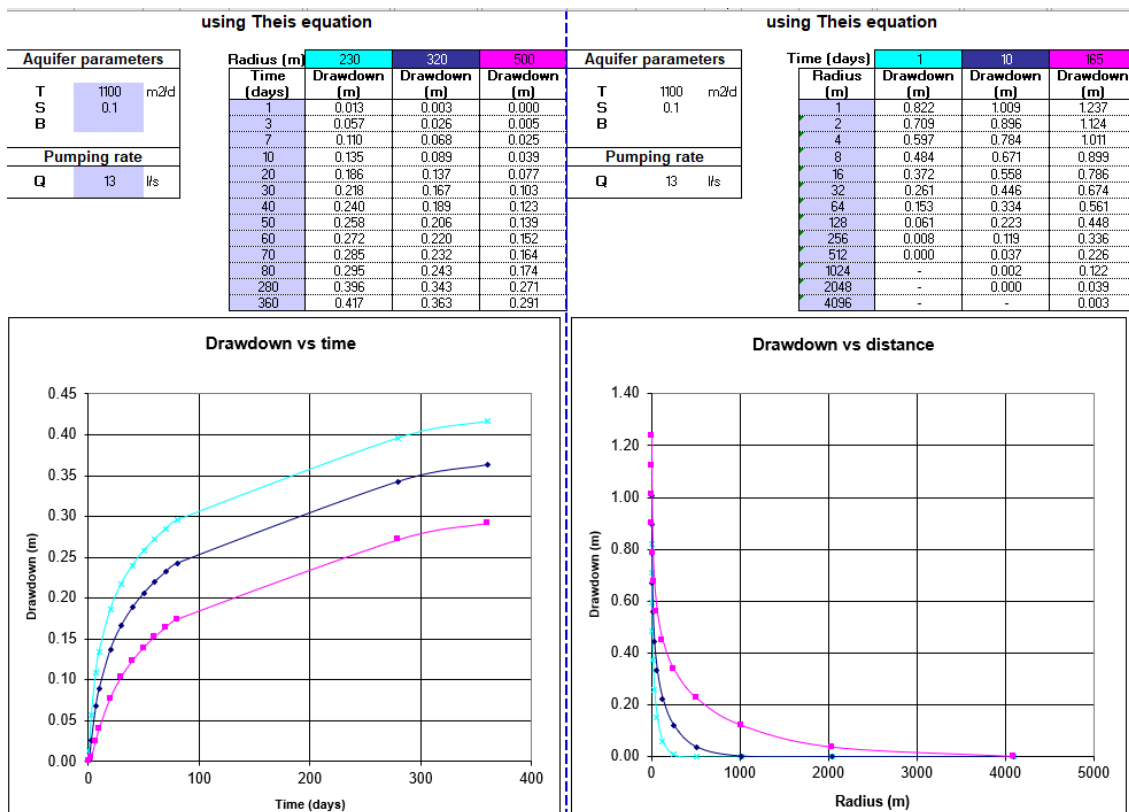
# Appendix C Groundwater bore interference modelling

Drawdown modelling using Theis equation

(1) Original assumptions,  $600\text{m}^3/\text{day} = 6.9\text{L/s}$  for 360 days.



(2) Increased take, same assumptions,  $1,119\text{ m}^3/\text{d}$ ,  $13\text{ L/s}$  for 280 days





(3) Worst possible case scenario, 3,024 m<sup>3</sup>/day = 35 L/s for 280 days

using This equation

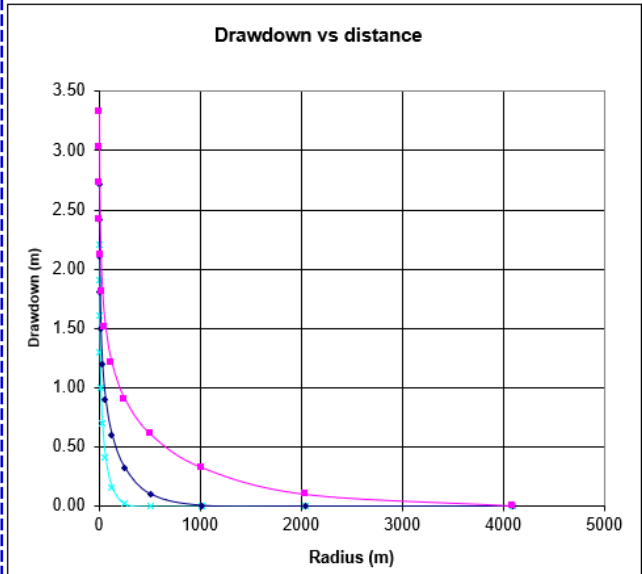
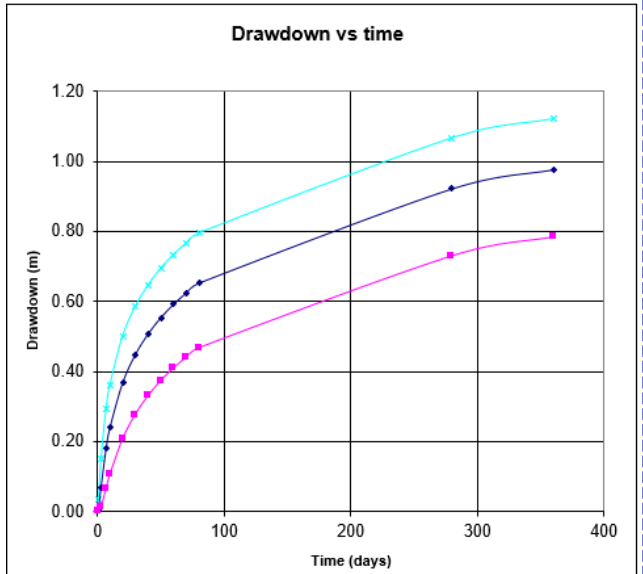
Aquifer parameters	
T	1100 m <sup>2</sup> /d
S	0.1
B	
Pumping rate	
Q	35 l/s

