APPLICATION AS NOTIFIED

Bluesure Developments Limited (RM230542)

FORM 12

File Number RM230542

QUEENSTOWN LAKES DISTRICT COUNCIL

PUBLIC NOTIFICATION

Notification of an application for a Resource Consent under Section 95A of the Resource Management Act 1991.

The Queenstown Lakes District Council has received an application for a resource consent from:

Bluesure Developments Ltd

What is proposed:

A subdivision consent to create five (5) lots of which four (4) will have identified residential building platforms, while the balance will contain an existing residential unit.

The location in respect of which this application relates is situated at:

1172 Lake Hāwea Albert Town Road, Wānaka

The application includes an assessment of environmental effects. This file can also be viewed at our public computers at these Council offices:

- **74 Shotover Street, Queenstown;**
- **Gorge Road, Queenstown;**
- **and 47 Ardmore Street, Wanaka during normal office hours (8.30am to 5.00pm).**

Alternatively, you can view them on our website when the submission period commences:

https://www.qldc.govt.nz/services/resource-consents/notified-resource-consents#public-rc or via our edocs website using RM230542 as the reference https://edocs.qldc.govt.nz/Account/Login

The Council planner processing this application on behalf of the Council is Angela Crang, who may be contacted by phone at 027 337 1395 or email at angela.crang@qldc.govt.nz.

Any person may make a submission on the application, but a person who is a trade competitor of the applicant may do so only if that person is directly affected by an effect of the activity to which the application relates that –

a) adversely affects the environment; and
b) does not relate to trade competition or the effects of trade competition.

If you wish to make a submission on this application, you may do so by sending a written submission to the consent authority no later than:

Friday 22nd September 2023

The submission must be dated, signed by you and must include the following information:

a) Your name and postal address and phone number/fax number.
b) Details of the application in respect of which you are making the submission including location.
c) Whether you support or oppose the application.
d) Your submission, with reasons.
e) The decision you wish the consent authority to make.
f) Whether you wish to be heard in support of your submission.

You may make a submission by sending a written or electronic submission to Council (details below). The submission should be in the format of Form 13. Copies of this form are available Council website:

https://www.qldc.govt.nz/services/resource-consents/application-forms-and-fees#other_forms

You must serve a copy of your submission to the applicant (Bluesure Developments Ltd) as soon as reasonably practicable after serving your submission to Council:

C/- Dan Curly
dan@ipsolutions.nz
IP Solutions
5 Chalmers St,
Wanaka 9305,

QUEENSTOWN LAKES DISTRICT COUNCIL

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(signed by Jacob Neaves, Senior Planner pursuant to a delegation given under Section 34A of the Resource Management Act 1991)

Date of Notification: **Friday 25th August 2023**

Address for Service for Consent Authority:

Queenstown Lakes District Council	**Phone**	**03 441 0499**
Private Bag 50072, Queenstown 9348	**Email**	**rcsubmission@qldc.govt.nz**
Gorge Road, Queenstown 9300	**Website**	**www.qldc.govt.nz**

TechnologyOne ECM Document Summary
Printed On 18-Aug-2023

Class	Description	Doc Set Id / Note Id	Version	Date
PUB_ACC	Appendix A - Form 9	7691937	1	19-Jul-2023
PUB_ACC	AEE	7691938	1	19-Jul-2023
PUB_ACC	Appendix B - Record of Title	7691936	1	19-Jul-2023
PUB_ACC	Appendix C - Plans	7691935	1	19-Jul-2023
PUB_ACC	Appendix D - Landscape Report	7691934	1	19-Jul-2023
PUB_ACC	Appendix E - Geotech Report	7691933	1	19-Jul-2023
PUB_ACC	Appendix E - Supplementary Earthworks Letter	7691932	1	19-Jul-2023
PUB_ACC	Appendix F - Hazard Report	7691931	1	19-Jul-2023
PUB_ACC	Appendix G - Infrastructure Report	7691930	1	19-Jul-2023
PUB_ACC	Appendix H - Chorus Confirmation	7691929	1	19-Jul-2023
PUB_ACC	Appendix I - Aurora Confirmation	7691928	1	19-Jul-2023
PUB_ACC	Appendix J - NZTA Correspondence	7691927	1	19-Jul-2023
PUB_ACC	Appendix K - PSI	7691926	1	19-Jul-2023
PUB_ACC	Appendix L - EMP	7691925	1	19-Jul-2023

PUB_ACC	Appendix M - APA 1147B Lake Hawea-Albert Town Rd	7691924	1	19-Jul-2023
PUB_ACC	Appendix M - APA Hawea Golf Course	7691923	1	19-Jul-2023

APPLICATION FOR RESOURCE CONSENT OR
FAST TRACK RESOURCE CONSENT

FORM 9: GENERAL APPLICATION

QUEENSTOWN LAKES DISTRICT COUNCIL

Under Section 87AAC, 88 & 145 of the Resource Management Act 1991 (Form 9)

PLEASE COMPLETE ALL MANDATORY FIELDS* OF THIS FORM.

This form provides contact information and details of your application. If your form does not provide the required information it will be returned to you to complete. Until we receive a completed form and payment of the initial fee, your application may not be accepted for processing.

APPLICANT //

- Must be a person or legal entity (limited liability company or trust).
- Full names of all trustees required.
- The applicant name(s) will be the consent holder(s) responsible for the consent and any associated costs.

*Applicant's Full Name / Company / Trust: Bluesure Developments Ltd
(Name Decision is to be issued in)

All trustee names (if applicable):

*Contact name for company or trust: Nathan Simon

*Postal Address: 2/64 Mount Linton Ave Northlake

*Post code: 9305

*Contact details supplied must be for the applicant and not for an agent acting on their behalf and must include a valid postal address

*Email Address: nathan.simon@jennian.co.nz

*Phone Numbers: Day 021 632244

Mobile:

*The Applicant is:

- [x] Owner
- [ ] Prospective Purchaser (of the site to which the application relates)
- [ ] Occupier
- [ ] Lessee
- Other - Please Specify:

Our preferred methods of corresponding with you are by email and phone.
The decision will be sent to the Correspondence Details by email unless requested otherwise.

CORRESPONDENCE DETAILS // If you are acting on behalf of the applicant e.g. agent, consultant or architect please fill in your details in this section.

*Name & Company: Dan Curley

*Phone Numbers: Day 0276015074

Mobile:

*Email Address: dan@ipsolutions.nz

*Postal Address: 5 Chalmers Street, Wanaka

*Postcode: 9305

INVOICING DETAILS //

Invoices will be made out to the applicant but can be sent to another party if paying on the applicant's behalf.
For more information regarding payment please refer to the Fees Information section of this form.

*Please select a preference for who should receive any invoices and how they would like to receive them.

Applicant:	[x]	Agent:	[ ]	Other - Please specify:	
Email:	[x]	Post:	[ ]		

*Attention: Bluesure Developments Ltd c/Nathan Simon

*Postal Address: 2/64 Mount Linton Ave Northlake

*Post code: 9305

*Please provide an email AND full postal address.

*Email: nathan.simon@jennian.co.nz

OWNER DETAILS // Please supply owner details for the subject site/property if not already indicated above

Owner Name: as above

Owner Address:

Owner Email:

If the property has recently changed ownership please indicate on what date (approximately) AND the names of the previous owners:

Date:

Names:

DEVELOPMENT CONTRIBUTIONS INVOICING DETAILS //

If it is assessed that your consent requires development contributions any invoices and correspondence relating to these will be sent via email. Invoices will be sent to the email address provided above unless an alternative address is provided below. Invoices will be made out to the applicant/owner but can be sent to another party if paying on the applicant's behalf.

*Please select a preference for who should receive any invoices.

Details are the same as for invoicing ☑

Applicant: ☑ Landowner: ☐ Other, please specify:

*Attention: Bluesure Developments Ltd c/Nathan Simon

*Email: nathan.simon@jennian.co.nz

Click here for further information and our estimate request form

DETAILS OF SITE // Legal description field must list legal descriptions for all sites pertaining to the application. Any fields stating 'refer AEE' will result in return of the form to be fully completed.

*Address / Location to which this application relates:

1172 Lake Hawea-Albert Town Road, Rd 2, Wanaka 9382

*Legal Description: Can be found on the Computer Freehold Register or Rates Notice – e.g Lot x DPxxx (or valuation number)

Section 22 Block III Lower Hawea Survey District

District Plan Zone(s): Rural

SITE VISIT REQUIREMENTS // Should a Council officer need to undertake a site visit please answer the questions below

Is there a gate or security system restricting access by council?	YES ☐	NO ☑
Is there a dog on the property?	YES ☐	NO ☑
Are there any other hazards or entry restrictions that council staff need to be aware of? If 'yes' please provide information below	YES ☐	NO ☑

Tenants in current house, please infom Nathan prior to site visit so tenants are aware.

PRE-APPLICATION MEETING OR URBAN DESIGN PANEL

Have you had a pre-application meeting with QLDC or attended the urban design panel regarding this proposal?

☐ Yes ☑ No ☐ Copy of minutes attached

If 'yes', provide the reference number and/or name of staff member involved:

CONSENT(S) APPLIED FOR // * Identify all consents sought // ALSO FILL IN OTHER CONSENTS SECTION BELOW

☑ Land use consent

☐ Change/cancellation of consent or consent notice conditions

☐ Extension of lapse period of consent (time extension) s125

☐ Land use consent includes Earthworks

☑ Subdivision consent

☐ Certificate of compliance

☐ Existing use certificate

QUALIFIED FAST-TRACK APPLICATION UNDER SECTION 87AAC

☐ Controlled Activity

☐ Deemed Permitted Boundary Activity

If your consent qualifies as a fast-track application under section 87AAC, tick here to opt out of the fast track process ☐

BRIEF DESCRIPTION OF THE PROPOSAL //

* Please complete this section, any form stating 'refer AEE' will be returned to be completed with a description of the proposal

*Consent is sought to:

To undertake a five-lot subdivision and the establishment of four residential building platforms and associated earthworks.

APPLICATION NOTIFICATION

Are you requesting public notification for the application?

☑ Yes ☐ No

Please note there is an additional fee payable for notification. Please refer to Fees schedule

OTHER CONSENTS

Is consent required under a National Environmental Standard (NES)?

■ NES for Assessing and Managing Contaminants in Soil to Protect Human Health 2012

An applicant is required to address the NES in regard to past use of the land which could contaminate soil to a level that poses a risk to human health. Information regarding the NES is available on the website https://environment.govt.nz/publications/national-environmental-standard-for-assessing-and-managing-contaminants-in-soil-to-protect-human-health-information-for-landowners-and-developers/

You can address the NES in your application AEE OR by selecting ONE of the following:

☐ This application does not involve subdivision (excluding production land), change of use or removal of (part of) a fuel storage system. Any earthworks will meet section 8(3) of the NES (including volume not exceeding 25m^3 per 500m^2). Therefore the NES does not apply.

☐ I have undertaken a comprehensive review of District and Regional Council records and I have found no record suggesting an activity on the HAIL has taken place on the piece of land which is subject to this application.
NOTE: depending on the scale and nature of your proposal you may be required to provide details of the records reviewed and the details found.

OTHER CONSENTS // CONTINUED

☑ I have included a Preliminary Site Investigation undertaken by a suitably qualified person.

☐ An activity listed on the HAIL has more likely than not taken place on the piece of land which is subject to this application. I have addressed the NES requirements in the Assessment of Environmental Effects.

- Any other National Environmental Standard

☐ Yes ☑ N/A

Do you need any consent(s) from Otago Regional Council?

☐ Yes ☑ N/A

If Yes have you applied for it?

☐ Yes ☐ No

If Yes supply ORC Consent Reference(s)

If ORC Earthworks Consent is required would you like a joint site visit ?

☐ Yes ☐ No

INFORMATION REQUIRED TO BE SUBMITTED //

Attach to this form any information required (see below & appendices 1-2).

To be accepted for processing, your application should include the following:

☑ Computer Freehold Register for the property (no more than 3 months old) and copies of any consent notices and covenants
(Can be obtained from Land Information NZ at https://www.linz.govt.nz/).

☑ A plan or map showing the locality of the site, topographical features, buildings etc.

☑ A site plan at a convenient scale.

☑ Written approval of every person who may be adversely affected by the granting of consent (s95E).

☑ An Assessment of Effects (AEE).
An AEE is a written document outlining how the potential effects of the activity have been considered along with any other relevant matters, for example if a consent notice is proposed to be changed. Address the relevant provisions of the District Plan and affected parties including who has or has not provided written approval. See Appendix 1 for more detail.

☑ We prefer to receive applications electronically – please see Appendix 5 – Naming of Documents Guide for how documents should be named. Please ensure documents are scanned at a minimum resolution of 300 dpi. Each document should be no greater than 10mb

PRIVACY INFORMATION

The information you have provided on this form is required so that your application can be processed under the Resource Management Act 1991 and may also be used in statistics collected and provided to the Ministry for the Environment and Queenstown Lakes District Council. The information will be stored on a public register and may be made available to the public on request or on the company's or the Council's websites.

FEES INFORMATION

Section 36 of the Resource Management Act 1991 deals with administrative charges and allows a local authority to levy charges that relate to, but are not limited to, carrying out its functions in relation to receiving, processing and granting of resource consents (including certificates of compliance and existing use certificates).

Invoiced sums are payable by the 20th of the month after the work was undertaken. If unpaid, the processing of an application, provision of a service, or performance of a function will be suspended until the sum is paid. You may also be required to make an additional payment, or bring the account up to date, prior to milestones such as notification, setting a hearing date or releasing the decision. In particular, all charges related to processing of a resource consent application are payable prior to issuing of the decision. Payment is due on the 20th of the month or prior to the issue date – whichever is earlier.

FEES INFORMATION // CONTINUED

If your application is notified or requires a hearing you will be requested to pay a notification deposit and/or a hearing deposit. An applicant may not offset any invoiced processing charges against such payments.

Section 357B of the Resource Management Act provides a right of objection in respect of additional charges. An objection must be in writing and must be lodged within 15 working days of notification of the decision.

LIABILITY FOR PAYMENT – Please note that by signing and lodging this application form you are acknowledging that the details in the invoicing section are responsible for payment of invoices and in addition will be liable to pay all costs and expenses of debt recovery and/or legal costs incurred by QLDC related to the enforcement of any debt.

MONITORING FEES – Please also note that the fee paid at lodgement includes an initial monitoring fee of $273 for land use resource consent applications and designation related applications, as once Resource Consent is approved you will be required to meet the costs of monitoring any conditions applying to the consent, pursuant to Section 35 of the Resource Management Act 1991.

DEVELOPMENT CONTRIBUTIONS – Your development, if granted, may also incur development contributions under the Local Government Act 2002. You will be liable for payment of any such contributions.

A list of Consent Charges is available on the on the Resource Consent Application Forms section of the QLDC website. If you are unsure of the amount to pay, please call 03 441 0499 and ask to speak to our duty planner.

Please ensure to reference any banking payments correctly. Incorrectly referenced payments may cause delays to the processing of your application whilst payment is identified.

If the initial fee charged is insufficient to cover the actual and reasonable costs of work undertaken on the application you will be required to pay any additional amounts and will be invoiced monthly as work on the application continues. Please note that if the Applicant has outstanding fees owing to Council in respect of other applications, Council may choose to apply the initial fee to any outstanding balances in which case the initial fee for processing this application may be deemed not to have been paid.

PAYMENT // An initial fee must be paid prior to or at the time of the application and proof of payment submitted.

Please reference your payments as follows:

Applications yet to be submitted: RM followed by first 5 letters of applicant name e.g RMJONES

Applications already submitted: Please use the RM# reference that has been assigned to your application, this will have been emailed to yourself or your agent.

Please note processing will not begin until payment is received (or identified if incorrectly referenced).

I confirm payment by:

- ☐ Bank transfer to account 02 0948 0002000 00 (If paying from overseas swiftcode is – BKNZNZ22)
- ☑ Invoice for initial fee requested and payment to follow
- ☐ Manual Payment (can only be accepted once application has been lodged and acknowledgement email received with your unique RM reference number)

*Reference RMBluesure

*Amount Paid: Landuse and Subdivision Resource Consent fees - please select from drop down list below

$3696 - Other subdivision (e.g. Rural Residential, Rural Lifestyle)

(For required initial fees refer to website for Resource Consent Charges or spoke to the Duty Planner by phoning 03 441 0499)

*Date of Payment TBC

Invoices are available on request

APPLICATION & DECLARATION

The Council relies on the information contained in this application being complete and accurate. The Applicant must take all reasonable steps to ensure that it is complete and accurate and accepts responsibility for information in this application being so.

○ If lodging this application as the Applicant:

I/we hereby represent and warrant that I am/we are aware of all of my/our obligations arising under this application including, in particular but without limitation, my/our obligation to pay all fees and administrative charges (including debt recovery and legal expenses) payable under this application as referred to within the Fees Information section.

OR:

◉ If lodging this application as agent of the Applicant:

I/we hereby represent and warrant that I am/we are authorised to act as agent of the Applicant in respect of the completion and lodging of this application and that the Applicant / Agent whose details are in the invoicing section is aware of all of his/her/its obligations arising under this application including, in particular but without limitation, his/her/its obligation to pay all fees and administrative charges (including debt recovery and legal expenses) payable under this application as referred to within the Fees Information section.

☑ I hereby apply for the resource consent(s) for the Proposal described above and I certify that, to the best of my knowledge and belief, the information given in this application is complete and accurate.

PLEASE TICK

Signed (by or as authorised agent of the Applicant) **

Full name of person lodging this form Dan Curley

Firm/Company IP Solutions Ltd

Dated 19/7/2023

**If this form is being completed on-line you will not be able, or required, to sign this form and the on-line lodgement will be treated as confirmation of your acknowledgement and acceptance of the above responsibilities and liabilities and that you have made the above representations, warranties and certification.

Section 2 of the District Plan provides additional information on the information that should be submitted with a land use or subdivision consent.

The RMA (Fourth Schedule to the Act) requires the following:

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:
    - (b) a description of the site at which the activity is to occur:
    - (c) the full name and address of each owner or occupier of the site:
    - (d) a description of any other activities that are part of the proposal to which the application relates:
    - (e) a description of any other resource consents required for the proposal to which the application relates:

Information provided within the Form above

    - (f) an assessment of the activity against the matters set out in Part 2:
    - (g) an assessment of the activity against any relevant provisions of a document referred to in section 104(1)(b).

(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.

Include in an attached Assessment of Effects (see Clauses 6 & 7 below)

ADDITIONAL INFORMATION REQUIRED IN SOME APPLICATIONS

- An application must also include any of the following that apply:
    - (a) 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)):
    - (b) 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)):

ASSESSMENT OF ENVIRONMENTAL EFFECTS

Clause 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.

CLAUSE 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.

A2 APPENDIX 2 // Information requirements for subdivision

UNDER THE FOURTH SCHEDULE TO THE ACT:

- An application for a subdivision consent must also include information that adequately defines the following:
    - (a) the position of all new boundaries:
    - (b) the areas of all new allotments, unless 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:
    - (d) the locations and areas of any existing esplanade reserves, esplanade strips, and access strips:
    - (e) the locations and areas of any part of the bed of a river or lake to be vested in a territorial authority under section 237A:
    - (f) the locations and areas of any land within the coastal marine area (which is to become part of the common marine and coastal area under section 237A):
    - (g) the locations and areas of land to be set aside as new roads.

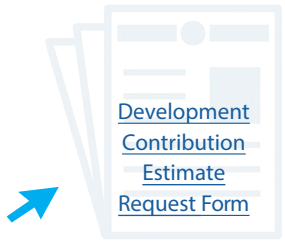
A3 APPENDIX 3 // Development Contributions

Will your resource consent result in a Development Contribution and what is it?

- A Development Contribution can be triggered by the granting of a resource consent and is a financial charge levied on new developments. It is assessed and collected under the Local Government Act 2002. It is intended to ensure that any party, who creates additional demand on Council infrastructure, contributes to the extra cost that they impose on the community. These contributions are related to the provision of the following council services:
    - Water supply
    - Wastewater supply
    - Stormwater supply
    - Reserves, Reserve Improvements and Community Facilities
    - Transportation (also known as Roading)

Click here for more information on development contributions and their charges

OR Submit an Estimate request *please note administration charges will apply



A4 APPENDIX 4 // Fast - Track Application

Please note that some land use consents can be dealt with as fast track land use consent. This term applies to resource consents where they require a controlled activity and no other activity. A 10 day processing time applies to a fast track consent.

If the consent authority determines that the activity is a deemed permitted boundary activity under section 87BA of the Act, written approval cannot be withdrawn if this process is followed instead.

A fast-track application may cease to be a fast-track application under section 87AAC(2) of the Act.

A5 APPENDIX 5 // Naming of documents guide

While it is not essential that your documents are named the following, it would be helpful if you could title your documents for us. You may have documents that do not fit these names; therefore below is a guide of some of the documents we receive for resource consents. Please use a generic name indicating the type of document.

- Application Form 9
- Assessment of Environmental Effects (AEE)
- Computer Register (CFR)
- Covenants & Consent Notice
- Affected Party Approval/s
- Landscape Report
- Ecological Report
- Engineering Report
- Geotechnical Report
- Wastewater Assessment
- Traffic Report
- Waste Event Form
- Urban Design Report

E Dan@ipsolutions.nz | **P** 027 601 5074 | **A** 5 Chalmers Street, Wanaka | **W** ipsolutions.nz

July 2023

Queenstown Lakes District Council
Wanaka Office
47 Ardmore Street
WANAKA 9305

Attention: Wanaka Planning Department

1.0 INTRODUCTION

Please find an application for Resource Consent to undertake a five-lot subdivision and the establishment of four residential building platforms and associated earthworks at 1172 Lake Hawea-Albert Town Road, Rd 2, Wanaka, 9382.

The application includes a description of the site and proposal; and an assessment of how the proposed outcomes will align with relevant District Plan rules and assessment criteria. A number of expert reports have been prepared in relation to this proposal including; Landscape Report; Geotechnical Report; Hazard Report; Infrastructure Report; Preliminary Site Investigation Report as well as an Infrastructure Report.

It is noted that the assessment within this report has been undertaken within early 2023, focussing and addressing the provisions which were operative at that time. It is recognised that due to the dynamic nature of the PDP, there has been environment court decisions released post this time period (namely [2023] NZEnvC 58), which may impact the numbering of policies and assessment matters referred to herein. In any case, it is considered that the outcomes remain as assessed and concluded below.

The applicant has requested public notification and wishes this to progress as soon as practically possible.

2.0 APPLICATION DETAILS

APPLICANT	**BLUESURE DEVELOPMENTS LIMITED**
SITE LOCATION	**1172 LAKE HAWEA-ALBERT TOWN ROAD, RD 2, 9382**
LEGAL DESCRIPTION	**SECTION 22 BLK III LOWER HAWEA SD**
SITE AREA	**5.233Ha**
ZONING (ODP)	**RURAL GENERAL**
ZONING (PDP)	**RURAL**

3.0 APPENDICES

APPENDIX A	**FORM 9**
APPENDIX B	**RECORD OF TITLE**
APPENDIX C	**PROPOSED SCHEME PLAN**
APPENDIX D	**LANDSCAPE ASSESSMENT**
APPENDIX E	**GEOTECH REPORT**
APPENDIX F	**HAZARD REPORT**
APPENDIX G	**INFRASTRUCTURE REPORT**
APPENDIX H	**CHORUS TELECOM SUPPLY CONFIRMATION**
APPENDIX I	**AURORA ENERGY SUPPLY CONFIRMATION**
APPENDIX J	**NZTA CORRESPONDENCE**
APPENDIX K	**PRELIMINARY SITE INVESTIGATION**
APPENDIX L	**EMP**
APPENDIX M	**WRITTEN APPROVALS**

4.0 SITE DESCRIPTION AND DESCRIPTION OF PROPOSAL

This application seeks subdivision and land use consents for a five-lot subdivision that will include the identification of 4 x 1,000m^2 residential building platforms, associated access, servicing, earthworks and landscaping.

The southern end of the subject site is located approximately 540m south of where the Lake Hawea Access Road intersects Lake Hawea-Albert Town Road (SH6). To the north is the Hawea service station which features a coffee caravan, fuel storage/station, mechanics workshop, and a transport depot, whilst to the south is Hawea Golf Course. The site sits approximately 500m southwest of Hawea Township, on the true right of the Hawea River.

Site topography is characterised by undulating, dilapidated land, which features an escarpment to the east which descends to just above Hawea River level, and a water race which runs north/south through the site.

The site currently features earth-worked bunds along the western perimeter of the site as well as a stream that transects the site from east to west. This course and channel appears to have been managed by previous land owners to suit hobby stock-water requirements.

The site covers 5.233ha in total and currently accommodates one dwelling (established around 1990) as well as two small sheds that appear somewhat run-down. The site has been utilised for residential living in a semi-rural context, offering some level of hobby stock keeping opportunities.

Being on the fringe of the Hawea Township, the wider area forms somewhat of a transitional zone, featuring a mixture of rural, semi-rural and urban land uses. Heading north from Wanaka/Albert Town towards Hawea, the environment is mostly Rural becoming more commercial, and featuring a greater quantum of built form as one approaches the subject site, including the Golf Course to the south and Hawea Garage (petrol station with associated mechanics and transport depot) to the north. Further north, past the Hawea Township intersection, there is the Hawea Campground and associated facilities/amenities.

In terms of landscape appreciation and how it is viewed in proximity to the site, the wider distant landscape comprises the slopes of mountains that are predominantly void of built form, whereas most parts of the basin floor, to the west of Hawea River, in close proximity to the Township, (of which the site is situated) exhibits a semi-rural character, containing scatterings of rural living/domestic occupation, along with a somewhat commercialised area within the vicinity of the site. As such, the subject site is considered nestled between commercial development to the north and south with rural living development to west. The development to the north and south forms a linear stretch of commercial development, all situated in a prominent position on the upper terrace (ie. a level above Hawea River). These occupations consist of scatterings of built form, with some established amenity planting, trees and shelter belts. The proposed subdivision and building platforms will form continuity,

sympathetically adding to the existing stretch of established development/visible built form that extends along the eastern side of SH6.

This proposal will result in one additional vehicle crossing to service the four proposed platforms with the status quo of access arrangements remaining for proposed Lot 1/the existing residential unit. This access lot, Lot 100, is to be held in equal ownership between Lots 2-5. The applicant undertook consultation with NZTA (Waka Kotahi) on the proposed access arrangement and whilst initially proposing to utilise an existing crossing place (noted on the Scheme Plan), NZTA indicated that a more suitable place would be 100m north to avoid conflict with an existing crossing place situated on the western side of SH6. This was agreed to by the applicant, as well as the conditions recommended by NZTA, and so this new crossing place now forms part of the proposed scheme. Please refer the Scheme Plan below (attached as **Appendix C**).

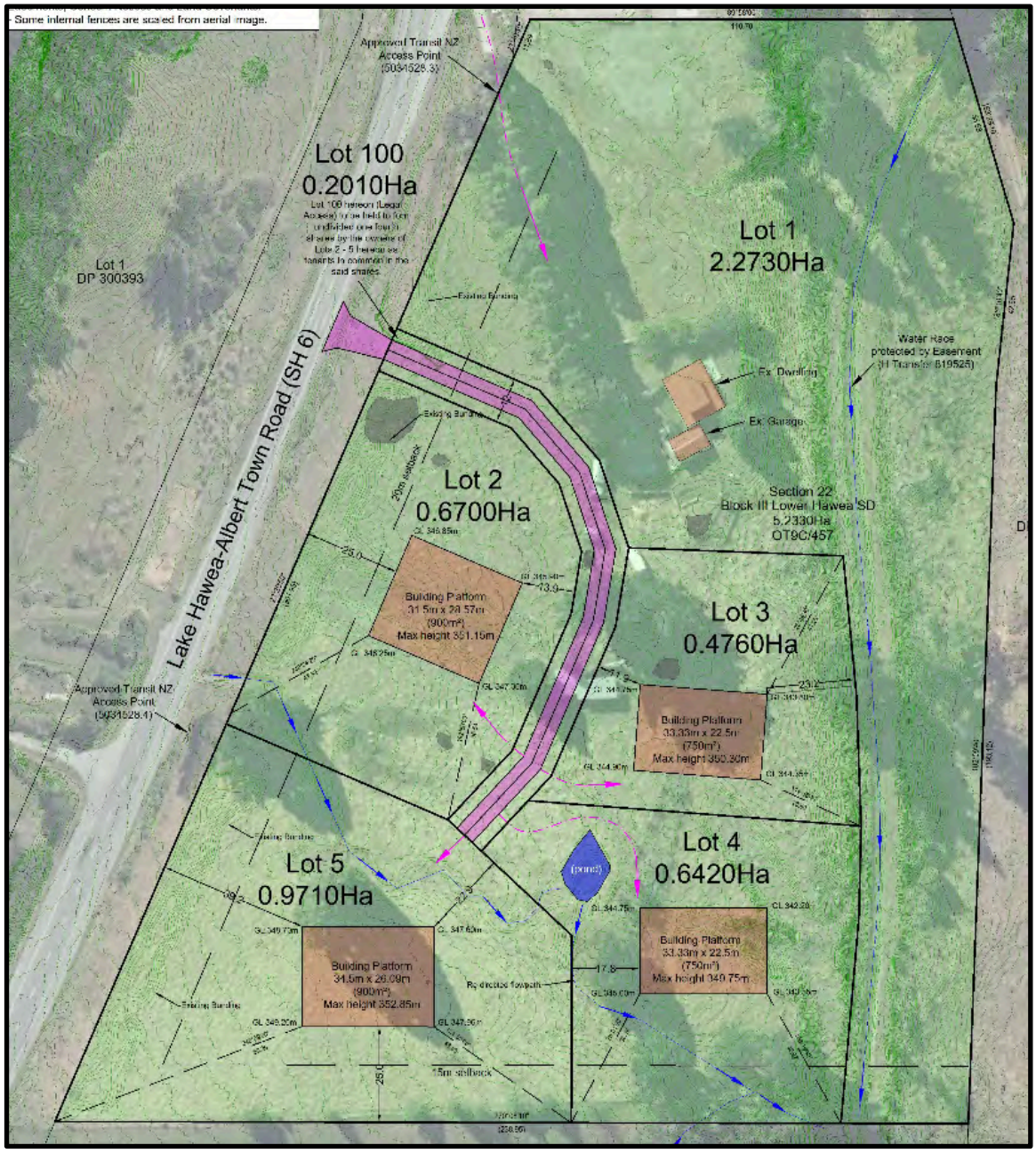


Figure 1: Subdivision Scheme Plan, attached as part of this application as **Appendix C**.

The site is zoned as Rural General under the Operative District Plan (ODP) and Rural Zone under the Proposed District Plan (PDP). The site and its surroundings are classified as being located within a Rural Character Landscape under the PDP. Whilst land to the west, beyond SH6, is classified as an Outstanding Natural Landscape, it is noted that the lower reaches of the Hawea River, closest to the subject site, are not identified as ONL by the PDP. It is also noted that this area of the river

corridor/Lake has been extensively modified through damming for electrical generation, bridge construction, associated gravel/maintenance tracks, water race construction (still visible today) and historic bridge construction (previously situated to the south east of the site).

The subject site is also identified as including Wahi Tupuna overlay. This overlay relates to two areas; Paetaraiki & Timaru (slopes and lake margins around southern Lake Hawea) as well as Hawea River. Consultation is now underway with Aukaha and outcomes/correspondence will be forwarded to the planner on receipt.

A geotechnical report was prepared by Insight Engineering and in response to their recommendations, a subsequent flooding/debris flow hazard report was prepared by R.JHall & Associates Ltd. These are attached **Appendix E** and **F** to this application. **Appendix F** explains and confirms appropriate flood mitigation which involves the recommendation of minimum finished floors levels and the establishment of two small bunds for the protection of platforms. It is offered that the bund recommended for Lot 3 and recommended flood water bypass mechanism for Lot 4 are specified at 223 stage and implemented prior to 224(c).

The Applicant would welcome dialogue with Council as to the timing of mitigation such as minimum floor levels, more specifically the appropriateness of earthwork components being constructed pre 224c or simply prior to the establishment of a residential development within each building platform (detailed as a Consent Notice requirement to be adhered to at the time of building establishment).

The application site currently features overhead power lines. The applicant intends to re-locate these underground. The scheme proposes an open space area along the escarpment on the eastern extent of the site to be held in the ownership of proposed Lot 1. This area is to include a re-vegetation initiative as detailed within **Appendix D.**

4.1 PROPOSED SUBDIVISION

Table 1. Proposed Lot Configurations

Proposed Allotment	Area (ha)	Building Platform Shape and Area (m^2)	Max Building Height (RL)	Access

1	2.2730	No platform proposed, status quo to continue	Status quo to remain	Existing formed access and driveway from SH6 (status quo to remain)
2	0.6700	Rectangular (31.5m x 28.57m)	351.15m	New proposed access from SH6 and shared private access via Lot 100
3	0.4760	Rectangular (33.33m x 22.5m)	350.30m	New proposed access from SH6 and shared private access via Lot 100
4	0.6420	Rectangular (33.33 x 22.5m)	349.75	New proposed access from SH6 and shared private access via Lot 100
5	0.9710	Rectangular (34.5 x 26.09m)	352.85m	New proposed access from SH6 and shared private access via Lot 100

The boundary between proposed Lots 1 and 3 and Lots 3 and 4 runs east to west across the site, partly parallel to the existing boundary. The boundary between Lot 2 and Lots 1/3/4 is irregular and follows the alignment of the curved access way. The boundary between Lot 4 and 5 generally runs north/south with an angled section to provide an access connection to Lot 4.

As discussed, there will be one additional vehicle crossing constructed as part of this proposal. Whilst the proposal was to originally utilise an existing 'Approved Transit NZ Access Point' (5034528.4), post consultation with NZTA, the proposed access has been shifted to the north in order to avoid vehicle crossing conflict with the existing crossing servicing 1147A Lake Hawea-Albert Town Road. Recommended construction management conditions and geometry standards have been agreed to by the applicant and are included within this application, correspondence attached as **Appendix J**.

Ultimately, all proposed platforms are situated on the usable upper terrace, sensitively set back from the Hawea River Corridor and associated walking tracks. The scheme seeks to utilise existing landform, topography and features, whilst providing for ecological enhancement via a regenerative riparian vegetation scheme on proposed Lot 1.

Earthworks will be required for services, installation of access, as well as to create flat, buildable platforms as well as flood water bypass mechanisms. An EMP for these works is attached as **Appendix L**.

4.2 SERVICING

Water

The subject site is currently supplied water by a natural run-off generated from the hill slopes directly west of the site (located on the other side of the State Highway corridor).

To service this proposal, it is proposed that the applicant upgrades an existing lateral which extends from Council reticulated water infrastructure to the Lake Hawea Garage/Clark's Autos.

There is an existing water line, of which a licence to occupy has been established over in favour of the neighbouring property (Clark's Autos) that extends from the intersection of the State Highway and Capell Avenue.

As part of this application, it is proposed to upgrade the diameter of this infrastructure, which will provide enhanced flow and pressure to both the current use, and future use (including any future development) of both the proposed subdivision, and the existing Clark's Auto industrial land use establishment.

Whilst P&I has been approached in this regard, a response has not yet been provided, and so will be forwarded to Council's planner on receipt.

In terms of firefighting provisions, there are two options; the first would be to gain enough water flow and pressure to provide an appropriate hydrant within the shared access. However, until the outcome of consultation with the Property and Infrastructure team is known, this cannot be definitively confirmed. The second option is to implement fire-fighting water tanks to service each lot at time a building is constructed within each platform. The applicant is agreeable for these options to form the basis of a condition of consent with confirmation and associated design/specifications provided at engineering acceptance stage.

Telecom

The existing dwelling on proposed Lot 1 is already serviced with telecommunications. This service can be extended to the proposed building platforms (Lots 1-4). Confirmation from Chorus is attached as **Appendix H.** Flexibility in regard to the provision of telecommunication services is requested such that the most appropriate and efficient telecommunication/broadband connection be established at the time of exercising the subdivision.

Figure 2: Application site and relevant broadband options overlayed. Pink that the site is within Vodafone 4G coverage and light yellow indicates the site is within 3G coverage. Subject site indicated with red drop. (Source: https://www.vodafone.co.nz/broadband/rural/).

Electricity

Electricity is able to be extended to the proposed lots/building platforms. Confirmation from Aurora Energy that these connections are able to be made is attached as **Appendix I.**

Wastewater and Stormwater

It is the intention that each lot/future rural living activity will have their own sceptic tank, with effluent from each tank pumped or drained via gravity to a communal dispersal to ground system. It is proposed that a communal secondary wastewater disposal area is installed, protected by easement, and managed by a formal ownership entity. This would apply to Lots 1-4, however should also enable a connection from Lot 1. A report prepared by Civilised Ltd is attached as **Appendix G.**

4.3 PROPOSED DEVELOPMENT CONTROLS

The following controls are proposed. These align with the recommendations in the Appendices and are volunteered as conditions of consent:

NZTA Conditions

1. That vehicle crossing place CP6 shall be shifted approximately 100m north from its existing location clear of the seal widening on the other side of the highway.
2. That CP6 in its' new location is upgraded in accordance with the NZ Transport Agency's Diagram E standard as outlined in the Planning Policy Manual (2007) and to the satisfaction of the NZ Transport Agency's Network Manager.
3. That CP6 in its current location shall be permanently closed, including reinstatement of any fence line, grassed areas, berm, highway drainage or kerb to be consistent with the adjacent road reserve treatment, to the satisfaction of the NZ Transport Agency Network Manager.
4. Prior to the issuing of a certificate pursuant to Section 224(c) of the Resource Management Act 1991, the consent holder shall provide to Council, correspondence from the NZ Transport Agency confirming that works to the State Highway, including vehicle crossings, have been constructed to NZ Transport Agency standards.
5. Prior to the issuing of a certificate pursuant to Section 224(c) of the Resource Management Act 1991, the consent holder shall provide to Council confirmation that NZ Transport Agency has been advised of the new Records of Title to issue and received the approved survey plan, to facilitate the registration of any new or shifted Crossing Place (CP) Notice against those new titles, under Section 91 of the Government Roading Powers Act 1989.

Engineering Conditions

6. Prior to commencing works on the site, the consent holder shall obtain 'Engineering Review and Acceptance' from the QLDC for development works to be undertaken and information requirement specified below. The application shall include all development items listed below:
    a. Specifications of the secondary communal wastewater treatment and disposal system designed by a suitably qualified professional.
    b. Confirmation and specifications, by a suitably qualified professional, of the suitable water bypass mechanism for Lot 4; and the formation of two bunds upon Lot 3.
    c. The formation of the vehicle crossing in accordance with Council Standards.
    d. The formation of the Private Access Way to be constructed in accordance with Council standards.
    e. Potable water connection design to council standards for each proposed lot.
    f. Confirmation of adequate firefighting water requirements which confirms either of the following;
        i. Adequate water pressure to allow for fire hydrants and their associated location and design;
        ii. Implement an ongoing consent notice condition to provide fire fighting water tanks and associated couplings at time buildings are established on each lot.
    g. Confirmation of earthwork areas relative to 'potentially impacted areas' as identified within Preliminary Site Investigation (PSI) report prepared by insight engineering dated 26th April 2023 and the proposed remediation method of these areas involving either 0.5m cover of cleanfill or the potentially impacted areas, disposed of offsite.

7. Any areas which are earthworked and fall within identified 'potentially impacted areas' as highlighted within the Preliminary Site Investigation (PSI) report prepared by insight engineering dated 26th April 2023), shall be covered with at least 0.5m of cleanfill or disposed of off-site at a suitable facility.

8. If at any point during the physical works, material is unearthed in other parts of the development which shows signs of significant contamination (visual or olfactory indicative of chemical odours or abnormal stains), work should stop immediately and a suitable qualified environmental practitioner should be able to assess the risk to human health prior to recommencing works.

9. Prior to the issuing of a certificate pursuant to Section 224(c) of the Resource Management Act 1991, written confirmation shall be provided from the telecommunications network supplier responsible for the area, that either; provision of underground telephone services has been made available to the boundary of Lots 2-5 and that all the network supplier's requirements for making such means of supply available have been met, OR, that there is adequate capacity within the local wireless distribution network to service Proposed Lots 2-5.

Landscaping

10. The maximum height for any built form within the building platform upon Lots 2-5 shall be no greater than the Maximum RL detailed within **Appendix C.** Pitched roofs (gable-end or mono-pitched) may breach the maximum RL by no more than 0.3m.