Radius (m)	230	320	500
Time (days)			
1	0.035	0.007	0.000
3	0.153	0.071	0.012
7	0.295	0.182	0.067
10	0.363	0.241	0.106
20	0.502	0.369	0.207
30	0.586	0.450	0.277
40	0.647	0.508	0.331
50	0.694	0.555	0.374
60	0.733	0.593	0.410
70	0.767	0.626	0.440
80	0.795	0.654	0.468
280	1.067	0.923	0.731
360	1.122	0.978	0.785

using This equation

Aquifer parameters	
T	1100 m <sup>2</sup> /d
S	0.1
B	
Pumping rate	
Q	35 l/s

Time (days)	1	10	165
Radius (m)			
1	2.213	2.716	3.330
2	1.910	2.413	3.026
4	1.606	2.110	2.723
8	1.303	1.807	2.420
16	1.001	1.504	2.117
32	0.701	1.201	1.813
64	0.413	0.899	1.510
128	0.164	0.602	1.207
256	0.022	0.322	0.906
512	0.000	0.100	0.608
1024	-	0.006	0.328
2048	-	0.000	0.104
4096	-	-	0.007







**LANDPRO**

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# **Cromwell Certified Concrete Ltd.**

Amisfield Quarry expansion, Luggate-Cromwell Road, Mt. Pisa,  
Ecological Impact Assessment.

Prepared For  
**Cromwell Certified Concrete Limited.**

Prepared By Cees Bevers

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October 2020

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## **1 Introduction**

It is proposed that the Amisfield Quarry is expanded north of its current site at 1248 Luggate-Cromwell Road (SH8), Mt. Pisa, Cromwell, to the north of Amisfield Road, and east of the Luggate-Cromwell Road, and west of Lake Dunstan. The proposed 9.8ha expansion site is immediately to the north of eastern portion of the current quarry (Appendix 1). The Mahaka Katia Scientific Reserve, administered by the Department of Conservation (DOC) is located immediately north-east of the proposed quarry expansion land.

## **2 Scope of this report**

This report assesses the ecological values of the land proposed for the expansion to the north of Amisfield Quarry, as well as those of the neighbouring Mahaka Katia Scientific Reserve.

## **3 Ecological context**

This proposed quarry expansion land sits adjacent to Lake Dunstan to the east, a man-made hydroelectricity generation lake created by the Clyde Dam. This site is situated within the Cromwell Basin which is characterised by several tiered river terraces along what was the bed of the Clutha/Mata-Au River, and is now Lake Dunstan. Mountain ranges surround the Cromwell Basin, and include the Pisa Range to the west, and the Dunstan Mountains to the east, and the river delta area of the Clutha/Mata-Au River at the head of Lake Dunstan to the north.

The 27ha Mahaka Katia Scientific Reserve lies immediately to the north of the proposed quarry expansion land. This reserve was created due to the presence of native cushion forming native plants, and other uncommon native plants now rare in the Cromwell Basin.

Appendix 1 shows the ecological context of the area in relation to the existing quarry, the proposed quarry expansion area, the reserve, Lake Dunstan, and the Clutha River.

## **4 Site visit**

Cees Bevers, Senior Ecologist, from Landpro Ltd. visited the site on the 29<sup>th</sup> February 2020 during fine weather. The adjacent Mahaka Katia Scientific Reserve was also visited, although the visit was limited to its southern title, immediately to the north of the proposed quarry extension land, and south of the residential lifestyle property nestled in between the northern and southern titles of the reserve.

## **5 Site Description**

The proposed 9.8ha expansion land is located at 1248 Luggate-Cromwell Road (SH8), Mt. Pisa, Cromwell, to the north of Amisfield Road, and east of the Luggate-Cromwell Road, and west of Lake Dunstan. The proposed expansion site is immediately to the north of eastern portion of the current quarry. The site is generally flat to rolling, and currently approximately 60% cultivated, and consists of silty soil (Appendix 2, Fig.'s 1 & 2). Adjacent land uses include a lifestyle block to the west, and a fruit orchard downslope on a lower terrace to the east. There are residential dwellings in the lifestyle blocks and the orchard.

The Mahaka Katia Scientific Reserve, administered by the Department of Conservation (DOC) is located immediately north-east of the proposed quarry expansion land, and has remnant native vegetation. The reserve consists of a southern and northern title (Appendices 1 and 2), and there is a lifestyle block with a residential dwelling nestled in between these two titles, at 20C Gilmore Road.

## 6 Ecological Values

Vegetation and birds are covered in this section., for both the proposed quarry expansion land, and the Mahaka Katia Scientific Reserve.

### 6.1 Vegetation

#### Proposed quarry expansion land

The majority (~60%) of the site is currently cultivated (C. Bevers *pers. obs.*) (Fig.'s 1 - 3). In general there are very few plant species currently on the site. Native plants found on site include the cushion forming golden scabweed (*Raoulia australis*), a lichen called *Xanthoparmelia semiviridis*, creeping pohuehue (*Muehlenbeckia axillaris*), and dwarf bedstraw (*Galium perpusillum*). Scabweed is classified as “At Risk – Declining” in the New Zealand Threat Classification System (de Lange 2009, de Lange *et. al.* 2018a). The lichen is classified as “naturally uncommon” (de Lange *et. al.* 2018b). The creeping pohuehue and dwarf bedstraw are classified as “Not Threatened” (de Lange *et. al.* 2018a). The native plant species are in low abundance on the site, and widely scattered, with only a handful of scabweed cushion plants found on site in areas that have not yet been cultivated.

Exotic plants are most abundant on site, and include Scotch thistle (*Cirsium vulgare*), St. John’s wort (*Hypericum perforatum*), moth mullein (*Verbascum virgatum*), viper’s bugloss (*Echium vulgare*), scarlet pimpernel (*Anagallis arvensis var. arvensus*), and smooth catsear (*Hypochaeris glabra*).



**Figure 1:** Proposed Amisfield Quarry expansion area, to the north of current quarry, looking north.





**Figure 2:** Proposed quarry expansion area, looking south-east. Site is predominantly cultivated.

### **Mahaka Katia Scientific Reserve**

The reserve has notable areas of native cushion plant communities, some sandy areas, and areas of native grasses and shrubs, but largely has sparse vegetative cover (Fig.'s 3 - 8).

The Department of Conservation (DOC) carries out regular monitoring of the plant communities within the reserve (Murdoch 2003), and the species records below come from the DOC plant list for the reserve (Patrick, Barkla & Thorsen 2020). There are a number of threatened native plants found within the reserve, as classified by de Lange *et. al.* (2018a), using the New Zealand Threat Classification System. There are several categories of threat status, and the plants within each category are listed below.

Native plants found within the reserve classified as "Threatened – Nationally Vulnerable" are Buchanan's orache (*Atriplex buchananii*), trailing bindweed (*Convolvulus verecundus*), and fan-leaved mat daisy (*Raoulia monroi*). Native plants found in the reserve classified as "Threatened - Nationally Critical" are the woollyhead *Craspedia* (a) (CHR 511522; Clutha River), Maniototo peppergrass (*Lepidium solandri*), and *Leptinella* (a) (CHR 515297; Clutha). Two native plant species found in the reserve are classified as "Data deficient", the sedge *Carex decurtata* and *Rytidosperma maculatum*, are likely to be threatened (de Lange *et. al.* 2018a).

Species that are found in the reserve and classified as "At Risk – Declining" are golden scabweed (*Raoulia australis*), desert broom (*Carmichaelia petriei*), pin cushion (*Colobanthus brevisepalus*), *Raoulia beauverdii*, and celadon mat daisy (*Raoulia parkii*) (de Lange *et. al.* 2018a). There is one species found in the reserve classified as "At Risk - Naturally Uncommon"; the perennial herb *Myosotis uniflora* (de Lange *et. al.* 2018a). There is a lichen species found in the reserve, *Xanthoparmelia semiviridis*, which is classified as "Naturally Uncommon" (de Lange *et. al.* 2018b).

Native plant species found within the reserve classified as "Not Threatened" (de Lange *et. al.* 2018a) are; dwarf pincushion grass (*Agrostis muscosa*), grassland sedge (*Carex breviculmis*), *Carex resectans*, *Crassula colligata* subsp. *colligata*, willowherb (*Epilobium hectorii*), *Epilobium microphyllum*, *Epilobium rostratum*, dwarf bedstraw (*Galium* (c) (;

aff. *Gallium perpusillum*; Clutha)), *Geranium brevicaule*, patotara (*Leucopogon fraseri* complex (mountain ecotype)), adders tongue fern (*Ophioglossum coriaceum* agg.), silver tussock (*Poa cita*), blue tussock (*Poa colensoi*), desert poa (*Poa maniototo*), *Puccinellia* sp., *Raoulia apicinigra*, *Rytidosperma pumilum*, the cushion plant *Scleranthus uniflorus*, *Spergularia media*, slender chickweed (*Stellaria gracilentia*), and white fuzzweed (*Vittadinia australis*) (Patrick, Barkla & Thorsen 2020).