11. Prior to the issuing of a certificate pursuant to Section 224(c) of the Resource Management Act 1991, **t**he Structural Landscape Plan shall be implemented. This includes the felling of the existing wilding pines situated on site.

12. The Structural Landscape Plan shall be retained and maintained in perpetuity in accordance with the approved plan. If any plant or tree should die or become diseased it shall be replaced within the next available planting season.

Ongoing Conditions

13. Primary wastewater systems on Lots 2-5 shall be designed by a suitably qualified engineer prior to the construction of a residential dwelling, taking account of the infrastructure report

attached as **Appendix G.** It shall also account for any ongoing specifications which may arise from the design and installation of the communal secondary treatment and disposal system.

4.4 NATIONAL ENVIRONMENTAL STANDARDS FOR ASSESSING CONTAMINANTS IN SOIL

With respect to a preliminary site investigation (PSI) of soil contaminants, consistent with the published guidelines for assessing and managing contaminants in soil to protect human health, a site walk over has been undertaken. This walkover highlighted areas of waste disposal as well as historic agricultural operation. Subsequently, a Preliminary Site Investigation was undertaken by a contaminated land expert, Claude Midgely from Insight Engineering. This report is attached as **Appendix K.**

The report suggests that has been four HAILs activities identified to have historically occurred onsite. As a result, the NES for assessing and managing contaminants in soil to protect human health is relevant and requires consideration.

With regards to the subdivision/changing use of the subject site, this is considered to be a permitted activity given that the requirements of regulation 8(4) have been met. As noted within this report, it is considered highly unlikely that there will be a risk to human health if the site is developed and used for residential purposes as long as potentially impacted areas are covered by at least 0.5 m of cleanfill or, the material is disposed of off-site. This is offered as a condition of consent within section 4.3 above.

With regards to Regulation 8(3), earthworks will exceed 25m^3 per 500m^2 and therefore the physical works necessary to execute the subdivision is not a permitted activity and requires consent. Upon the advice of a contaminated land expert (Claude Midgely from Insight engineering), no detailed site investigation has been undertaken given the low likelihood of contamination impacts resulting in risks to worker health. **As a result, resource consent for a discretionary activity is required as per Regulation 11(1) of the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health.**

5.0 SITE HISTORY

The following resource consents are relevant to this application:

- RM980410 – Approved the establishment of a two-bay garage.
- RM0601079 – Applied for the establishment of an implement shed. This application was not progressed and was subsequently never approved.

6.0 RELEVANT PROVISIONS OF THE DISTRICT PLAN

6.1 ACTIVITY STATUS (Operative District Plan)

The subject site is zoned Rural General under the Operative District Plan, however the application does not require consent under the ODP given that the relevant rules under the PDP have been ratified.

6.2 ACTIVITY STATUS (Proposed District Plan)

Under the Proposed District Plan, the site is zoned Rural and the proposed subdivision and building platforms require the following consents:

- A **discretionary** activity consent pursuant to **Rule 21.4.10** regarding identification of building platforms not less than 70m^2 and not greater than 1000m^2;

- A **discretionary** activity consent pursuant to **Rule 27.5.12** regarding all subdivision activities in the rural zone;

- A **restricted discretionary** activity pursuant to **Standard 21.5.1** for the placement of building platforms (within which future built form would be a permitted activity to occur) at a distance less than 15m from proposed internal boundaries. Both Lots 2 and 3 breach this internal setback standard by 1.1m and 3.1 respectively. Council's discretion is restricted to the following matters:

    a. Rural amenity and landscape character;

b. Privacy, outlook and amenity from adjoining properties.

- A **restricted discretionary** activity pursuant to **Standard 21.5.2** for the placement of building platforms (within which future built form would be a permitted activity to occur) at a distance less than 40m from SH6. In this case, both Lots 2 and 5 breach this setback standard by 15m and 0.8m respectively. Council's discretion is restricted to the following matters:

  a. Rural amenity and landscape character;
  b. Open space;
  c. Adverse effects on the proposed activity from noise, glare and vibration from the established road;
  d. Where electricity sub-transmission infrastructure or significant electricity distribution infrastructure as shown on the DP web mapping application is located within the adjacent road, any adverse effects on that infrastructure.

- A **non-complying** activity pursuant to **Rule 27.7.28** given that there is no building platform proposed upon Lot 1, which is being created to contain existing residential activity, including the existing dwelling and garaging.

- A **restricted discretionary** activity pursuant to **Standard 29.5.20** for breaching the minimum distance between vehicle crossings onto State Highways. The distance between the proposed crossing the crossing on the other side of the road to the south, is approximately 63m. The distance between the proposed crossing the existing crossing to the north is approximately 145m. Council's discretion is restricted to effects on the efficiency of land-use and the safety and efficiency of the transport network, including the pedestrian and cycling environment.

- A **restricted discretionary** activity pursuant to **Rule 27.5.11** for the subdivision of land that results in creation of an additional lot within an identified Wahi Tupuna area, outside of the urban environment, where subdivision is a potential threat set out in schedule 39.6. Council's discretion is restricted to; Effects on Manawhenua values.

It is noted that for the purposes of 27.5.11, these activities will not be publicly notified and for the

purpose of limited notification, assessment of affected persons shall be limited to effects on Manawhenua.

Overall, under the Proposed District Plan, the proposal qualifies as a **non-complying** activity.

7.0 ASSESSMENT OF ADVERSE EFFECTS

7.1 PERMITTED BASELINE

Pursuant to Section 104(2) of the Act, when considering the actual and potential effects of an application for resource consent, a consent authority may disregard an adverse effect of an activity on the environment if the plan permits an activity with that effect (the permitted baseline).

In this instance, the permitted baseline includes:

- Vehicle movements associated with existing residential use and occasional hobby farming of the property;
- Extension to the existing dwelling up to 30% of the existing floor area up to 8m in height;
- Horticultural and viticultural activities;
- Farming activities;
- Planting of grasses, pasture grass species, crops and any other plant (shrubs and/or trees in line with Chapters 33 and 34 of the PDP) for landscaping or other purposes;
- Earthworks of an unlimited volume for cropping or cultivation;
- Up to 1,000m^3 for activities other than cropping or cultivation;
- Earthworks of an unlimited contiguous area for cropping or cultivation;
- Up to 10,000m^3 contiguous area of exposed soil for activities other than cropping or cultivation;
- Digging of holes for offal pits; and
- Fencing up to 2m in height of rural or other style;

7.2 EXISTING ENVIRONMENT

The existing environment is of relevance to the consideration of the proposed subdivision and

comprises of consented development. The existing environment includes a residential dwelling and associated garaging, sheds and remnants of waste.

7.3 RECEIVING ENVIRONMENT

In addition to the permitted baseline and existing environment, it is important to consider the receiving environment which includes existing and consented development adjacent to and in the vicinity of the application site.

The receiving environment includes commercial and service activities located to the south and north, as well as further north of the subject site. These occupations consist of scatterings of built form, with some established amenity planting, trees and shelter belts.

The broader area of which the site is located is characterised by somewhat of a band of rural-living type development located to the west (true right) of the Hawea River, which is interspersed with some small-scale rural activities. To the east (true left) of the Hawea River, opposite the subject site, is Hawea Township, including the developments known as 'Timsfield' as well as 'Longview' further out.

To the west of the subject site, on the opposite side of the SH6 are the lower slopes of Mount Maude. These lower reaches are characterised by a number of residential properties including; 1147A, 1147B, 1147C, 1147E Lake Hawea-Albert Town Road.

Given the above, despite its Rural zoning, when travelling north along SH6, approximately 1.2km beyond the Te Awa Road turnoff, visual evidence of rural living development and commercial enterprises extend northwards.

It is within the context of the above-described permitted baseline, existing and receiving environments that the actual and potential effects of the proposed development will be considered below.

7.4 ASSESSMENT OF ADVERSE EFFECTS ON THE ENVIRONMENT

In addition to the subdivision, earthwork and transport assessment matters, the following are relevant and will be addressed below:

21.21.2.1 Existing Vegetation;
21.21.2.2 Effects on landscape quality and character;
21.21.2.3 Effects on visual amenity;
21.21.2.4 Design and density of Development;
21.21.2.5 Tangata Whenua, biodiversity and geological values;
21.21.2.6 Cumulative effects of subdivision and development on the landscape; and
21.21.3 Other factors and positive effects.

An assessment of landscape and visual effects has been undertaken by Anne Steven, Landscape Architect and is attached as **Appendix D** to this application which is adopted for the purposes of this report and is drawn on below.

Existing Vegetation

As stated in **Appendix D**, there are a number of mature trees on the site which were well established by 2002, and therefore form part of the environment. It is noted however that the pines are wilding species and have been disregarded.

Effects on Landscape Quality and Character

The area in which the site is located is categorised as RCL under the PDP. Somewhat significantly, it is noted that whilst the subject site is categorised as RCL, it is not identified within any priority area indicated by Council's Upper Clutha Landscape study, the closest being West of Hawea River.

Related to this, it is imperative to understand and account for the current landscape context as it currently exists. This character and the current visual amenity values the subject site exhibits have been described within **Appendix D**, section 4.3. Overall, Ms Steven considers the site to ***"have no particular significant and does not contribute in any significant way to landscape values"***.

In terms of the assessment on landscape character, **Appendix D** notes and concludes the following:

- The development would be broadly seen in the same view as the ONL area of Mt Maude but would not adversely affect the quality and character given the existing and receiving built and vegetative environment;
- Site is in the foreground of views of distant ONL of Mckerrow Range but given the expanse of views and elements which are encompassed within this, the proposed development would not have an adverse effect in respect of these views of the ONL;
- Ms. Steven considers the proposed native planting along the SH6 boundary would improve the foreground;
- The retention of the lower terrace and scarp area in open space with re-vegetation in predominantly native species would be consistent with the character of the Hawea River corridor;
- The pastoral character and openness of the site would be diminished however the proposal there would be a greater degree of coherence due to the planned layout with design controls and a planned unifying tree framework and highway boundary planting;
- Given the eclectic character and existing overall low quality of the landscape the Site is set in, and the limited landscape values the Site itself has (set out within section 4.3 **Appendix D**), Ms Steven does not consider the proposed rural living land use, including extensive landscape enhancement, would degrade the quality and character of the surrounding RCL; and
- Overall, the proposal is considered to improve the road corridor amenity and the approach to Hawea with the outcome being a significant greening of the approach with less clutter and woody weeds apparent.

The above conclusions inform this AEE. Overall, I understand that potential adverse effects on landscape character will be minor.

Visual Amenity

In terms of visibility, **Appendix D** includes a visual effects assessment and assessment of effects upon

visual amenity. This concludes:

- Future dwellings would be highly visible on Lots 2 and 5 from SH6 until the road boundary planting on the mounding matured.
- Building platforms/curtilage upon proposed Lots 3 and 4 and the associated building platforms/curtilage would be considerably less visible from SH6.
- The conversion of the relatively small and isolated Site from a somewhat unkempt and deteriorating pastoral state with a persistent woody weed problem to a more managed landscape including amenity landscaping around dwellings is likely to provide a similar if not higher level of public visual amenity.
- The Lot 3 and 4 dwellings would be visually prominent in views from the true right of Hawea River corridor including skyline effects. Whilst this may be initially moderately adverse, the public track has a low-level usage and will be viewed in the context of the Hawea Dam, unkempt contact energy land as well as the Hawea garage. The re-vegetation of the scarp and lower terrace area would soften and filter views of future residential land use. In time the degree of adverse effect is likely to substantially diminish with the long-term outcome likely to be a positive effect as the vegetation comes to dominate.
- It is possible, given the context and run-down site character, that the visibility of this proposed residential development may not necessarily be regarded as adverse at all but rather a change for the better.
- There are no meaningful views of RCL across the Site due to existing tree vegetation on and off site.
- This landscape area is not viewed from the wider area in a public sense being broadly confined by topography being the lower flank of Mt Maude, the crest of the large alluvial fan, and the Hawea dam and terminal moraine.
- The proposed development would not result in any new lines, earth forms or vegetation patterns that would sit uncomfortably in the landscape.

Overall, in consideration of the assessment Ms Steven, the proposed development will result in adverse visual effects that will be more than minor in the short term, reducing to less than minor in degree in the longer term (approximately 5-7 years).

Design and Density of Development

Appendix D provides within section 7.5, an assessment of the form and density of development. It is imperative to consider the proposed form and density of development in context with the existing and surrounding environments. As concluded within **Appendix D**, whilst there are no options for alternative locations that would have less impact on the existing landscape character, *"the change in character is not regarded as an adverse outcome in this case"*.

Overall, it is considered that the scheme configuration, location of building platforms, landscape planting and proposed building controls (coupled with those within the District Plan) will ensure adverse effects are mitigated as much as is possible.

Tangata Whenua, biodiversity and geological values

The site is located within the Wahi Tupuna overlay identified within the district plan. This relates to two areas; Paetaraiki & Timaru (slopes and lake margins around southern Lake Hawea) as well as Hawea River. There is a strip of land to the east of the site owned by Contact Energy Ltd, this separates the site and the Hawea River Margin.

The application is proposing a communal septic discharge system. Not only is this to be located as far as possible from Hawea River (whilst still being geologically adequate), but the discharge will also comply with the ORC (and national) requirements.

Whilst the application will involve earthworks, there are no known specific tangata whenua values on the site. The applicant is agreeable to an accidental discovery protocol condition in order to protect any findings.

The site as it stands exhibits no biodiversity values of note, the vegetation is largely exotic in species, featuring large, dilapidated pines with mostly rank grass interspersed with rocky outcrops. The application proposes a swathe of indigenous, somewhat riparian planting on the escarpment next to

the existing race, ensuring access to this is preserved. Large amounts of planting is also proposed around the entrance to the subdivision as well as along SH6. The outcome is to be an unequivocal positive on the biodiversity of the site via the reduction in exotic species (wilding pines) and a concurrent increase in native vegetation.

The escarpment may be considered the most notable geological feature, and in this regard, the subdivision proposes to preserve this area as open space whilst undertaking revegetation along this area. The building platforms have also been sensitively situated off the escarpment edge to avoid adverse effects in this regard.

It should be noted that the applicant is consulting with Aukaha. All outcomes related to that consultation will be made available to the Council's planner on receipt of Aukaha's position/assessment of the proposal.

Cumulative Effects of Development on the Landscape

The nature and extent of existing development has been described in Section 4 above and also in the landscape assessment attached as **Appendix D.** Ms Steven has assessed the site as lacking the values typically associated with other Rural Character Landscapes in the basin and this is reflected in its omission from the West Hawea River Priority Area.

As supported by **Appendix D**, the main effects associated with the proposal will relate to an increased sense of domestication, however it will not be established in such a way that is adverse. Overall, Ms Steven considers that the application in a cumulative sense, would be positive due to the future effect of a "green" approach to Hawea. Adverse effects in this regard will be less than minor.

7.5 EARTHWORK CONSIDERATIONS

Soil Erosion, Generation and Run-off Sediment

Earthworks within the site have potential to generate silt runoff during rainfall, and this would naturally drain downslope/via drainage systems that terminate at the Hawea River. Potential adverse effects will be avoided by implementing an environmental management plan, which will include an erosion and sediment control plan (ESCP). These measures involve systems such as separate clean and dirty water diversion channels as well as drop-out pits, while sediment control measures involve earth bunds and silt fences. Minimal subsoil will be exposed at any stage of construction and surfacing will be established as soon as is practical.

It is anticipated that conditions of consent will appropriately mitigate adverse effects such that any potential adverse effects relating to soil erosion, generation and run-off sediment will be less than minor.

Landscape and Visual Amenity Values

While effects on landscape quality, character and visual amenity have been addressed as a whole, it should be noted that as a consequence of each building platform being raised by earthworks, the potential adverse effects of this have been recognised and mitigated through a volunteered restriction in building height, limiting future buildings to be no higher than around 5-5.5m above the lowest ground height (lowest profile pole).

Effects on Infrastructure, Adjacent Sites and Public Roads

The earthworks will generate the requirement for heavy machinery to be entering and exiting the site. It is anticipated that conditions of consent will adequately address site management matters.

With the implementation of appropriate conditions in this regard, it is considered that the adverse effects of earthworks on infrastructure and/or adjacent sites and public roads will be no more than minor.

Land stability

The works will comply with all guidance contained within **Appendix E**, and this guidance is anticipated to form conditions of consent. As a result of this, as well as the extent of the earthworks in relation to the subject site and surrounding structures, the proposed works will not result in adverse effects relating to land stability (or instability).

Effects on Water Bodies, Ecosystem Services and Biodiversity

Whilst Lake Hawea is relatively close to the subject site, it is situated 'upstream' of the subject site and therefore will have no impact. There is however the Hawea River, within the vicinity of the site. The design of wastewater disposal systems will be required to account for these natural features and a condition of consent is offered in this regard.

The proposed earthworks are proposed to be undertaken in line with an environmental management plan, including an erosion and sediment control plan, which has been compiled by a suitably qualified professional (**Appendix L**). It is anticipated that this will form conditions of consent and serves to firstly avoid, and secondly mitigate any adverse effects related to sediment deposition and/or run-off which will also limit the impact of any earthworks on water bodies and/or ecosystems. Importantly, as part of this application, there is proposed to be a net increase in native vegetation and along with removal of existing wilding pines, approval of the proposal will lead to an increase in indigenous biodiversity. Overall, adverse effects in this regard will be less than minor in degree.

Cultural Heritage and Archaeological Sites

The application site does not include any known archaeological site or site of cultural significance. Whilst it is noted that the site is located within a Wahi Tupuna, the application proposes mitigation measures against any potential adverse effects, such as conditions around wastewater systems and accidental discovery protocols. As noted, the applicant has engaged with Aukaha and will respectfully respond to their matters of interest or concern.

Nuisance effects

Nuisance effects have been considered within reporting attached at **Appendix E** to this application. It is noted that the vibrations associated with the placement of engineered fill will not present any issue to third parties. The noise will arise from machinery including trucks, excavators, plate compactors and/or rollers, as the surrounding area is of a commercial or rural living character, noise is unlikely to be a significant issue during construction.

Overall, adverse nuisance effects will be less than minor in degree.

Natural Hazards

As with all sites in the district, the risk of seismic activity has been identified and appropriate allowance will be made as part of the building consent process.

Liquefaction risk has been assessed and the results are presented in section 3.2.3 5 of **Appendix E**. There is 'no to low' liquefaction risk at the surface of the site.

Flooding and debris flow/alluvial fan hazards have been assessed by RJHall&Associates in **Appendix F**. Reporting explains and confirms appropriate mitigation measures which involve the recommendation finished floor levels for each proposed allotment as well as water bypass measures. Due the conclusions within **Appendix F**, and associated conditioning around these conclusions, adverse effects with regard to natural hazards will be less than minor.

Functional and Positive Effects

The functional aspects of this subdivision is that it will allow for four additional rural living opportunities whilst suitably mitigating adverse effects on landscape quality, character and concurrently increasing biodiversity. Details of the proposal have the potential to mitigate adverse effects on productive land through the placement of platforms within a rural site that is unviable to cultivate. It is in a poor state, generally suffering as a result of historic land use and associated poor geological conditions.

Further positive effects include the establishment of indigenous vegetation with the concurrent removal of wilding pines, serving to enhance natural character and biodiversity values of the site. Overall, the application is considered to give rise to more intensive custodian management of land, that is likely to enable more intensive improvement of land than if left solely as a non-productive rural unit.

Overall, the proposal will function such that there will be positive effects.

7.6 SUBDIVISION AND TRANSPORT CONSIDERATIONS

The effects on rural character, landscape values and visual amenity have been addressed in section 7.5 above and in the Landscape assessment reporting attached as **Appendix D** to this application.

The site does not include any known heritage values. No adverse effects are anticipated in this regard.

The proposal will utilise existing roading infrastructure and result in the creation of one additional access. All access will be constructed in accordance with applicable council and NZTA standards. Whilst there will be a non-compliance in terms of vehicle crossing distances, the proposed crossing is supported by NZTA and the proposed crossing will benefit from visibility of the other, being on the opposite side of the SH. Vehicles will be able to safely enter and exit the site whilst benefiting from sufficient visibility in both directions.

The proposed building platforms are considered to be well setback from the external site boundaries and have been sensitively placed away from the escarpment edge. Where Lot 2 and 5 do not reach the required SH6 setback, visibility is likely to be high/prominent. However, given the existing environment and proposed landscape planting effects with regard to rural amenity and landscape character will not necessarily be adverse. Open space will inevitably be reduced however the character of that open space which the site currently exhibits is of low significance/value. Bunding and planting are present on the site and more vegetation is proposed within this application, this serves to mitigate potential adverse effects on the proposed development from noise, glare and vibration from the established road.

Given the surrounding land uses, adverse effects are not anticipated with regard to reverse sensitivity or on adjacent land uses.

The proposed building platforms can be appropriately serviced as demonstrated above whilst the risks arising from natural hazards can be appropriately mitigated.

The life supporting capacity of soils will largely be retained, if not improved by indigenous planting and wilding pine removal and whilst earthworks will be undertaken, related effects will be appropriately addressed by conditions of consent.

As a result of identifying building platforms, planting and related controls (including curtilage), future built form will be appropriately managed such that once established, the development will give rise to a net positive outcome including the future effect of a "green" approach to Hawea.

8.0 ASSESSMENT OF EFFECTS ON PERSONS

Two written approvals have been gained in relation to this application and are supplied within **Appendix M**. The location of these properties and associated approvals are highlighted within Figure 3. Associated adverse effects upon these owners/occupiers have been disregarded within the below assessment.

Figure 3: Aerial image of subject site (outlined in blue) and surrounding sites subject to assessment highlighted with an orange star. Sites which have provided approval indicated with a green star. Source: QLDC GIS.

Whilst the subject site is in direct view for the owners/occupiers of 1147A Lake Hawea-Albert Town Road, that view of development will be set amongst a very expansive view of the basin and Grandview Range beyond.

The visibility of development from the Hawea Garage will be in the background of the existing residential unit and associated garaging. The proposed development is largely setback from this site, and the existing access, closest to Hawea Garage is not proposed to be utilised for the purposes of this

development.

The site to the east is owned by Contact Energy and is likely only utilised for servicing of infrastructure. The proposal will not affect this purpose.

The building platforms ensure that built form is contained and serves to limit the extent to which domestication can sprawl across each of the proposed sites. The proposed development controls, in conjunction with the District Plan and Landscaping, attempt to mitigate adverse effects in terms of visibility and visual amenity from all vantage points.

9.0 NOTIFICATION ASSESSMENT

Public notification has been requested by the applicant.

10.0 OBJECTIVES AND POLICIES OF THE OPERATIVE & PROPOSED DISTRICT PLAN

Operative District Plan (ODP)

Sections of the ODP that are relevant to this application include; 4 (District Wide Issues), 5 (Rural Areas) and 15 (Subdivision, Development and Financial Contributions).

In respect of Section 4 (District Wide Issues), the objectives and supporting policies generally seek to establish development outcomes while protecting nature conservation values (where they exist), landscape quality and amenity values as experienced or anticipated to be experienced from private and/or public locations that may benefit from such quality and/or amenity.

Part 4.2; Landscape and Visual Amenity is relevant to the application as the site's current landscape values will change as a result of proposed land use. In this regard, Policy 1 of 4.2.5 specifically focusses on 'Future Development' and its appropriateness.

Specific considerations relate to a landscapes capability to absorb effects, site specific visual amenity values (that may require protection) and ensuring that future outcomes will generally harmonise with site specific topography and ecological systems that may be a feature of a given site.

This sentiment is echoed throughout Policies 9, 'Structures' and 17 'Land Use' which both emphasise the preservation of visual amenity and landscape character. Policy 8 is related to the avoidance of cumulative degradation.

Section 5 of the ODP is relevant to Rural Areas. This section describes the purpose of the zone as being to manage activities so they can be carried out in a way that:

- *protects and enhances nature conservation and landscape values;*
- *sustains the life supporting capacity of the soil and vegetation;*
- *maintains acceptable living and working conditions and amenity for residents of and visitors to the Zone; and*
- *ensures a wide range of outdoor recreational opportunities remain viable within the Zone.*

Objectives 1 and 3 generally seek to protect the character and landscape of rural areas by avoiding, remedying or mitigating potential adverse effects of activities on rural amenity. Objective 1, Policy 1.3 and 1.4 considers the specific issue of rural land use associated with rural production, and its protection.

Policy 1.7 and 1.8 both concern structures and seek to ensure that structures associated with land use are located in areas that exhibit a potential to absorb change.

In respect of Section 15 (Subdivision, Development and Financial Contributions), relevant objectives and policies (15.1.3) seek that subdivisions are provided with appropriate services (objective 1) and that the cost of services are met by the developer (Objective 2). Objectives 4 and 5 seek to recognise and preserve ONFs, ONLs and nature conservation values whilst at the same time protecting amenity.

In respect to the proposed development, Ms Steven notes that the area of which the site is situated displays a low natural character, which other than for a development occurring such as that proposed, is not likely to change. Whilst development as proposed will modify and diminish the currently

somewhat open, pastoral character of the site, it is noted by Ms Steven, that the effects related to that loss is not necessarily adverse given the current state of the land.

As proposed planting will establish, any increase in rural living density as immediately perceived will decrease over time. Structural landscape plantings will protect and enhance nature conservation values. While users of the public spaces will experience an increased level of domestication, as a consequence of density and design controls, that domestication, and resultant change in landscape character will provide for a level of change and a type of effect which is not necessarily adverse.

In terms of rural production, the site is not considered productive, and the majority of the site is not zoned as highly productive soil. Where it is zoned as highly productive (LUC 3 at the very southwestern corner of the site), it is important to consider the rudimentary nature of this mapping as it currently exists being - it is highly evident on site that the land resource does not offer productive use. Furthermore, the site is not currently being used for productive purposes and therefore the increased density in rural living is not deemed to have any adverse effect on rural land use.

As detailed within this report, the development is proposed to be appropriately serviced. Where the development proposes to change visual amenity, it is not necessarily considered that this would be in an adverse way.

Proposed District Plan (PDP)

The relevant chapters of the PDP include Chapters 3 (Strategic Direction), 6 (Landscapes and Rural Character), 21 (Rural) and 27 (Subdivision and Development).

The relevant strategic objectives in Chapter 3 (Strategic Direction) are 3.2.1, 3.2.5, 3.3.23, 3.3.24, 3.3.26, 3.3.32, 3.3.33, 3.3.34 and 3.3.35.

Objective 3.2.1 focuses on the development of prosperous, resilient, and equitable economy within the district. Policy 3.2.1.8 is particularly relevant in this instance being that it seeks to provide for land use in rural areas to go beyond traditional activities provided that Landscape character of RCLs is

maintained and their visual amenity values are maintained or enhanced. Objective 3.2.5 (associated policies 3.2.5.5/6/7) also focuses on the protection and retention of the district's distinctive landscapes.

Further to the above Strategic policies, 3.3.23, 3.3.24, 3.3.26, 3.3.32, 3.3.33, 3.3.34 and 3.3.35 also focus on the protection and retention of the District's RCL landscapes. It is noted that the subject site is not included in any of the District's Priority Areas (PAs). As noted within **Appendix D**, this is a clear indication that it does not possess the same values as the closest PA, West of Hawea River. The Landscape character and visual amenity of the site and surrounds has been described within **Appendix D** (as per methodology set out within 3.3.45), and whilst it is noted that the proposed development will lead to a change in landscape character comparative to the existing environment, this change is not considered adverse. The development will not result in the alteration of character such that the area is no longer rural. The proposed lots will also be appropriately serviced and the subdivision will not result in adverse effects on the water quality of any lake, river or wetland. Therefore, it is considered that the proposal is generally consistent with the relevant objectives and policies of Chapter 3 within the PDP.

The relevant policies in Chapter 6 (Landscapes and Rural Character) are 6.3.1 Rural Landscape Categorisation, 6.3.2 Managing Activities in the Rural Zone and 6.3.4 Managing Activities in Rural Character Landscapes.

The second relevant policies revolves around; *Managing Activities in the Rural Zone, the Gibbston Character zone, the Rural Residential Zone and the Rural Lifestyle Zone*. Within this, the relevant policies are 6.3.2.1, 6.3.2.2, 6.3.2.6 and 6.3.2.7. These seek to avoid urban densities, avoid light pollution, encourage subdivision/development proposals to promote indigenous biodiversity protection and regeneration where landscape values and conservation values would be maintained or enhanced, particularly where the development constitutes a change in the intensity of land use/retirement of productive farm land, and ensure that subdivision and development in the RCL does not comprise the landscape values of a close ONL/ONF.

The proposal will not result in urban densities and the location and direction of lights is controlled by activity standards in the PDP such that lighting will not result in excessive glare nor will it degrade views of the night sky or landscape character. Whilst the development proposes a change in the intensity of rural living activity, it does this in conjunction with offering a large open space area with swathes of indigenous vegetation enhancing both biodiversity and conservation values of the site. As noted within **Appendix D**, it is considered that the proposal does compromise any surrounding landscapes nor features.

The third relevant policy involves Managing Activities in Rural Character Landscapes (6.3.4). The associated policies relevant to this application are; 6.3.4.1, 6.3.4.2, 6.3.4.3, 6.3.4.4, 6.3.4.5, 6.3.4.8, 6.3.4.10 and 6.3.4.11. Each of these will be addressed in turn.

6.3.4.1 seeks appropriate subdivision and development in RCL's which are consistent with objectives and policies. On balance, that the proposal can be assessed to be consistent with the objectives and policies of the Plan. 6.3.4.2 encourages plan changes where appropriate. In consideration of site specific details and age of the current District Plan, rezoning of the site is not considered appropriate. Accordingly, it is considered that the proposal is an appropriate means of developing the site and providing additional rural living opportunities.

6.3.4.3 requires proposals to have regard for consented subdivision or development in assessing the potential for adverse cumulative effects. Existing and consented subdivisions have been taken into consideration when assessing the extent of adverse cumulative effects that may arise. As discussed within **Appendix D**, *"With regard to cumulative effects, it is considered that the proposed development would not further degrade landscape quality, character and visual amenity values".*

Policy 6.3.4.4 seeks regard to the potential adverse effects on the landscape character and visual amenity values where further subdivision and development would constitute sprawl along roads. The proposal may be considered sprawl given two of the sites which have proposed road frontage however, given the commercial development to the north and south of the subject site, it is not necessarily considered a negative nor extensive sprawl which this policy seeks to avoid.

6.3.4.5 seeks to ensure incremental changes from subdivision and development do not degrade landscape quality or character, or important views as a result of activities associated with mitigation of the visual effects of proposed development such as screening planting, mounding and earthworks. As discussed within **Appendix D**, it is considered that the proposal will not detract from any important views as a result of the activity nor mitigation proposed. The Landscape character and visual amenity of the site and surrounds has been described within **Appendix D** (as per methodology set out within 3.3.45), and whilst it is noted that the proposed development will lead to a change in landscape character comparative to the existing environment, this change is not considered adverse.

6.3.4.8 seeks the avoidance of adverse effects on visual amenity from subdivision use and development that is highly visible from public places and other places frequented by members of the public generally or forms a foreground for an ONL/ONF when viewed from public roads. The proposal is not considered to form the foreground for an ONL or ONF which is frequented by the public. The proposal is however considered to be highly visible from the state highway. Whilst development as proposed will modify and diminish the currently somewhat open, pastoral character of the site, it is noted by Ms Steven, that the effects related to that loss is not necessarily adverse given the current state of the land. As a result, it is considered that the proposal is inconsistent with this policy but not contrary given the type and degree of effect.

6.3.4.10 seeks the maintenance of open landscape character where that is the existing character of the RCL. As discussed within **Appendix D**, the openness of the subject site would reduce as a result of the development however, it is considered that there would be a greater degree of coherence due to the planned layout, planting and highway planting. The overall outcome will be a significant greening of the approach to Hawea with less clutter and woody weeds apparent. As a result, the application, whilst inconsistent with this particular policy, will provide for a positive change in character.

Policy 6.3.4.11 encourages development to utilise shared accesses and infrastructure, and to locate within parts of the site where it will minimise disruption to natural landforms and to rural character. The proposed development will one shared vehicle access which forms a new access from the SH6 (from an authorised crossing point) which is situated far from the escarpment edge. It is therefore

considered that the access and infrastructure associated with the proposed development is likely to result in indiscernible adverse effects on natural landforms and rural character.

Overall, on balance, whilst it is recognised that there are some inconsistencies, it is considered that the proposal is generally consistent with the above objectives and policies within Chapter 6 of the PDP.

The relevant objectives in Chapter 21 (Rural) are 21.2.1, 21.2.2, 21.2.3, 21.2.4.

Objective 21.2.1 - A range of land uses, including farming, are enabled while:

a. *Protecting the landscape values of ONF and ONLs*
b. *Maintaining the landscape character of RCLs and maintaining or enhancing amenity values;*
c. *Maintaining or enhancing amenity values within the rural environment; and*
d. *Maintaining or enhancing nature conservation values.*

Associated policy 21.2.1.3 seeks development to have appropriate setbacks from boundaries in order to mitigate potential adverse effects on landscape character, visual amenity, outlook from neighbouring properties and to avoid adverse effects on established and anticipated activities. The proposed subdivision layout allows for the building platforms to be adequately set back from the both the internal and road boundaries of the site. When accounting for the sculpted bunds within the site as well as proposed structural planting replacing rank, dilapidated land as it currently exists, it is considered that any adverse effects on landscape character, visual amenity and neighbours outlook will be minimised. Furthermore, the subject site is within an established stretch of development including both commercial (with the Golf Course and Hawea Garage) as well as Rural Living to the east of the site. As a result of this surrounding land use, as well as proposed planting within the site, it is considered that the proposed subdivision will not result in significant adverse reverse sensitivity effects.

Policy 21.2.1.5 addresses location and direction of light. As discussed above, the PDP standards will control the location and direction of lights so as to avoid glare on other properties, roads, public places or views of the night sky.

Policy 21.2.1.6 seeks to avoid adverse cumulative impacts on ecosystem services and nature conservation values. When accounting for the existing environment, the proposed development will result in negligible adverse cumulative effect on ecosystem services or nature conservation values.

21.2.1.7 seeks for development to have regard to the spiritual beliefs, cultural traditions and practices of Tangata Whenua. As discussed, the subject site is located within a Wāhi Tūpuna area identified as part of Stage 3 of the Proposed District Plan. This relates to two areas; Paetaraiki & Timaru (slopes and lake margins around southern Lake Hawea) as well as Hawea River. There is a strip of land to the east of the site owned by Contact Energy Ltd, this separates the site and the Hawea River Margin. The applicant is open and willing to work with Aukaha and has already begun engagement. Any response received shall be made available to Council.

21.2.1.9 addressed adequate firefighting water and fire service vehicle access to ensure an efficient and effective emergency response. It is anticipated that if this application were to be approved, both conditions of consent as well as the District Plan standards will address and secure adequate firefighting water supply and access arrangements.

Objective 21.2.2 and associated policy 21.2.2.2 seek to sustain the life supporting capacity of soils and maintain the productive potential of soil resource of rural zoned land and encourage land management practices and activities that benefit soil and vegetation cover. The application has purposefully identified a dilapidated area of the Rural zone with little productive capacity for the purposes of Rural living. It does so with the increase of swathes of indigenous and somewhat riparian planting. Where the site is zoned as highly productive (LUC 3 at the very southwestern corner of the site), it is important to consider the rudimentary nature of this mapping as it currently exists – it is very apparent on observation that there is little topsoil, which is of a low quality at the location of this mapping.

The site is not currently being used for productive purposes and already contains rural living, therefore the increasing the intensity of this rural living is not deemed to have an adverse effect on rural land use. Overall, the proposal will sustain but also improve the life supporting capacity of the site's soils, maintaining the productive potential of the site's soil resource.

Objective 21.2.3 and associated policy 24.2.3.1 seeks the safeguarding of the life supporting capacity of water through the management of activities and the discouragement of activities which adversely affect its potable quality, life supporting capacity and associated ecosystems. As discussed, the subject site has yet to gain access to potable water for the proposed additional platforms however, it is noted that conversations are under way with Council's Property and Infrastructure Team. It is noted that conditions of consent will ensure water is adequately provided and that the future proposed wastewater system will comply with ORC standards and be designed by a suitably qualified professional inline with the Infrastructure report in **Appendix G**. It is therefore considered that the proposal is not likely to result in the inefficient use of water and will result in negligible adverse effects on the potable quality and life supporting capacity of the water resource and associated ecosystems.

Objective 21.2.4 addresses conflicts between existing and anticipated activities and seeks the management of these to minimise this. Policies 21.2.4.1 and 21.2.4.2 seeks the recognition of expected nuisance effects such as odour, noise dust and traffic generation as well as the control of non-farming activities so as to minimise conflict between potentially non-compatible activities. Given the surrounding land use, the proposed lots and building platforms are adequately set back from potential production operations in the wider rural zone. It is not considered that the proposed development will result in significant adverse effects relating to reverse sensitivity.

Overall, it is considered that the proposal is consistent with the above objectives and the associated policies within Chapter 21 of the PDP.

The relevant objectives in Chapter 27 (Subdivision & Development) are 27.2.1, 27.2.4 and 27.2.5.

Objective 27.2.1 seeks to ensure that subdivision will enable quality environments to ensure the District is a desirable place to live, visit, work and play. The relevant associated policies are 27.2.1.1,

27.2.1.3, 27.2.1.5, 27.1.6 and 27.2.1.7. As demonstrated, the proposed subdivision can be appropriately serviced. Each lot is of appropriate size and dimension to provide for future rural living development, which is encouraged via zoning provisions so long as adverse effects on landscape, visual amenity and productive capacity are avoided, remedied and/or mitigated. In this instance, the application is considered to achieve this given the existing and receiving environments as well as the current productive capacity of the subject site.

Objective 27.2.4 seeks to identify, incorporate and enhance natural features, indigenous biodiversity and heritage values within subdivision design. Associated policies 27.2.4.1 and 27.2.4.4 encourage the retention of landscape features, incorporation of existing and planned waterways as well as vegetation into the design of subdivision including open spaces where that will maintain or enhance biodiversity, riparian and amenity values. The application as proposed features an open space area featuring large swathes of indigenous planting along a natural terrace land formation, incorporating (but not encumbering) the existing water race which runs through the site. The existing water course which runs through the site has been incorporated as a natural feature and enhanced with clusters of planting. The large areas of planting as proposed will serve to greatly enhance the indigenous biodiversity of the site. As such, the application is deemed consistent with the above objective and associated policies.

Objective 27.2.5 relates to infrastructure and services are provided to new subdivisions and developments. This objective encompasses transport access and roads, water supply, stormwater, wastewater and easements. In terms of Transport, Access and Roads the associated policies are 27.2.5.1, 27.2.5.2, 27.2.5.3, 27.2.5.4 and 27.2.5.5. The proposed subdivision will utilise the existing vehicle crossing to the north of the site as well as implement a new vehicle crossing to the state highway, utilising an approved crossing location endorsed by NZTA. The proposed vehicle crossing is proposed to service Lots 2-4. Accounting for NZTA's recommended conditions which has been incorporated within this application, it is considered that the proposal will result in less than minor adverse effects on the safety or efficiency of the roading network and will not result in a significant increase in traffic levels. Given the sites topography, it is considered that there is relatively little opportunity to utilise existing topography to minimise physical and visual effects of subdivision and roading.

Policy 27.2.5.6 relates to water supply, stormwater and wastewater. No reticulated council services are available in the vicinity of the subject site with regards to wastewater and stormwater and those services will be provided by alternative means as detailed in section 4.2. Where there is potential connections to Council reticulation in terms of potable water, this avenue is being explored with Council's Property and Infrastructure team, the outcomes of such discussions will be detailed to the planning department when possible.

Policies 27.2.5.7, 27.2.5.8, 27.2.5.9, 27.2.5.10 is related to water supply. As discussed, the subdivision has yet to gain additional domestic water. However, the correct pathway to gain this is being explored and appropriate conditions of consent will ensure that there the subdivision cannot be created unless proof of sufficient domestic supply is provided to council. Furthermore, this approach serves to promote efficient use of water.

Policy 27.2.5.11 is related to stormwater and the proposed and existing onsite stormwater disposal is considered appropriate and adequate as supported by **Appendix E**. Policy 27.2.5.13, 27.2.5.14 and 27.2.5.15 are related to wastewater. Through the implementation of consent conditions, it is considered that stormwater is considered appropriate and adequate as supported by **Appendix E.** Policy 27.2.5.16 is related to energy supply and telecommunications and it is considered that in this case, electricity and telecommunications connections are considered adequate and appropriate. Policies 27.2.5.17 and 27.5.5.18 are related to easements. Easements have been considered as part of this proposal and these will be granted and/or where applicable, reserved.

Overall, it is considered that the proposal will result in outcomes that are consistent with the objectives and policies of the PDP.

11.0 NPS: HIGHLY PRODUCTIVE LAND

The NPS-HPL came into effect on 17 October 2022 and has an overarching objective to protect Highly productive land for use in land-based primary production, both now and for future generations. In trying to achieve this objective, national level mapping has been produced highlighting areas initially deemed as highly productive (Land Use Capability (LUC) classes 1-3). Figure 4 below shows the subject

site and the relevant Land Use Capability classes it encompasses (note that this is shown at the greatest scale available).

Figure 4: LUC Mapping with subject site outlined in blue. Source: https://ourenvironment.scinfo.org.nz

The mapping is currently rudimentary, being a maximum scale of 1:25,000 whilst ORC have yet to map the highly productive land nor has it updated its District Plan in response to the NPS-HPL, therefore, the extent to which the current available mapping can be relied upon is minimal.

Despite this, it is considered that the NPS-HPS requires specific consideration given the subject site contains a small area of Land Use Capacity categorisation 3 (depicted in dark green within Figure 4). This categorisation is noted as 'Arable' meaning *"very good multiple-use land, slight limitations, suitable for cropping, viticulture, berry fruit, pastoralism, tree crops and forestry*".

When looking at the policy section 3.4 gives direction to regional council's as to implement the

mapping of Highly Productive Soils. Subclause (1) states that *"every regional council must map as highly productive land any land in its region that:*

(a) Is in general rural zone or rural production zone; and
(b) Is predominantly LUC 1, 2, or 3 land; and
(c) Forms a large and geographically cohesive area."

In this respect, the subject site does not fall under either category (b) nor (c.); it is not predominantly LUC 3, nor does it form a large and geographically cohesive area being separated by both cadastral in separate ownerships boundaries as well as SH6. Furthermore, the policy then goes on to state, *"For the purpose of identifying land referred to in subclause (1):...(d) small, discrete areas of LUC 1, 2, or 3 land need not be included if they are separated from any large and geographically cohesive area of LUC 1, 2, or 3 land."*

In this regard, it is considered that the subject site is predominantly LUC 6 (approximately 4ha), with a small area (approximately 1ha) within the southwestern corner of the subject site being LUC 3. When visiting the site and noting the ground typology (large areas of uneven ground, rank grass, large boulders and rocky outcrops) as well as the historical use of the site not including productive use despite its zoning, it is considered highly unlikely that the small area rudimentarily highlighted as LUC 3 is productive in actuality. Even if this land were productive, the realisation of such usage for any truly productive purposes would be highly unlikely given the small area of LUC 3 within the applicants control, the dilapidated surrounding LUC 6 land, as well as fragmented ownership of larger LUC 3 area highlighted within the vicinity.

Despite the above, the following assessment focusses on the small area of LUC 3 highlighted upon the LUC mapping given the lack of site-specific data to the contrary (aside from visual observations and site usage history).

Given the extremely limited productive capacity of the subject site, it is considered that if the application were to be approved, it would not lead to the reduction in productivity over the long term (therefore meeting 3.8(1)). It is considered that through the approval of this subdivision, it is providing

rural living opportunities within an area of the district which is unable to be utilised for productive purposes somewhat reducing the pressure in areas that are perhaps productive, whilst minimising reverse sensitivity effects as noted above (therefore meeting 3.8(2)(a) & (b)).

Furthermore, clause 3.10 notes exemptions for highly productive land subject to permanent or long-term constraints. The subject site is considered to be subject to permanent/long term constraints (3.10(a)) given the surrounding LUC 6 land which is not viable/able to turn into productive land and this is mainly down to erosion (an extremely difficult issue to navigate and the solutions to such difficulties would impact surrounding land). As a result, the site is considered fragmented whereby just 1ha in the southwestern corner has been classified productive, whilst the remaining 4ha is unproductive/non-arable and subject to erosion ultimately unable to be cohesively farmed. In line with 3.10(b), the application is considered to avoid significant loss of productive capacity of highly productive land given the small area highlighted as such; it avoids the fragmentation of large and geographically cohesive areas of highly productive land given that the area is already deemed small and fragmented, separated by SH6 and cadastral boundaries under separate ownership; and lastly, the application avoids reverse sensitivity effects given the lack of production uses in the receiving environment. In line with 3.10(c) discussed, the outcomes which would eventuate through this proposal include vast swathes of planting dramatically increasing indigenous biodiversity values when compared with the status quo. It is also considered to provide social benefits for future owners through the provision of sought after, well-located, pleasant living environments within a site which would otherwise be unproductive, rank, dilapidated land.

Overall, the application is considered consistent with the objective and associated outcomes sought by the NPS-HPL.

12.0 PART II OF RMA 1991

In consideration of the relevant principles outlined in Sections 6, 7 and 8 of the Act, it is considered if approved, the proposed subdivision and associated building platforms will achieve the purpose of the Act as presented in Section 5.

13.0 CONCLUSION

This application seeks Resource Consent to undertake a five-lot subdivision and establish four residential building platforms on each resultant lot with associated earthworks at 1172 Lake Hawea-Albert Town Road, Rd 2, Wanaka, 9382.

When aligned against the relevant assessment criteria of the District Plan, it is considered that the subdivision and building platforms as proposed will promote outcomes encouraged by the rules, assessment criteria, objectives and policies of the Rural General and Rural zones.

The applicant has requested that this application be processed on a Publicly Notified basis.

Kind Regards,

Dan Curley

IP Solutions Ltd

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Search Copy

R.W. Muir
Registrar-General
of Land

Identifier	**OT9C/457**
Land Registration District	**Otago**
Date Issued	09 February 1984

Prior References
OT6C/446

Estate	Fee Simple
Area	5.2330 hectares more or less
Legal Description	Section 22 Block III Lower Hawea Survey District

Registered Owners
Bluesure Developments Limited

Interests

Subject to Section 8 Mining Act 1971

Subject to Section 5 Coal Mines Act 1979

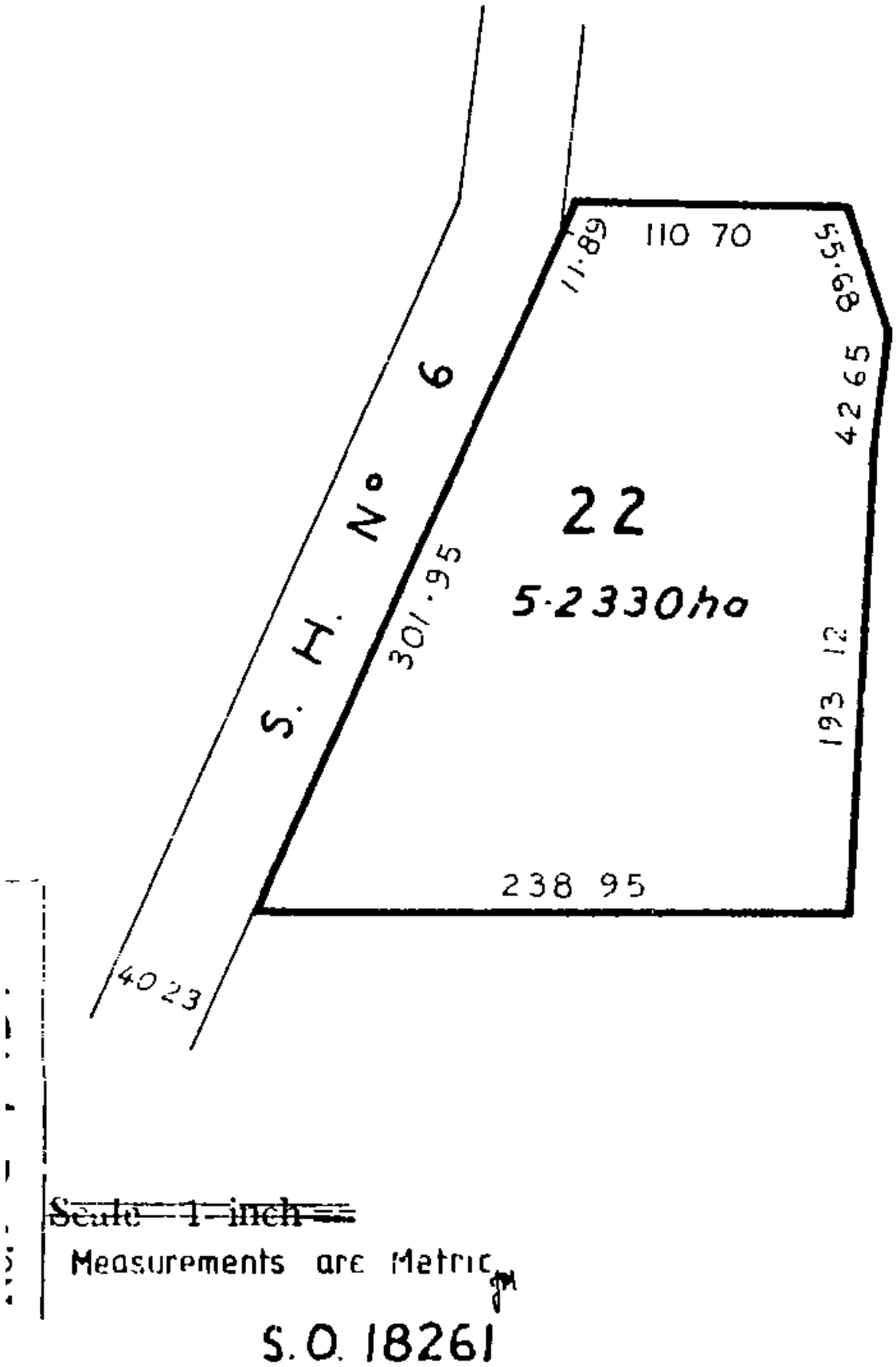
819525 Transfer creating the following easements in gross - 4.12.1992 at 9.35 am

Type	Servient Tenement	Easement Area	Grantee	Statutory Restriction
Convey water	Section 22 Block III Lower Hawea Survey District - herein	H Transfer 819525	Hawea Irrigation Company Limited	

5016824.1 Gazette Notice declaring adjoining road (State Highway No.6) to be a Limited Access Road - 21.12.2000 at 9:21 am

5034528.3 Notice pursuant to Section 91 Transit New Zealand Act 1989 - 9.4.2001 at 2:29 pm

5034528.4 Notice pursuant to Section 91 Transit New Zealand Act 1989 - 9.4.2001 at 2:29 pm



Notes:
- Boundary information sourced from SO 18261.
- Adjoining boundaries sourced from LINZ XML.
- Levels in terms of OIT III SO 18261 @ 362.29m.
- Contours produced from QLDC Lidar 2019 1m x 1m.
- Contours = 1.0m/0.2m.
- Areas & dimensions subject to final LT Survey.
- See Record of Title OT9C/457 for details of any existing Easements, Consent Notices and Land Covenants.
- Some internal fences are scaled from aerial image.

iP solutions

Section 20

Approved Transit NZ Access Point (5034528.3)

Lot 100
0.2010Ha
Lot 100 hereon (Legal Access) to be held to four undivided one fourth shares by the owners of Lots 2 - 5 hereon as tenants in common in the said shares.

Lot 1
DP 300393

Lot 1
2.2730Ha

Existing Bunding

Water Race protected by Easement (H Transfer 819525)

Ex. Dwelling

Ex. Garage

Lake Hawea-Albert Town Road (SH 6)

Lot 2
0.6700Ha

20m setback

Building Platform
31.5m x 28.57m
(900m²)
Max height 351.15m

GL 346.85m
GL 345.90m
GL 348.25m
GL 347.30m

Section 22
Block III Lower Hawea SD
5.2330Ha
OT9C/457

Lot 2
DP 25173

Lot 3
0.4760Ha

Building Platform
33.33m x 22.5m
(750m²)
Max height 350.30m

GL 344.75m
GL 343.80m
GL 344.90m
GL 344.35m

Approved Transit NZ Access Point (5034528.4)

Lot 4
0.6420Ha

(pond)

Lot 5
0.9710Ha

Building Platform
34.5m x 26.09m
(900m²)
Max height 352.85m

GL 348.70m
GL 347.60m
GL 349.20m
GL 347.95m

Building Platform
33.33m x 22.5m
(750m²)
Max height 349.75m

GL 344.75m
GL 342.20m
GL 345.00m
GL 343.55m

Re-directed flowpath

15m setback

Lot 6
DP 26200

MEASURED LAND SURVEYS

Scheme Plan

Lots 1-5 & 100 being a Subdivision of Section 22 Block III Lower Hawea SD

(1172 Lake Hawea-Albert Town Road)

Client:	Simon
Scale:	1 : 1000 @ A3
Surveyed:	ST 29/10/21
Drawn:	ST 04/05/23
Datum:	Lindis Peak 2000/NZVD 2016
Job #:	21111_S1
Rev:	B
Sheet:	1 of 1

CSNZ THE CONSULTING SURVEYORS OF NEW ZEALAND
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Rev	Description	Date
A	ORIGINAL	01/09/22
B	Contour update	04/05/23

Notes:
- Boundary information sourced from SO 18261.
- Adjoining boundaries sourced from LINZ XML.
- Levels in terms of OIT III SO 18261 @ 362.29m.
- Contours produced from QLDC Lidar 2019 1m x 1m.
- Contours = 1.0m/0.2m.
- Areas & dimensions subject to final LT Survey.
- See Record of Title OT9C/457 for details of any existing Easements, Consent Notices and Land Covenants.
- Some internal fences are scaled from aerial image.

iP solutions

- +4.5m to +5.0m (Fill)
- +4.0m to +4.5m (Fill)
- +3.5m to +4.0m (Fill)
- +3.0m to +3.5m (Fill)
- +2.5m to +3.0m (Fill)
- +2.0m to +2.5m (Fill)
- +1.5m to +2.0m (Fill)
- +1.0m to +1.5m (Fill)
- +0.5m to +1.0m (Fill)
- 0.0m to +0.5m (Fill)
- 0.0m to -0.5m (Cut)
- -0.5m to -1.0m (Cut)
- -1.0m to -1.5m (Cut)

Earthworks Notes:-

Roading quantities:
Area = 2270m²
Total Cut = 790m³
Total Fill = 490m³

Building Platform (Lot 4):
Area = 920m²
Total Fill = 1160m³

Cut volumes includes topsoil strip (assumed topsoil depth = 0.3m)

Section 20

Approved Transit NZ Access Point (5034528.3)

Lot 1
1.7890Ha

Lot 100
0.2010Ha

Max Fill = 1.05m

Existing Bunding

Water Race protected by Easement (H Transfer 819525)

Ex. Dwelling

Ex. Garage

Lake Hawea-Albert Town Road (SH 6)

Lot 2
0.6700Ha

20m setback

Building Platform
31.5m x 28.57m
(900m²)

GL 346.85m
GL 345.90m
GL 348.25m
GL 347.30m

Section 22
Block III Lower Hawea SD
5.2330Ha
OT9C/457

Lot 2
DP 25173

Lot 3
0.4760Ha

Building Platform
33.33m x 22.5m
(750m²)

GL 344.75m
GL 343.80m
GL 344.90m
GL 344.35m

Max Cut = 1.30m

Approved Transit NZ Access Point (5034528.4)

Lot 5
0.9710Ha

Existing Bunding

Building Platform
34.5m x 26.09m
(900m²)

GL 348.70m
GL 347.60m
GL 349.20m
GL 347.95m

15m setback

Re-directed flowpath

(pond)

Lot 4
0.6420Ha

Building Platform
33.33m x 22.5m
(750m²)

GL 344.75m
GL 342.20m
GL 345.00m
GL 343.55m

Max Fill = 4.70m

Lot 6
DP 26200

MEASURED LAND SURVEYS

Earthworks Plan

Lots 1-5 & 100 being a Subdivision of Section 22 Block III Lower Hawea SD

(1172 Lake Hawea-Albert Town Road)

Client: Bluesure Developments Limited

Scale: 1 : 1000 @ A3

Surveyed: ST 29/10/21

Drawn: RC 04/05/23

CSNZ THE CONSULTING SURVEYORS OF NEW ZEALAND
A DIVISION OF THE NEW ZEALAND INSTITUTE OF SURVEYORS

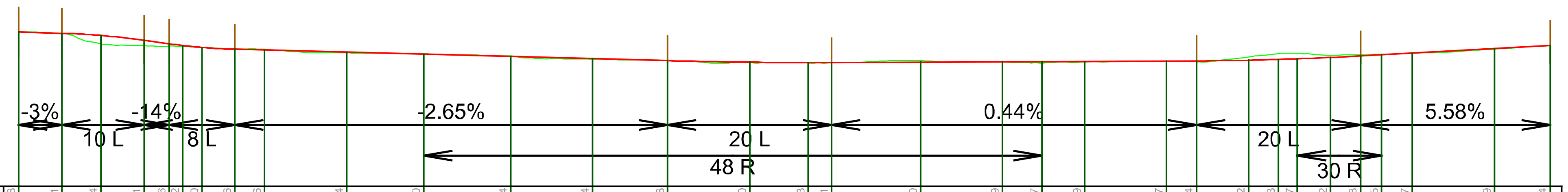
Datum: Lindis Peak 2000/NZVD 2016

Sheet: 1 of 2

Job #: 21111_E1

Rev: A

Rev	Description	Date
A	ORIGINAL	04/05/23



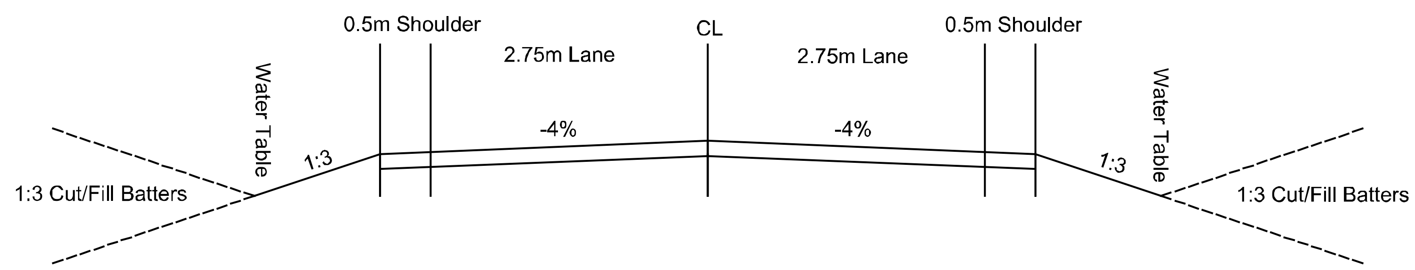
Chainages	Existing	Depth	Design
0.00	348.88	0.00	348.88
5.28	348.71	0.00	348.72
10.00	347.44	1.01	348.45
15.28	347.21	0.66	347.87
18.35	347.16	0.28	347.44
20.00	347.12	0.11	347.23
22.35	347.00	-0.01	346.99
26.35	346.76	0.01	346.77
30.00	346.76	-0.09	346.67
40.00	346.34	0.07	346.41
49.39	346.20	-0.04	346.16
60.00	345.94	-0.06	345.88
70.00	345.54	0.07	345.61
79.15	345.38	-0.01	345.37
89.15	345.10	0.08	345.18
96.30	345.13	0.02	345.14
99.15	345.11	0.04	345.15
110.00	345.40	-0.20	345.20
120.00	345.19	0.05	345.24
124.79	345.07	0.19	345.26
130.00	345.19	0.09	345.28
140.00	345.27	0.06	345.33
143.65	345.24	0.10	345.34
150.00	345.82	-0.39	345.42
153.65	346.23	-0.71	345.52
155.96	346.27	-0.68	345.59
160.00	346.02	-0.26	345.76
163.65	346.08	-0.13	345.95
166.25	346.15	-0.06	346.09
170.00	346.27	0.03	346.30
180.00	346.79	0.07	346.86
186.78	347.24	0.00	347.24

LONGITUDINAL SECTION Road 1

Horizontal Scale 1 : 750

Vertical Scale 1 : 750

Typicall Section - Road 1



Rev	Description	Date
A	ORIGINAL	17/03/23

MEASURED LAND SURVEYS

www.measuredlandsurveys.co.nz info@measuredlandsurveys.co.nz

Roading Sections
Lots 1-5 & 100 being a Subdivision of Section 22 Block III Lower Hawea SD
(1172 Lake Hawea-Albert Town Road)

Client: Bluesure Developments Limited

Scale: 1 : 1000 @ A3

Surveyed:

Drawn: RC 17/03/23

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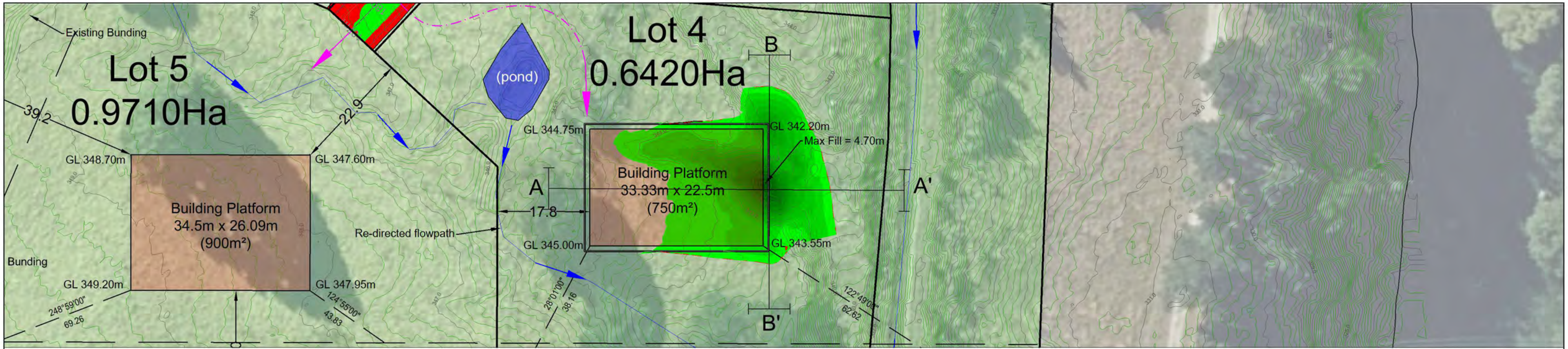
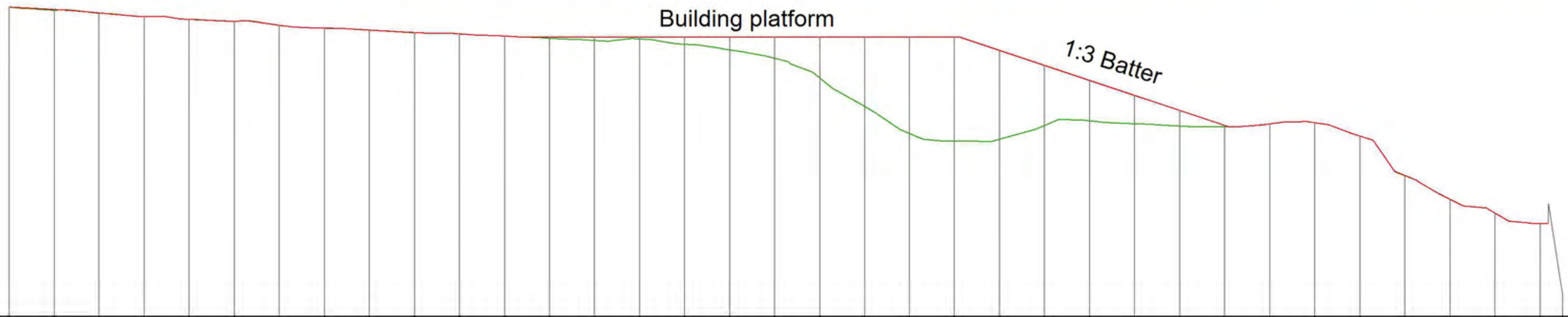
Datum: Lindis Peak 2000

Sheet: 2 of 2

Job #: 21111_E1

Rev: A





DATUM R.L.332.00

EXISTING GROUND	345.74	345.60	345.47	345.31	345.20	345.11	344.93	344.80	344.72	344.60	344.55	344.45	344.35	344.26	344.32	344.09	343.84	343.46
+ FILL DEPTH - CUT DEPTH	0.00	0.03	0.01	0.00	-0.00	0.00	0.00	-0.00	0.00	0.01	-0.01	-0.00	0.05	0.14	0.08	0.31	0.56	0.94
FINISHED LEVEL	345.74	345.63	345.48	345.32	345.19	345.11	344.93	344.80	344.72	344.61	344.55	344.45	344.40	344.40	344.40	344.40	344.40	344.40
CHAINAGE	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00	24.00	26.00	28.00	30.00	32.00	34.00

EXISTING GROUND	342.59	341.32	340.13	339.79	339.87	340.48	340.69	340.56	340.46	340.43	340.55	340.60	340.01	338.25	337.21	336.60	336.14	336.13
+ FILL DEPTH - CUT DEPTH	1.81	3.08	4.27	4.61	3.95	2.67	1.80	1.26	0.69	0.06	0.00	0.00	0.00	0.01	-0.01	0.00	0.00	0.00
FINISHED LEVEL	344.40	344.40	344.40	344.40	343.82	343.15	342.48	341.82	341.15	340.49	340.55	340.61	340.01	338.27	337.21	336.60	336.14	336.13
CHAINAGE	36.00	38.00	40.00	42.00	44.00	46.00	48.00	50.00	52.00	54.00	56.00	58.00	60.00	62.00	64.00	66.00	68.00	68.38

Hz Scale 1:500 @ A3
Vert Scale 1:500 @ A3

Cross Section A-A'

MEASURED LAND SURVEYS

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Rev	Description	Date
A	ORIGINAL	13/04/23

Cross Sections
Lots 1-5 & 100 being a Subdivision of Section 22 Block III Lower Hawea SD
(1172 Lake Hawea-Albert Town Road)

Client: Bluesure Developments Limited

Scale: 1 : 500 @ A3

Surveyed:

Drawn: RC 13/04/23

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Datum: Lindis Peak 2000

Sheet: 1 of 2

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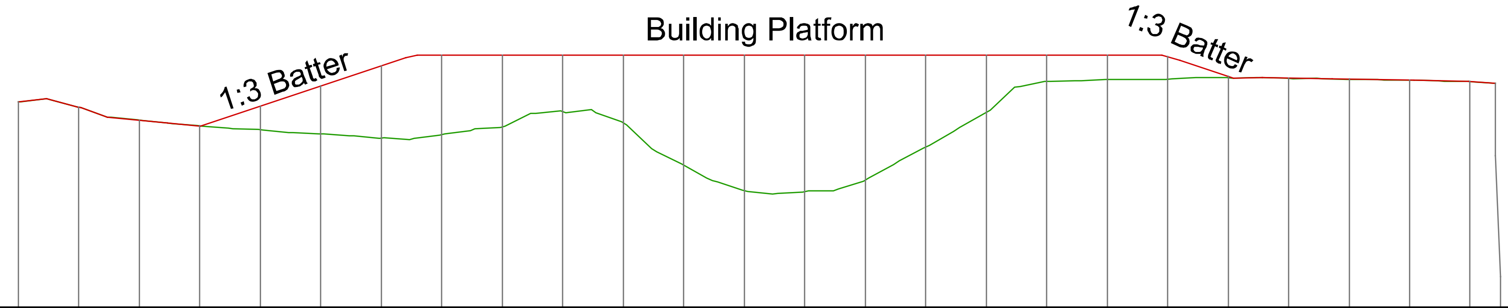
Rev: A



DATUM R.L.336.00

CHAINAGE	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00	24.00
EXISTING GROUND	342.79	342.61	342.18	341.99	341.87	341.73	341.59	341.71	341.96	342.46	342.09	340.70	339.85
+ FILL DEPTH - CUT DEPTH	0.00	0.00	-0.00	0.00	0.78	1.58	2.39	2.62	2.37	1.87	2.24	3.63	4.48
FINISHED LEVEL	342.79	342.61	342.18	341.99	342.65	343.31	343.97	344.33	344.33	344.33	344.33	344.33	344.33

CHAINAGE	26.00	28.00	30.00	32.00	34.00	36.00	38.00	40.00	42.00	44.00	46.00	48.00	48.84
EXISTING GROUND	339.81	340.20	341.29	342.44	343.46	343.53	343.53	343.58	343.56	343.53	343.51	343.46	343.41
+ FILL DEPTH - CUT DEPTH	4.53	4.13	3.04	1.90	0.87	0.80	0.75	0.06	0.01	0.01	0.00	-0.00	0.00
FINISHED LEVEL	344.33	344.33	344.33	344.34	344.34	344.34	344.28	343.64	343.57	343.54	343.52	343.46	343.41

Hz Scale 1:500 @ A3
Vert Scale 1:500 @ A3

Cross Section B-B'

MEASURED LAND SURVEYS

www.measuredlandsurveys.co.nz info@measuredlandsurveys.co.nz

Rev	Description	Date
A	ORIGINAL	13/04/23

Cross Sections
Lots 1-5 & 100 being a Subdivision of Section 22 Block III Lower Hawea SD
(1172 Lake Hawea-Albert Town Road)

Client: Bluesure Developments Limited

Scale: 1 : 500 @ A3

Surveyed:

Drawn: RC 13/04/23

CSNZ THE CONSULTING SURVEYORS OF NEW ZEALAND
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Datum: Lindis Peak 2000

N

Sheet: 2 of 2

Job #: 21111_M1

Rev: A

PROPOSED SUBDIVISION AND NEW DWELLINGS

RIVER RIDGE, 1172 Albert Town-Lake Hawea Road

Bluesure Developments Ltd

Landscape Assessment Report

Anne Steven
LANDSCAPE ARCHITECT

JULY 2023

PROPOSED SUBDIVISION AND NEW DWELLINGS

Bluesure Developments Ltd
Landscape Assessment Report

JULY 2023

CONTENTS **Page no.**

PROPOSED SUBDIVISION AND NEW DWELLINGS
RIVER RIDGE, 1172 Albert Town-Lake Hawea Road

Landscape Assessment Report

1. INTRODUCTION

I have been engaged by Bluesure Developments Ltd (the Applicant) to provide advice on and carry out a landscape and visual assessment for a proposed subdivision and new dwellings on a 5.23ha property at 1172 Lake Hawea-Albert Town Road (SH6) ("the LHAR").

The Application Site ("the Site") is located between the Hawea Golf Course and the Hawea Garage, and between the LHAR and the Hawea River.

This report is a landscape and visual assessment of the effects of the proposed subdivision with regard to the provisions of the proposed Queenstown Lakes District Plan ("the PDP").

Location of Application Site

1.1 Relevant Experience

I have had a sole practice in Wanaka since 2001. I have advised on and assessed a number of development proposals in the Wanaka rural area, including preparing evidence for Council and Environment Court hearings. I consider myself experienced in this field and familiar in the objectives, policies and rules of the Queenstown Lakes District Plan (Operative and Proposed District Plans).

I have carried out a number of landscape assessments over the last 21 years or so for rural subdivision and residential activity in the rural landscape of the Upper Clutha basin.

I am familiar with the Site in its context landscape having passed it many times along SH6. I visited the Site and surrounding landscape several times in 2022 for the purposes of this assessment. Relevant to this Site, I have provided advice and carried out assessments for three properties in the Te Awa Road area and one on Maungawera Hill.

1.2 Scope of Report

The report sections following are:

- description of site
- landscape context analysis
- landscape classification
- description of proposal
- visibility and visual effect of proposal
- assessment of effects

Figures and photos of views referred to in the text are included in Graphic Attachment A and B respectively ("GAA" and "GAB"). Numbers in brackets thus [xx] refer to the paragraphs in the document referenced.

2 LANDSCAPE ASSESSMENT METHODOLOGY

The assessment method used to assess effects on landscape character and landscape values including visual amenity is informed and guided by the New Zealand Institute of Landscape Architects' most recent landscape assessment guidelines[1]. A methodological outline for assessment of effects is also set out in Ch. 3 of the PDP:

Landscape Assessment Methodology

3.3.45 Landscape assessments shall:

b. for Rural Character Landscapes:

> i. define a relevant landscape character area and its wider landscape context;
>
> ii. identify the landscape character and visual amenity values of that landscape character area and within its wider landscape context; and
>
> iii. assess effects on that character and those values and on related landscape capacity;

c. in each case apply a consistent rating scale for attributes, values and effects

Te Tangi a te Manu Aotearoa NZ Landscape Assessment guidelines are referred to in assessing the landscape and visual effects of this proposal (Paragraph 6.21 particularly). The rating definitions I have used for assessing degree of visibility, and effects on landscape character and landscape effects including

[1] *Te Tangi a te Manu Aotearoa New Zealand Landscape Assessment Guidelines, Tuia Pita Ora New Zealand Institute of Landscape Architects, July 2022.p151*

visual amenity effects are set out in my Appendix 1. I have developed these independently based on my experience, the NZILA Guidelines and rating schedules used by other landscape architects experienced in assessment.

This is aligned with RMA terminology in accordance with parts 6.36 to 6.38 of the Guidelines. The table below sets out how I assess effects, the differences being that in my opinion some Low-Mod degrees of effect can have a Less than Minor effect, and some Moderate degrees of effect can be Minor, depending on context and the nature of the effect. The guidelines suggest avoiding an overly mechanical approach.

Ranking Increments	Very Low	Low	Low-Mod	Mod	Mod-High	High	Very High
ASLA	Nil or Negligible	Less than Minor or Minor	Less than Minor or Minor	Minor to More than Minor	More than minor	significant	Significant/ unacceptable
NZILA	Less than Minor Negligible	Less than Minor or Minor	Minor	More than Minor	More than Minor	Significant	Significant

– 'Less than minor' means insignificant. It can be characterised as 'very low' and overlapping with 'low' on the 7-point scale.[161 162]

I have defined a scale of visual effect describing the visibility and the nature and degree of the visual change to the landscape as viewed from private and/or public locations; and a scale for assessment of effects on landscape character and landscape values including a visual amenity effects rating using the 7-point scale. These are contained in my Appendix.

3 THE SITE

The Site is a 5.23ha area of open rough pasture and woody weed vegetation over basin-floor alluvium and uneven bouldery till with occasional small rocky protrusions and sporadic boulders. These are possibly in situ bed rock, or possibly large buried boulders or rockfall. There is a steep river-cut scarp and lower riverbank area related to the Hawea River forming the east part of the Site. An irrigation water race follows the foot of the bank. The alluvium spreads out across the southwest corner of the Site

forming a smoother surface. It is the northern part of a relatively small, very shallow angle fan built by a stream coming off Mt Maude.

The degree to which the land surface is natural is unclear. A study of historic aerial photos shows a substantial curving road was built through the middle of the Site between SH6 and the Hawea Water Race as early as 1955, and there is an excavated pit notching the top of the scarp where the road crosses. The water race is an engineered feature, elevated above the lower riverbank area. A section of ditch connects runoff from SH6 to a small-scale natural ephemeral water course running through the southern half of the property. A small retention pond has been built on the water course (for stock water presumably), before it flows to the small gully notched in the scarp by the old roadway. Another small ditch runs through the roadside paddock closer to the north end of the Site. There is also a small gully in the southeast corner of the Site, also taking run off from the neighbouring golf course.

The land currently has rough pasture cover over the upper surface with individual or small groups of large gum and pine trees. Mature gum trees line the access drive. The area has had more pine trees on it on the past, and also has had extensive pest broom cover. This has been sprayed in the past but is now re-growing forming low, dense, dark green clumps. The lower parts of the Site closer to the Hawea River have a mosaic of pasture grass and taller pest broom over uneven ground. There are relict native shrubs of coprosma and porcupine shrub.

The land has been divided into small paddocks to facilitate grazing. A small shed and stock yard is centrally placed. These elements are approaching a state of dereliction. There is an older style existing dwelling with a separate garage in the middle of the Site towards the northern end, accessed by the tree-lined gravel drive entering the northwest corner of the Site. The house has a small curtilage with a small amount of mature amenity tree/shrub planting, and a couple of small sheds. An overhead powerline crosses the Site between the northwest and southeast corners.

A naturalistic earth mound up to 2m in places has been constructed along the highway boundary for privacy and noise control. This is to be planted out in a mix of native shrubs and trees, similar in appearance to native plantings on properties on the other side of SH6 from the Site. The details of the planting are on the Landscape Development Concept Plan Ref 362.LP01 April 2023 in my GAA.

The existing deer fence on the road boundary is not on the legal boundary. This lies several metres inside the fence.

The reedy areas and ditch/small watercourse on Lots 2, 4 and 5 have been partly naturalised to form small pond areas and a more natural course.

Existing site features are shown on Existing Site Plan in my GAA, and on the Topographical Survey Plan by Measured Land Surveys ref. 21111_T1_A dated 31.1.21.

View into Site from LHAR (SH6) on approach to Hawea from the south.

3.1 Neighbouring Properties

The Site is bordered to the south by the Hawea Golf Course. The 5th hole runs parallel to the south boundary running from the highway towards the river. Intermittent trees line the boundary with the Site.

To the west SH6 borders the Site, with large rural living properties on the flank of Mt Maude beyond where the dwellings are located high up on the hillside.

To the north the Hawea Garage complex adjoins including a dwelling associated with the garage. To the northeast to east, the Hawea Dam area and the top of the Hawea River corridor borders the Site. This area is owned by Contact Energy Ltd, extending down river past the Site and halfway down the golf course boundary and as far as Domain Road on the true left. This area is accessible to the public including occasional walkers using the vehicle track. The lower terrace has two deer fenced areas. The outer fenced area closest to the track is not part of the Site, the eastern (river) boundary of which is marked by the inner deer fence.

Neighbouring properties are shown in the plan titled Landscape Context in my GAA.

4 LANDSCAPE CONTEXT

4.1 Description

The Site is located on the eastern side of the LHAR (SH6) just south of the western "dam" entrance to Hawea township, close to the Hawea Dam and next to the Hawea Garage. These are locally dominant landscape elements. The Site is overshadowed by the steep, conifer-covered, ice-scraped schist rock "bulge" of lower Mt Maude. In broad terms this is a peri-urban/public facilities/infrastructure/utility context, with the Site sandwiched between the Hawea Garage, the Hawea River Contact Energy area (managed for hydro purposes including the irrigation water race), the Hawea Golf Club, and SH6. Utility areas of the larger rural living properties (indicated by utility sheds) adjoin on the other side of SH6. Just north of the Hawea Dam round the corner is the Lake Hawea Holiday Park and public boat ramp/jetty.

The landscape context for the purposes of this assessment is considered to be area bounded by the Hawea Dam; the western edge of Hawea township to the east as far as Cemetery Road; the spacious manicured landscape of the Hawea Golf course to the south; and the eastern "bulge" flank of the lower

Mt Maude, which supports several rural living properties. This is a relatively small self-contained landscape context which has an inward focus tending to centre on the Hawea Garage space. It is depicted in Fig. 2 Landscape Context in my GAA.

There is no existing defined Landscape Character Area applicable to the Site. This assessment will be based on the landscape context identified and defined above, which can also be defined as a landscape character area. It can be recognised however that whilst it is mapped as being within RCL, the landscape context for this proposal is a relatively small discrete and self-contained area forming a transition from landscape of more typical rural character to an urban area. It is an area dominated by public utility infrastructure, the garage/service station and the golf course. It is also an area of active enhancement including wilding tree removal and native planting.

The LHAR (SH6) is the main public experience of this landscape. It is the main route between Otago and the West Coast, and between Hawea and Wanaka. It carries a lot of traffic ranging from daily commute and local traffic, to seasonal visitors and holiday makers and tourists.

There is a crest in the LHAR where it crosses a large alluvial fan some 380m south of the Site, as it passes the golf course. This marks the transition into or out of the landscape context. The bulge of Mt Maude's flank to the north has a similar function.