Additional records of native plants in the reserve were found on iNaturalist website ([www.inaturalist.org](http://www.inaturalist.org)), which is a crowd sharing plant and animal location records frequently used by professional scientists and amateurs. Only the observations for the reserve categorised as "Research Grade" on the iNaturalist website are used here, and include native dandelion (*Taraxacum magellanicum*), creeping pohuehue (*Muehlenbeckia axillaris*), scabweed mat daisy (*Raoulia hookeri* var. *hookeri*), which are all classified as "Not threatened" (de Lange et. al. 2018a)

The cushion plants scabweed and *Scleranthus uniflorus*, are a distinct and abundant feature of the vegetation cover of the reserve land, in contrast to the quarry expansion land, where only scabweed is present as a few scattered individual cushions.

Exotic plants found in the Mahaka Katia Scientific Reserve include; sheeps bur (*Acaena agnabila* var. *aequispina*), silvery hair grass (*Aira caryophyllea* subsp. *caryophyllea*), yellow gromwell (*Amsinckia calycina*), parsley piert (*Aphanes inexpectata*), viper's bugloss (*Echium vulgare*), long storkbill (*Erodium botrys*), musky storkbill (*Erodium moschatum*), Californian poppy (*Eschscholzia californica*), tussock hawkweed (*Hieracium lepidulum*), mouse-eared hawkweed (*Hieracium pilosella* subsp.), St John's wort (*Hypericum perforatum*), *Logfia minima*, dwarf mallow (*Malva neglecta*), horehound (*Marrubium vulgare*), *Muehlenbeckia ephedroide*, grassland forget-me-not (*Myosotis discolor*), cotton thistle (*Onopordum acanthium*), sweet briar (*Rosa rubiginosa*), sheep's sorrell (*Rumex acetosella*), dandelion (*Taraxacum officinale*), suckling clover (*Trifolium dubium*), clustered clover (*Trifolium glomeratum*), gorse (*Ulex europaeus*), woolly mullein (*Verbascum thapsus*), moth mullein (*Verbascum virgatum*), spring speedwell (*Veronica verna*), and vulpia hair grass (*Vulpia myuros* var. *megalura*) (Patrick, Barkla & Thorsen 2020, and records from [www.inaturalist.org](http://www.inaturalist.org))



**Figure 3:** Boundary between Mahaka Katia Scientific Reserve in distance, and proposed quarry expansion area in foreground.



**Figure 4:** Mixture of native cushion forming plants, native grasses, open sandy areas and exotic weeds in reserve.



**Figure 5:** Open sandy areas, native grasses and exotic weed species in reserve.



**Figure 6:** Abundant cushion plants in Mahaka Katia Scientific Reserve.



**Figure 7:** Golden scabweed cushion plant in reserve, showing rabbit damage in centre.



**Figure 8:** Desert broom (*Carmichaelia petriei*) in reserve.

## 6.2 Birds

### Proposed quarry expansion land

A total of three banded dotterel (*Charadrius bicinctus*) were seen foraging within the proposed quarry expansion land (Fig. 9). Banded dotterel are classified as "Threatened - Nationally Vulnerable" under the New Zealand Threat Classification System (Robertson *et. al.* 2017). A native harrier hawk (*Circus approximans*) was also seen flying over the land, a species classified as "Not Threatened" (Robertson *et. al.* 2017).

It is likely that the banded dotterel were passing through the proposed quarry expansion land, and not resident. No evidence of nesting could be seen, as it is outside of the breeding season, which is likely to be from August to December in Central Otago (Heather & Robertson 2005).

The habitat quality would be relatively low for banded dotterel in the proposed quarry expansion area, as they prefer braided riverbeds and river terraces for breeding and feeding, but will feed on pasture and tilled ground for invertebrates, and will also use lakeshores and mudflats (Heather & Robertson 2005). Several of these habitat types occur nearby in the Cromwell Basin. It is unlikely that the banded dotterel rely on the relatively small and already ecologically disturbed quarry expansion area.

A flock of introduced European greenfinch (*Carduelis chloris*) were also seen on the land. And an introduced California quail (*Callipepla californica*) was seen on an adjacent property when travelling from the site.

### Mahaka Katia Scientific Reserve

Banded dotterel are known to nest in the Mahaka Katia Scientific Reserve, as signposted on the DOC signage for the reserve (Fig. 10). South Island pied oystercatcher (*Haematopus finschi*) are also known to nest within the reserve (Fig. 10), and are classified as "At Risk - Declining" (Robertson *et. al.* 2017).

It is likely that all of the above bird species can be found either in the proposed quarry expansion land or the adjacent reserve from time to time.



Figure 9: Banded dotterel foraging in proposed quarry expansion land.



Figure 10: Sign at Mahaka Katia Reserve entrance showing banded dotterel and South Island Pied oystercatcher nest in the reserve.