This area has been extensively modified, most obviously by the construction of the Hawea Dam and SH6 and the Hawea Garage which occupies a substantial area. The Hawea River remains a natural element in form however its flow is controlled and the section of river corridor adjoining the Site is owned by Contact Energy. It is lined with large mature conifers mainly pine, and other exotic trees notably willow with a sporadic understorey of relict native kanuka, coprosma, corokia, matagouri, broom and mountain cottonwood interspersed with a significant amount of pest broom, sweet briar and other woody weeds. This tall vegetation reduces visibility of Hawea village from SH6 to glimpses of houses in gaps, however houses can be seen along the top of the terminal moraine that sits under the village.

The Site is the only rural living property on the east side of the LHAR, sandwiched between the golf course and the Hawea Garage and dam area. Large rural living properties are the sole land use on the west side of LHAR, occupying the bulge of Mt Maude which extends up to 500m or more asl. The dwellings on these properties are located high up on the bulge. Their narrow basin floor areas adjoining LHAR have been largely developed, first for pasture now supporting a variety of mown areas and planted vegetation, with driveways and utility buildings. The planting is dominated by native species, largely extensive highway boundary plantings[2]. This includes a constructed berm within the highway corridor with recent native planting on it. This has been carried out by the adjoining landowner at 1147B LHAR. A large swathe of mature pine tree cover over the steeper slopes of the bulge has been removed (due to wilding spread and fire risk) with the cleared areas planted out in native species.

The native planting that has been and will be undertaken either side of SH6 including on the Site will in a reasonably short time (within 3-5 years) provide a more attractive more visually coherent "native leafy green" southern entry to Hawea. This will complement the manicured Hawea Golf Course which heralds arrival from the south into the Hawea township locality.

The river corridor on both sides of the Hawea River, from the dam area down-river, is understood to be open to the public. However recreational use is mainly associated with the Hawea River Trail, which enters the true left river corridor at Cemetery Road some 400m to the southeast of the Site. At its closest it is around 260m away from the Site, but a number of mature pines and willows prevent visibility with the Site. On the true right side, the public access via a 4WD track passes right by the Site. The lower terrace and scarp form the immediate enclosure in the first part of the river corridor moving down river, transitioning into the golf course. This area has a mixed character of a relatively natural but unkempt

[2] This planting has been undertaken in the last 3-4 years in relation to RM190930 and RM190947 Application to Construct a Shed outside a Building Platform and undertake Earthworks - DL Kenton Family Trust granted consent by the QLDC December 2019. There is a range of species including toetoe, red tussock, flax, coprosma spp., corokia, broadleaf, pittosporum, hebe, olearia, cabbage tree, ribbonwood and kowhai. The property to the north of this and opposite the Site has more mature plantings along the road of mainly pittosporum, ribbonwood, cabbage tree, hebe, flax, mountain beech.

weedy landscape with wilding pines, pest broom, brier and other woody weeds, interspersed with kanuka and coprosma. There is a glimpse of the existing dwelling on the Site above with its eclectic mix of vegetation. There is a utilitarian aspect to the landscape character in this area due to the engineered water race, access track and proximity to the dam area. The river itself is difficult to see due to vegetation.

4.2 Landscape Zoning and Classification

The Site is within the Rural Zone under a Rural Character Landscape (RCL) classification. It is not within a Landscape Priority Area. In fact, the golf course, the Site and the dam area (including part of Lake Hawea) are the only areas not in the "West of Hawea River" LPA on the true right of the Hawea River.

The Site is very close to the ONL of Mt Maude where its lower edge passes around the base of the steep slopes. It is clearly separated from the ONL however by SH6, and in a topographic sense. The ONL area is shown on Fig. 2 in my GAA.

The Site falls within two Wahi Tupuna (WT) areas related to the margin of Lake Hawea and the Hawea River. The eastern lower part of the Site is part of the Hawea River margin in my opinion.

4.3 Significance of the Site in Landscape Context – Landscape Character and Visual Amenity Values

The Site contributes to a peri-urban landscape character at the western entrance to Hawea township. The landscape of this area has low openness and visual coherence attributes compared to the more open rural landscape of large lifestyle blocks and small farms further south, between the golf course/SH6 fan crest and Maungawera Hill. It is characterised by "clutter" due to the mix of land uses of relatively small scale and contrasting character.

The Site is sandwiched between the Hawea garage and the golf course, and all three land uses have their own landscape character. The Site has no particularly notable characteristics. At times it has appeared unkempt with aging sheds, aging trees, rank grassland and spread of pest broom. There are a number of detracting elements in the landscape context such as the substantial clutter of parked vehicles, buildings, structures, externally stored items and expanses of roading/parking comprising Hawea garage complex; the engineered dam area; swathes of wilding pines, pest broom and other woody weeds; presence of a power line; the highway itself with signage and barrier clutter; and the several sheds and deer fencing compartmentalising the Site. The mix of tree species on the golf course and visible built form of Hawea village contribute to the visual clutter.

Features of the Site that contribute positively to the landscape character of the immediate context are the mature eucalypt trees (although some may be approaching a stage of over maturity), the surface boulders and rock outcrops and small areas of open space in the way of rough grassland with a small number of grazing animals. These are the more rural aspects of the peri-urban character. The broad division of land between the upper and lower levels is the only other natural (biophysical) element of note albeit modified by the water race. The watercourses on the Site are very small in scale, partially modified and ephemeral and of little interest from outside the Site. There is a small and insignificant presence of relict native vegetation.

The Site is part of the immediate highway corridor with a road frontage of approximately 320m, as a non-descript piece of land of small-scale relict pastoral and residential use sandwiched between the golf course and the garage.

From the LHAR the Site is the foreground to views of mature trees, mainly conifers, along the Hawea River, or to the Hawea Golf Course landscape. The Site is always viewed in conjunction with the Hawea garage and/or with the golf course to greater or lesser degrees depending on viewer location on the LHAR, and always with the backdrop of mature trees along the Hawea River. Large trees on the Site

fragment and partially obstruct views, limited to the trees themselves. There are glimpses of Hawea township's "green" western edge, with some houses to the east, with a background of the ONL of the Grandview Range. Looking south to west, the Dunstan and Pisa Ranges are seen above and beyond the foreground trees in the far distance. Travelling north, there is a tree-framed view along the highway and over the dam infrastructure of the McKerrow Range and Corner Peak ONL. Collectively, these are distant limited and fragmented views of the Outstanding Natural Landscape (ONL) of the ranges, and the Site is not considered to have significance as foreground. There are no views of wider RCL over the Site due to extensive tree cover on and off-site (and the fact there is very little surrounding RCL).

As stated earlier, native-dominant planting on both sides of the LHAR on the southern approach to Hawea will provide a more attractive transition into the utilitarian/urban area of Hawea Dam and village.

The Site is not part of the outlook from any private dwellings. It is directly in view when exiting the private properties opposite, and it forms the immediate bounding landscape on the north side of the golf course, providing a degree of amenity as open pastoral space with some mature trees. It is not part of the outlook from Hawea village or any roads or streets on the other side of the Hawea River, and as stated earlier, it is not visible from the Hawea River trail.

From the true right river margin accessible to the public, the Site is part of the immediate corridor landscape. It contributes to and is consistent with a somewhat wild and unkempt vegetated character (dominated by woody weed vegetation and rank exotic grass) albeit with an industrial/utilitarian overlay due to the proximity of the engineered features of the dam, power line and the irrigation water race, and the Hawea Garage. At present the scarp and lower terrace is considered to have low aesthetic value due to these factors. Residential land use has a minor presence in this landscape experience although there is awareness of the proximity of the urban area of Hawea, which would be more visible if the mature conifers were absent.

In my opinion, the Site has no particular significance and does not contribute in any significant way to landscape values. It does have a role to play in creating a visually pleasant and welcoming approach to Hawea village and as neighbour and part of the landscape setting for the golf course and the very northern (dam) end of the Hawea River corridor.

Summary of Site Landscape Values:

- part of approach landscape to Hawea (highway corridor)
- open space and rural character (on a small scale, only locally significant)
- mature trees; surface rocks (limited significance)
- immediate setting for river track (low amenity value at present)
- broader scale legibility of moraine/fan surface and lower river terrace

5 PROPOSALS

The proposal is to subdivide the upper level of the property into five separate lots. One larger lot (Lot 1) would comprise the northern part of the Site and contain the existing dwelling and access drive. It would include most of the lower level of the Site.

The remaining upper level area would be divided into four new rural living lots each with a residential building platform (RBP). The two RBPs close to the river would each be 750m^2 in area with a 5m height limit. The two RBPs on the highway side would each be 900m^2 in area with a 5m height limit. Access to the four lots would intersect with SH6 about 100m south of the existing Site entrance.

Earth mounding and planting to provide privacy, noise control from SH6 and visual amenity is being implemented at the time of writing. The mounding has largely been completed. Planting is planned to start autumn/winter/spring 2023 depending on plant availability. This landscape work is designed to complement the mounding and planting on the land opposite across SH6. It forms part of the application as existing landscape features and proposed planting to be retained.

The existing ephemeral stream and reedy area on proposed Lots 2, 4 and 5 would be recognised and protected as a small-scale natural landscape feature. This has been slightly modified in places to create naturalistic ponding areas and to ensure water flows down the natural gully in the southeast part of the Site. This area may be maintained in grass, and/or planted out in local native species appropriate to wetland and riparian conditions.

Additional tree planting is proposed within the subdivision to provide a cohesive integrating framework and to soften and break up public views of residential land use; provide privacy, shade and shelter; and ensure maintenance of amenity with respect to the golf course.

The pines on the Site and the large gums on Lots 4 and 5 will be removed. The large roadside gum mid-Site would be retained. The access drive gums and trees around the existing dwelling are not proposed to be removed but are not considered necessary to retain for visual mitigation purposes, so they have not been identified as such.

The lower terrace is proposed to be retained as an open space area. The existing rank grass and pest broom would be planted out to establish a new cover of native trees, shrubs and groundcovers to provide lizard, bird and insect habitat and a pleasant section of river corridor. It would provide seed source to promote natural regeneration in the adjoining river corridor of a greater diversity of species. The planting is also intended to mitigate visibility of domestic land use on the upper level. It is intended the lot owners would have equal access to this area. The implementation and management of the area would be the responsibility of Lot 1. An Implementation and Management Plan for this area is proposed to be submitted to Council for approval within 3 months of granting of consent, and the works are proposed to be fully implemented within 5 years.

The existing power line would be put underground where it crosses the Site.

6 VISIBILITY AND VISUAL EFFECT

6.1 Relevant Viewpoints

The Site is highly visible from the LHAR (SH6). This is the most relevant public viewpoint. The Site has high visibility for people using the publicly accessible parts of the Hawea River corridor adjacent to the Site. Visibility is limited to the scarp and lower level terrace, and to any tall elements on the upper surface close to the scarp. There would be a much smaller viewing audience related to the river corridor as it is used at present.

The Site is also highly visible from the Hawea Golf Course although this too has a more limited viewing audience who are primarily focused on playing golf.

There are no relevant private viewpoints (from dwelling areas). The Site is in direct view for people leaving 1147A and 1147B LHAR. In any case, APAs have been obtained from all neighbouring properties.

Visual effect (nature and degree of visual change) is assessed under the conditions present at the time of taking photos of the profile poles. This includes mounding along the highway boundary but no planting. The visual effect is then qualified taking into account the future planting proposed. Visibility and the overall visual effect are rated in accordance with the definitions in the Appendix. It needs to be acknowledged that visual effect (visual change) including of a high degree is purely descriptive and is not inherently adverse or positive. This is determined by the second round of evaluation of effect on landscape character and visual amenity.

Whilst it is likely the mature conifers (which appear to be mostly pines) and possibly the willows will be removed from the Hawea River corridor in due course (inter alia, for wilding tree control), for the purposes of this assessment it is assumed that the mature trees along the Hawea River (off-site) will

remain for some time yet (i.e., for at least 10 more years). A brief assessment of effect should they be removed is given for completeness.

Profile poles were erected and viewed from different perspectives on 7 December and on subsequent pass-bys. A set of photos with the profile poles and RBPS marked on are contained in the GAB (V1-V16) which have assisted in assessing the potential visibility and visual effect of the proposed development.

6.2 Visibility from the LHAR

The proposed development would be visible from a 700-800m section of the LHAR, on the approach to the west dam entry to Hawea village from the south and from the north.

6.2.1 Southerly Approach

Approaching from the south, there would be intermittent glimpses of residential development on proposed Lots 2, 3 and 5 across the golf course. Mostly mature evergreen and some deciduous trees on the golf course obstruct and fragment these views of the Site. It is assumed these trees will remain. Proposed Lot 5 development would mask development on proposed Lots 2 and 3 to some degree. The existing sheds and dwelling on the Site are currently glimpsed in this view, as are some Hawea village houses up on the moraine to the right. Directly ahead, the Hawea Garage frontage marked by a cluster of parked vehicles, and part of the Hawea Dam are in these views too. Built form is/would be visible within a framework of mature mostly evergreen trees on and off-Site. The visual layer of built form within a tree framework - apart from Hawea houses up on the moraine - sit well below the backdrop of mountains and the small framed view of Lake Hawea.

Coming close to the Site (see V1), golf course trees block views of the Site, but there is a partial view to the Lot 2 RBP, framed between trees including the large roadside gum on the Site. The mounding and native tree and shrub planting on the left side of the road is part of the scene. Layers of large evergreen trees form the midground to the right of the road, with the ONL of mountains behind, obscuring any views of Lake Hawea village.

Passing by the Site (see V2 - V5, V8 - V10) the development on proposed Lots 5 and 2 would be mostly to fully visible at close range (between some 50-200m) depending on viewpoint, as the large roadside gum fragments the view. The visual effect would be Highly to Prominently visible. The road boundary mounding in itself offers little visual screening. Development on proposed Lots 3 and 4 would be intermittently visible to varying degrees of visibility (Low to Moderate) between existing trees on the Site and due to the masking effects of Lots 2 and 5 in the foreground. The existing dwelling and associated curtilage and sheds have Low to Moderate visibility in these views at present, partially screened by existing trees and being set back from the road. However, the proposed Lot 2 RBP tends to sit in front of it and would largely screen views of it (e.g. V3, V4A). There are occasional glimpses through gaps in tree foliage of a small amount of built form of Lake Hawea village behind and above the Site on the elevated moraine ridge. Generally, however, the future built form on the Site would be seen amongst and against a backdrop of evergreen trees, with views of the ONL Grandview mountain range above the trees.

Should the background off-site trees be absent and there is no new tree planting in its place, the development on the Site would most likely be seen as a lower foreground layer of more spacious built form to background layers of urban built form interspersed with vegetation along the river and planted on the west side of Hawea village. However, at that time, it is likely the planting on the Site would have matured so that there would be limited visibility across the Site in any case. There would be intermittent viewshafts through the low points and gaps, e.g. where the access road is.

6.2.2 Northerly Approach

In views approaching the Site from the north (V6, V7), the future Lot 2 development would be the most visible to a High degree. In the vicinity of the Dam and entrance to Lake Hawea village and approaching the north end of the Site, the clutter of the Hawea Garage is a prominent part of the view. Proposed Lot 5 development would be of Low visibility until past proposed Lot 2, as it would be largely hidden behind proposed Lot 2. The development would be set against a backdrop of mainly evergreen trees on the

Hawea Golf Course (which are assumed to remain) and the distant ONL of the Dunstan and Pisa Ranges. The golf course trees are relatively smaller in scale and built form on Lot 2 would potentially intrude slightly on the view of these ONL ranges when viewed at closer range. This would be a very brief effect at travelling speed (car or cycle).

As one passes the Site, the built form on Lots 2 and 5 would be Highly to Prominently visible, set against the large evergreen mass of trees of the Hawea River corridor, as described above. Lot 3 and 4 development would be intermittently visible set further back as above, with Moderate to Low visual effect.

6.2.3 Summary of Visibility and Visual Effect from LHAR

In summary, under the current Site conditions, visibility of the future development on proposed Lots 2 and 5 from the LHAR on approaching and passing by the Site in either direction would, inevitably, vary from being Visually Dominant, Prominent or Highly Visible to more limited instances of Moderate to Low visibility when views are more oblique and further from the Site. Future built form on proposed Lots 3 and 4, and for the existing dwelling, visibility would mostly be Low to Very Low or not visible but there would be instances from particular viewpoints of Moderate to High visibility. At driving or cycling speed, there would be an awareness of two residential developments close to the road, with another three (including the existing house) recessively in the background. Overall this would be a visual change (effect) of a High degree from open pasture to residential land use in a well-treed setting albeit of a spacious rural living character. There would also be a noticeable change from dominantly exotic tree vegetation to a mixed vegetation including greater proportion of indigenous vegetation including shrubs and smaller plants. The planted mound alongside the LHAR is/would be visually Prominent in effect, similar to the effect on the other side of the road.

6.2.4 Effect of Mitigation Mounding and Planting on Visibility of Built Form from the LHAR

With the removal of the large gum on Lot 5 and the pine trees and shrubby broom on the Site generally, visibility would increase. Development on Lot 5 in particular would become more visible. The existing mounding has little screening value in itself. However, the proposed native trees and shrubs to be established on the mounding, which should easily attain heights of between 1m and 4m within 5-7 years (depending on species), would provide substantial softening and filtering of views and eventually intermittent full screening. Visibility of future development overall would be likely to reduce in a relatively short time frame to first Moderate then Low to Very Low or Nil. The mounding would enable the screening effect to be achieved faster by adding 1-2m of height from the outset and providing a good growing medium. The growth of the recent planting on the property at 1147B LHAR[3] demonstrates the screening ability of mounding combined with native tree and shrub planting within a very short time frame of only 3-4 years.

In addition, the framework of trees proposed through the lots and the retention of some of the existing trees would add visual softening, filtering and screening. This would include background tree vegetation looking across the Site, e.g., along the golf course boundary looking south to the ONL backdrop and looking east towards the Grandview range (should the river trees be absent).

6.3 Visibility from the Hawea Golf Course

This viewpoint was not visited however it is inevitable that development on proposed Lots 4 and 5 would be Visually Prominent to Highly visible for people on the north end of the golf course, especially playing Hole 5 parallel to and close to the shared boundary. Development on proposed Lots 2 and 3 would be further away and partially visible to a Moderate to Low degree. The internal tree planting proposed within the Site would reduce visibility to Moderate and Low, filtering and breaking up views of residential

[3] This is only present in Google Earth views after late 2019.

development. It is intended to maintain a partial golf course outlook for proposed Lots 4 and 5 for amenity. It is acknowledged that the Golf Course entity has provided an APA.

6.4 Visibility from the Hawea River Corridor

From viewpoints along the river track looking across and up into the Site future built form on proposed Lots 3 and 4 would be visible to a Moderate to High degree. The potential visual effect is shown in V11 to V16. With removal of the large gum and pine trees on the Site there would be skyline effects from more north-easterly viewpoints (see V11 to V13). Looking northwest to west across the Site, built form would have Mt Maude as a backdrop. The existing dwelling and garage are of Low visibility as they are set back from the scarp and have mature planting around them.

Proposed planting of the scarp and lower terrace area would provide effective visual screening of residential development on Lots 3 and 4 and screen out the existing built form so that it would be likely to be visible to a Low to Very Low degree at most. The planting would become the dominant feature. Planting on the scarp at the top would most likely take up to 5 years to become effective at filtering and screening views of built form (i.e., a Moderate to Low visibility/visual effect), if it is well-cared for with irrigation.

Overall visual effect on river track views would be High including the change in vegetation.

7 LANDSCAPE AND VISUAL ASSESSMENT

The relevant assessment matters are in the Proposed District Plan (PDP) relating to land use activities in Ch. 21.21.2 in the Rural Zone in RCL. It is understood these now "outweigh" the assessment matters in the operative District Plan and are similar in any case.

The relevant objectives and policies are in Chapters 3, 6, 21 and 27 of the PDP. The relevant ones are briefly covered in the final section of this report. Objectives and policies are more comprehensively covered in the AEE prepared by the planning consultant.

7.1 Preliminary Matter regarding Existing Vegetation:

To preface assessment, there is a principle around existing vegetation. There are a number of mature trees on the Site. These were well established by 2002 and are part of the receiving environment. The pines however are wilding species and should be disregarded. They would be removed in any case. It is also acknowledged that the wilding spread-risk conifers in the Hawea River corridor may be removed at some point (but conservatively it is assumed not within the next 10 years).

7.2 Methodology for Assessing Degree of Effect

The methodology for assessment has been explained in Part 2 of this Report. The ratings for and definitions of degrees of effect (adverse or positive) on landscape character and visual amenity are set out in the Appendix.

7.3 21.21.2.3 Effects on landscape quality and character:

The following shall be taken into account:

a. where the site is adjacent to an Outstanding Natural Feature or Landscape, whether and the extent to which the proposed development will adversely affect the quality and character of the adjacent Outstanding Natural Feature or Landscape;

The Site is very close to the Outstanding Natural Landscape area of Mt Maude. It is separated from the ONL by the LHAR/SH6 and a narrow strip of RCL between the base of Mt Maude and the road. The development would be broadly seen in the same view as the ONL from the main viewpoint, the LHAR, but in my opinion it would not adversely affect the quality and character for several reasons.

The area of Mt Maude close to the Site is the least outstanding part of it with wilding pine cover and recently cleared pine forest. It is also the area of rural lifestyle development, with much modified utility and property entrance areas closest to the Site within the narrow strip of RCL. The view also includes the LHAR, power lines, the Hawea Garage and the dam infrastructure, mature pine and other wilding/weed species along the Hawea River, and glimpses of the urban area of Hawea village to the east. Given this context, it is my view there would be no adverse effects. The development would not be in the foreground of views of Mt Maude.

The Site is part of the foreground in views of distant ONL of Lake Hawea (glimpse only from the fan crest), the McKerrow Range and other mountains around Lake Hawea on the southern approach to Hawea dam/village; and the more distant Dunstan, Pisa and Criffel Ranges on the northern approach to Hawea. These views also have the Hawea Garage, LHAR and its signage, dam infrastructure, power lines, pine trees, etc, in them. Mature tree vegetation on and around the Site forms a midground layer in these views. I do not consider these views to be important views of ONL. The proposed development would not have an adverse effect on ONL character and quality in respect of these views in my opinion, given the context.

The proposed native planting along the Site's LHAR frontage would improve the foreground visually. The cumulative effect in time (taking into account the planting on the west side of the LHAR) would have a positive effect to a Low-Moderate degree in my opinion (compared to the existing visual amenity).

b. *whether and the extent to which the scale and nature of the proposed development will degrade the quality and character of the surrounding Rural Character Landscape;*

c. *c. whether the design and any landscaping would be compatible with or would enhance the quality and character of the Rural Character Landscape.*

There is very little RCL surrounding the Site and it hardly constitutes a landscape. The RCL including and surrounding the Site does not possess the core attributes and qualities of the more expansive RCL to the south between the Golf Course and Maungawera Hill, namely openness and a sense of open space, a reasonable degree of visual coherence, and a pastoral character interspersed with more natural character of shrublands and remnant short tussock grassland, as well as rural living development. This is reflected in its omission from the "West of Hawea River" RCL LPA. As described in the context section, there is an eclectic mix of land uses around the Site which are not typical pastoral farming uses. They constitute a peri-urban character, combined with proximity to a hydro-dam. The Hawea garage is a dominant element, along with the Hawea dam structures and the LHAR (especially because the RCL here is a relatively small and narrow as context). These factors result in a degree of "visual clutter" and confer a low level of visual coherence and a more industrial/utilitarian character. The overall quality of the landscape of and around the Site is considered to be low. As the planting that has been undertaken in the area matures the aesthetic quality will improve. The removal of the pines and subsequent replanting on Mt Maude's flank will also be a significant contextual improvement in the longer term in my opinion. The Hawea garage including many parked vehicles and the plethora of signs, road barriers, and the powerline however will continue to dominate and "clutter" the scene approaching the Site especially from the north.

The openness of the Site and its pastoral character would be significantly reduced per se. These attributes are not considered to be of any notable value however given their small scale and isolated nature sandwiched between the golf course and the Hawea garage. The pastoral use also involved several deer fences, sheds and yards (now in a dilapidated state) which due to the small scale resulted in clutter reducing the amenity typically associated with pastoral use. The persistent presence of pest broom and the uneven ground disturbed in places and rank grass exacerbated this effect.

The proposed rural living development is consistent with the land use on the Site in nature but is of a significantly greater scale and density being a change from one dwelling to five. There are no dwellings on surrounding land (apart from one attached to the Hawea garage). The land opposite belongs to the larger rural living blocks on the Mt Maude bulge, containing their entry and utility buildings and various plantings for amenity and production. The dwellings are situated high up on the hill. The proposed development is not consistent with golf course land use or industrial land use of the garage complex and hydro-electricity infrastructure.

The development of the Site for rural living at the density proposed would result in a more complex landscape. At a Site level there would be markedly less open space and pastoral character. This is not considered significant as these attributes are limited to the Site which is small and isolated and does not constitute a landscape in itself with respect to open pastoral character. There would be a greater degree of visual coherence due to the planned layout with design controls and a planned unifying tree framework and highway boundary planting.

From the LHAR the main outward expression of the Site will be the native species planting along the road boundary mounding already constructed with a backdrop of exotic and native trees. This will augment the character of the landscape development on the other side of the road. This landscape approach will provide a high level of visual coherence as well as providing substantial screening of the future development on the Site over time. From this perspective, the proposals are considered to improve the road corridor amenity and the approach to Hawea. The overall outcome will be a significant greening of the approach with less clutter and woody weeds apparent.

Regarding aspects of the proposed development, the retention of the lower terrace and scarp area in open space with re-vegetation in predominantly native species would be consistent with the character of the Hawea River corridor. The creation of the mounding which is also to be planted in native species is consistent with the landscape development approach on the west side of the LHAR. Amenity tree planting within the Site would be relatively consistent with the tree vegetation on the golf course but would be more visually coherent using a limited number of species.

Given the eclectic character and existing overall low quality of the landscape the Site is set in, and the limited landscape values the Site itself has (set out in Part 4) I do not consider the proposed rural living land use including extensive landscape enhancement would degrade the quality and character of the surrounding RCL, such as it is. This is despite the increased density in residential land use. Rather, there would be an improvement even in the short term (within 3-5 years) once the mounding is planted and the tree framework established.

7.4 ***21.21.2.3*** ***Effects on visual amenity***:

Whether the development will result in a loss of the visual amenity of the Rural Character Landscape, having regard to whether and the extent to which:

a. the visual prominence of the proposed development from any public places will reduce the visual amenity of the Rural Character Landscape. In the case of proposed development which is visible from unformed legal roads, regard shall be had to the frequency and intensity of the present use and, the practicalities and likelihood of potential use of these unformed legal roads as access;

Future dwellings would be prominently visible on Lots 2 and 5 from the LHAR, the main public viewpoint, until the road boundary planting on the mounding matured. Lot 3 and 4 development would be considerably less visible and would not approach prominent visibility (refer Part 6 of this Report).

As described above, the existing RCL of the Site and its immediate context is not typical of and does not confer the same visual amenity as the more open and pastoral to natural landscape of the West Hawea River RCL LPA.

In my opinion the conversion of the relatively small and isolated Site from a somewhat unkempt and deteriorating pastoral state with a persistent woody weed problem to a more managed landscape including amenity landscaping around dwellings is likely to provide a similar if not higher level of public

visual amenity. The main difference would be a greater presence of native species in large plantings and exotic and native backdrop tree vegetation. These will complement existing recent planting, and the golf course vegetation, with an overall improvement in visual amenity on the approaches to Hawea.

In this case, given the context, I do not consider that the visual prominence of the dwellings and curtilage would detract from the visual amenity experienced from the LHAR.

The Lot 3 and 4 dwellings would be visually prominent in views from the true right Hawea River corridor, including skyline effects. There is potential for these effects to be moderately adverse, with the highly modified industrially flavoured context and the low level of public use and absence of a formal track moderating the degree of adverse effect. The re-vegetation of the scarp and lower terrace area would soften and filter views of future residential land use. In time the degree of adverse effect is likely to substantially diminish with the long-term outcome likely to be a positive effect as the vegetation comes to dominate. This may take up to 7 years from planting. With dense planting and top-level care including irrigation this period could reduce to 4-5 years.

It is possible, given the context and run-down site character, that the visibility of this proposed residential development would not be regarded as adverse at all but rather a change for the better.

b. the proposed development is likely to be visually prominent such that it detracts from private views;

There are no private views of the proposed development. In any case APAs have been obtained from all neighbouring landowners including the golf course.

c. any screening or other mitigation by any proposed method such as earthworks and/or new planting will detract from or obstruct views of the Rural Character Landscape from both public and private locations;

There are no meaningful views of RCL across the Site as there is very little RCL surrounding or seen beyond the Site. The Site is buffered to the south where the RCL opens out by the golf course, which has its own specific landscape character. The proposed planting on the Site would complement the tree vegetation on the golf course.

d. the proposed development is enclosed by any confining elements of topography and/or vegetation and the ability of these elements to reduce visibility from public and private locations;

The Site is in a relatively small self-contained area which is the immediate context described in Section 4 of this report. This landscape area is not viewed from the wider area in a public sense. It is broadly confined by topography being the lower flank of Mt Maude, the crest of the large alluvial fan, and the Hawea dam and terminal moraine, and the Hawea River. Extensive mature tree vegetation also encloses the Site to the east and south although many of these are wilding-risk conifers which should be removed. Amenity tree vegetation on the golf course also broadly encloses the Site. Overall it is a very local and discrete self-contained landscape

e. any proposed roads, boundaries and associated planting, lighting, earthworks and landscaping will reduce visual amenity, with particular regard to elements which are inconsistent with the existing natural topography and patterns;
f. boundaries follow, wherever reasonably possible and practicable, the natural lines of the landscape or landscape units.

The proposed development would not result in any new lines/boundaries, earth forms or vegetation patterns that would sit uncomfortably in the landscape and have a visually detracting effect, in my

opinion. The broad topographical structure of the Site is reflected in the subdivision layout with the scarp and lower terrace retained as open space with a proposed uniform use. The boundary of Lots 2 and 4 is aligned with the top of the river scarp.

The highway boundary mounding and planting reflects the landscaping approach already present on the west side of the road.

7.5 21.21.2.4 Design and density of development:

In considering the appropriateness of the design and density of the proposed development, whether and to what extent:

a. opportunity has been taken to aggregate built development to utilise common access ways including roads, pedestrian linkages, services and open space (i.e. open space held in one title whether jointly or otherwise);

The proposed subdivision would require a new road from the LHAR. The proposal includes all of the lower terrace and scarp in one title with a uniform land use (including ongoing use of the irrigation water race).

b. there is merit in clustering the proposed building(s) or building platform(s) having regard to the overall density and intensity of the proposed development and whether this would exceed the ability of the landscape to absorb change;

The Site is too small and too isolated to achieve clustering on the Site or present as clustering in the context landscape, i.e., clustering is not practically possible in this case. In a broader landscape sense, the development is clustered in a "corner" of the RCL that is already heavily modified with a number of prominent to dominant cultural elements and close to an urban area.

c. development, including access, is located within the parts of the site where they will be least visible from public and private locations;
d. development, including access, is located in the parts of the site where they will have the least impact on landscape character

There are no options for less visible locations on the Site given its small size. There are also no options for alternative locations that would have less impact on the existing landscape character. However, the change in character is not regarded as an adverse outcome in this case, except possibly with respect to short term visibility of dwellings from the river corridor.

7.6 21.21.2.5 Tangata Whenua, biodiversity and geological values:

a. Whether and to what extent the proposed development will degrade Tangata Whenua values including Topuni or nohoanga, indigenous biodiversity, geological or geomorphological values or features and, the positive effects any proposed or existing protection of regeneration of these values or features will have.

The Council acknowledges that Tangata Whenua beliefs and values for a specific location may not be known without input from iwi.

There are no known specific tangata whenua values on the Site however the entire Site is within the wahi tupuna of the southern margin of Lake Hawea and the Hawea River. This matter is addressed in the planner's report.

There are no indigenous biodiversity values of note on the Site. A very few relict matagouri, porcupine shrub and coprosma bushes are present.

There are no geological or geomorphological features of note on the Site.

7.7 *21.21.2.6 Cumulative effects of development on the landscape:*

Taking into account whether and to what extent any existing, consented or permitted development (including unimplemented but existing resource consent or zoning) has degraded landscape quality, character, and visual amenity values. The Council shall be satisfied;

a. the proposed development will not further degrade landscape quality, character and visual amenity values, with particular regard to situations that would result in a loss of valued quality, character and openness due to the prevalence of residential or non-farming activity within the Rural Landscape.
b. where in the case resource consent may be granted to the proposed development but it represents a threshold to which the landscape could absorb any further development, whether any further cumulative adverse effects would be avoided by way of imposing a covenant, consent notice or other legal instrument that maintains open space.

As described earlier the Site and context lack the values typically associated with the RCL areas elsewhere in the Basin, reflected in its omission from the West Hawea River LPA. The Site is essentially a small isolated area of "left over" land bounded by the Hawea golf course, the LHAR, the Hawea garage and Hawea Dam area and the Contact Energy section of the Hawea River with the urban area of Hawea beyond to the east.

I am not aware of any unimplemented but consented new development in the vicinity that would need to be taken into account in assessment of cumulative effect.

There is one existing dwelling on the Site. The proposed subdivision would result in an isolated node of dwellings. There would be an increased sense of domestic land use however given the context, I do not consider this to be an adverse effect necessarily. As stated earlier, the overall effect in a cumulative sense would be positive due to the future effect of a "green" approach to Hawea.

No protective mechanisms are proposed to stop further subdivision and additional built form or other non-productive land uses. Given the location, I consider there to be capacity for additional development over the northern part of the Site. The open space that would remain in the northern part of this subdivision is of no particular value in a wider landscape sense as it is too small and isolated. It is also immediately adjacent to the Hawea Garage complex and close to the LHAR which suggests future commercial use would not be inappropriate.

An open space protection mechanism may be appropriate over the scarp and lower terrace although given the narrowness of this area and the presence of the water race development in this area is considered unlikely. It is also proposed to be planted out which would form part of the consented development in perpetuity.

7.8 *21.21.3 Other factors and positive effects, applicable in all the landscape categories (ONF, ONL and RCL)*

21.21.3.1 In the case of a proposed residential activity or specific development, whether a specific building design, rather than nominating a building platform, helps demonstrate whether the proposed development is appropriate.

I do not consider that specific building design is necessary in this case to be able to assess the likely effects.

21.21.3.2 Other than where the proposed development is a subdivision and/or residential activity, whether the proposed development, including any buildings and the activity itself, are consistent with

rural activities or the rural resource and would maintain or enhance the quality and character of the landscape.

n/a

21.21.3.3 In considering whether there are any positive effects in relation to the proposed development, or remedying or mitigating the continuing adverse effects of past subdivision or development, the Council shall take the following matters into account:

a. whether the proposed subdivision or development provides an opportunity to protect the landscape from further development and may include open space covenants or esplanade reserves;

As stated above there is no proposal for any protective mechanisms in this application.

b. whether the proposed subdivision or development would enhance the character of the landscape, or protects and enhances indigenous biodiversity values, in particular the habitat of any threatened species, or land environment identified as chronically or acutely threatened on the Land Environments New Zealand (LENZ) threatened environment status;

There is opportunity here to enhance indigenous biodiversity through the road boundary planting and on the lower terrace and scarp. The latter is contiguous with the river corridor which contains relict native vegetation. Species can include threatened and At Risk species such as Coprosma spp., Olearia spp, Hebe cupressoides. The Land Environment is Acutely Threatened.

c. any positive effects including environmental compensation, easements for public access such as walking, cycling or bridleways or access to lakes, rivers or conservation areas;

n/a, although the proposed planting out of the lower terrace and scarp will improve the amenity of the river corridor.

d. any opportunities to retire marginal farming land and revert it to indigenous vegetation;

As above for b. The Site is marginal (former and relictual) farming land.

e. where adverse effects cannot be avoided, mitigated or remedied, the merits of any compensation;
f. whether the proposed development assists in retaining the land use in low intensity farming where that activity maintains the valued landscape character.

n/a

8 OBJECTIVES AND POLICIES (O&P) – PROPOSED DISTRICT PLAN

In this section I address the relevant objectives and policies of the proposed District Plan. It is understood these are now the only relevant O&P.

Ch. 27 Subdivision and Development

27.2.4 Objective - Natural features, indigenous biodiversity and heritage values are identified, incorporated and enhanced within subdivision design.

Policies

27.2.4.1 Incorporate existing and planned waterways and vegetation into the design of subdivision, transport corridors and open spaces where that will maintain or enhance biodiversity, riparian and amenity values.

The design of the subdivision incorporates the existing ephemeral waterway which would be enhanced. The proposed tree planting framework, the roadside indigenous planting, and lower terrace re-vegetation will/would enhance biodiversity and amenity values.

27.2.4.3 Encourage subdivision design to protect and incorporate archaeological sites or cultural features, recognising these features can contribute to and create a sense of place. Where applicable, have regard to Maori culture and traditions in relation to ancestral lands, water, sites, wāhi tapu and other taonga.

Addressed in the AEE.

Policies
Transport Access and Roads
27.2.5.4 Ensure the physical and visual effects of subdivision and roading are minimised by utilising existing topographical features.

The Site is essentially flat and contains an historic roadway as well as an existing road access to the existing dwelling, and other expressions of disturbance. The proposed access road located well within the Site would have limited visual effect. This effect would not be considered unsympathetic.

CH. 21 RURAL

The purpose of the Rural Zone is to enable farming activities and provide for appropriate other activities that rely on rural resources while protecting, maintaining and enhancing landscape values, ecosystem services, nature conservation values, the soil and water resource and rural amenity.

21.2.1 Objective - A range of land uses, including farming are enabled while:
a. Protecting the landscape values of Outstanding Natural Features and Outstanding Natural Landscapes;
The proposal would not have any adverse effects on the nearby Outstanding Natural Landscape. The proposed planting would in time provide a more appealing foreground to views of distant ONL.

b. Maintaining the landscape character of Rural Character Landscapes and maintaining or enhancing their visual amenity values;
The Site and its surrounds form a small extremity of RCL and do not express the typical attributes and qualities of RCL. Rather it is "space left over" with an eclectic character and overall low aesthetic quality due to a variety of land uses over a small area. This character would be maintained with attenuation of the residential land use of a rural living character. The Site has limited landscape values in my opinion (refer Part 4). I do not consider the proposed rural living land use including extensive landscape enhancement would degrade the quality and character of the surrounding RCL such as it is. Rather, visual amenity values would be improved once the development is established, compared to the existing situation.
c. Maintaining or enhancing amenity values within the rural environment; and
d. Maintaining or enhancing nature conservation values.

As above.

POLICIES
21.2.1.3 Require buildings to be set back a minimum distance from internal boundaries and road boundaries in order to mitigate potential adverse effects on landscape character, visual amenity,

outlook from neighbouring properties and to avoid adverse effects on established and anticipated activities.
21.2.1.6 Avoid adverse cumulative impacts on ecosystem services and nature conservation values.
21.2.1.7 Have regard to the spiritual beliefs, cultural traditions and practices of Tangata whenua.
21.2.1.8 Have regard to fire risk from vegetation and the potential risk to people and buildings, when assessing subdivision and development in the Rural Zone.

All setbacks are complied with. There are no neighbouring dwellings relevant to this proposal. The Hawea Golf Course has provided an APA. The development is set back from and physically separated from the Hawea River track. New planting is proposed to mitigate visual effects of dwellings viewed from the river area.
There would be a positive cumulative effect on ecosystem services/nature conservation values, of a low degree.

Objective - The natural character of lakes and rivers and their margins is protected, or enhanced, while also providing for appropriate activities, including recreation, commercial recreation and public transport.
Policies
21.2.12.1 Have regard to statutory obligations, Wāhi Tūpuna and the spiritual beliefs, and cultural traditions of tangata whenua where activities are undertaken on the surface of lakes and rivers and their margins.

The proposed development sits beyond what is considered to be the physical margin of the river (marked by the scarp between upper and lower surfaces) but parts of it would be visible on the immediate scarp crest and would have a Low reducing effect on natural character (given the context). The proposed planting and longer-term revegetation of the lower surface would on balance improve natural character in an ecological and a visual sense compared to the current state in my opinion.

Ch. 6 LANDSCAPES
6.3.2 Managing Activities in the Rural Zone, the Gibbston Character Zone, the Rural Residential Zone and the Rural Lifestyle Zone
Policies
6.3.2.1 Avoid urban development and subdivision to urban densities in the rural zones.
The density would not be urban.

6.3.2.2 Ensure that the location and direction of lights does not cause excessive glare and avoids unnecessary degradation of views of the night sky and of landscape character, including of the sense of remoteness where it is an important part of that character
In context, with the proximity of urban Hawea and the dam night lighting, the effect of house lights is not considered to be an issue. Remoteness is not an attribute of the context landscape.

6.3.2.6 Encourage subdivision and development proposals to promote indigenous biodiversity protection and regeneration where the landscape values and nature conservation values would be maintained or enhanced, particularly where the subdivision or development constitutes a change in the intensity in the land use or the retirement of productive farm land.
The land of the Site would be retired from farming but is not productive land (as the Site is far too small to be a viable unit). Indigenous biodiversity would be promoted with the design. Landscape values including nature conservation values would be enhanced.

6.3.2.7 Ensure that subdivision and development in the Outstanding Natural Landscapes and Rural Character Landscapes in proximity to an Outstanding Natural Feature or Outstanding Natural Landscape does not compromise the landscape values of that Outstanding Natural Feature or Outstanding Natural Landscape.

See above at 21.2.1.

6.3.2.8 Encourage any landscaping to be ecologically viable and consistent with the established character of the area.
Proposed planting would be ecologically viable as it consists of species local to the area. It is also consistent with the existing vegetation of the area around the Site including relict grey shrubland and plantings of native species that have recently been established and are maturing.

6.3.4 Managing Activities in Rural Character Landscapes
Policies
6.3.4.3 Require that proposals for subdivision or development for rural living in the Rural Zone:
a. take into account all subdivision and development that is in existence or is consented for all land within the relevant landscape character area as at 14 May 2021; and
b. assess the potential for adverse cumulative effects on the landscape character of that area and its wider landscape context.
6.3.4.4 Have particular regard to the potential adverse effects on landscape character and visual amenity values where further subdivision and development would constitute sprawl along roads.
6.3.4.5 Ensure incremental changes from subdivision and development do not degrade landscape character, or important views as a result of activities associated with mitigation of the visual effects of proposed development such as screen planting, mounding and earthworks.
6.3.4.8 Avoid adverse effects on visual amenity from subdivision, use and development that:
a. is highly visible from public places and other places which are frequented by members of the public generally (except any trail as defined in this Plan);or
b. forms the foreground for an Outstanding Natural Feature or Outstanding Natural Landscape when viewed from public roads
6.3.4.10 In the Upper Clutha Basin, subdivision and development maintains open landscape character where that is the existing character of the Rural Character Landscape.
6.3.4.11 Encourage development to utilise shared accesses and infrastructure, and to locate within the parts of the site where it will minimise disruption to natural landforms and to rural character.

These matters have largely been addressed in the assessment in Part 7. The proposal would be consistent with or give effect to these policies. Re 6.3.4.4, the proposed development is a form of sprawl along the LHAR comprising the two lots on the road frontage. However, in context, and given the tight bounding of the small Site by the Golf Course on one side and the Hawea Garage on the other, I do not consider this development constitutes the negative sort of sprawl contemplated by this policy.

CH 3 STRATEGIC OBJECTIVES

Policies
3.2.4 The distinctive natural environments and ecosystems of the District are protected.
3.2.4.1 Development and land uses that sustain or enhance the life-supporting capacity of air, water, soil and ecosystems, and maintain indigenous biodiversity.
3.2.4.2 The spread of wilding exotic vegetation is avoided.
3.2.4.3 The natural character of the beds and margins of the District's lakes, rivers and wetlands is preserved, or enhanced where possible, and protected from inappropriate subdivision, use and development.
3.2.4.4 The water quality and functions of the District's lakes, rivers and wetlands are maintained or enhanced.
3.2.4.5 Public access to the natural environment is maintained or enhanced.

3.2.4.6 The values of significant indigenous vegetation and significant habitats of indigenous fauna are protected.
3.2.4.7The survival chances of rare, endangered, or vulnerable species of indigenous plant or animal communities are maintained or enhanced.

These matters are all addressed in Part 7, noting that the Site is very modified with a woody weed burden. The proposal would be consistent with and give effect to these policies. No exotic species are proposed that would spread. The natural character of the Hawea River would be enhanced on balance, despite the presence of two additional residential developments which would be visible in part in the short term. It is not considered inappropriate subdivision and development, in context. The ephemeral stream corridor would be protected. With removal of stock water quality may improve slightly. There would be no provision of new public access within the Site. There is no indigenous vegetation on the Site of note to protect. New planting includes species At Risk or Threatened.

3.2.5 The retention of the District's distinctive landscapes.
Rural Character Landscapes
3.2.5.5 Within Rural Character Landscapes, adverse effects on landscape character and visual amenity values from subdivision, use or development are anticipated and effectively managed, through policies and rules, so that:
a. landscape character is maintained; and
b. visual amenity values are maintained or enhanced.

3.2.5.6 In Rural Character Landscapes, new subdivision, use and development in proximity to any Outstanding Natural Feature or Outstanding Natural Landscape does not compromise the landscape values of that Feature or Landscape.
3.2.5.7 In Rural Character Landscapes of the Upper Clutha Basin:
a. Priority Areas of Rural Character Landscapes are identified; and
b. associated landscape character and visual amenity values and related landscape capacity are identified.

These policies are addressed by the assessment matters in Part 7. They would be upheld with this proposal. The Site is not within an RCL LPA. The Site's character and landscape values are described and identified.

Natural Environment
3.3.20 Manage subdivision and / or development that may have adverse effects on the natural character and nature conservation values of the District's lakes, rivers, wetlands and their beds and margins so that their life-supporting capacity is safeguarded; and natural character is maintained or enhanced as far as practicable.

As for Policies 3.2.4.1 to 3.2.4.7.

Rural Activities
3.3.23 Ensure that the effect of cumulative subdivision and development for the purposes of Rural Living does not compromise:
a. the protection of the landscape values of Outstanding Natural Features and Outstanding Natural Landscapes; and
b. the maintenance of the landscape character and maintenance or enhancement of the visual amenity values of Rural Character Landscapes.
3.3.26 Avoid the planting of identified exotic vegetation with the potential to spread and naturalise unless spread can be acceptably managed for the life of the planting.

As for Policies 6.3.4.3 to 6.3.4.11 and Policy 3.2.4.2.

Outstanding Natural Features and Landscapes and Rural Character Landscape

3.3.33 For Rural Character Landscapes, identify landscape character to be maintained, and visual amenity values to be maintained or enhanced and related landscape capacity:

b. outside of identified Priority Areas, in accordance with the landscape assessment methodology in SP 3.3.45, and through best practice landscape assessment methodology; and

c. through associated District Plan rules setting measurable spatial or other limits, and related assessment matters, as to cumulative subdivision and development including as to location, quantity, density and design.

The Site is outside the West Hawea River RCL LPA. This proposal has been assessed in accordance with this landscape methodology as set out in Part 2 of this Report. The landscape character of the Site and immediate surrounds has been described and values identified. It is considered to have capacity for further built development of the nature proposed.

3.3.35 In any Rural Character Landscape that is not a Priority Area, or is a Priority Area that has not achieved the requirements of SP 3.3.33, do not allow new subdivision or development for the purposes of Rural Living except where:

a. according to the methodology in SP 3.3.45 and having regard to the wider landscape context:

i. a landscape character area for assessment purposes is identified at an appropriate landscape scale including by mapping;

ii. the landscape character and visual amenity values of that landscape character area are identified; and

iii. the landscape capacity of that landscape character area is assessed so as to soundly inform a determination that the requirements of SP 3.3.23 are met; and

b. the approval of new subdivision or development for the purposes of Rural Living maintains the landscape character and maintains or enhances the visual amenity values identified in relation to that landscape character area and the wider landscape context.

The Site is not within an LPA. An appropriate context landscape has been identified and mapped for the purposes of assessment. This includes part of ONL and urban environments. The landscape character of the Site and immediate surrounds has been described and landscape values identified including visual amenity values. The landscape capacity is such that the proposed development can be absorbed without lasting adverse effects on landscape character and values. Rather the proposals are considered on balance to have positive outcomes for landscape character and amenity within a few years, in particular contributing to a pleasant well-vegetated approach dominated by native species to the Hawea locality.

It is not considered appropriate to maintain the existing character of the Site in its run-down state. Given the eclectic character of the context landscape in a broader sense the existing character is maintained, and further, it will be enhanced. It is considered that the values the Site has are recognised and maintained or enhanced by the proposals.

9 CONCLUSIONS

9.1 Landscape Context and Site Character

The Site is a small isolated pocket of former pastoral land located within an extremity of Rural Character Landscape tightly bounded by the LHAR (SH6), Hawea Dam, Hawea Garage, Hawea River/Hawea urban area and the Hawea Golf Course. The rather confined, self-contained somewhat triangular landscape context for the Site is largely comprised of these elements, the southern edge (as the “triangle base”)

marked by the crest of a piedmont fan about 380m south of the Site. The Site is not within an LPA. It is very close to the ONL of Mt Maude but is separate from it topographically and by the LHAR. It also falls within two wahi tupuna areas and within the margin of the Hawea River. There is very little RCL surrounding the Site, except to the south (but this comprises the Hawea golf course). The Lake Hawea-Albert Town Road (SH6) is the main public experience of this landscape and it is the approach landscape to Hawea village. There is also public access along the Hawea River adjacent to the Site however this is informal at present. The formed Hawea River Trail is on the other side of the river with little visual connection with the Site.

The landscape context is typified by an eclectic mix of land uses and does not have the open pastoral character and associated values typical of most RCL. Rather its character is peri-urban and industrial/utilitarian, dominated by the Hawea Dam, Hawea Garage and the LHAR. This "flavour" also affects the perception of the Hawea River corridor adjacent to the Site with the added influence of the irrigation water race. Rural living is a characteristic land use (including the Site and the land west of the LHAR). The dwellings on the latter however are high up outside the landscape context. Removal of large tracts of mature conifer cover and replanting with native species is a feature of the context landscape as well as native plantings on land alongside the highway. Overall the context landscape is considered to have low openness and visual coherence and a low level of visual amenity due to the high degree of "visual clutter."

Pastoral use (which was only of a hobby nature) has ceased on the Site and it currently has an unkempt appearance with a woody weed burden. The Site does not contribute any distinctive elements or particular qualities to the landscape it is set in. It does however contribute positively through its mature trees, to some degree its open rural pastoral aspects (albeit unkempt and deteriorating), and through its broadscale landforms. Only the latter is considered worthy of specific recognition and preservation. The Site has a role as part of the approach to Hawea village and as part of the highway corridor, and as part of the setting and margin of the Hawea River.

9.2 Landscape and Visual Assessment

The proposals would not adversely affect the character and quality of the adjacent Mt Maude ONL. It would not have adverse effects on views of distant ONL. Rather, the foreground to these views would be improved. The overall effect would be positive to a Low-Moderate (less than minor to minor) degree.

There is very little surrounding RCL and it does not have the qualities of open pastoral landscape that comprise most RCL in the Upper Clutha Basin. This is reflected in its omission from the West of Hawea RCL LPA.

Given the nature of the landscape context and the Site itself, with its low level of visual amenity and eclectic-ness, my opinion is that the proposed development would not degrade the quality and character of surrounding RCL, and that the landscaping as well as the proposed residential land use is compatible with and would, within a few years, enhance the character and amenity value of the landscape. The main outward expression from the main public experience of the LHAR would be the well vegetated mounding comprising native species. This would complement the existing highway treatment on the west side and create a more attractive approach to Hawea from the south. The proposed re-vegetated open space area along the river scarp and lower terrace would improve the natural character and amenity of the Hawea River corridor.

Regarding effects on visual amenity, the proposed development would be visually prominent to highly visible at the outset from the LHAR and for Lots 3 and 4, from the Hawea River corridor. As the planting to be implemented matures visibility will reduce so that it is not visually prominent. Vegetation will become the dominating element. Despite early visual prominence, my view is that the proposal would not detract from the visual amenity of the landscape generally apart from initial moderately adverse skyline effects as seen from the river corridor. Over time it would come to have a positive visual amenity effect. No private views would be affected and in any case, all neighbours have provided a APA.

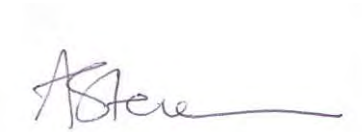
The proposed mitigation planting would not detract from or obstruct any views of RCL, as there are no meaningful views of RCL across the Site.

The Site is broadly confined to a “discrete corner” of the wider basin landscape which greatly limits its visual influence. It is very much a self-contained “local” landscape. Because of this, the proposed rural living lots are clustered in a highly modified area with respect to the wider landscape. There are no meaningful opportunities within the Site for tighter clustering or to limit visual and character effects by locating in different parts of the Site as it is too small.

With regard to cumulative effects, it is considered that the proposed development would not further degrade landscape quality, character and visual amenity values for reasons previously articulated. The Site has potential to absorb further development in its northern part, given its close proximity to the Hawea Garage, and the LHAR at the turnoff to Hawea village. There is no further capacity in my opinion on the lower terrace or over the Lot 2-5 area. There would be an overall positive cumulative effect of increased vegetation dominance on the approach to Hawea.

The proposals would increase indigenous biodiversity and nature conservation values and represents retirement of marginal land from farming use. The natural character of the river corridor would also be improved.

The proposal would be consistent with and /or give effect to relevant landscape objectives and policies in Ch. 3, 6, 21 and 27 of the Proposed District Plan. Most relevantly, the proposed development would maintain the existing eclectic landscape character of the context landscape and enhance its visual amenity values.



Anne Steven

Registered Landscape Architect, Wanaka

July 2023

APPENDIX

Landscape Assessment Ratings
- Visibility
- Visual Amenity Effect
- Landscape Effect

Landscape and Visual Assessment
Bluesure Developments Ltd Subdivision,
1172 Lake Hawea-Albert Town Road

Anne Steven
Landscape Architect
Wanaka

April 2023

LANDSCAPE AND VISUAL EFFECTS ASSESSMENT RATING DEFINITIONS

Visual Effect - Visibility Rating Method

The degree of visibility of the proposed development from a particular viewpoint, or from collectively a number of viewpoints, has been rated as follows:

Visually dominant – the element being assessed is fully visible, stands out and attracts the most visual attention rendering all other elements subordinate and less influential

Visually prominent – the element is fully to mostly visible, is very noticeable and may be a visual focus but is co-dominant with other elements

Highly visible (but not prominent) – the element is easy to see and most or all of its form is visible but there are other elements that are a visual focus or dominate visually

Moderately Visible – the element is partially visible and is less easily discernible as an entity, it is not a visual focus and is visually subordinate to other landscape elements

Low visibility – very little of the element is visible, it can be discerned but it is a minor landscape element

Very Low – hardly any of the element is visible such that it is easily over looked or missed; it may not be recognised.

Not Visible

Adverse Visual Amenity Effects Rating

Very High – the proposal changes the scene to such a degree that valued visible elements and patterns are completely lost and replaced by ones that do not contribute to the visual amenity expected or previously experienced. The overall level of visual amenity that will result is very substantially less than the visual amenity expected or previously experienced despite mitigation.
High - the proposal changes the scene to such a degree that most valued visible elements and patterns are lost and replaced by ones that do not contribute to the visual amenity expected. The overall level of visual amenity that will result is markedly less than the visual amenity expected or previously experienced despite mitigation.
Moderate-High - the proposal changes the scene to the extent many valued visible elements and patterns are lost and replaced by ones that do not contribute to the type or level of visual amenity expected or previously experienced. The overall level of visual amenity that will result is noticeably less than the visual amenity expected or previously experienced despite mitigation.
Moderate - the proposal changes the scene to the extent that some valued visible elements and patterns are lost or disrupted; or are augmented to the degree less desirable elements/patterns are partially offset. The overall level of visual amenity that will result is lower than the visual amenity expected or previously experienced despite mitigation.
Moderate-Low - the proposal changes the scene to the extent that most valued visible elements and patterns remain or are augmented to the degree that less desirable elements/patterns are mostly offset and new elements generally integrate well. The overall level of visual amenity that will result is somewhat lower than the visual amenity expected or previously experienced despite mitigation.
Low - the proposal changes the scene to the extent that most valued visible elements and patterns remain and/or are enhanced to the degree that less desirable elements/patterns are largely offset

and new elements integrate well. The overall level of visual amenity that will result is lower but close to the visual amenity expected or previously experienced despite mitigation.
Very Low – the proposal changes the scene to the extent that valued visible elements/patterns are almost completely retained and/or enhanced to the degree detracting elements fit in well and have negligible effect on overall visual amenity. The overall level of visual amenity that will result is marginally lower than the visual amenity expected or previously experienced even with mitigation.
No Effect – there is no change to the nature and/or level visual amenity enjoyed (i.e. it is neutral)

Positive Visual Amenity Effects
Very High –The overall level of visual amenity that will result is very substantially higher than that previously experienced.
High - The overall level of visual amenity that will result is markedly higher than that previously experienced.
Moderate-High - The overall level of visual amenity that will result is noticeably higher than that previously experienced.
Moderate - The overall level of visual amenity that will result is higher than that previously experienced.
Moderate-Low - The overall level of visual amenity that will result is somewhat higher than that previously experienced.
Low - The overall level of visual amenity that will result is slightly higher than that expected or previously experienced.
Very Low –the overall level of visual amenity that will result is marginally higher than that previously experienced.
No Effect – there is no change to the nature and/or level visual amenity enjoyed (ie, it is neutral)

Improvements in visual amenity are due to elements and patterns restored/enhanced or introduced to the site that are valued in context, and to detracting elements and patterns being removed or remediated (either physically or through screening so they no longer contribute). A positive effect must improve on the ambient visual amenity of the site in context (acknowledging some sites can be very degraded prior to development). The higher the degree of positive effect the more valued elements and patterns dominate. Very High and High positive effects are also relative to what is expected in context, i.e. they are over and above what might be expected.

Adverse Landscape Effects

Very High – there is a total loss of key elements and patterns and attributes of the site that are characteristic and valued in context. The scale and nature of the change is such that a very substantial change to landscape character is evident. The new elements and patterns do not create a different character that would be potentially valued.
High - there is a substantial loss of or reduction in key elements and patterns and attributes of the site that are characteristic and valued in context. The scale and nature of the change is such that a substantial change to landscape character is evident. The new elements and patterns do not create a different character that would be potentially valued.
Moderate-High - there is a loss of or reduction in a number of key elements and patterns and attributes of the site that are characteristic and valued in context. The scale and nature of the change is such that a marked change to landscape character is evident. The new elements and patterns do not create a different character that would be potentially valued.
Moderate - there is a loss of or reduction in some key elements and patterns and attributes of the site that are characteristic and valued in context. The scale and nature of the change is such that a change to landscape character is evident. The new elements and patterns do not create a different character

that would be potentially valued but a few aspects are neutral in effect or contribute positively to landscape character.
Moderate-Low - there is a loss of or reduction in some key elements and patterns and attributes of the site that are characteristic and valued in context. The scale and nature of the change is such that a change to landscape character is evident but a number of aspects are neutral in effect or contribute positively to landscape character.
Low - there is a slight loss of or reduction in some key elements and patterns and attributes of the site that are characteristic and valued in context. The scale and nature of the change is such that a change to landscape character is slightly noticeable and many aspects of the development are neutral in effect or contribute positively to landscape character.
Very Low - there is very little loss of or reduction in key elements and patterns and attributes of the site that are characteristic and valued in context. The scale and nature of the change is such that a change to landscape character is marginally noticeable and most aspects of the development are neutral in effect or contribute positively to landscape character.
No Effect – there is no change to the character of the landscape and its values (ie, the effect is neutral)

In assessing landscape character, the scale of assessment is important. It includes the site and its context and how it is experienced and valued from different viewpoints.

Positive Landscape Effects

Very High – there is an almost total change in landscape character with restoration of the key elements, patterns and attributes of the site that are characteristic and valued in context. The scale and nature of the change is such that a very substantial change to landscape character is evident.
High - there is a substantial increase in key elements, patterns and attributes of the site that are characteristic and valued in context. The scale and nature of the change is such that a substantial change to landscape character is evident.
Moderate-High - there is an increase in a number of key elements, patterns and attributes of the site that are characteristic and valued in context. The scale and nature of the change is such that a marked improvement to landscape character is evident.
Moderate - there is an increase in several key elements and patterns and attributes of the site that are characteristic and valued in context. The scale and nature of the change is such that a change to landscape character is evident. Some few aspects remain neutral in effect.
Moderate-Low - there is an increase in some key elements and patterns and attributes of the site that are characteristic and valued in context. The scale and nature of the change is such that a change to landscape character is evident but a number of aspects are neutral in effect.
Low - there is a slight increase in some of the key elements and patterns and attributes of the site that are characteristic and valued in context. The scale and nature of the change is such that a change to landscape character is slightly noticeable; many aspects of the development are neutral in effect.
Very Low - there is very little slight increase in the key elements, patterns and attributes of the site that are characteristic and valued in context. The scale and nature of the change is such that a change to landscape character is marginally noticeable and most aspects of the development are neutral in effect.
No Effect – there is no change to the character of the landscape and its values (ie, the effect is neutral)

ATTACHMENT A
Figures

Proposed Subdivision and Building Platforms

Bluesure Developments Ltd Subdivision,
1172 Lake Hawea-Albert Town Road

Landscape Assessment Report
Anne Steven Landscape Architect

Anne Steven
LANDSCAPE ARCHITECT

April 2023

HAWEA GARAGE

site entry

rural lifestyle properties on west side of SH6 (dwellings located high on hill above)

LAKE HAWEA-ALBERT TOWN ROAD (SH6)

rough pasture

gum trees along driveway

acacias

irrigation water race

existing dwelling

gum tree

amenity trees

rough pasture and sprayed broom

boundary is inside existing deer fence

rough pasture with scattered boulders and rock piles

old roadway from dam construction period

mature pines

recently constructed earth mounding to be planted out in native trees and shrubs

mature pines (some removed)

CONTACT ENERGY HAWEA RIVER LAND

gum trees and conifer

reedy area

flow diverted along a small ditch

rough pasture and sprayed broom

small retention pond remodelled to flow to SE corner

pest broom

gum tree

excavated pit

gum tree

mature pines

rough pasture and pest broom underlain by alluvial fan

small gully

small water course from golf course

HAWEA GOLF COURSE

prepared by Anne Steven
Registered Landscape Architect
WANAKA

EXISTING SITE
1172 Lake Hawea-Albert Town Road (SH6)
Bluesure Developments Ltd

Scale 1 : 1000 at A3

March 2023

LANDSCAPE CONTEXT

OUTSTANDING NATURAL LANDSCAPE

MT MAUDE
(lower east flank,
semi-schist ice-scoured rock)

LAKE HAWEA
AND HAWEA DAM

older LAKE HAWEA VILLAGE
located on glacial terminal moraine

Hawea Garage

wilding pine cover

wilding pines now
removed from this area

APPLICATION SITE

vehicle tracks
accessible to
the public

newer LAKE HAWEA VILLAGE
located on glacial outwash gravels

LAKE HAWEA - ALBERT TOWN ROAD (SH6)

river-cut scarp

HAWEA RIVER
(incised in bedrock close to dam,
in glacial outwash southward)

Hawea Golf Course

glacial outwash gravels

Hawea Irrigation Race

crest of large alluvial fan marks the southern
extent of the landscape context

HAWEA RIVER TRAIL

river-cut scarp

glacial outwash gravels

scale 1: 5000 A3
aerial base ESRI

FIG. 2 LANDSCAPE CONTEXT

1172 Lake Hawea-Albert Town Road
Bluesure Developments Ltd

prepared by ASLA

February 2023

NATIVE TREE PLANTING LEGEND

	No. Required TOTAL	A	B	C	E
HALLS TOTARA Podocarpus laetus	11	-	5	6	
MOUNTAIN or SILVER BEECH Fuscospora cliffortioides, Lophozonia menziesii	24	13	11	-	
KAPUKA, BROADLEAF Griselinia littoralis	87	13	34	40	
KOHUHU, PITTOSPORUM Pittosporum tenuifolium	93	19	37	37	
RED MAPOU Myrsine australis	10	-	5	5	
SOUTH ISLAND KOWHAI Sophora microphylla	51	2	16	19	14
LOWLAND RIBBONWOOD Plagianthus regius	59	10	24	25	
MOUNTAIN RIBBONWOOD Hoheria lyalli	17	-	5	12	
HECTORS TREE DAISY Olearia hectorii	34	-	6	28	
TREE DAISY Olearia lineata	37	-	16	21	
CABBAGE TREE Cordyline australis	46	6	19	21	
FIERCE LANCEWOOD Pseudopanax ferox	39	8	18	13	
COPROSMA Coprosma virescens					

TOTAL PLANT AREAS AND NUMBERS : (HIGHWAY BOUNDARY)

A 100m2 65/100 Total Plants 65
B 270m2 85/100 Total Plants 230
C 542m2 85/100 Total Plants 460
E 150m2 85/100 Total Plants 130

SHRUB PLANTING LEGEND

	A	E	B	C
DESERT BROOM Carmichaelia petriei			13	27
COPROSMA Coprosma crassifolia			5	13
COPROSMA Coprosma dumosa				5
COPROSMA Coprosma rugosa	15		5.	-
COPROSMA MINGIMINGI Coprosma propinqua	10		8	315
COPROSMA Coprosma virescens	5		5	5
KOROKIO Corokia cotoneaster	10		8	28
PORCUPINE SHRUB Melicytus alpinus		30	25	48
WEEPING MAPOU Myrsine divaricata			5	5
SHRUB DAISY Olearia avicenniaefolia	10		5	15
SHRUB DAISY Olearia odorata	5		11	21
MOUNTAIN COTTONWOOD Ozothamnus leptophylla				10
WHIPCORD HEBE Leonehebe cupressoides			5	20
HEBE Veronica odora			12	16
KOROMIKO Veronica salicifolia	5		6	10

	A	E	B	C
SNOW TUSSOCK Chionochloa rigida		90	60	80
RED TUSSOCK Chionochloa rubra			30	85
MOUNTAIN FLAX Phormium cookianum	5	12	20	47
TOETOE Austroderia richardii			7	10

HAWEA GARAGE

N

15m setback

PROPOSED OPEN SPACE AREA (LOT 1)
open space area, weeds controlled
planted out in native plants optimized for lizards and birds.
May include flowering exotics for bees such as
pussy willow, grevillea, callistemon, eucalyptus.
Maintain service access for race.
Area to be accesible to lot owners via walking tracks
to be provided within the area.

Revegetation implementation and management plan for entire Open Space Area
to be provided within 3 months of granting of consent.
Plan is to be fully implemented within
5 years of date of approval of Plan.

LOT 1
1.xxha
(balance lot)

COTTER PROPERTY

LAKE HAWEA-ALBERT TOWN ROAD (SH6)

A

E

new access road

B

existing low naturalistic mounding retained with occasional large rock "outcrop" and planted with mainly native trees and shrubs for noise control and privacy from highway and for visual amenity.
Will also contribute to an attractive entrance to Hawea complementing the planting on the other side of the road

approximate crest of embankment

ephemeral riparian/wetland corridor to accommodate overland flow.
Area in blue to be generally maintained in grass and/or planted out in naturally occurring native riparian species such as sedges, rushes, wetland herbs, tussock grasses, flax and toe toe.

LOT 2
67ha

Building Platform
31.5 x 28.57m
900m2

(old road line from 1950s)

LOT 3
.xxha

Building Platform
33.33 x 22.5m
750m2

LOT 4
.xxha

Building Platform
33.33 x 22.5m
750m2

power line put underground through the site

rubbish pit filled in

LOT 5
.97ha

Building Platform
34.5 x 26.09m
900m2

Lot 1 Gully

South Gully

20m setback

15m setback

existing fence

C1 100m2 85/100
10 Carmichaelia petriei
8 Corokia cotoneaster
7 Leonehebe cupressoides
15 Melicytus alpinus
5 Olearia odorata
20 Chionochloa rigida
15 Chionochloa rubra
5 Phormium cookianum
85 Total

C2 45m2 85/100
5 Coprosma dumosa
5 Veronica salicifolia
5 Austroderia richardii
20 Chionochloa rigida
5 Phormium cookianum
40 Total

C3 320m2 85/100
17 Carmichaelia petriei
13 Coprosma crassifolium
15 Coprosma propinqua
5 Coprosma virescens
20 Corokia cotoneaster
13 Leonehebe cupressoides
27 Melicytus alpinus
5 Myrsine divaricata
15 Olearia avicenniaefolia
16 Olearia odorata
10 Ozothamnus leptophylla
12 Veronica odora
5 Veronica salicifolia
45 Chionochloa rigida
25 Chionochloa rubra
27 Phormium cookianum
270 Total

C3 cont'd.

C4 77m2 85/100
6 Melicytus alpinus
4 Veronica odora
5 Austroderia richardii
15 Chionochloa rigida
25 Chionochloa rubra
10 Phormium cookianum
65 Total

spaced tree planting to soften straight edge with golf course and provide some mutual privacy

HAWEA GOLF COURSE

TREE PLANTING LEGEND RIVER SCARP, SOUTH GULLY

MOUNTAIN or SILVER BEECH Fuscospora cliffortioides, Lophozonia menziesii	80
KOHUHU, PITTOSPORUM Pittosporum tenuifolium	72
SOUTH ISLAND KOWHAI Sophora microphylla	20
LOWLAND RIBBONWOOD Plagianthus regius	50
TREE DAISY Olearia lineata	22
CABBAGE TREE Cordyline australis	23
COPROSMA Coprosma virescens	35

HAWEA RIVER MARGIN CONTACT ENERGY

INTERNAL FRAMEWORK TREE PLANTING (nb. Beeches in south and Lot 1 gullies included in River Scarp planting)

EVERGREEN TREES
12 Cd HIMALAYAN CEDAR Cedrus deodara
14 ClyNB LEYLAND CYPRESS NAYLORS BLUE Cupressocyparis leylandii Naylors Blue
21 SILVER BEECH or MOUNTAIN BEECH Lophozonia menziesii or Fuscospora cliffortioides

DECIDUOUS TREES
10 Ap NORWAY MAPLE Acer platanoides
5 Fa CLARET ASH Fraxinus angustifolia"Raywoodii"
17 Fo MANNA ASH Fraxinus ornus
3 Py YUNNAN POPLAR Populus yunnanensis
6 PV VERONESE POPLAR Populus "Veronese"
2 PrY YOSHINO CHERRY Prunus yedoensis
4 Qe NORTHERN PINOAK Quercus ellipsoidalis
6 Qp PIN OAK Quercus palustris
13 Tc SMALL LEAFED LIME Tilia cordata
12 Zs CHINESE ELM Zelkova serrata
3 Sc WEEPING PUSSY WILLOW Salix caprea "Pendula"
1 Sb WEEPING WILLOW Salix babylonica
2 SC GOLDEN WEEPING WILLOW Salix x sepulcralis 'Chrysocoma'

prepared by Anne Steven
Registered Landscape Architect
WANAKA

April 2023

LAND DEVELOPMENT CONCEPT FOR 1172 Lake Hawea-Albert Town Road (SH6) Bluesure Developments Ltd

scale 1 : 1000 A3

ATTACHMENT B
Views V1-V16

Proposed Subdivision and Building Platforms

Bluesure Developments Ltd Subdivision,
1172 Lake Hawea-Albert Town Road

Landscape Assessment Report
Anne Steven Landscape Architect

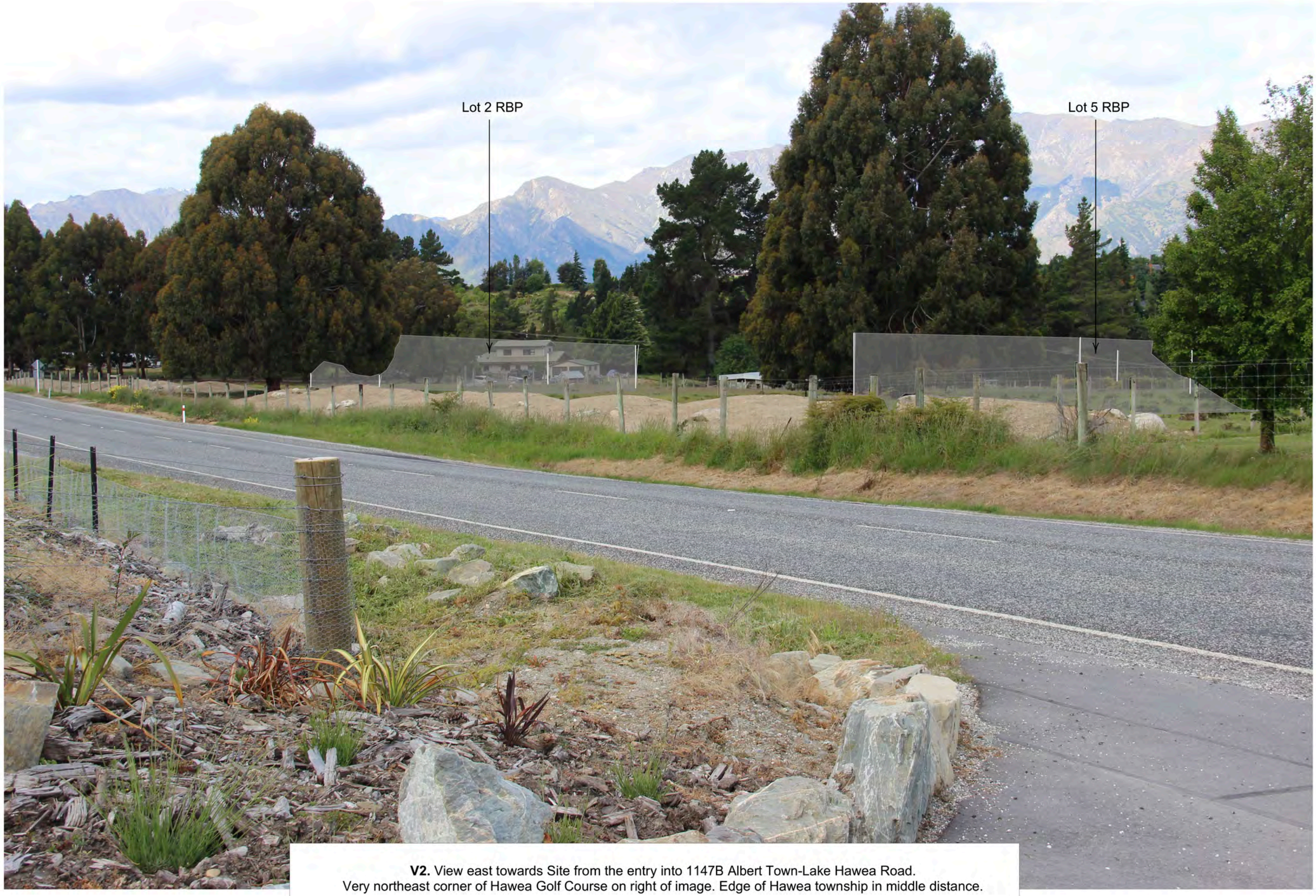
Anne Steven
LANDSCAPE ARCHITECT

April 2023

NOTE:

All photos are taken with a Canon EOS 600D digital camera on a 32mm focal length.
This is equivalent to a 50mm standard lens. All photos were taken on December 7 2022 at approx. 1.5m above ground.
The images have been prepared using Vectorworks and are to be viewed at A3 in colour.
Some photos comprise a single photo, others are stitched panoramas cropped to include all necessary detail.
The location and extent of the proposed building platforms are identified using profile poles.

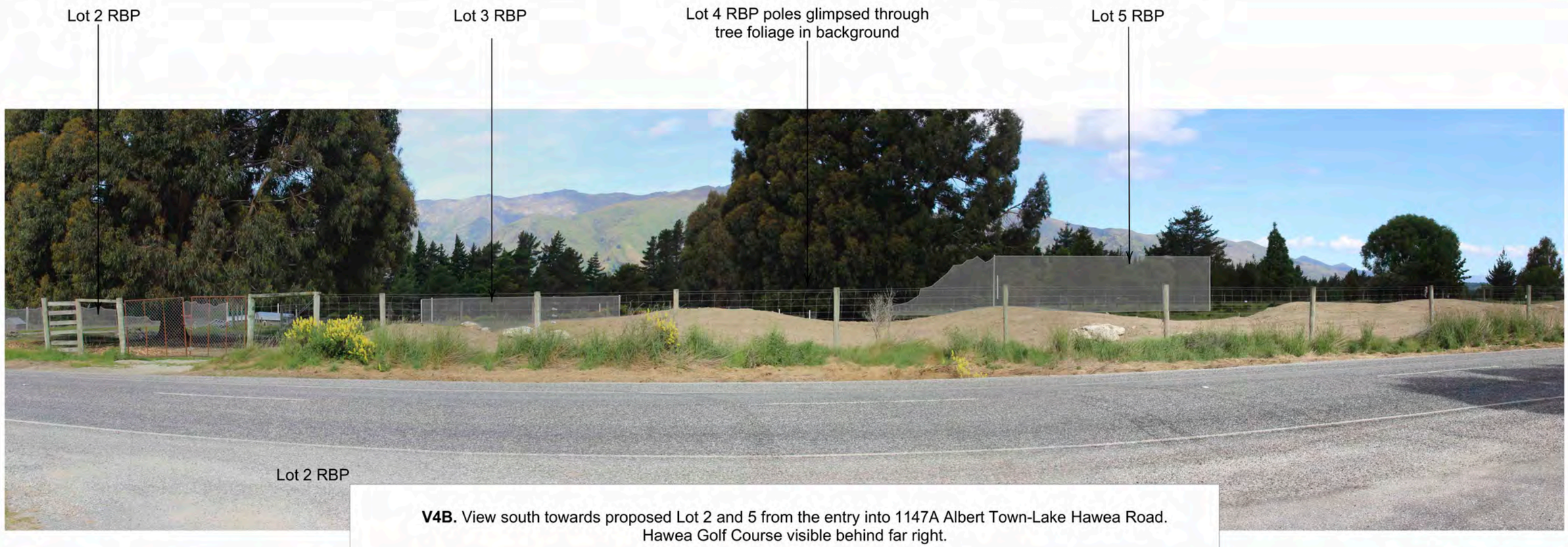
V1. View northeast towards Site from SH6 from a point just west of the entry into 1147B Albert Town-Lake Hawea Road. Northeast corner of Hawea Golf Course on right of image. Lake Hawea and dam in the distance.



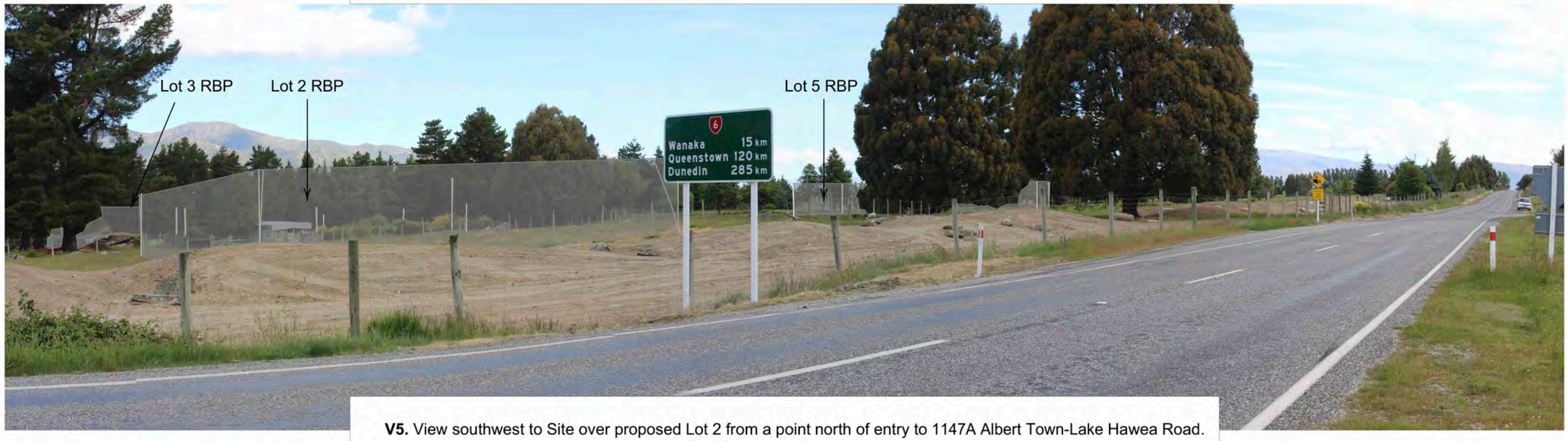
V2. View east towards Site from the entry into 1147B Albert Town-Lake Hawea Road.
Very northeast corner of Hawea Golf Course on right of image. Edge of Hawea township in middle distance.