### 6.3 Mammals

A feral cat (*Felis catus*) was seen on the proposed quarry expansion land (Fig. 11). Feral cats are a predator of banded dotterel, and pose a significant conservation threat to the species (Heather & Robertson 2005). European rabbits (*Oryctolagus cuniculus*) were seen on both the quarry expansion land and the Mahaka Katia Scientific Reserve, and were abundant (Fig. 12). Widespread sign of rabbit browsing and digging is evident.





**Figure 11:** Feral cat in proposed quarry expansion land.



**Figure 12:** Rabbit in Mahaka Katia Scientific Reserve. Rabbits are abundant over both sites.

## **7 Description of proposed activities**

It is proposed that the current Amisfield Quarry is expanded north from its eastern end, into the proposed expansion land, which is 9.8ha in size. This will involve excavating materials over the life of the quarry, which will be sorted and crushed and taken off site. Ultimately the site will consist of a large working pit or pits, with 25m set-backs from the boundaries to prevent land subsidence, as well as the formation of screening bunds to manage landscape effects and potential dust issues (Landpro 2020, Appendix 3). The bunding is intended to be 3m high, and will be designed with consideration to views from neighbouring properties (both with regards to maintaining views to the greater landscape, as well as obscuring the quarry activities (M. Curran, Landpro Ltd. *pers. comm.*).

## **8 Assessment of Ecological Effects**

### **8.1 Vegetation clearance**

#### **8.1.1 Effects – vegetation clearance within quarry expansion land**

Clearance of the plant species found on the proposed quarry expansion poses a no more than minor ecological effect. The site is already cultivated and dominated by exotic weed species and a few native plants found onsite are in low abundance and scattered, in what is a highly ecologically disturbed site.

#### **8.1.2 Mitigation – vegetation clearance**

None required.

### **8.2 Wildlife Disturbance**

#### **8.2.1 Effects – wildlife disturbance**

##### **Proposed quarry expansion land**

Over time the amount of habitat available for banded dotterel for occasional foraging will be completely removed by quarrying activities. It is likely that this will be a no more than minor ecological effect, as the habitat quality of the site currently is low, and banded dotterel are unlikely to be reliant on the small site, with better habitat being widely available nearby in the Cromwell Basin.

##### **Mahaka Katia Scientific Reserve**

There is some potential disturbance effect from quarrying the expansion area on the use of the Mahaka Katia Scientific Reserve by banded dotterel and South Island pied oystercatcher, but it is likely to be low.

It is unlikely that occasional banded dotterel foraging behaviour within the reserve will alter significantly. This is based on the observation of banded dotterel on the proposed quarry expansion land on the southern end of the land adjacent to the existing Amisfield Quarry, although it was not operating that particular day.

The potential disturbance effect on nesting by banded dotterel within the reserve exists, but is likely to be low. The reserve has open access to the public all year round, and there are two residential dwellings immediately adjacent to the reserve to the north and west, already creating a base level of disturbance to the site for wildlife. Noise from the use of quarrying machinery may create more disturbance to the birds in the reserve, if this is not mitigated adequately.

The level of potential disturbance, and its 'reach' over the reserve will depend on the "flight zone" of banded dotterel and the pied oystercatchers, which is the proximity distance at which they feel impacted by noise or the presence

people or operating machinery, and take flight and leave the site. It is likely there are areas within the reserve are far enough away from the boundary with the proposed quarry extension site, and the residential dwellings, where these birds will still feel comfortable enough to stay and nest, as the reserve is relatively large at 27ha over the two titles of the reserve.

## **8.2.2 Mitigation – wildlife disturbance**

### **Proposed quarry expansion land**

The removal of the marginal habitat on the quarry expansion land is unable to be mitigated, however the ecological effect is no more than minor.

### **Mahaka Katia Scientific Reserve**

Screening of the quarrying activities using earth bunds between 3m high could partially reduce the potential impacts of any noise, as if the source of the noise cannot be seen, the impact of the noise may be less severe. Seeing the source of a noise (i.e. moving machinery and people), can compound the level of disturbance from the actual noise itself.

It is proposed that aggregate quarried from the expansion area is processed in the existing quarry footprint, and not the proposed expansion area. The edge of the quarry in the expansion area will be set back 25m from the boundary. These measures will result minimal increases in noise disturbance in the reserve. The noise levels within the proposed quarry expansion area will comply with current consent conditions (Styles Group 2020).

## **8.3 Dust**

### **8.3.1 Effects – dust effects in Mahaka Katia Scientific Reserve**

There is potential for dust from quarrying to smother native vegetation and wildlife within the reserve, if not adequately mitigated. Depending on the amount of dust generated and settling out in the reserve, this could decrease the amount of photosynthesis the plants in the reserve are able to carry, and reduce plant vigour and health, potentially decreasing the amount of vegetation cover long-term.

Excessive dust, if not controlled, would also likely impact wildlife in the reserve, and in the case of the banded dotterel and oystercatchers restrict them to areas free from excessive dust within the reserve.