V3. View east towards Site from a point just north of the entry into 1147B Albert Town-Lake Hawea Road.
Edge of Hawea township in middle left distance.

V4. View southeast towards proposed Lot 1 and 2 part of Site from the entry into 1147A Albert Town-Lake Hawea Road. Edge of Hawea township in middle right distance.

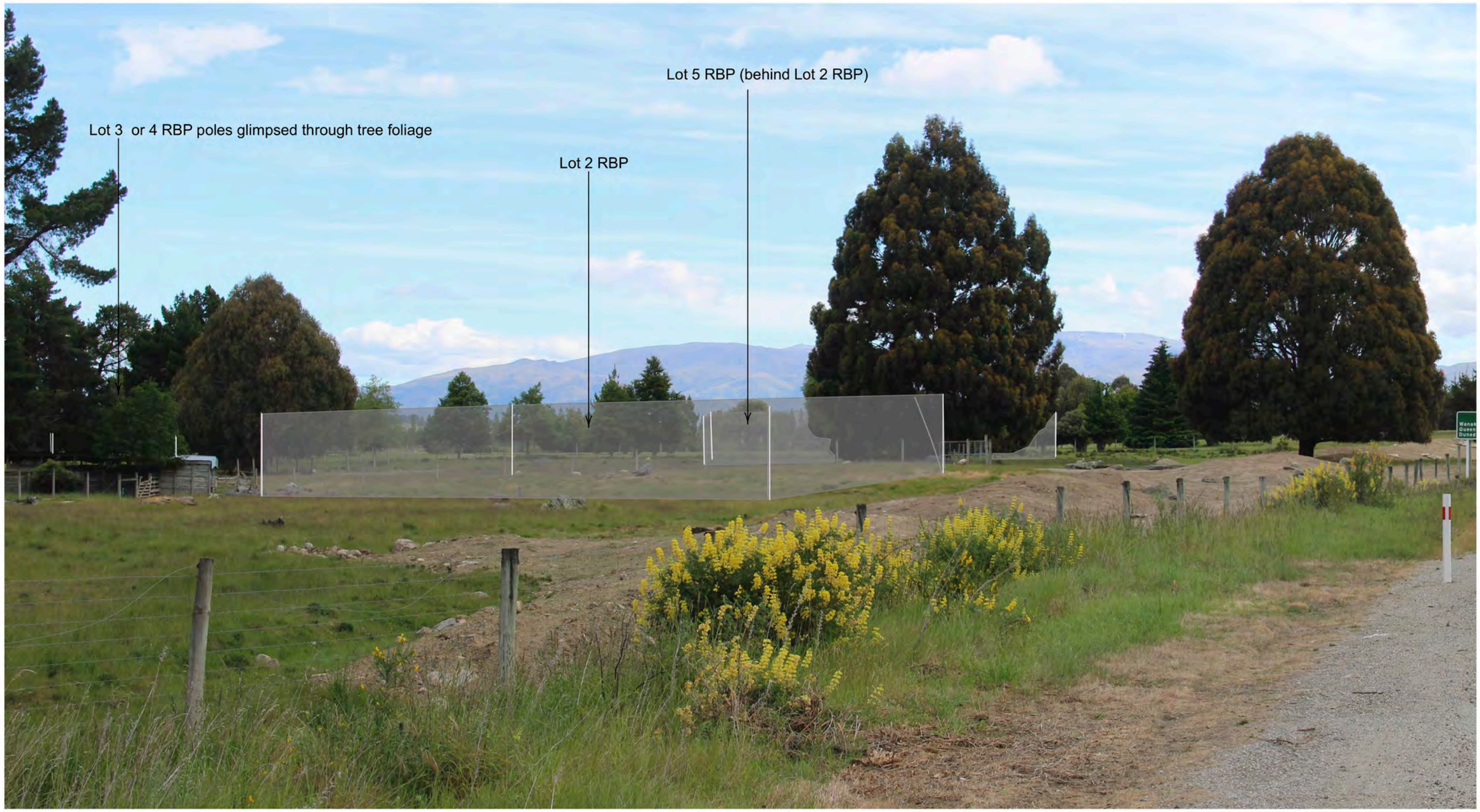


V4B. View south towards proposed Lot 2 and 5 from the entry into 1147A Albert Town-Lake Hawea Road. Hawea Golf Course visible behind far right.



V5. View southwest to Site over proposed Lot 2 from a point north of entry to 1147A Albert Town-Lake Hawea Road. Hawea Golf Course visible in the background.

V6. View west along SH6 to the Site from a point near turnoff to Hawea township.
Hawea Golf Course visible as glimpses in the background. Hawea Garage in foreground.

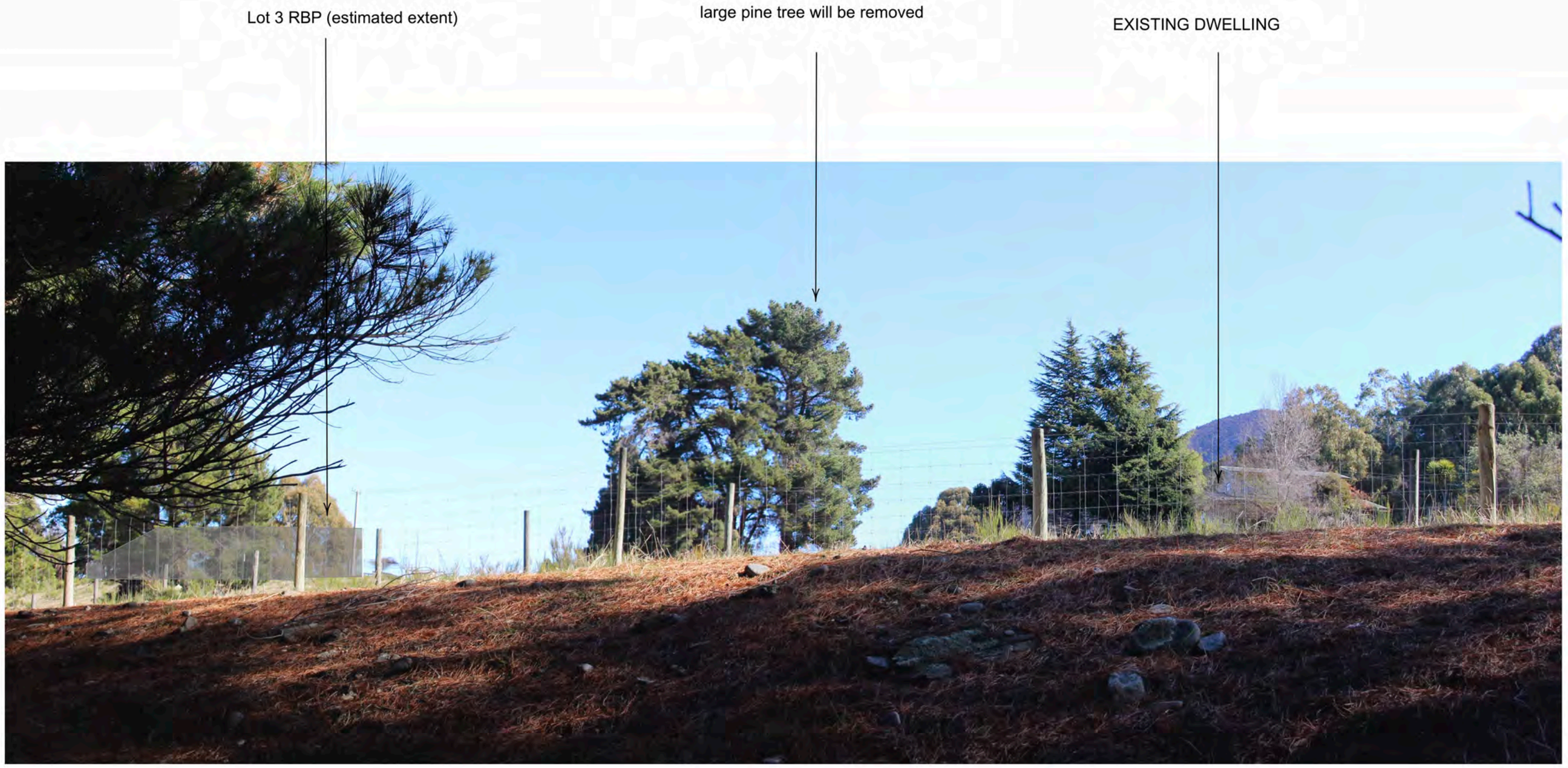


V7. View from SH6 into the north part of the Site, over Lot 2.
Hawea Golf Course visible as glimpses in the background.

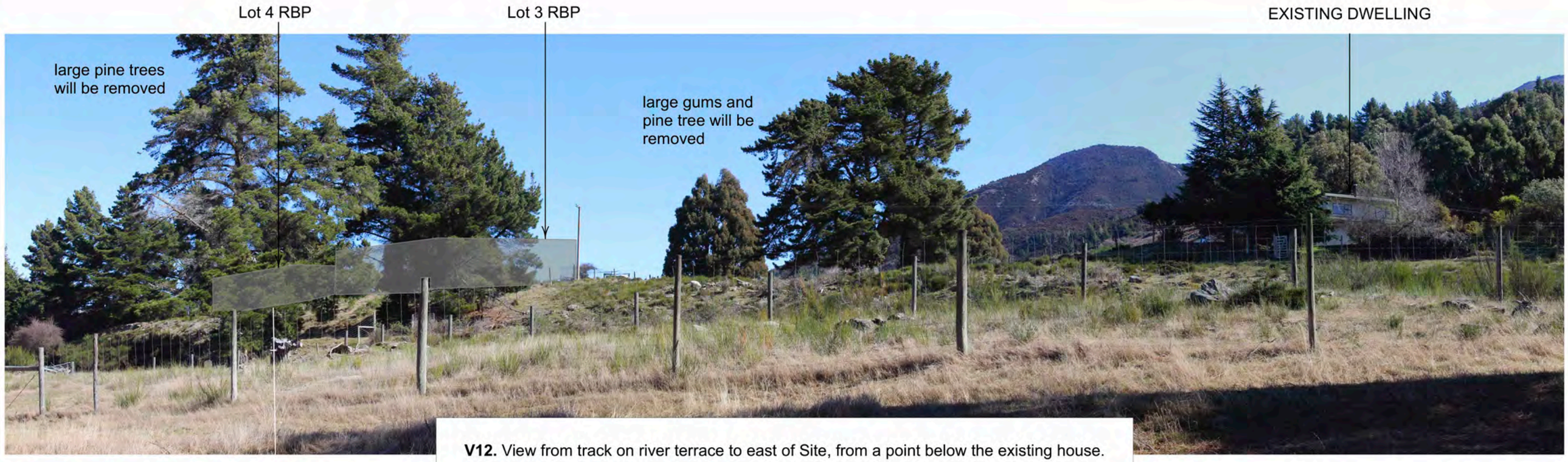
V8. View from SH6 into the middle part of the Site, over Lot 2.
Hawea Golf Course visible as glimpses in the background.

V9. View from SH6 into the south part of the Site, over Lot 5.
Hawea Township visible in glimpses in the background.

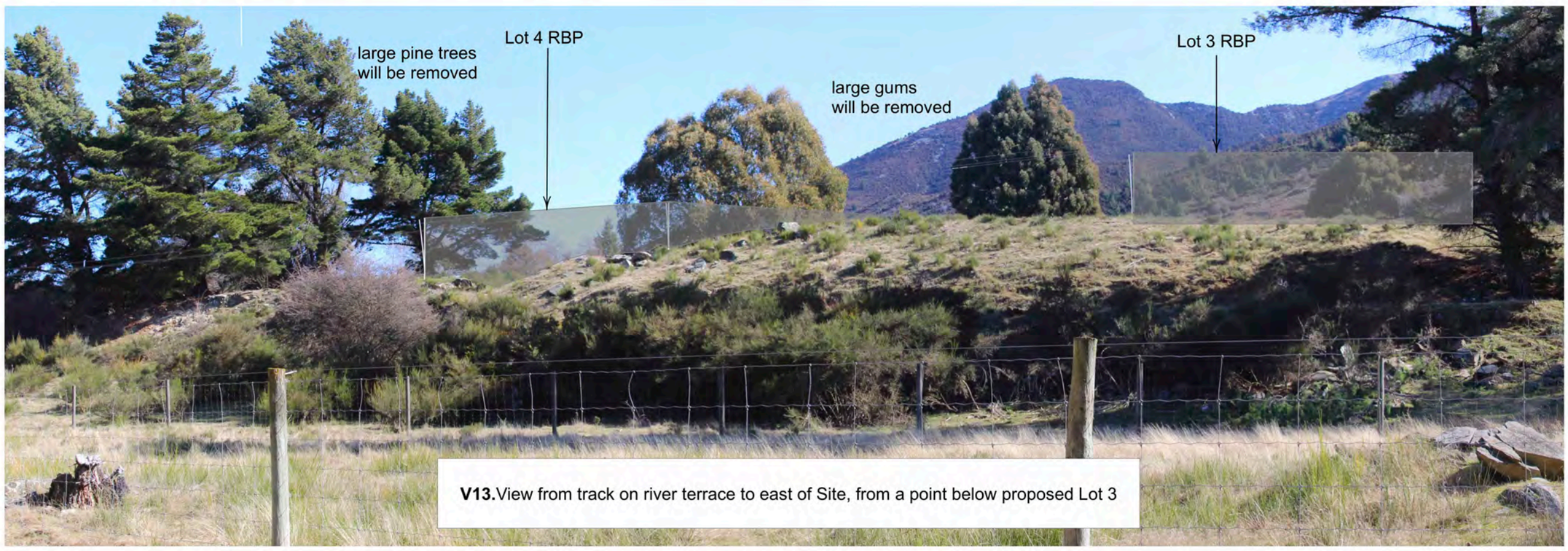
V10. View from SH6 into the south part of the Site, over Lot 5.
Hawea Golf Course visible to right of image.



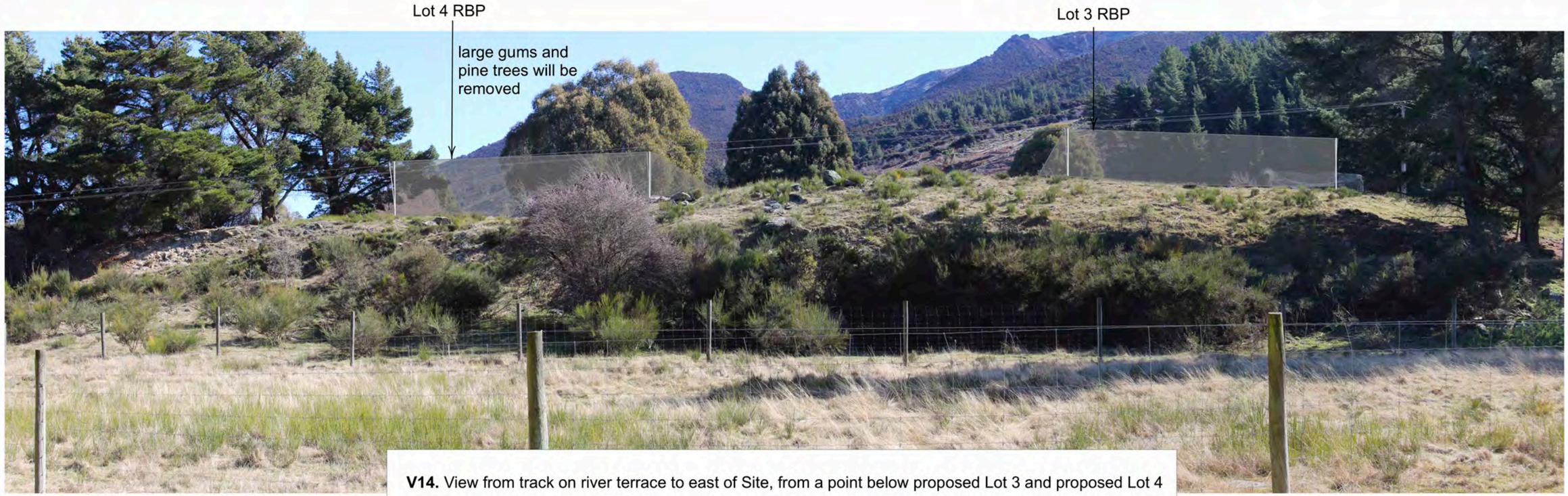
V11. Northernmost view into Site from track along river terrace to east of Site.



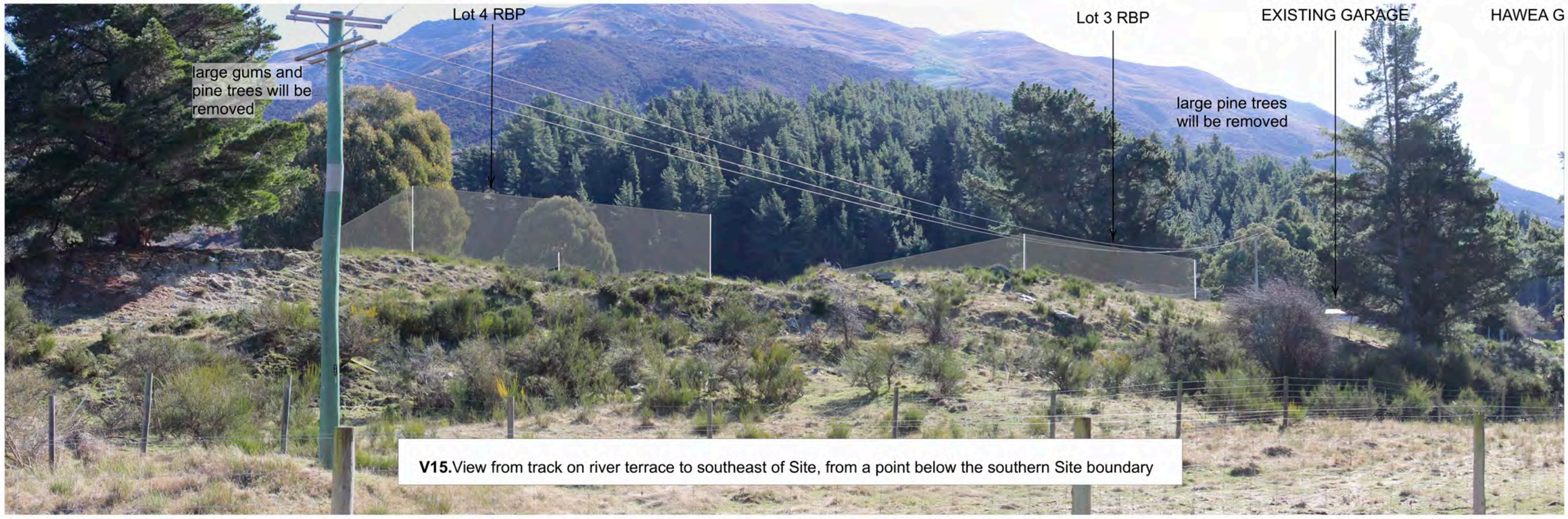
V12. View from track on river terrace to east of Site, from a point below the existing house.



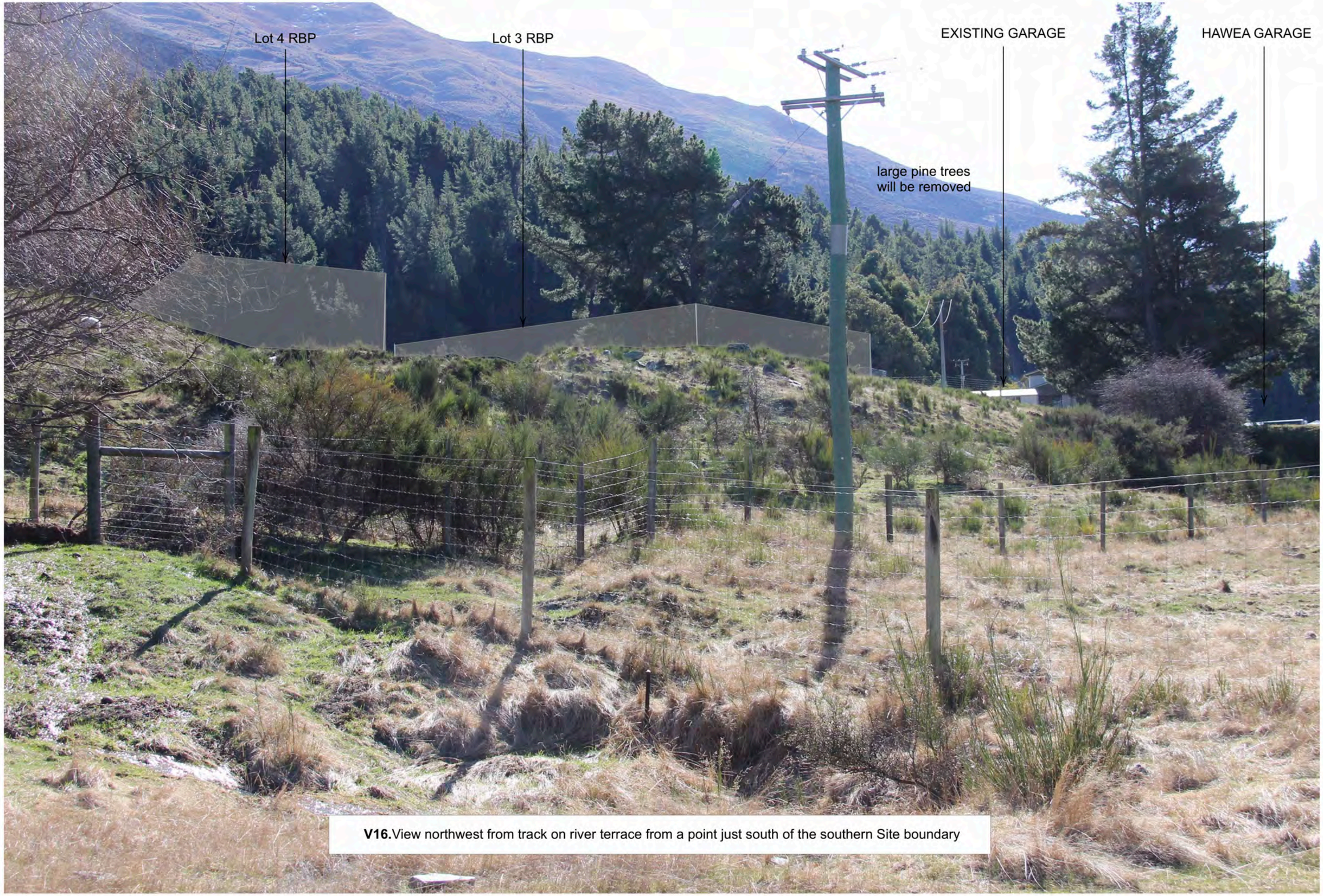
V13. View from track on river terrace to east of Site, from a point below proposed Lot 3



V14. View from track on river terrace to east of Site, from a point below proposed Lot 3 and proposed Lot 4



V15. View from track on river terrace to southeast of Site, from a point below the southern Site boundary



V16. View northwest from track on river terrace from a point just south of the southern Site boundary

Geotechnical Assessment for Proposed Subdivision at 1172 Lake Hawea-Albert Town Road, RD2, Wanaka

Prepared for:	Bluesure Developments C/- IP Solutions Ltd
Date:	8/06/2022
Our Reference Number:	22018_1
Report prepared by:	Jana Kruyshaar CMEngNZ
Reviewed by:	Mike Pretty MEngNZ

Insight Engineering PO Box 456, Cromwell www.insighteng.co.nz

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1 Introduction and Scope of Report

JKCM Ltd, trading as Insight Engineering (IE), was requested to undertake a geotechnical assessment at 1172 Lake Hawea-Albert Town Road, RD2, Wanaka (herein referred to as 'the site') as outlined in our proposal (reference P22018, fully executed on 16 April 2022).

We understand that the site is proposed to be subdivided for future residential use. A scheme plan of the proposed development, showing 5 new lots, is included as Appendix 1 of this report.

Our scope of work for this geotechnical assessment included:

- Desktop review of available information for the site, including published geological maps, local authority GIS webmaps, ORC groundwater data, and historical aerial photographs;
- Organise subcontractors and co-ordinate with sub-consultants;
- Shallow Investigations including a GPR survey, observation and geotechnical logging of eight machine excavated test pits to a maximum depth of 2m;
- Data processing and geotechnical assessment of potential geotechnical hazards for the proposed subdivision;
- Preparation of this geotechnical assessment report, presenting the findings of our investigations and recommendations for the proposed subdivision

This report may be used to accompany a Resource Consent application to the Queenstown Lakes District Council (QLDC).

2 Site Description and Development Proposals

The site (Section 22 Block III Lower Hawea SD) is located at 1172 Lake Hawea-Albert Town Road, Wanaka as shown on Figure 1 (below). Lake Hawea is approximately 300 m to the north of the site, and the Hawea River is approximately 50 m from the eastern site boundary. The Hawea River flows to the south and the eastern site boundary is approximately 17 m above the river elevation.

Lake Hawea-Albert Town Road (SH6) is located at the western site boundary, a fuel station is adjacent to the northern site boundary and the Lake Hawea Golf Club is to the south.

An existing dwelling with a double garage is located in the northern third of the site. Several farm sheds are located in the central portions of the site, and the remainder of the site is divided into a series of grass covered paddocks.

Remnants of an old access road are visible. The road traversed the site from the western boundary to the south-eastern corner. Additionally, a series of meandering ephemeral watercourses are observed at the site, generally orientated west to east. These watercourses appear to connect with a shallow, artificial depression in the southern portion of the site as well as a steeply incised gully at the eastern side. A shallow manmade channel is visible at the western boundary and connects to one of the ephemeral watercourses.

The gully at the eastern side is estimated to be up to 3 m deep and 5 m wide in places. A concrete culvert is visible in the base of the gully, however it appears to be blocked. Miscellaneous waste is present in the gully.

Generally, the ground surface across most of the site is undulating (hummocky) and uneven, apart from the south-western portion which is generally smooth in appearance. The ground surface slopes

gently at 2 - 2.5 degrees within the south-western portion and becoming less than 2 degrees towards the north and east.

The ground surface falls away steeply (45 degrees to near vertical in places) for 6 - 7 m near the eastern boundary to a lower level terrace nearer the Hawea River. A water race is present along the eastern boundary.

Numerous large, schist boulders are visible at the ground surface across the site area. Boulders were also observed at the ground surface on the eastern side of the Hawea River. The general site elevation (around 345 m to 350 m elevation on the upper terrace/proposed development area) is around the same elevation as the upper terrace (developed area) across the Hawea River.

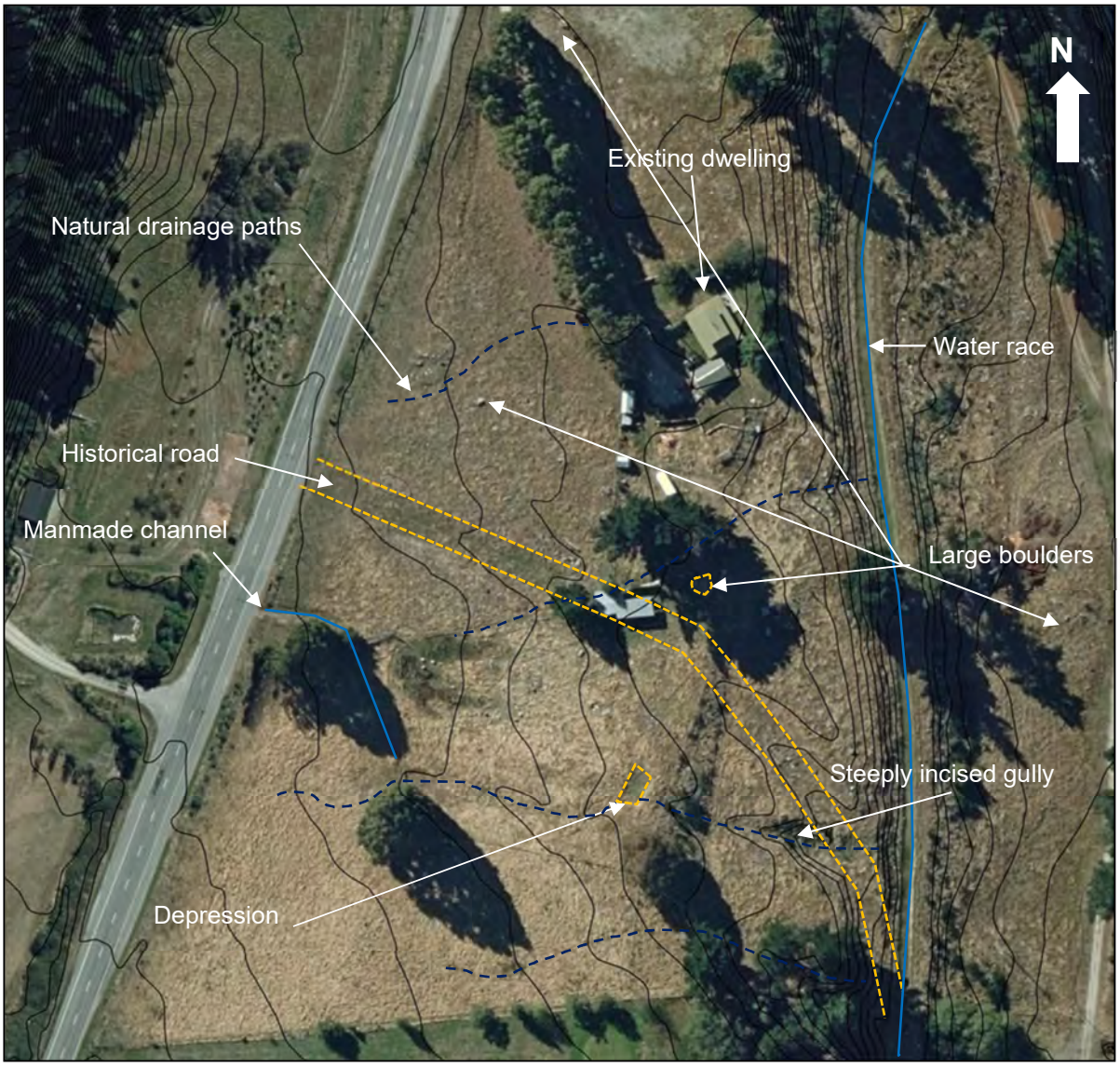
Several mature trees are located at the site.

Surface features are presented in Figure 2 and photographs of the site are presented as Figure 3.

Figure 1: Site Location Plan

Base image sourced from QLCD GIS

Figure 2: Surface Features and Contours



Base image sourced from QLCD GIS

Figure 3: Site Photographs (taken 16 May 2022)

Photograph 1: View looking east showing hummocky ground with large boulders on the ground surface (Proposed Lot 2). The existing house is in the background.

Photograph 2: View looking south showing a mature tree and smoother ground surface (Proposed Lot 4).

Photograph 3: View showing the steeply incised gully containing miscellaneous waste (Proposed Lot 5).

Photograph 4: View looking north showing the water race and steep slope near the eastern site boundary. Schist boulders are visible in the slope.

Photograph 5: View looking south showing the rectangular shaped depression.

Photograph 6: View showing a mature tree with roots entwined around schist rock (Proposed Lot 5).

The proposed development (Appendix 1) includes 5 new residential lots and a reserve (Lot 6). A new driveway is proposed to extend from Lake Hawea-Albert Town Road. The existing dwelling is to remain and will occupy Lot 1.

Building platforms locations are indicated for each new residential lot. The platform for Lot 5 is shown to straddle the gully, and the platform for Lot 3 is shown to be approximately 5 m from the crest of the steep slope to the east.

A riparian corridor is proposed between Lot 4 and the other lots, encompassing some of the existing drainage paths and channels. Landscape mounds and planting are shown along the western site boundary.

3 Desktop Review

3.1 Geology

3.1.1 Geological Setting

The Otago region is predominantly underlain by metamorphic basement rocks that have been folded and uplifted by continental plate boundary tectonic processes. Glacial and fluvial processes have shaped landforms in much of the western Central Otago area where the site is located.

During the Miocene period, Central Otago was a large river and lake environment resulting in deposition of sediment which was carried from mountain ranges to the north. The Miocene terrestrial sediments and basement rock are almost exclusively covered by Quaternary sediments (Pleistocene glacial till and outwash deposits) as well as more recent alluvium and fan deposits.

The following text is extracted from a report prepared by GNS dated March 2019 titled '*General Distribution and Characteristics of Active Faults and Folds in the Queenstown Lakes and Central Otago Districts, Otago':*

> *"The youngest deposits of the districts are unconsolidated sediments whose nature and distributions are primarily a consequence of tectonic uplift and erosion of the mountain ranges and fluctuating climatic conditions during the latter half of the Quaternary Period (from about 1 million years ago to the present day). Uplift and erosion produced voluminous sediment that has been laid down in the basins, valleys and plains on top of the basement or cover rocks. A major feature of the Quaternary Period has been a cycle of large-scale natural shifts in global climate, with periods of generally cool conditions (glaciations, or 'ice ages') separated by periods of warmer climate ('interglaciations'), such as that existing today. Ice-age glaciers that formed in the Southern Alps flowed down the main valleys of western Otago. Lakes Wakatipu, Wanaka and Hawea occupy troughs formed at the downstream ends of those glaciers. The last glaciation ended about 18,000 years ago, after which ice rapidly retreated into the mountains (e.g. Barrell et al. 2013). Wanaka and Hawea townships are built on terminal moraines formed by glaciers."*

The Lake Hawea terminal moraine forms a ridge at the southern side of the lake and a broad area of outwash materials extends further to the south. The moraine is located approximately 250 m northeast of the site and is generally around 15 to 20 m higher than the outwash plains to the south.

3.1.2 Published Geological Mapping

GNS Science has mapped the site as being predominantly underlain by Late Pleistocene (Quaternary) outwash deposits, broadly described as "*Unweathered to slightly weathered, well sorted, sandy gravel forming large outwash terraces in Clutha catchment*".

The southwestern corner of the site is situated on a mapped alluvial fan landform. This is discussed further in Section 3.3.

3.1.3 Published Studies

Significant excavation works took place in the 1950s for the construction of the Lake Hawea Control Dam (located approximately 250 m north of the site), exposing much of the morainic and outwash depositions at the southern end of the lake. An account of the materials encountered was published by the New Zealand Geological Survey in 1959. The publication discusses the composition of the moraine, as well as the influence of landsliding (from the slopes to the east of Mt Maude) on the lake outlet channels.

3.2 Seismic Hazards

Mapped hazards from the Otago Regional Council (ORC) natural hazards portal and the QLDC spatial data hub are discussed in the following sections.

3.2.1 Active Faults

The characteristics and potential effects of local active faults are discussed in the report prepared by GNS dated March 2019 titled '*General Distribution and Characteristics of Active Faults and Folds in the Queenstown Lakes and Central Otago Districts, Otago'.*

The nearest mapped fault zone to the site is the Cardrona-Hawea Fault, located approximately 530 m to the south-east. The Cardrona-Hawea Fault is reported by GNS as being "*possibly active*" with a calculated recurrence interval (RI) of 30,000 years.

The Grandview Fault, is mapped as "*likely*" active is located approximately 3.5 km to the east and has a reported recurrence interval of 22,000 years.

The GNS report discusses that the faults in the Upper Clutha region are generally assessed as low-activity faults, with many calculated recurrence intervals being more than 10,000 years. However, the faults are capable of generating large, locally damaging earthquakes in the future decades to centuries. Accordingly, severe ground shaking and permanent deformation of the land are possible primary effects in the event of rupture of these faults.

The Alpine fault, located approximately 100 km to the west of the site, also presents a seismic hazard to the Otago region. The Alpine Fault is assessed as having a shorter (more frequent) recurrence interval and capable of generating earthquakes of Mw8.1. The likelihood of a major Alpine fault rupture was previously reported as 30% over the next 50 years (Berryman *et al*., 2012). However more recent research (Howarth *et al*., 2021) reports a 75% likelihood for magnitude 7 or greater rupture of the Alpine Fault over the next 50 years.

3.2.2 Seismic Shaking Intensity

The ORC hazards portal provides estimates of ground shaking intensity for various fault rupture scenarios and exceedance for given recurrence intervals. Shaking intensity is presented using the Modified Mercalli Intensity (MMI) scale which is composed of increasing levels of intensity that range from imperceptible shaking to catastrophic destruction. The version of the scale presented on the ORC database goes from MM1 up to MM12.

The source report for the seismic shaking intensity mapping is '*Seismic Risk in the Otago Region'* prepared by Opus in 2005. The report can be found on the ORC website and contains additional detail regarding specific event shaking intensity and the MMI scale.

At the site, MM7 shaking is expected to be exceeded 1/100 years. This level of ground shaking would be felt by all. Effects of MM7 shaking include difficulty standing, furniture moving, damage to fragile contents of buildings, damage to unbraced parts of buildings, windows may break, small landslides are possible and cracks may appear sloping ground.

MM9 shaking is expected to be exceeded 1/2500 years at the site. This level of ground shaking can heavily damage or destroy many buildings, houses not secured to foundations can slide off, ground cracking is conspicuous, and landsliding is possible on steep slopes.

3.2.3 Liquefaction

The site is mapped within a region indicated to have a low to nil risk of liquefaction (A Domain) on the Otago Regional Council (ORC) hazards portals. The mapping is based on the report compiled by GNS Science, dated June 2019 and entitled "*Assessment of liquefaction hazards in the Queenstown Lakes, Central Otago, Clutha and Waitaki districts of the Otago Region*".

3.2.4 Seismic Ground Class

The seismic ground classification appears to be based on the mapped geology. The site is mapped by ORC as being Class D (deep or soft soil).

3.3 Alluvial Fans

The southwestern corner of the site is situated on a mapped alluvial fan landform. The mapping is reproduced as Figure 4 below and is based on the findings of the regional scale Otago Alluvial Fans Project, dated March 2009.

Figure 4: Mapped Fan Landforms

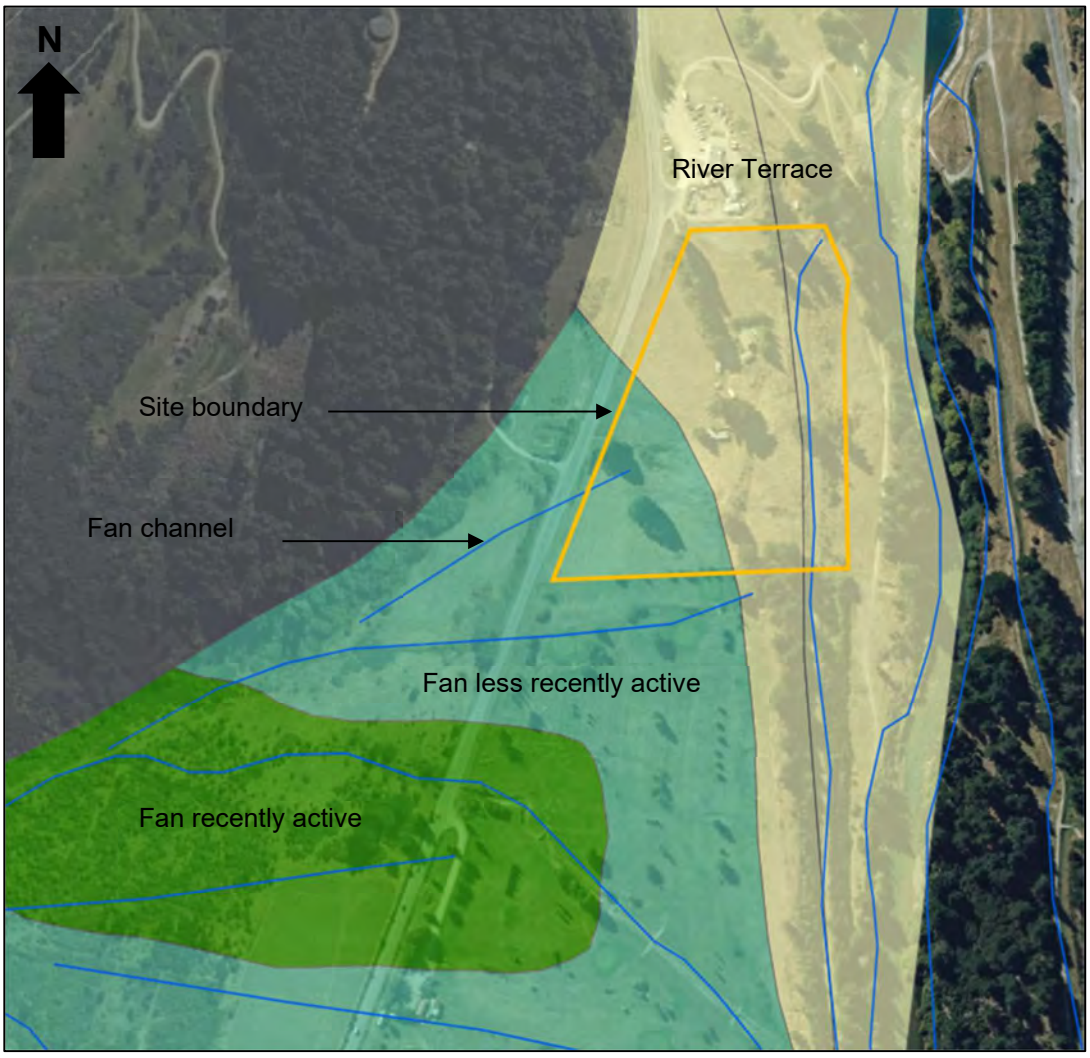


Image sourced from ORC Hazards Portal

The GNS report defines the mapped fan landform types as follows:

- Fan less recently active - Area of less recent stream activity (e.g. more than about 300 years). Mature native forest (if present) and immature to mature soils. Includes terrace-riser slopes up to adjacent higher fan surfaces.
- Fan recently active - Area of relatively recent (e.g. less than about 300 years) stream activity. Immature forest (if present) and raw or very immature soils. Alternatively, the stream may be flowing on the fan surface, in a channel less than about 1 m deep. Includes terrace-riser slopes up to adjacent higher fan surfaces
- River terrace - Not subdivided further on basis of relative height/age. Includes terrace-riser slopes up to adjacent higher terrace or fan surfaces.