In their technical assessment of potential effects of dust discharges report, BECA (2020) state that dust deposition, if not controlled, is unlikely to occur to any significant degree beyond a distance of up to 200 m from significant dust sources in most circumstances. This translates to an area of approximately 7.8ha of the southern end of the reserve potentially affected by dust should it be uncontrolled, using 175m into the reserve (200m dust deposition limit minus 25m quarry pit set-back from boundary), over a width of approximately 450m across the southern end of the reserve immediately adjacent to the proposed area to be quarried. This is 7.8ha area is 29% of the 27ha reserve.

### **8.3.2 Mitigation – dust effects in Mahaka Katia Scientific Reserve**

Adequate mitigation must be undertaken to prevent significant dust loadings into the reserve. BECA (2020) recommend several dust control and mitigation measures in their report, and conclude that as long as the quarry continues to carry out current dust control measures and implements the recommended additional monitoring and mitigation measures, the effects of dust discharges to the reserve will be minimal.

## 9 Conclusions

1. The proposed quarry expansion area is largely cultivated (~60%), and dominated by exotic plant species, although some native plant species are present in small numbers.
2. One native plant species present in the proposed quarry expansion area, the cushion forming scabweed, is classified as "At Risk – Declining" in the New Zealand Threat Classification System.
3. The proposed quarry expansion area is ecologically a disturbed site.
4. Few bird species were encountered. Banded dotterel were observed foraging on the proposed quarry expansion area. Banded dotterel are classified as "Threatened - Nationally Vulnerable".
5. The ecological effect of the clearance of vegetation and use of the site for a quarry will be minimal.
6. The adjacent Mahaka Katia Scientific Reserve has high ecological values due its remnant native plant community.
7. Three of the native plant species present in the reserve are classified as "Threatened – Nationally Vulnerable". Three plants are classified as "Threatened - Nationally Critical". Two plant species present are classified as "At Risk - Declining". Two plant species present are classified as "Data Deficient", but are likely threatened to some extent. Five species are classified as "At Risk – Declining". One plant species is classified as "At Risk - Naturally Uncommon". A lichen species present is classified as "naturally uncommon". The remaining 21 native species present are "Not Threatened".
8. The reserve is a known site for the breeding of banded dotterel and South Island pied oystercatchers.
9. South Island pied oystercatchers are classified as "At Risk - Declining".
10. There is potential for disturbance to wildlife in the reserve from quarrying operations, in terms of noise and seeing machinery and people, but is likely to be low. It is likely that due to the size of the and shape of the reserve, that there will still be undisturbed areas for wildlife within the reserve.
11. If left unmitigated, there could be potential adverse ecological effects on native vegetation and wildlife from any dust from the proposed quarry expansion into the reserve. However with mitigation measures in place, the effects of dust within the reserve will be minimal.

## 10 Recommendations

1. That the quarry expansion area is screened along its boundary with the reserve with the use of earth bunds.
2. That dust from quarrying activities are effectively controlled and minimised beyond the property boundaries, by implementing the mitigation measures recommended in the BECA (2020) dust discharges report..

## 11 Acknowledgements

Matt Curran, Landpro Ltd. Travis Alison, Cromwell Certified Concrete Ltd.

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**Appendix 1:**

Ecological Context Plan. Landpro, Cromwell. Job. No.19474. Drawing No.: 01. 4.6.2020.



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L:\19474 - Cromwell Certified Concrete Limited - Permit applications for expansion of the Amisfield Quarry\CAD\19474\_01\_QUARRY PLAN.dwg Plotted: 04.06.2020



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Client  
**CROMWELL CERTIFIED  
CONCRETE LTD**

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 only, final dimensions and areas may vary on final survey

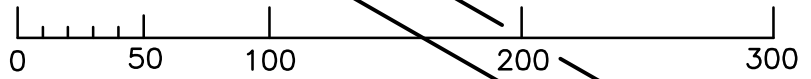
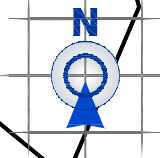
## ECOLOGICAL CONTEXT PLAN

Rev.	Date	Revision Details	By	Surveyed	Signed	Date	Job No.	Drawing No.
-	-	-	-	-	-	-	19474	01
				Drawn	Signed	Date	Scale	1:4000 @ A1
				SLB		4.6.20		1:8000 @ A3
				Designed	Signed	Date	Datum & Level	Rev.
							NZTM 2000 & MSL	-

**Appendix 2:**

Cromwell Certified Concrete, Aerial Photograph and Boundaries. Patterson Pitts Group, Cromwell. C2618. Sheet 1.  
Rev. A. 02/04/2019.





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 or  
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 Cromwell 9342.  
 T 03 445 1826  
 E cromwell@ppgroup.co.nz

Client/Location:  
**Cromwell Certified Concrete  
 Amisfield Quarry**

Purpose/Drawing Title:  
**Aerial Photograph  
 and Boundaries  
 April 2019**

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Surveyed by:	J Reeves	Original Size:	Scale:
Designed by:	XXX	A3	1:300 @ A3
Drawn by:	MG		
Checked by:	XXX		
Approved by:	XXX	DO NOT SCALE	
Job Ref:	C2618	Sheet No:	Date Created:
		1	A 02/04/2019

**Appendix 3:**

Cromwell Certified Concrete, Site Plan. Landpro Ltd., Cromwell. Job No. 19474. Drawing No.: 01. Rev. B.  
22/07/2020.



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L:\19474 - Cromwell Certified Concrete Limited - Permit applications for expansion of the Amisfield Quarry\CAD\19474\_01\_QUARRY PLAN\_REV B.dwg Plotted: 19.08.2020

 <p>OFFICES IN CROMWELL, GORE, AND NEW PLYMOUTH - www.landpro.co.nz</p>	Client <b>CROMWELL CERTIFIED CONCRETE LTD</b>	<h2>SITE PLAN</h2>	Rev. Date Revision Details By Surveyed Signed Date Job No. Drawing No. A 21.7.20 50m setback around neighbouring dwelling slb 19474 01 B 22.7.20 setback area expanded slb Drawn Signed Date Scale SLB 4.6.20 1:1500 @ A1 Designed Signed Date Datum & Level Rev. NZTM 2000 & MSL
	NOTES - All dimensions shown are in metres unless otherwise shown - Copyright on this drawing is reserved - Check any electronic data against the hardcopy plan to ensure it is the latest version - If this plan is being used as part of sale and purchase agreement then it is done so on the basis that it is preliminary only, final dimensions and areas may vary on final survey		

# Affected Persons Approval



To: The Manager, Planning and Environment  
Central Otago District Council  
PO Box 122  
Alexandra 9340

## TO BE COMPLETED BY THE PERSON(S) REQUESTING APPROVAL

Applicant(s): Cromwell Certified Concrete Ltd

Type of resource consent: Landuse Consent

Proposed activity: Expand existing quarry into adjoining parcel of land; increase annual production to 200,000m3/yr and associated increase in truck movements; installation of an entrance sign; increase water take and discharge; excavation of a bore; discharge to air (see AEE for further detail)

Location of site: 1248 Luggate-Cromwell Road (SH6)

I have sighted all the attached plans and supporting information for the above activity.

I hereby give unconditional approval for the application to be processed without public notification.

I understand that, by giving approval, the Council will not take into account any effects that the proposed activity may have on me, when considering whether this application should be notified (Section 95E of the Resource Management Act 1991) and whether the application should be granted (Section 104(3) of the Resource Management Act 1991).

## TO BE COMPLETED BY THE PERSON(S) GIVING THEIR APPROVAL

Name: ~~Lindsay Moore~~ Lindsay Allan Moore

Organisation: \_\_\_\_\_

Address: 1180

L A Moore

Signature

15/10/20

Date

Name: \_\_\_\_\_

Organisation: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Signature

\_\_\_\_\_

Date

### Checklist:

Signature of all legal owners

Site and/or subdivision plan with all required signatures

Elevations with all required signatures (if applicable)

**Information Sighted**

I have read or sighted the following information:

- 1. Full application for resource consent
- 2. Assessment of Environmental Effects
- 3. Plans as follows (*Please list plan title, author and date*):

Site Plan - Landpro

**Declaration**

- I/We have signed each page of the plans in respect of the proposal. These need to accompany this form.
- I/We understand that by giving my/our written approval, the Council when considering the application cannot take account of any actual or potential effects of the activity on my/our property.
- I/We understand that at any time before the hearing, if there is one, or, if there is not, before the application is determined, I/we may give notice in writing to the Council that this approval is withdrawn.

**Note:** You should only sign below if you fully understand the proposal. If you require the resource consent process to be explained you can contact the Customer Service Team at the Council who can provide you with information.

Signature(s):	A. <input type="text" value="J. Moore"/>	Date:	<input type="text" value="1/10/20"/>
Signature(s):	B. <input type="text"/>	Date:	<input type="text"/>
Signature(s):	C. <input type="text"/>	Date:	<input type="text"/>

**Privacy Information:** The Council requires the information you have provided on this form to process your application under the RMA and to collect statistics. The Council will hold and store the information, including all associated reports and attachments, on a public register. The details may also be made available to the public on the Council's website. These details are collected to inform the general public and community groups about all consents which have been processed or issued through the Council. If you would like to request access to, or correction of any details, please contact the Council.

**Notes to affected person signing written approval**

Conditional written approvals cannot be accepted.

There is no obligation to sign this form, and no reasons need to be given.

If this form is not signed, the application may be notified with an opportunity for submissions.

If signing on behalf of a trust or company, please provide additional written evidence that you have signing authority.

## Written Approval of Affected Persons Form 8A

Section 95E, Resource Management Act 1991

### Resource Consent Applicant's Details

**Applicant(s) name** (please write all names in full):

Cromwell Certified Concrete Ltd

**Consent number** (if known):

N/A

### Affected Person's Details

**Full name(s)** (please list the full names of all persons and/or organisations providing their written approval):

A. Lindsay Allan Moore

B.

C.