The mapping also includes a “less recently active fan channel” extending into the site.

Alluvial fans are further categorised by GNS according to their physical characteristics. The mapped fan at the Hawea west area (Grayburn North) is reported as “aggradational”. The following information is extracted from the Otago Alluvial Fans Project report dated 2009:

Table 1: Fan Stability Classification

Category	Definition	Diagnostic Features	Anticipated Future Behaviour
Aggradational	Net up-building of the fan surface and net out-building of sediment at the fan toe.	Fan built on abandoned river terrace, or other inactive landform, with fan toe remote from a lateral transport agency (e.g. active river channel, wave-eroding shoreline).	Expect rapid short-term changes in channel position and in the loci of sediment accumulation and flooding

GNS further report that “*Predominant processes appear to have been flooding and sedimentation rather than debris flows*” for the Hawea west fans. Additionally, GNS reports potential hazard issues for fans less recently active as “*Possibility of being reoccupied as location(s) of flooding/sedimentation activity, particularly on aggradational- or equilibrium- fan types*”.

Further assessment has been carried out by GNS to assess the potential for debris flow at the Grayburn North fan, and this is discussed further in Section 5.2 below.

The GNS alluvial fan summary information is presented as Appendix 2 of this report.

3.4 Historical Photograph Review

Limited publicly available aerial and historical photographs reviewed as part of this investigation include:

- Aerial photographs dated between 1955 and 2005 sourced from retrolens.nz; and
- Aerial photographs dated between 2010 and 2019 sourced from Google Earth;

The following table broadly summarises the geotechnically relevant features visible in selected photographs. Photographs with poor resolution or scale were not assessed. Photographs with * are reproduced below as Figures 5 and 6.

Table 2: Historical Aerial Photograph Summary

Date	Description
1955	The site appears as undeveloped land on the western side of the Hawea River. An unpaved road enters the site at the western side and curves to the southern side. Drainage paths orientated west to east are visible. The ground surface at the south-western side appears smooth compared with the rest of the site, and has the shape and appearance of an alluvial fan toe. There are no trees on the hill to the west and features that appear to match the mapped landslide mapping are visible. There are no structures present at the site, however some trees are visible.
1956*	The Lake Hawea control dam is under construction, but there are no significant changes at the site compared with the 1955 photograph. There appears to have been recent flooding of the stream/drainage that crosses the (present day) golf course, which has resulted in sediment deposition around the channel on the fan as well as the paddock where the golf course is today.
1964	The dam control construction is in process. The ephemeral drainage paths at the site are clearly visible. The stream/drainage that crosses the golf course paddock appears to have flooded again (possible minor debris flood or debris flow) – the channel (above and below the road) appears more sediment laden compared to the previous photos. The flow appears to have stayed confined to the channel on the upper parts of the fan then spread out depositing soil onto the golf course paddock, possibly where the natural channel became too shallow or terminated. A straight channel has been cut from this location to the southeast, presumably for drainage/to formalise the channel.
1968 - 1896	There are no significant changes compared with the 1964 photograph, apart from changes in vegetation.
2003 - 2005	The site appears to be developed with the current buildings and is broadly in similar condition to present day. The channels and drainage paths within the golf course to the south appear to have been excavated and artificial channels formed to divert water to the east. This appears to have cut off flow to at least one channel at the southern side of the site.
2010 – 2019 (2011*)	There are no significant changes compared with the 2005 photograph, apart from changes in vegetation

Figure 5: Historical aerial photograph dated 1956

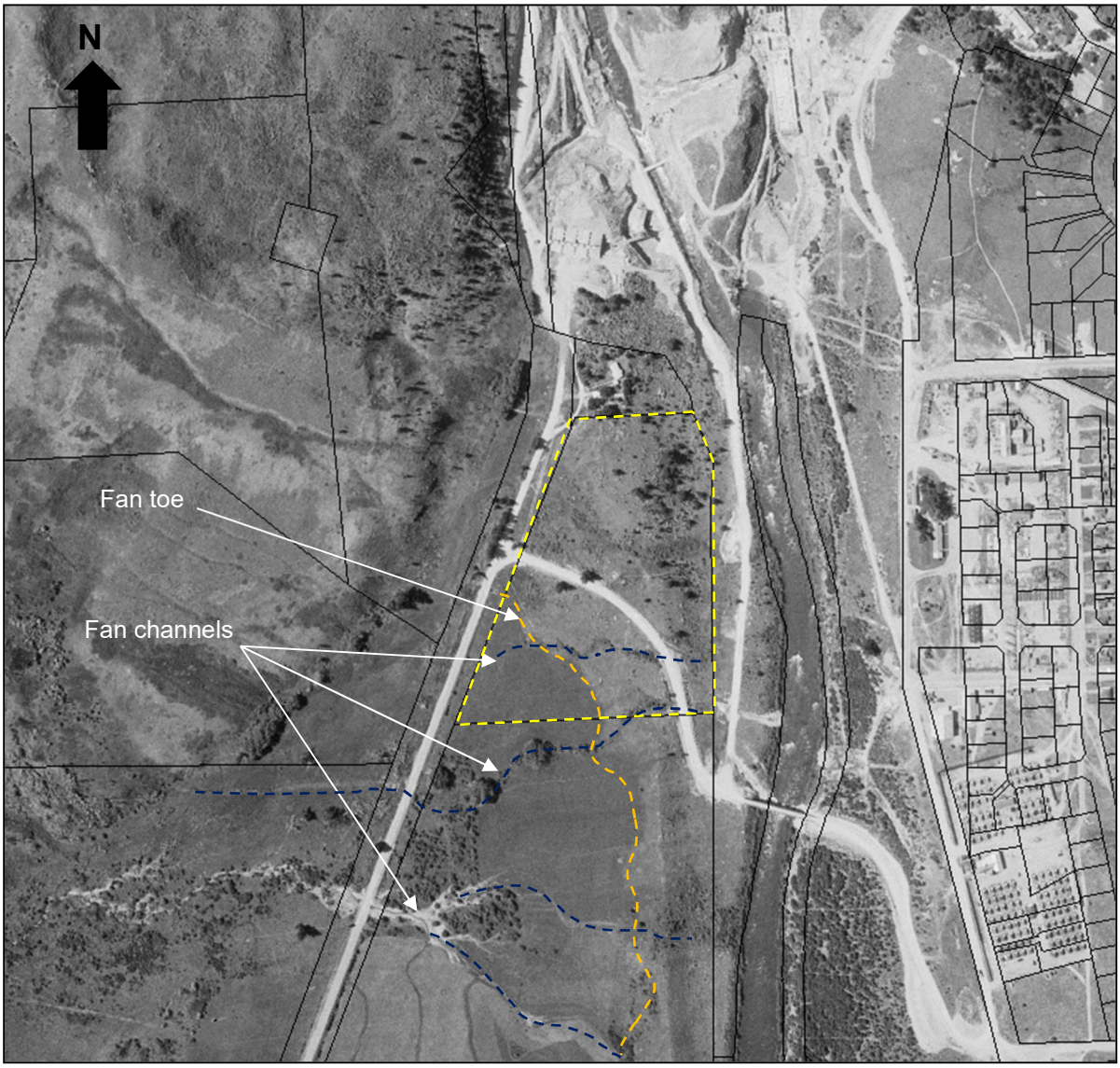


Image sourced from Retrolens.nz

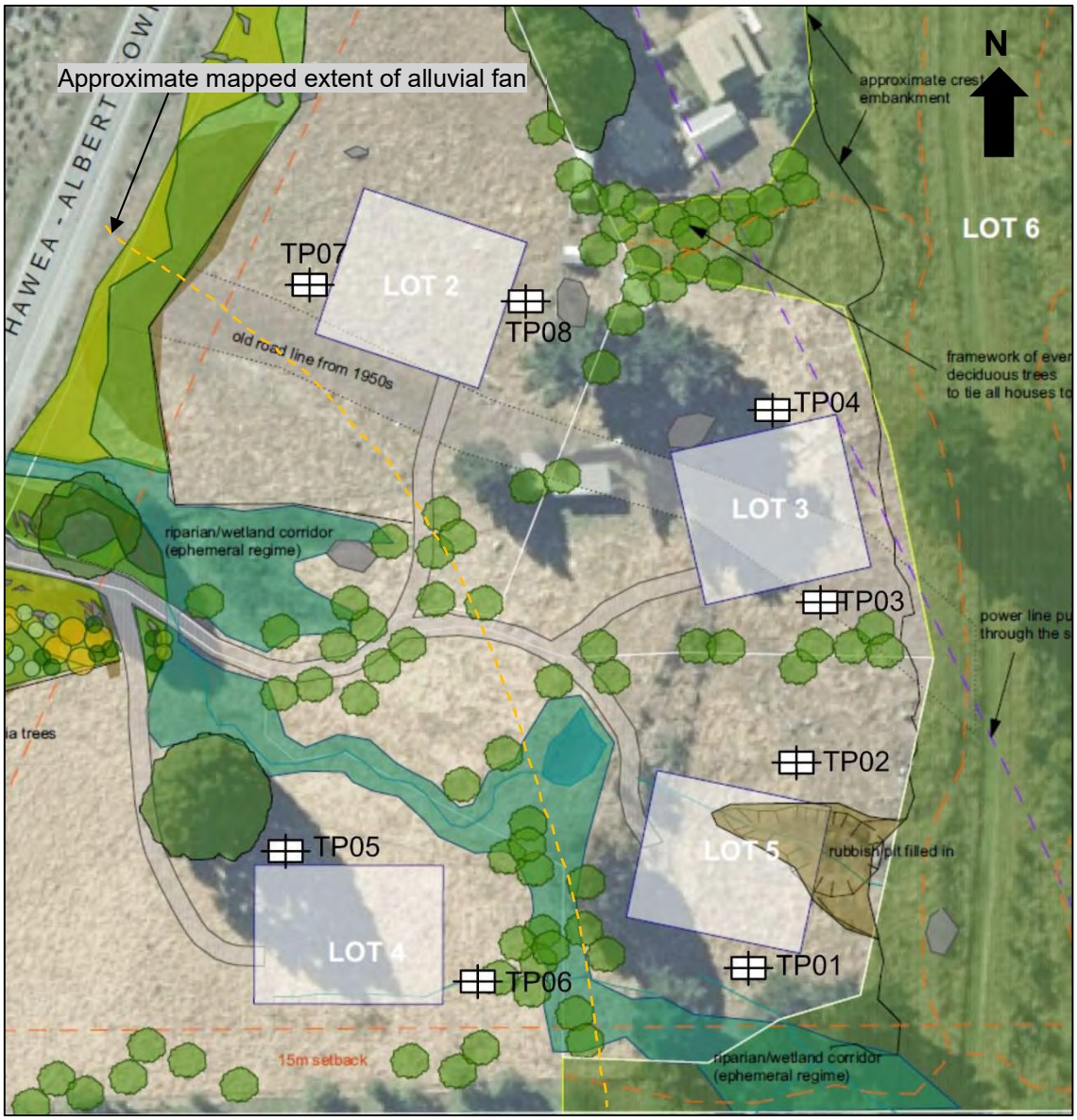
Figure 6: Historical aerial photograph dated 2011

Image sourced from Google Earth

4 Subsurface Investigations

IE visited the site on 16 May 2022 and observed the excavation of eight test pits at the site. The approximate locations of the investigations are shown on Figure 7 below.

Figure 7: Approximate Test Pit Investigation Location Plan (not to scale)



Base image courtesy of Ann Steven Landscape Architect

4.1 Test Pits

The test pits were excavated using an 18 tonne excavator with a toothed bucket. The test pits were terminated in native deposits at depths ranging between 0.7 m and 2.3 m. Test pits were typically terminated due to practical refusal on hard ground.

Topsoil was identified at all test locations. The thickness of the topsoil is typically around 0.2 m to 0.3 m, however thicker deposits up to 0.7 m and 0.5 m were encountered at TP06 and TP07 respectively.

Under the topsoil, we generally encountered variable soil comprising unsorted, angular to subrounded Schist gravel, cobbles and boulders in a sandy silt matrix. This soil is generally consistent with descriptions of glacial till deposits to the north of the site or a combination of outwash gravel and till, additionally we observed cobbles and boulders at the ground surface across the site area, as well as on the eastern side of the Hawea River. Near the southwestern part of the site there is a thin veneer

of fan alluvium under the topsoil layer, overlying the till/outwash deposits. There is an absence of boulders at the surface in this area.

The fan alluvium was encountered at TP05, 06 and 07. It typically comprised bedded layers of SILT with trace fine sand, clayey SILT and silty, fine to coarse, subrounded to subangular GRAVEL with minor sand. Fan alluvium extended to a maximum depth of 1.1 m at TP05, 0.7 at TP06 and 0.9 m at TP07. The topsoil cover at the test locations (0.3 m to 0.7 m thick) was generally well developed indicating some time since deposition.

Neither groundwater nor bedrock was encountered in any of the test pits. Copies of the test pit logs are presented as Appendix 2.

Scala penetrometer tests were not carried out due to the nature of the materials identified in the test pits.

5 Discussion on Geotechnical Considerations

The following geotechnical considerations are identified for the site as a result of our investigations. Discussions on the perceived implications are presented below:

- Summary of Ground Conditions;
- Preliminary Alluvial Fan Hazard Assessment;
- Seismicity / Ground shaking;
- Slope stability; and
- Subsurface obstructions (boulders and tree roots)

5.1 Summary of Ground Conditions

The site is positioned on a relatively flat terrace of outwash/till deposits, and consistent with the elevation across the river. From the information presented herein, we consider that the site subsoils are likely glacial till or near moraine outwash in origin. The exact deposition environment is not clear as the material appears to be till but it is situated beyond the terminal moraine of the last advance (Hawea). It is unlikely that the coarse deposits are related to debris flow deposition given the surface geomorphology as well as the presence of large cobbles and boulders at the surface extending much further north than the alluvial fan toe..

The till materials are highly variable, unsorted and contain large boulders (commonly greater than 1 m long). These materials are challenging to excavate and the natural ground surface is uneven due to the presence of boulders.

There is an alluvial fan that covers part of the southwest of the site. Alluvial fan deposits form a relatively thin veneer over the till materials at the western and southern extents of the site. Additionally, the presence of ephemeral drainage paths and the more deeply incised gully at the eastern side of the site suggest higher water flows across the site area (likely from the fan) at times in the past. The fan catchment area is a steep gully on the side of Mt Maude.

Groundwater was not encountered and is anticipated to be similar to the river elevation, i.e. greater than 10 m depth.

5.2 Preliminary Alluvial Fan Hazard Assessment

GNS (2009) provide a glossary of terminology including:

- Debris flood: a very rapid (up to ~5 m/s) surging flow of water heavily charged with sediment. Debris floods are more fluid than debris flows. Debris floods and debris flows may occur during the same flood.

- Debris flow: a flow comprising a slurry of water and debris, typically form within steep, narrow stream channels during high-intensity rainstorms and travel down stream rapidly. A debris flow is generally classified as a type of landslide.
  Debris flows are highly charged with sediment and have a consistency like wet concrete. Debris flows can pick up and carry all manner of material including trees and boulders. Because of the their high velocity, high density and ability to carry large volumes of material, debris flows are the most dangerous process associated with fans.

Additionally, flood events can arrive suddenly as channelised flows, or sudden channel migration may give rise to sheet flow flooding across the entire fan.

5.2.1 Summary of Alluvial Fan Features and Characteristics

- The fan is mapped by GNS Science as "*less recently active*", aggradational and historically floodwater dominated rather than debris flows. The reported activity (which may have implications for development) for such types of fan include "*Possibility of being reoccupied as location(s) of flooding/sedimentation activity".*

- The fan slope gradient is approximately 6 degrees from the apex to the central portion of the fan (upslope of the road), reducing to around 2 degrees at the distal end of the toe (including the site).

- In a study carried out in 2010 ("*Assessment of debris flow potential on alluvial fans in Otago, New Zealand, using morphometry*"), GNS have indicated that there is a potential for future debris flows for the Grayburn North fan based on the Melton ratio R (an index of catchment ruggedness) and the average fan slope gradient. The Melton ratio gives an indication as to whether a debris flow can be generated from the catchment area (if R >0.4) and the slope angle indicates whether the debris can be transported over the fan surface (if > 4 degrees). GNS calculated the Melton Ratio (R) to be 0.78 and the average fan slope as 5.9 degrees.

- There appears to be significant sediment supply in the upper catchment area with mapped (by GNS) and interpreted (from aerial images) landslide and scree.

- The stream channels on the southern and south-western sides of the site appear to be relatively narrow and gently incised over the lower reaches of the fan. The two channels crossing the golf course are active and have been altered in the past. The northern most of these two channels diverts flows from the southern site boundary and appears to extend west to the toe of the slope. This channel carried water at the time of our assessment. The road crossing between the site and the fan has a ~300 mm diameter culvert and the road side swales are generally shallow.
  The ephemeral streams at the site have eroded the eastern side slope to form relatively steeply incised gullies in the past.

5.2.2 Preliminary qualitative assessment of fan hazard as it relates to the site

- Based on the assessment report by GNS (2010) and the catchment characteristics, there is a potential for the catchment to generate debris flows. However GNS's assessment report states that this does not mean that debris flows will necessarily occur, nor that all of the fan area is susceptible to a debris flow hazard. Further, GNS have previously reported that the "*Predominant processes appear to have been flooding and sedimentation rather than debris flows*" for the Hawea west fans.

- The terrace upon which the site is located is generally stable i.e. no material is being removed by river or toe erosion. Therefore, it is likely the current site geomorphology is representative

of a relatively long time period, potentially not long after the last glacial retreat. GNS mapping indicates the underlying outwash terrace and the terminal moraine further northwest are between 12,000 and 18,000 years old.

- Geomorphic evidence does not indicate obvious debris flow lobes at the site. The sloping ground where the fan extends onto the site area is generally smooth on top with no large boulders at the surface, generally appearing more consistent with sheetflow and/or fluvial processes. The area beyond is hummocky and has boulders present on the surface consistent with the underlying till/outwash material.

- The site is on the distal edge of the fan toe with a slope gradient of around 2 degrees. This is considered a relatively shallow angle and the cutoff for a fan slope angle for GNS assessing debris flow potential is 4 degrees (average fan slope gradient). Given the shallow slope angle at the site and lack of historical evidence of coarse debris deposition/debris lobes, we consider there is a generally low likelihood of a significant debris flow affecting the site. It should be noted that it is possible that fan fluvial processes could have obscured or removed surficial diagnostic features of past debris flows.

- However, the potential for debris flooding, fluvial flooding, sheet flooding and sediment deposition/build-up at the site exists, due to the mapped and observed extents of the fan and drainage paths and while we consider the likelihood of a debris flow (with a damaging front/snout) reaching the site to be relatively low, however it cannot be ruled out entirely. Such events are most likely to be result of large storm events and generally may cause nuisance flooding and sediment deposition with possible build up and aggradation. Structural and property damage may occur if appropriate mitigation is not carried out. We provide some preliminary mitigation concepts below.

It should be noted that we have carried out a high-level qualitative assessment of the hazards the alluvial fan may present to the proposed development. More detailed work may be required in order to quantify risk and/or for providing detailed design for mitigation, which is beyond the scope of this report.

5.2.3 Conceptual Mitigation Options

Possible conceptual mitigation options are presented below:

1. Do nothing and accept the existing hazard level, however note that this may not be conducive to the proposed development.

2. Do additional work to quantify the hazard and risk to the development. This may require involvement of specialist consultant to model potential flood hazards (possibly debris flood/flow modelling and quantification) and then undertake detailed design of mitigation options as necessary depending on the outcome of the risk assessment (such as width and depths of diversion channels and detention ponds, minimum floor elevations, erosion protection etc.).

3. Re-design the proposed scheme plan layout to avoid building platforms over the alluvial fan toe (possibly in conjunction with Option 2 to address flooding).

5.3 Seismicity / Ground shaking

A future significant earthquake is likely to result in moderate to severe ground shaking (as discussed in Section 3.2.1 and 3.2.2 of this report), which may lead to deformations in the ground surface. Appropriate design of structures and underground services, as well as thoughtful positioning away from slopes, can reduce, although not fully eliminate, the overall effects of ground shaking for a large future earthquake.

5.4 Slope Stability

The ground surface falls away steeply on the eastern side of proposed Lots 3 and 5. The slope is approximately 7 m high.

There were no obvious signs of instability of the slope during our time on site. However, it is not advisable to surcharge unsupported slopes. Therefore, set back distances for new foundations are recommended for dwellings constructed on Lots 3 and 5, or alternatively specific retaining systems may be required. Further information is presented in Section 6.5 below.

5.5 Subsurface Obstructions

Several mature trees are located at the site, and their roots may impact Lots 3, 4 and 5. Removal of the roots may require over-excavation and backfilling with approved materials to the design subgrade elevation.

As discussed previously, large boulders are scattered throughout the glacial till and therefore this material is challenging to excavate. Deep foundations or excavations should be avoided where possible, or allowance should be made for appropriate size machinery to undertake site works.

6 Geotechnical Recommendations

6.1 General

The development of the site for future residential use should be undertaken in accordance with NZS4404:2010 Land Development and Subdivision Infrastructure, the relevant QLDC codes of practice and the recommendations of this report.

The primary geotechnical considerations are described in the previous section and specific recommendations are presented below.

Bulk earthworks are required for the development of the site to form suitable building platforms for new dwellings and to manage surface drainage. There are no “borrow” areas at the site and therefore all fill materials are anticipated to be imported to the site.

Groundwater and bedrock are not anticipated to be encountered during the bulk earthworks.

6.2 Alluvial Fan Hazard Mitigation

As discussed previously, we have identified three conceptual options for fan hazard management based on our preliminary assessment. These options are:

1. Do nothing and accept the existing hazard level, however note that this may not be conducive to proposed subdivision;

2. Do additional work to quantify the hazard and risk to the development. This is envisioned to involve a specialist consultant to model potential flood hazards, and possibly debris flow/flood modelling and then undertake detailed design of mitigation options as necessary depending on the outcome of the risk assessment (such as width and depths of diversion channels and detention ponds, minimum floor elevations, erosion protection etc.); and/or

3. Re-design the proposed scheme plan layout to avoid building platforms over the alluvial fan toe (possibly in conjunction with Option 2 to address flooding).

Of these options, Option 2 (quantitative risk assessment) will present the most confidence for the design of the proposed development. The outcome of quantitative risk assessment will inform the

extent of bulk earthworks required at the site to achieve minimum site elevations and surface drainage (in addition to the formation of the building platform on Lot 5).

A quantitative risk assessment is beyond the scope of this assessment, and we recommend that a suitably experienced civil / flood management engineer and designer is engaged to undertake such work. This may include a detailed quantitative debris flow risk assessment.

We would anticipate that as a minimum, the design should ensure that flow paths into the site can carry the design flow, are not obstructed or impinged by the any proposed structures or bunds, and that any water flows from the fan are able to be diverted away from future structures and disposed appropriately. Additionally, surface water flows should also be diverted away from the eastern side gullies, where these gullies are proposed to be infilled.

6.3 Bulk Earthworks

We have not yet been provided proposed earthworks plans for the development; however we anticipate that as minimum the work will primarily involve importation of fill materials and placement over Lots 3 and 5 to form level building platforms, as well as formation of earth bunds at the site boundaries. Placement of a nominal layer of compacted fill to form a level and uniform surface is also recommended for the building platforms at Lot 2 and Lot 4 (not including any other bulk earthworks measures that may be required for flood mitigation as per the preceding section).

The following broad recommendations are given for the bulk earthworks, however, these recommendations and the earthworks specification should be confirmed once the subdivision and civil design is finalised.

Earthworks and fill placement should be carried out in accordance with NZS4431:2022 Engineered Fill Construction for Lightweight Structures and the recommendations of the Geotechnical Engineer. Excavations at the site should be carried out in general accordance with the Good Practice Guidelines for Excavation Safety published by Worksafe (July 2016).

Geotechnical observation and monitoring of the filling within future lots is required to verify that the criteria for certified fill is met, particularly where fill extends into building footprints or supports foundations, driveways etc. The extent of ongoing geotechnical involvement and testing of the fill is dependent on the quantity and extent of fill placed at the site.

Site Preparation and Excavations

All organic soil, vegetation, waste, any loose surface materials and overly coarse materials (e.g. boulders) should be stripped to expose competent native deposits. In addition, over excavation to remove the root ball from areas containing trees will be required. Stockpiles of unsuitable materials should be sited well clear of the works on stable areas of natural ground.

If any areas of weaker soil or additional areas of existing fill are identified during the site clearance and excavation activities, then further localised excavation and backfilling may be required. Advice should be sought from the Geotechnical Engineer in the event that this work is necessary.

Re-grading should be carried out as necessary to meet the drainage design requirements and to divert surface flows and stormwater away from proposed building areas.

Fill Batter Slopes and Earth Bunds

Generally, fill slopes on building platforms should not be formed any steeper than 1(V):3(H) subject to the fill materials used. Temporary batters may be formed at steeper angles subject to approval by the Geotechnical Engineer.

Appropriate measures, such as vegetating and/or the use of erosion control mats, should be carried out to stabilise the surface of any unsupported batters and bunds to protect against erosion and rilling.

Fill Materials

Fill materials for building platforms should be approved by the Geotechnical Engineer prior to use and are anticipated to comprise imported aggregate such as well graded, sandy GRAVEL sourced from local quarries (Material type C or R).

As a preliminary measure, allowance should be made for the inclusion of geogrid reinforcement in the filled platforms on Lot 3 and 5, for additional internal stability (over the gullies etc.), as well as stability near the crest of the slope.

Fill Placement and Compaction Testing

Fill placement and compaction should typically be carried out in layers no greater than 250 mm thick, and compaction testing by means of Nuclear Density testing (or other approved method) should be carried out as directed by the Geotechnical Engineer to verify that the appropriate degree of compaction has been achieved. A minimum target dry density of 95% of the maximum dry density (MDD) is typically recommended for residential development.

Field compaction testing should be carried out by an independent testing company or may be carried out by the earthworking contractor providing this is done under the supervision of the Geotechnical Engineer. Test results should be reviewed by IE on an ongoing basis during the earthworks programme.

If any tests indicate failure to comply with the earthfill specification, then the contractor is required to rework the area in question as necessary to achieve compliance. The reworked area must be retested and return a satisfactory result before further fill placement can continue.

6.4 Future Foundations

Final foundation recommendations for future dwellings are subject to developed/final design plans and the actual extent of earthworks. However, we anticipate that future dwellings designed and built in accordance with NZS3604:2011 should be able to be supported on standard shallow foundations such as reinforced concrete slab or raft foundations such as a waffle slab or beam and grid slab foundations, subject to verification of the ground conditions of the future lots.

All foundations should either bear within competent native soils below topsoil or within engineered fill materials placed in accordance with the recommendations of this report. Deep foundations are recommended to be avoided, due to the anticipated difficulties with excavation into the till.

Any dwellings to be built with elevated, suspended floors requiring piled foundations should take into account the potential difficulties anticipated with pile hole excavations.

6.5 Retaining Structures and Preliminary Set Back Distances

Depending on the final design for the platforms at Lots 3 and 5, retaining structures may be needed to support the fill batters on the eastern sides of the platforms, or where the batters are constrained. These structures, if required, should be subject to specific engineering design and may be constructed either at bulk earthworks stage or building construction stage.

Implementation of set back distances for new foundations from the crests of slopes is recommended for Lot 3 and Lot 5, particularly if the slopes are to remain unsupported. Final set back distances are dependent on the finished platform design elevation and position, but as a preliminary guide we recommend that foundations should not be constructed within a 45 degree zone taken from the toe of the slope.

6.6 Stormwater and Surface Water Management at Building Platforms

For future building reference, ponding of water should not be permitted near or under the future building areas, as well as foundation excavations. To prevent surface runoff from entering these areas, perimeter berms or swales may be constructed as necessary at the top and bottom of slopes or across depressions to re-direct surface water into approved drainage systems.

We recommend that the future building platforms are positively graded at all times to provide for rapid removal of surface water runoff from the foundation elements and to prevent ponding of water or seepage toward the foundation systems at any time during or after construction.

Stormwater from roof downspouts and other hardstand areas should be directed to an approved disposal system. Discharges into sloping ground should not be permitted.

7 References

1. Turnbull, I.M 2000. Geology of the Wakatipu area. Institute of Geological and Nuclear Sciences1:250 000 geological map 18. 1 sheet plus 72 p. Lower Hutt, New Zealand: Institute of Geological and Nuclear Sciences Ltd.

2. GNS Webmap Institute of Geological and Nuclear Sciences 2013: 1:250,000 Geology. Viewed at: http://data.gns.cri.nz/geology/

3. Opus Consultants Ltd 2005. Seismic Risk in the Otago Region, Report No. SPT:2004/23

4. Barrell DJA. 2019. General distribution and characteristics of active faults and folds in the Queenstown Lakes and Central Otago districts, Otago. Lower Hutt (NZ): GNS Science. 99 p. Consultancy Report 2018/207

5. Otago Regional Council 2015. Seismic hazard in the Queenstown Lakes district

6. Barrell D.J.A..; Cox, S.C.; Greene, S.; Townsend, D.B. 2009: Otago Alluvial Fans Project: Supplementary maps and information on fans in selected areas of Otago. GNS Science Consultancy Report 2009/052. Prepared for Otago Regional Council. 19 pages, 3 tables and 3 appendices

7. Retrolens Historical Image Resource. Viewed at retrolens.nz.

8 Limitations

i. We have prepared this report in accordance with the brief as provided. This report has been prepared for the use of our client, Bluesure Developments Ltd, their professional advisers and the relevant Territorial Authorities in relation to the specified project brief described in this report. No liability is accepted for the use of any part of the report for any other purpose or by any other person or entity.

ii. The recommendations in this report are based on the ground conditions indicated from published sources, site assessments and subsurface investigations described in this report based on accepted normal methods of site investigations. Only a limited amount of information has been collected to meet the specific financial and technical requirements of the client's brief and this report does not purport to completely describe all the site characteristics and properties. The nature and continuity of the ground between test locations has been inferred using experience and judgement and it should be appreciated that actual conditions could vary from the assumed model.

iii. Subsurface conditions relevant to construction works should be assessed by contractors who can make their own interpretation of the factual data provided. They should perform any additional tests as necessary for their own purposes.

iv. This Limitation should be read in conjunction with the IPENZ/ACENZ Standard Terms of Engagement.

v. This report is not to be reproduced either wholly or in part without our prior written permission.

Appendix 1

Proposed Scheme Plan

LOT 1
(balance lot)

open space area, weeds controlled
planted out in native shrubs, trees,
ground cover, optimized for lizards and birds.
May include flowering exotics such as pussy willow,
grevillea, callistemon, eucalypt for bees.
Creat walking trail through.
Maintain service access for race.

LAKE HAWEA - ALBERT TOWN ROAD

approximate crest of
embankment

LOT 2

LOT 6

old road line from 1950s

framework of evergreen and
deciduous trees
to tie all houses together

LOT 3

low naturalistic mounding with occasional
large rock "outcrop"; and mainly native tree
and shrub planting plus tussock, flax, etc
along highway margin for amenity, enclosure
noise control and privacy from highway;
and to create attractive entrance to
Hawea complementing the planting
on the other side of the road

riparian/wetland corridor
(ephemeral regime)

power line put underground
through the site

lancewoods

Olearia trees

kowhai

LOT 5

rubbish pit filled in

20m setback

cabbage trees

LOT 4

15m setback

riparian/wetland corridor
(ephemeral regime)

tree planting to soften straight edge with golf course
and provide some privacy

HAWEA GOLF COURSE

prepared by Anne Steven
Registered Landscape Architect
WANAKA

March 2022

LAND DEVELOPMENT CONCEPT FOR
XX Lake Hawea-Albert Town Road (SH6)
Bluesure Developments Ltd

Appendix 2

Alluvial Fan Summary Information

OTAGO REGIONAL COUNCIL ALLUVIAL FAN HAZARDS

HAWEA (west) area – summary assessment

A. Extent and nature of the assessment area

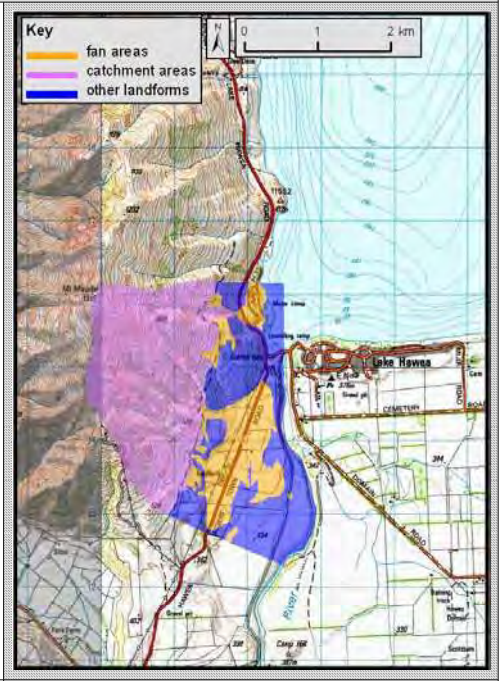
DESCRIPTION:

The assessment area lies to the west of the Lake Hawea outlet, under the eastern flank of Mt Maude. The fan area includes the Lake Hawea camping ground.

Ranges either side of the Hawea Basin are formed in ancient semi-schist bedrock. This tectonic basin was occupied repeatedly by glaciers during Ice Ages. Glaciers scoured and shaped the flanks of the ranges and left extensive areas of moraine and glacial outwash river terraces in the basin. Ice retreated from Lake Hawea most recently about 18,000 years ago; most of the landforms date from about that time. The landscape, geologically speaking, is young.

Eroding bedrock in the fan catchments has fed sediment onto small alluvial fans that have built out onto terraces of the Hawea River.

Annual precipitation at Hawea (west) is about 800 mm/yr at the valley floor, increasing with altitude to more than 1,000 mm/yr at the catchment heads (growOTAGO).



LOCATION MAP

Base map from LINZ NZMS260 series.
Crown copyright reserved.

Aerial Photo Interpretation: Oct 2008

Field Check: Jan 2009

Revisions:

B. Nature of the alluvial fans

B1. EVIDENCE OF PAST ACTIVITY: Most parts of the fans have mature soils, indicating that there has been little or no sediment-laden flooding on these areas within at least the past few hundred years, except close to present stream channels. Recent failure of a small water-supply dam in the gully north of Grayburn homestead caused scouring (to a depth of 2 m) and accompanying sedimentation of the stream channel at the highway.

B2. EXISTING TYPES OF VEGETATION/LAND-USE: Pasture with some areas of forest and scrub. Pastoral farming, some large-holding residential, minor commercial and recreational.

B3. EXISTING INFRASTRUCTURE: Lake Hawea Holiday Park, Lake Hawea Motors, golf course, State Highway 6.

B4. EXISTING CONTROL WORKS: Minor channel control of active streams. At the highway, a large road-fill embankment has been constructed across the Holiday Park fan stream channel, and appears to have isolated the fan from its catchment.

B5. TYPES OF FAN: Aggradational to equilibrium fans. Predominant processes appear to have been flooding and sedimentation rather than debris flows.

B6. CONDITIONS AT TOES OF FANS: All fans are built on Hawea River terraces, except the northernmost which abuts Lake Hawea as a delta. Any sediment brought down by the streams is likely to build up in their channels, and possibly spread onto the fans, unless sediment is removed mechanically.

C. Nature of the fan catchments

C1. CHARACTER OF SLOPES: Extensive areas of gullied terrain with some landslide terrain, some of which are active and others that appear dormant.

C2. EXISTING TYPES OF VEGETATION/LAND-USE: Grass with large areas of regenerating scrub.

C3. TOPOGRAPHIC RELIEF: Total elevation change from the tops of the catchments to the heads of the fans is between about 900 m in the north, decreasing to 400 m in the south.

D. Additional information

D1. EXISTING REPORTS: none known.