**Tick whether you are the:**

Owner

Occupier

Other (please specify)

**Address of affected property:**

7 Mt Pisa Road.

### Details of Proposal

**I/We hereby give written approval to the following activity that is the subject of a resource consent application** (please provide a brief description of the proposed activity):

Expand existing quarry into adjoining parcel of land; increase annual production to 200,000m<sup>3</sup>/yr and associated increase in truck movements; installation of an entrance sign; increase water take and discharge; excavation of a bore; discharge to air (see AEE for further detail).

**Address of proposed activity:**

1248 Luggate-Cromwell Road (SH6)

L. Moore 1/10/20

# APPLICATION FOR RESOURCE CONSENT OR FAST TRACK RESOURCE CONSENT FORM 9: SECTION 88 RESOURCE MANAGEMENT ACT 1991

1 Dunorling Street  
PO Box 122, Alexandra 9340  
New Zealand

03 440 0056

Info@codc.govt.nz  
www.codc.govt.nz



Email to: resource.consent@codc.govt.nz

Post to: The Chief Executive  
Central Otago District Council  
PO Box 122  
Alexandra 9340

## CONTACT DETAILS OF APPLICATION

Full name(s) and contact details of owner/occupier/applicant: *(name will be issued on the decision)*

---

Postal Address

---

Email

Phone

Full name(s) and contact details for service of application *(if different from above)* e.g. Agent:

---

Postal Address

---

Email

Phone

## DETAILS OF PROPERTY

Street address/rapid number of property to which this application relates:

---

---

Legal description of land:

---

## DETAILS OF APPLICATION

Application Type(s) applying for: *(please tick one)*

- Land use consent
- Subdivision consent
- Change/Cancelation of consent or consent notice conditions
- Extension of lapse period of consent (time extension) s125
- Certificate of compliance
- Existing use certificate

Description of proposal:

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- No additional resource consents are needed for the proposed activity.

Or

- The following additional resource consents are needed for the proposed activity. *(give details)*  
They have / have not been applied for: *(please highlight)*

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Under section 87AAC a controlled activity or deemed permitted boundary activity may be eligible for fast-track processing. Please select one:

I opt out  / I do not opt out  of the fast-track consent process.

## PAYMENT DETAILS

I confirm amount and date paid:

Reference used (if applicable):

- Bank Transfer to 020916 0081744 00 (BNZ Alexandra Branch). Please reference: "RC APP" and the applicant's surname in the payment details eg, RC APP SMITH
- Manual payment (can only be made once application lodged and RC reference number issued)



## APPLICATION CHECKLIST

### The following is attached to this application:

*(please tick boxes as appropriate)*

- \*Non-refundable application fee of the prescribed amount (an additional charge may also be payable where the initial application fee is inadequate to recover Council costs).
- Assessment of the Effects on the Environment (AEE).
- \*Copy of current Certificate of Title.
- \*A location plan.
- \*A site plan which shows the location of any buildings, driveways, parking areas or other significant features in relation to site boundaries. (Please ensure the paper size is either A4 or A3.)
- A building plan including the floor plan of the proposed building and elevations (if appropriate). (Please ensure the paper size is either A4 or A3.)
- Photographs of the site and of any important features relative to the application.
- Any other information required by the District Plan or Act or regulations to be included.

*\*Items with a star are required for all consent applications.*

Full details relating to the contents of applications are contained in the checklists and guidance notes available on Councils website [www.codc.govt.nz](http://www.codc.govt.nz) or from any Council office.

### Note to applicant:

You may apply for two or more resource consents that are needed for the same activity on the same form.

You must pay the charge payable to the consent authority for the resource consent application under the Resource Management Act 1991 (if any).

I/We attach, in accordance with the Fourth Schedule of the Resource Management Act 1991, an assessment of environmental effects in the detail that corresponds with the scale and significance of the effects that the proposed activity may have on the environment.

I/We attach any information required to be included in this application by the district plan, the regional plan, the Resource Management Act 1991, or any regulations made under the Act.

*(List all documents that you are attaching)*

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### **Subdivision consent requirements**

As/if this is an application for a subdivision consent, I/We attach information that is sufficient to adequately define: *(delete if this is not an application for a subdivision consent)*

- (a) The position of all new boundaries; and
- (b) the areas of all new allotments; and *(delete if the subdivision involves a cross-lease. Company lease or unit plan)*
- (c) the locations and areas of new reserves to be created, including any esplanade reserves and esplanade strips; and
- (d) the locations and areas of any existing esplanade reserves, esplanade strips, and access strips; and
- (e) the locations and areas of land below mean high water springs of the sea, or of any part of the bed of a river or lake, to be vested in the Crown or local authority under section 237A of the Resource Management Act 1991; and
- (f) the locations and area of land to be set aside as new roads.

As this is an application for a resource consent for reclamation, I/We attach information to show the area proposed to be reclaimed, including its location, the position of all new boundaries, and the portion of that area (if any) to be set apart as an esplanade reserve or esplanade strip. *(delete if this is not an application for a resource consent for reclamation)*



Signature

*(to be signed by applicant or person authorised to sign on behalf of applicant)*

Date