D2. ILLUSTRATIONS:

D3. COMMENTS:

Document Set ID: 7691933
Version: 1, Version Date: 19/07/2023

Alluvial Fans Map Legend

LANDFORM TYPE

- fna - fan active bed
- fra - fan recently active
- fla - fan less recently active
- fge - fan gully erosion
- fun - fan undifferentiated
- fsi - fan stabilised isolated
- tcr - terrace riser
- cca - catchment channel active
- cge - catchment gully erosion
- cas - catchment active scree
- cla - catchment landslide active
- cld - catchment landslide creeping
- cst - catchment long stabilised
- cun - catchment undifferentiated
- prc - catchment peripheral
- bra - beach ridge active
- brs - beach ridge stabilised
- rtc - river terrace
- rva - river active bed
- lba - lake bed abandoned
- hum - human modified
- oth - other
- water

LANDFORM BOUNDARY

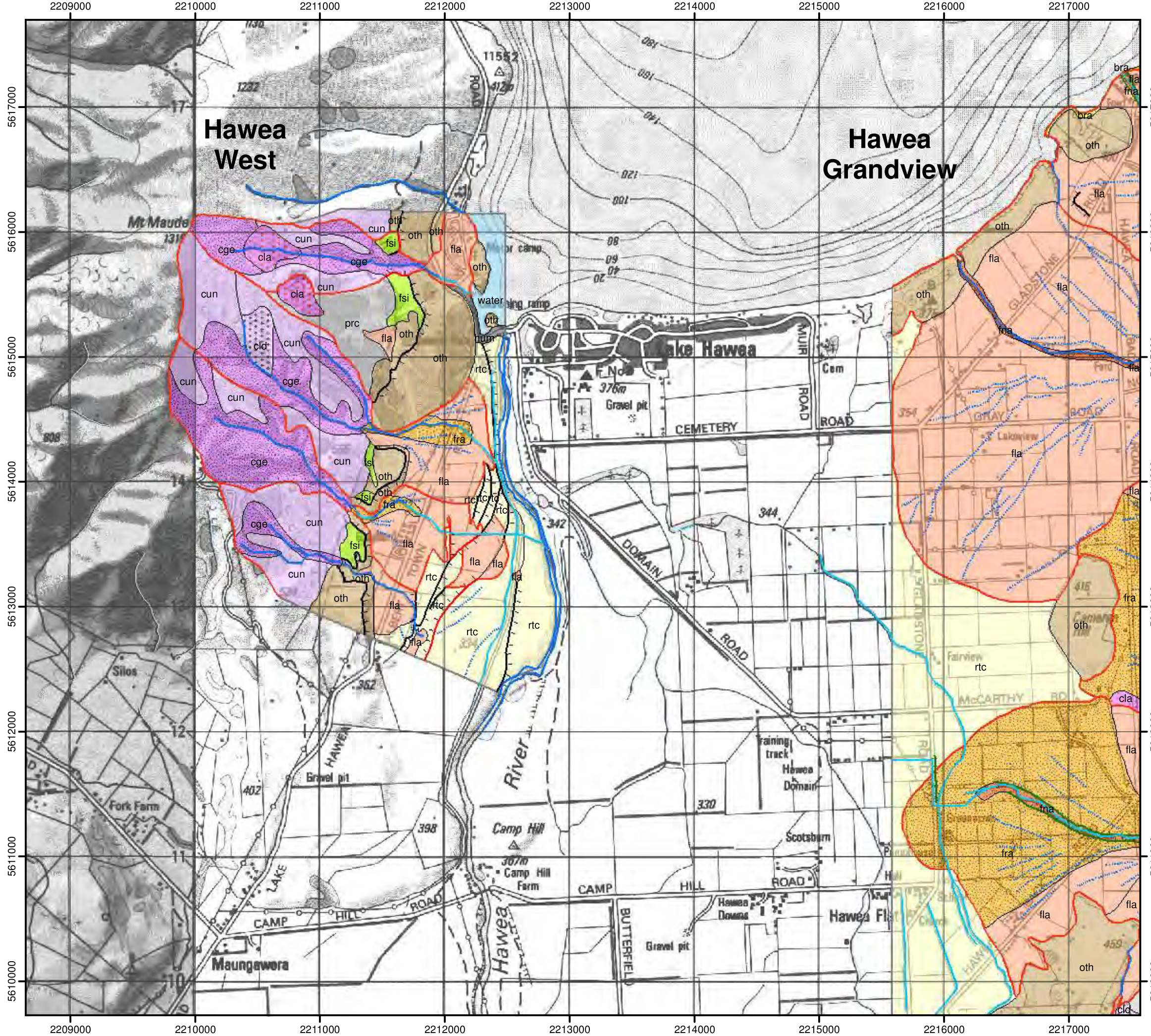
- contact
- map border
- terrace edge
- artificial
- fault scarp base
- fault scarp crest
- perimeter
- artificial perimeter
- terrace perimeter

CHANNEL TYPE

- active
- artificial
- recently active
- less recently active
- unclassified

Drawn from ArcMap GIS dataset
Geodetic Datum NZMG 1949
Base Map LINZ NZMS 260 series
(Crown copyright reserved)

0 0.5 1 2 Km



Appendix 3

Test Pit Logs

Project:	1172 Lake Hawea-Albert Town Road				
Client:	Bluesure Developments Ltd				
Location:	Refer to site plan for test pit locations				
Ref:	22018_1	**Date:**	16/05/2022	**Page:**	1 of 8

Test Pit 1

INFERRED GEOLOGY	DESCRIPTION OF SOIL	SOIL SYMBOL	DEPTH (m)	SAMPLE TYPE	WATER CONTENT (%)	WATER LEVEL	CORRECTED VANE SHEAR STRENGTH (kPa) 50 100 150	SCALA PENETROMETER BLOWS / 100 mm 5 10 15
TS	SILT with rootlets; dark brown. 'Firm', dry [TOPSOIL]							
Till	Schist GRAVEL, COBBLES and BOULDERS intermixed with SILT with trace fine sand; brown. Tightly packed, dry; angular to subrounded. Unsorted. Schist boulders are tabular.							
	EOTP 0.7 m - Practical Refusal on inferred Schist boulders		1 2 3 4					

Photos:

Excavation measures ~3 m x 1.5 m
Bedrock and groundwater was not encountered
Density/strength terms in quotation marks are estimated from field observations

LOGGED BY: JK
DATE: 5-May-22
METHOD: 18T excavator

Project:	1172 Lake Hawea-Albert Town Road				
Client:	Bluesure Developments Ltd				
Location:	Refer to site plan for test pit locations				
Ref:	22018_1	**Date:**	16/05/2022	**Page:**	2 of 8

Test Pit 2

INFERRED GEOLOGY	DESCRIPTION OF SOIL	SOIL SYMBOL	DEPTH (m)	SAMPLE TYPE	WATER CONTENT (%)	WATER LEVEL	CORRECTED VANE SHEAR STRENGTH (kPa) 50 100 150	SCALA PENETROMETER BLOWS / 100 mm 5 10 15
TS	SILT with rootlets; dark brown. 'Firm', dry [TOPSOIL]							
Till	Schist GRAVEL, COBBLES and BOULDERS intermixed with SILT with trace fine sand; brown. Tightly packed, dry; angular to subrounded. Unsorted. Schist boulders are tabular.		1 2					
	EOTP 2.3 m - Target depth		3 4					

Photos:

Excavation measures ~2.3 m x 1.5 m. Scraped into the side of the gully.
Bedrock and groundwater was not encountered
Density/strength terms in quotation marks are estimated from field observations

LOGGED BY: JK
DATE: 16-May-22
METHOD: 18T excavator

Project:	1172 Lake Hawea-Albert Town Road				
Client:	Bluesure Developments Ltd				
Location:	Refer to site plan for test pit locations				
Ref:	22018_1	**Date:**	16/05/2022	**Page:**	3 of 8

Test Pit 3

INFERRED GEOLOGY	DESCRIPTION OF SOIL	SOIL SYMBOL	DEPTH (m)	SAMPLE TYPE	WATER CONTENT (%)	WATER LEVEL	CORRECTED VANE SHEAR STRENGTH (kPa) 50 100 150	SCALA PENETROMETER BLOWS / 100 mm 5 10 15
TS	SILT with rootlets; dark brown. 'Firm', dry [TOPSOIL]							
Till	Schist GRAVEL, COBBLES and BOULDERS intermixed with SILT with trace fine sand; orange-brown. Tightly packed, dry; angular to subrounded. Unsorted. Schist boulders are tabular. At 1.3 m: Becoming with grey mottled orange silt. At 1.5m: Becoming with medium to coarse GRAVEL with cobbles and boulders, sub-angular to sub-rounded.		1 2					
	EOTP 2.3 m - Target depth		3 4					

Photos:

Excavation measures ~3 m x 1.5 m.	LOGGED BY: JK
Bedrock and groundwater was not encountered	DATE: 16-May-22
Density/strength terms in quotation marks are estimated from field observations	METHOD: 18T excavator

Project:	1172 Lake Hawea-Albert Town Road				
Client:	Bluesure Developments Ltd				
Location:	Refer to site plan for test pit locations				
Ref:	22018_1	**Date:**	16/05/2022	**Page:**	4 of 8

Test Pit 4

INFERRED GEOLOGY	DESCRIPTION OF SOIL	SOIL SYMBOL	DEPTH (m)	SAMPLE TYPE	WATER CONTENT (%)	WATER LEVEL	CORRECTED VANE SHEAR STRENGTH (kPa) 50 100 150	SCALA PENETROMETER BLOWS / 100 mm 5 10 15
TS	SILT with rootlets; dark brown. 'Firm', dry [TOPSOIL]							
Till	Schist GRAVEL, COBBLES and BOULDERS intermixed with SILT with trace fine sand; orange-brown. Tightly packed, dry; angular to subrounded. Unsorted. Schist boulders are tabular. Some topsoil is intermixed to 0.4 m.							
	EOTP 0.9 m - Practical refusal on inferred Schist boulders		1 2 3 4					

Photos:

Excavation measures ~3 m x 1.5 m.
Bedrock and groundwater was not encountered
Density/strength terms in quotation marks are estimated from field observations

LOGGED BY: JK
DATE: 16-May-22
METHOD: 18T excavator

Project:	1172 Lake Hawea-Albert Town Road				
Client:	Bluesure Developments Ltd				
Location:	Refer to site plan for test pit locations				
Ref:	22018_1	**Date:**	16/05/2022	**Page:**	5 of 8

Test Pit 5

INFERRED GEOLOGY	DESCRIPTION OF SOIL	SOIL SYMBOL	DEPTH (m)	SAMPLE TYPE	WATER CONTENT (%)	WATER LEVEL	CORRECTED VANE SHEAR STRENGTH (kPa) 50 100 150	SCALA PENETROMETER BLOWS / 100 mm 5 10 15
TS	SILT with roots and rootlets; dark brown. 'Firm', dry to moist [TOPSOIL]							
Fan Alluvium	SILT with trace fine sand; orange-brown. "Stiff"; dry; low plasticity.							
	Silty, fine to coarse GRAVEL with minor sand and trace cobbles; brown; bedded. Tightly packed; dry. Bedded, thin, sub-horizontal; subrounded to subangular. Layer extends to 1m on northern side, 0.8 m on southern side.		1					
	Fne sandy SILT with minor gravel; light grey. "Very stiff"; dry; low plasticity.							
Till	Schist GRAVEL, COBBLES and BOULDERS intermixed with SILT with trace fine sand; grey-brown. Tightly packed, dry; angular to subrounded. Unsorted.		2					
	EOTP 2.2 m - Target depth		3					
			4					

Photos:

Excavation measures ~3 m x 1.5 m.
Bedrock and groundwater was not encountered
Density/strength terms in quotation marks are estimated from field observations

LOGGED BY: JK
DATE: 16-May-22
METHOD: 18T excavator

Project:	1172 Lake Hawea-Albert Town Road				
Client:	Bluesure Developments Ltd				
Location:	Refer to site plan for test pit locations				
Ref:	22018_1	**Date:**	16/05/2022	**Page:**	6 of 8

Test Pit 6

INFERRED GEOLOGY	DESCRIPTION OF SOIL	SOIL SYMBOL	DEPTH (m)	SAMPLE TYPE	WATER CONTENT (%)	WATER LEVEL	CORRECTED VANE SHEAR STRENGTH (kPa) 50 100 150	SCALA PENETROMETER BLOWS / 100 mm 5 10 15
TS	SILT with roots and rootlets; dark brown. 'Firm', dry to moist [TOPSOIL]. Extends to 0.3 m at the northern side, and 0.7 m at the southern side.							
Fan Alluvium	SILT with trace fine sand; orange-brown. "Stiff"; dry; low plasticity.							
Till	Schist GRAVEL, COBBLES and BOULDERS intermixed with SILT with trace fine sand; grey-brown. Tightly packed, dry; angular to subrounded. Unsorted.		1					
	EOTP 1.1 m - Target depth		2					
			3					
			4					

Photos:

Excavation measures ~3 m x 1.5 m.
Bedrock and groundwater was not encountered
Density/strength terms in quotation marks are estimated from field observations

LOGGED BY: JK
DATE: 16-May-22
METHOD: 18T excavator

Project:	1172 Lake Hawea-Albert Town Road				
Client:	Bluesure Developments Ltd				
Location:	Refer to site plan for test pit locations				
Ref:	22018_1	**Date:**	16/05/2022	**Page:**	7 of 8

Test Pit 7

INFERRED GEOLOGY	DESCRIPTION OF SOIL	SOIL SYMBOL	DEPTH (m)	SAMPLE TYPE	WATER CONTENT (%)	WATER LEVEL	CORRECTED VANE SHEAR STRENGTH (kPa) 50 100 150	SCALA PENETROMETER BLOWS / 100 mm 5 10 15
TS	SILT with rootlets; dark brown. 'Firm', moist [TOPSOIL].							
Fan Alluvium	Clayey SILT; orange-brown with occasional limonite staining. "Very stiff"; moist; low plasticity.							
Till	Schist GRAVEL, COBBLES and BOULDERS intermixed with SILT with trace fine sand; grey-brown. Tightly packed, dry; angular to subrounded. Unsorted.		1					
	EOTP 1.7 m - Target depth		2					
			3					
			4					

Photos:

Excavation measures ~3 m x 1.5 m.
Bedrock and groundwater was not encountered
Density/strength terms in quotation marks are estimated from field observations

LOGGED BY: JK
DATE: 16-May-22
METHOD: 18T excavator

Project:	1172 Lake Hawea-Albert Town Road				
Client:	Bluesure Developments Ltd				
Location:	Refer to site plan for test pit locations				
Ref:	22018_1	**Date:**	16/05/2022	**Page:**	8 of 8

Test Pit 8

INFERRED GEOLOGY	DESCRIPTION OF SOIL	SOIL SYMBOL	DEPTH (m)	SAMPLE TYPE	WATER CONTENT (%)	WATER LEVEL	CORRECTED VANE SHEAR STRENGTH (kPa) 50 100 150	SCALA PENETROMETER BLOWS / 100 mm 5 10 15
TS	SILT with rootlets; dark brown. 'Firm', moist [TOPSOIL].							
Till	Schist GRAVEL, COBBLES and BOULDERS intermixed with SILT with trace fine sand; grey-brown. Tightly packed, dry; angular to subrounded. Unsorted.		1					
	EOTP 1.0 m - Practical refusal		2					
			3					
			4					

Photos:

Excavation measures ~3 m x 1.5 m.
Bedrock and groundwater was not encountered
Density/strength terms in quotation marks are estimated from field observations

LOGGED BY: JK
DATE: 16-May-22
METHOD: 18T excavator

26 April 2023

Bluesure Developments
C/- IP Solutions Ltd
Via email: dan@ipsolutions.co.nz

Re: Geotechnical Earthworks Recommendations and Specification at 1172 Lake Hawea-Albert Town Road, RD2, Wanaka

Our Reference: 22018_2

1 Introduction and Scope of Report

JKCM Ltd, trading as Insight Engineering (IE), was requested to provide supplementary geotechnical recommendations for the earthworks related to the proposed subdivision at 1172 Lake Hawea-Albert Town Road, RD2, Wanaka (herein referred to as "the site").

IE have previously undertaken a geotechnical investigation at the site and prepared a Geotechnical Assessment Report for the proposed subdivision dated 8 June 2022 (reference number 22018_1). This letter is intended to supplement our prior report, and should be read in conjunction with our prior report as not all information will be reiterated herein.

This supplementary letter presents more detailed recommendations in relation to the proposed earthworks at the site.

2 Proposed Earthworks Plans

We have received a copy of the proposed scheme and earthworks plans prepared by Measured Land Surveys dated 17 March 2023. A copy of the plans is presented as Appendix 1 of this letter.

We note that the subdivision layout shown on plans differs from the initial concept layout included in our prior report. On the current earthworks plans, Lot 4 was previously labelled as Lot 5. Therefore, prior recommendations presented for Lot 5 should now be considered to apply to Lot 4, and vice versa.

The plans show bulk earthworks for the subdivision occurring at the shared accessway and the building platform of proposed Lot 4 (previously Lot 5) only. The plans do not shown earthworks on any of the other new lots and therefore this letter should not be assumed to apply to any other earthworks that may occur elsewhere at the site. It is recommended that geotechnical input is obtained for any fill that will support a future dwelling on other lots at this site, regardless of the height of fill.

The plans show that the accessway is to be formed by excavation and fill placement to form a smooth surface. The maximum depth of excavation is shown as 1.3 m and the maximum height of fill is shown as 1.05 m (at the proposed new site entrance).

The plans show the earthworks for proposed Lot 4 as fill only, to a maximum height of 4.7 m (noting that the earthworks plans don't show the site clearance excavations). The fill is to form a level surface for the Lot 4 building platform by infilling the existing gullies.

We understand that changes have been made to the overland flow paths at the site since our prior report was issued. These changes primarily involve diverting water flows from the shallow pond to the northwest of the Lot 4 building platform to the south, instead of to the east. It is generally understood that uncontrolled outflow from the shallow pond caused the formation of the gullies within Lot 4. Therefore, it is our understanding that overland flow will no longer occur through these gullies. The proposed flow path is shown on the earthworks plans.

3 Earthworks and Fill Placement Recommendations

The earthworks should be undertaken in accordance with the requirements of NZS4431:2022, Good Practice Guidelines for Excavation Safety published by Worksafe (July 2016) and the recommendations of this report.

The following sections provide geotechnical recommendations in addition to those presented in NZS4431 which are specific to the proposed earthworks at the site. The recommendations apply to both the accessway and the Lot 4 Building Platform, unless stated otherwise.

3.1 Lot 4 Building Platform Design

We have presented drawings showing the recommended shear keys, benches and areas of over-excavation for the Lot 4 building platform. These are presented in Appendix 2 of this letter.

3.2 Subgrade Preparation

3.2.1 General

All organic soil, vegetation, loose surface materials or otherwise unsuitable materials should be stripped to expose native deposits. Stockpiles of topsoil and unsuitable materials should be sited well clear of the works on suitable areas of natural ground. From our prior test pits, the depth of topsoil may be up to 0.5 m in places.

If any areas of weaker soil, or excessive boulders are identified during the site clearance and excavation activities, then further localised excavation and backfilling may be required. Advice should be sought from the Geotechnical Engineer in the event that this work is necessary.

Allowance should be made for appropriately sized machinery to excavate and remove any large boulders to form a smooth surface prior to placement of fill.

The Geotechnical Engineer shall view all stripped areas and undertake testing as necessary to verify the stiffness of the subgrade in the proposed fill areas.

3.2.2 Fill Placement on Sloping Ground

Fill placed on sloping ground steeper than 4:1 (H:V) shall be appropriately keyed and benched into the slope to avoid downward migration of fill materials. Shear keys and benches shall be formed as

per NZS4431. At this site, we anticipate benches are required at the Lot 4 Building Platform as per the drawings in Appendix 2.

Typical depths for shear keys and bench heights are between 0.6 m and 1 m, however this may vary slightly in different parts of the site. The width of the shear keys and benches may be determined by the size of machinery on site, and the quantity of the benches will be dependent on the actual slope geometry. The drawings in Appendix 2 are intended as a guide and the number of actual benches may vary from what is indicated, depending on the size of machinery and materials encountered.

3.2.3 Over-Excavation and Geogrid Reinforcement – Lot 4 Building Platform

We recommend that the western side of the Lot 4 building platform is over-excavated by at least 0.8 m to facilitate the installation of geogrid reinforcement, below the finished surface elevation of the certified fill (refer to Appendix 2).

We recommend that a triaxial or biaxial geogrid (e.g. Triax 160 or a similar performing product) is incorporated into the building platform fill. A single layer of geogrid should be placed in accordance with the manufacturer's specifications at a depth of no less than 0.7 m below the design platform surface (i.e. a thin layer of fill should underlie the geogrid). The depth of geogrid should be sufficient such that future excavations for foundations and buried services do not penetrate through the geogrid.

3.3 Subfill Drainage and Overland Flow

Appropriate measures should be taken to prevent the infiltration of water into any new fill embankments. Subfill drainage should be installed in the base of the gullies. We recommend that the ground surface is prepared as per Section 3.2 above, prior to excavating a shallow trench which shall contain perforated PVC pipe (or a suitable alternative, which is resistant to crushing due to the weight of the overlying fill). The drainpipe shall be lined with a filter sock to mitigate the potential migration of fines into the drainage system.

The drain system should be sloped at a minimum gradient of 2 percent, and the alignment should not involve changes in direction greater than 45 degrees.

The trench should be backfilled with appropriate free draining aggregate to the stripped subgrade level. A geotextile fabric liner (such as Bidim A19 or similar performing product) shall wrap around the drainage aggregate in addition to the filter sock.

The drain outflows should connect to the approved stormwater disposal system, or to soakage areas approved by both the Civil and Geotechnical Engineers.

3.4 Excavations and Batter Slope Angles

Excavation safety on site is responsibility of the contractor, and the recommendations of Worksafe should apply.

Generally, unsupported fill and excavated slopes in soil and gravel should not be formed any steeper than 1(V):3(H) subject to the materials used, the height of the batter and relative position of future buildings. The excavation batter angle may be reviewed by the Geotechnical Engineer subject to the actual materials exposed by the excavations.

Appropriate measures, such as vegetating, should be carried out to stabilise the surface of any permanent unsupported batters and to protect against erosion and rilling.

3.5 Fill Materials

Fill materials shall comprise imported materials only as there are no suitable local sources from the site. Fill materials for building platforms should be approved by the Geotechnical Engineer prior to use and are anticipated to comprise imported aggregate such as well graded, sandy GRAVEL sourced from local quarries (generally material type C or R).

For the Lot 4 Building Platform, bulk fill materials (as per Appendix 2) may comprise well graded, sandy GRAVEL no coarser than AP100. The surface fill materials may comprise well graded, sandy GRAVEL no coarser than AP65.

We recommend that the Earthworks Specification document as per NZS4431 is prepared once the earthworks contractor has identified a local quarry from which the fill materials will be sourced. The contractor shall co-ordinate with the Geotechnical Engineer to ensure that the proposed fill materials are appropriate for the site and in keeping with the recommendations of this letter. The contractor shall provide the relevant laboratory test results (usually available from the quarry) to the Geotechnical Engineer so that the Earthworks Specification document can be prepared.

3.6 Fill Placement and Compaction Testing

Fill placement and compaction should typically be carried out in layers no greater than 250 mm thick.

Field compaction testing should be carried out by Nuclear Density testing (as per the specification) to verify that the appropriate degree of compaction has been achieved. A minimum target dry density of 92% or 95% of the maximum dry density (MDD) is typically recommended for normal residential development, depending on the test method to obtain the MDD.

Field compaction testing shall be carried out by an independent testing company. Draft test results shall be forwarded to the Geotechnical Engineer for review as soon as completed and on an ongoing basis during the earthworks programme.

If any tests indicate failure to comply with the earthworks specification, then the contractor is required to rework the area in question as necessary to achieve compliance. The reworked area shall be retested and return a satisfactory result before further fill placement can continue.

3.7 Erosion and Dust Mitigation

Permanent measures such as vegetating, hydro-seeding and/or the placement of proprietary erosion control mats, should be carried out to stabilise the surface of any unsupported excavation and fill batters and bunds to protect against long term erosion and the formation of dust.

3.8 Short Term Stormwater Management and Sediment Control

The contractor is responsible for implementing appropriate short term stormwater management and sediment (including dust) controls during the earthworks, such that water and sediment run-off from the site is appropriately treated prior to entering the receiving environment.

Appropriate stormwater and sediment management plans should be prepared prior to earthworks commencing.

3.9 Geotechnical Monitoring

For certification purposes, geotechnical monitoring should be carried out during the fill placement activities. Site visits should be carried out as necessary to view:

- The exposed subgrade, shear keys and benches prior to the placement of any drains, fill and geogrid reinforcement;
- The fill placement operations to monitor progress as necessary (subject to the contractor's programme, compaction achieved on site and any earthworks difficulties or lack thereof); and
- The completed fill platform on Lot 4 and completed accessway, and to verify the foundation conditions for foundation construction on Lot 4.

A geotechnical completion report (GCR) should be prepared upon completion of the earthworks, subject to the above monitoring work being carried out. Final survey is required upon completion of the earthworks such that As-Built plans can be prepared, which shall accompany the GCR.

4 Limitations

i. We have prepared this report in accordance with the brief as provided. This report has been prepared for the use of our client, Bluesure Developments Ltd, their professional advisers and the relevant Territorial Authorities in relation to the specified project brief described in this report. No liability is accepted for the use of any part of the report for any other purpose or by any other person or entity.

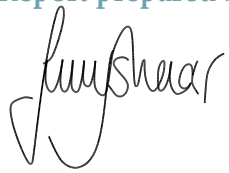
ii. The recommendations in this report are based on the ground conditions indicated from published sources, site assessments and subsurface investigations described in this report based on accepted normal methods of site investigations. Only a limited amount of information has been collected to meet the specific financial and technical requirements of the client's brief and this report does not purport to completely describe all the site characteristics and properties. The nature and continuity of the ground between test locations has been inferred using experience and judgement and it should be appreciated that actual conditions could vary from the assumed model.

iii. Subsurface conditions relevant to construction works should be assessed by contractors who can make their own interpretation of the factual data provided. They should perform any additional tests as necessary for their own purposes.

iv. This Limitation should be read in conjunction with the IPENZ/ACENZ Standard Terms of Engagement.

v. This report is not to be reproduced either wholly or in part without our prior written permission.

Report prepared by



Jana Kruyshaar, CMEngNZ, MIPENZ
Associate Geotechnical Engineer

Appendix 1: Measured Land Surveys – Earthworks Plans
Appendix 2: Lot 4 Building Platform Design Profiles

Appendix 1

Measured Land Surveys – Earthworks Plans

Notes:
- Boundary information sourced from SO 18261.
- Adjoining boundaries sourced from LINZ XML.
- Levels in terms of OIT III SO 18261 @ 362.29m.
- Contours produced from QLDC Lidar 2019 1m x 1m.
- Contours = 1.0m/0.2m.
- Areas & dimensions subject to final LT Survey.
- See Record of Title OT9C/457 for details of any existing Easements, Consent Notices and Land Covenants.
- Some internal fences are scaled from aerial image.

+4.5m to +5.0m (Fill)
+4.0m to +4.5m (Fill)
+3.5m to +4.0m (Fill)
+3.0m to +3.5m (Fill)
+2.5m to +3.0m (Fill)
+2.0m to +2.5m (Fill)
+1.5m to +2.0m (Fill)
+1.0m to +1.5m (Fill)
+0.5m to +1.0m (Fill)
0.0m to +0.5m (Fill)
0.0m to -0.5m (Cut)
-0.5m to -1.0m (Cut)
-1.0m to -1.5m (Cut)

Earthworks Notes:-

Roading quantities:
Area = 2270m²
Total Cut = 790m³
Total Fill = 490m³

Building Platform (Lot 4):
Area = 920m²
Total Fill = 1160m³

Cut volumes includes topsoil strip (assumed topsoil depth = 0.3m)

Section 20

Approved Transit NZ Access Point (5034528.3)

Lot 1
1.7890Ha

Lot 100
0.2010Ha

Max Fill = 1.05m

Existing Bunding

Water Race protected by Easement (H Transfer 819525)

Ex. Dwelling

Ex. Garage

Lake Hawea-Albert Town Road (SH 6)

Lot 2
0.6700Ha

20m setback

Building Platform
31.5m x 28.57m
(900m²)
GL 346.85m
GL 345.90m
GL 348.25m
GL 347.30m

Section 22
Block III Lower Hawea SD
5.2330Ha
OT9C/457

Lot 2
DP 25173

Lot 3
0.7180Ha

Building Platform
33.33m x 22.5m
(750m²)
GL 344.75m
GL 343.80m
GL 344.90m
GL 344.35m
Max Cut = 1.30m

Approved Transit NZ Access Point (5034528.4)

Existing Bunding

Lot 5
0.9710Ha

(pond)

Building Platform
34.5m x 26.09m
(900m²)
GL 348.70m
GL 347.60m
GL 349.20m
GL 347.95m

Re-directed flowpath

Lot 4
0.8850Ha

Building Platform
33.33m x 22.5m
(750m²)
GL 344.75m
GL 342.20m
Max Fill = 4.70m
GL 345.00m
GL 343.55m

15m setback

Lot 6
DP 26200

MEASURED LAND SURVEYS

Earthworks Plan
Lots 1-5 & 100 being a Subdivision of Section 22 Block III Lower Hawea SD
(1172 Lake Hawea-Albert Town Road)

Client: Bluesure Developments Limited

Scale: 1 : 1000 @ A3

Surveyed: ST 29/10/21

Drawn: RC 17/03/23

Datum: Lindis Peak 2000/NZVD 2016

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A DIVISION OF THE NEW ZEALAND INSTITUTE OF SURVEYORS

Sheet: 1 of 2

Job #: 21111_E1

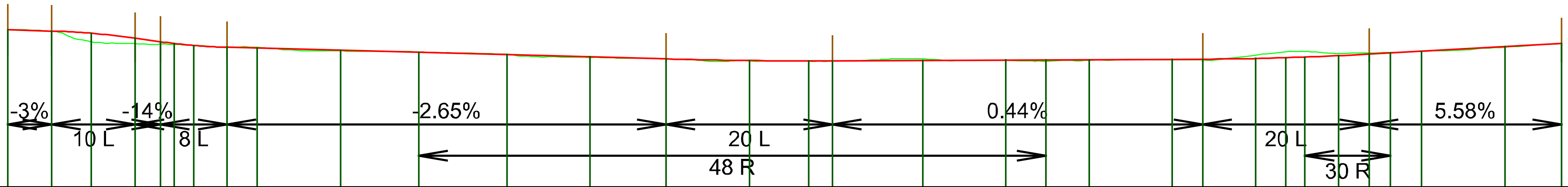
Rev: A

Rev	Description	Date
A	ORIGINAL	17/03/23

Vertical Grade

Horizontal Curve

DATUM R.L.330.00



Existing	348.88	348.71	347.44	347.21	347.16	347.12	347.00	346.76
Depth	0.00	0.00	1.01	0.66	0.28	0.11	-0.01	0.01
Design	348.88	348.72	348.45	347.87	347.44	347.23	346.99	346.77
Chainages	0.00	5.28	10.00	15.28	18.35	20.00	22.35	26.35

Existing	346.76	346.34	346.20	345.94	345.54	345.38	345.10	345.13
Depth	-0.09	0.07	-0.04	-0.06	0.07	-0.01	0.08	0.02
Design	346.67	346.41	346.16	345.88	345.61	345.37	345.18	345.14
Chainages	30.00	40.00	49.39	60.00	70.00	79.15	89.15	96.30

Existing	345.11	345.40	345.19	345.07	345.19	345.27	345.24	345.82
Depth	0.04	-0.20	0.05	0.19	0.09	0.06	0.10	-0.39
Design	345.15	345.20	345.24	345.26	345.28	345.33	345.34	345.42
Chainages	99.15	110.00	120.00	124.79	130.00	140.00	143.65	150.00

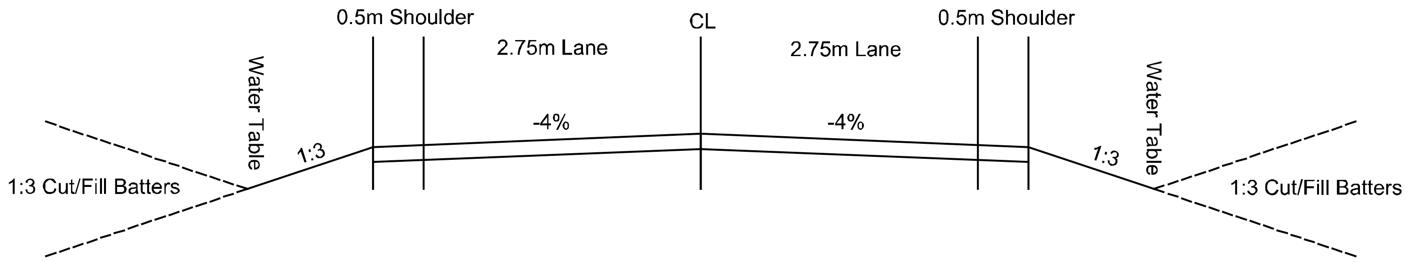
Existing	346.23	346.27	346.02	346.08	346.15	346.27	346.79	347.24
Depth	-0.71	-0.68	-0.26	-0.13	-0.06	0.03	0.07	0.00
Design	345.52	345.59	345.76	345.95	346.09	346.30	346.86	347.24
Chainages	153.65	155.96	160.00	163.65	166.25	170.00	180.00	186.78

LONGITUDINAL SECTION Road 1

Horizontal Scale 1 : 750

Vertical Scale 1 : 750

Typicall Section - Road 1



MEASURED LAND SURVEYS

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Rev	Description	Date
A	ORIGINAL	17/03/23

Roading Sections Lots 1-5 & 100 being a Subdivision of Section 22 Block III Lower Hawea SD

(1172 Lake Hawea-Albert Town Road)

Client: Bluesure Developments Limited

Scale: 1 : 1000 @ A3

Surveyed:

Drawn: RC 17/03/23

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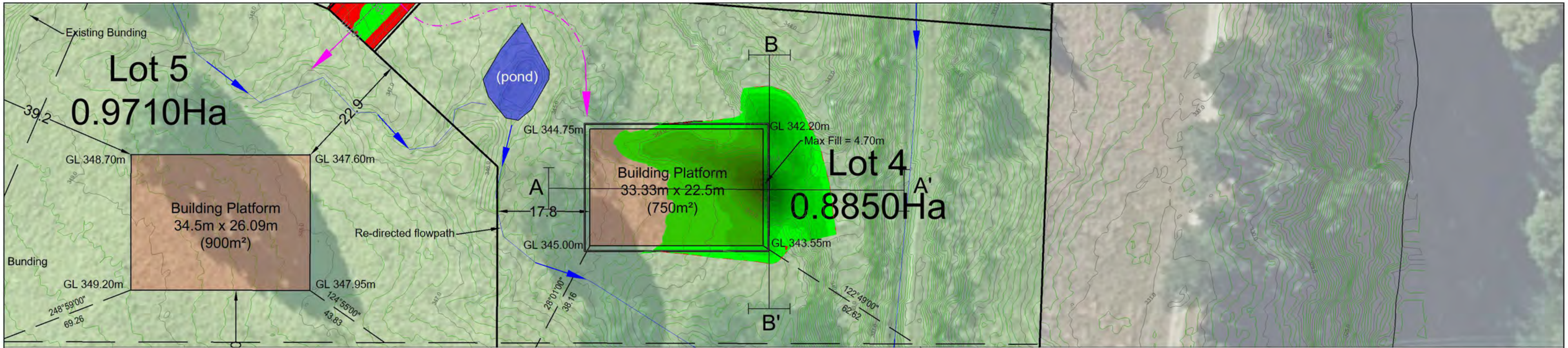
A DIVISION OF THE NEW ZEALAND INSTITUTE OF SURVEYORS

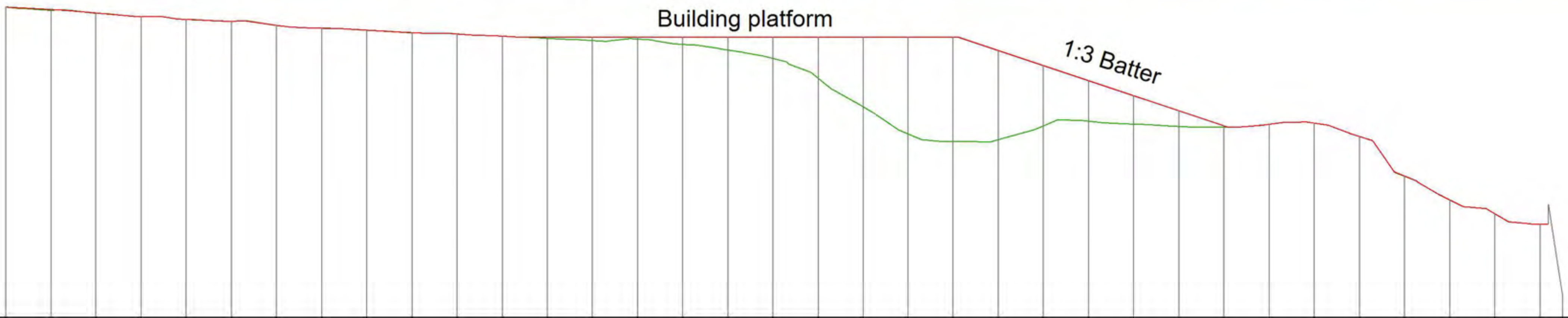
Datum: Lindis Peak 2000

Sheet: 2 of 2

Job #: 21111_E1

Rev: A





DATUM R.L.332.00

EXISTING GROUND	345.74	345.60	345.47	345.31	345.20	345.11	344.93	344.80	344.72	344.60	344.55	344.45
+ FILL DEPTH - CUT DEPTH	0.00	0.03	0.01	0.00	-0.00	0.00	0.00	-0.00	0.00	0.01	-0.01	-0.00
FINISHED LEVEL	345.74	345.63	345.48	345.32	345.19	345.11	344.93	344.80	344.72	344.61	344.55	344.45
CHAINAGE	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00

EXISTING GROUND	344.35	344.26	344.32	344.09	343.84	343.46	342.59	341.32	340.13	339.79	339.87	340.48
+ FILL DEPTH - CUT DEPTH	0.05	0.14	0.08	0.31	0.56	0.94	1.81	3.08	4.27	4.61	3.95	2.67
FINISHED LEVEL	344.40	344.40	344.40	344.40	344.40	344.40	344.40	344.40	344.40	344.40	343.82	343.15
CHAINAGE	24.00	26.00	28.00	30.00	32.00	34.00	36.00	38.00	40.00	42.00	44.00	46.00

EXISTING GROUND	340.69	340.56	340.46	340.43	340.55	340.60	340.01	338.25	337.21	336.60	336.14	336.13
+ FILL DEPTH - CUT DEPTH	1.80	1.26	0.69	0.06	0.00	0.00	0.00	0.01	-0.01	0.00	0.00	0.00
FINISHED LEVEL	342.48	341.82	341.15	340.49	340.55	340.61	340.01	338.27	337.21	336.60	336.14	336.13
CHAINAGE	48.00	50.00	52.00	54.00	56.00	58.00	60.00	62.00	64.00	66.00	68.00	68.38

Hz Scale 1:500 @ A3
Vert Scale 1:500 @ A3

Cross Section A-A'

MEASURED LAND SURVEYS

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Rev	Description	Date
A	ORIGINAL	13/04/23

Cross Sections
Lots 1-5 & 100 being a Subdivision of Section 22 Block III Lower Hawea SD
(1172 Lake Hawea-Albert Town Road)

Client: Bluesure Developments Limited

Scale: 1 : 500 @ A3

Surveyed:

Drawn: RC 13/04/23

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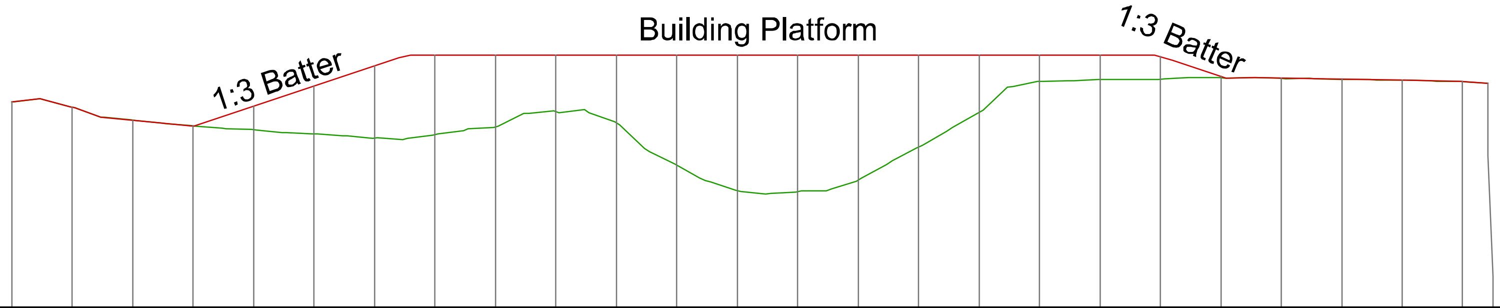
Datum: Lindis Peak 2000

Job #: 21111_M1 Rev: A



DATUM R.L.336.00

EXISTING GROUND	342.79	342.61	342.18	341.99	341.87	341.73	341.59	341.71	341.96	342.46	342.09	340.70	339.85
+ FILL DEPTH - CUT DEPTH	0.00	0.00	-0.00	0.00	0.78	1.58	2.39	2.62	2.37	1.87	2.24	3.63	4.48
FINISHED LEVEL	342.79	342.61	342.18	341.99	342.65	343.31	343.97	344.33	344.33	344.33	344.33	344.33	344.33
CHAINAGE	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00	24.00

EXISTING GROUND	339.81	340.20	341.29	342.44	343.46	343.53	343.53	343.58	343.56	343.53	343.51	343.46	343.41
+ FILL DEPTH - CUT DEPTH	4.53	4.13	3.04	1.90	0.87	0.80	0.75	0.06	0.01	0.01	0.00	-0.00	0.00
FINISHED LEVEL	344.33	344.33	344.33	344.34	344.34	344.34	344.28	343.64	343.57	343.54	343.52	343.46	343.41
CHAINAGE	26.00	28.00	30.00	32.00	34.00	36.00	38.00	40.00	42.00	44.00	46.00	48.00	48.84

Hz Scale 1:500 @ A3
Vert Scale 1:500 @ A3

Cross Section B-B'

Rev	Description	Date
A	ORIGINAL	13/04/23

Cross Sections
Lots 1-5 & 100 being a
Subdivision of Section 22
Block III Lower Hawea SD
(1172 Lake Hawea-Albert Town Road)

Client: Bluesure Developments Limited

Scale: 1 : 500 @ A3

Surveyed:

Drawn: RC 13/04/23

Datum: Lindis Peak 2000

Sheet: 2 of 2

Job #: 21111_M1

Rev: A

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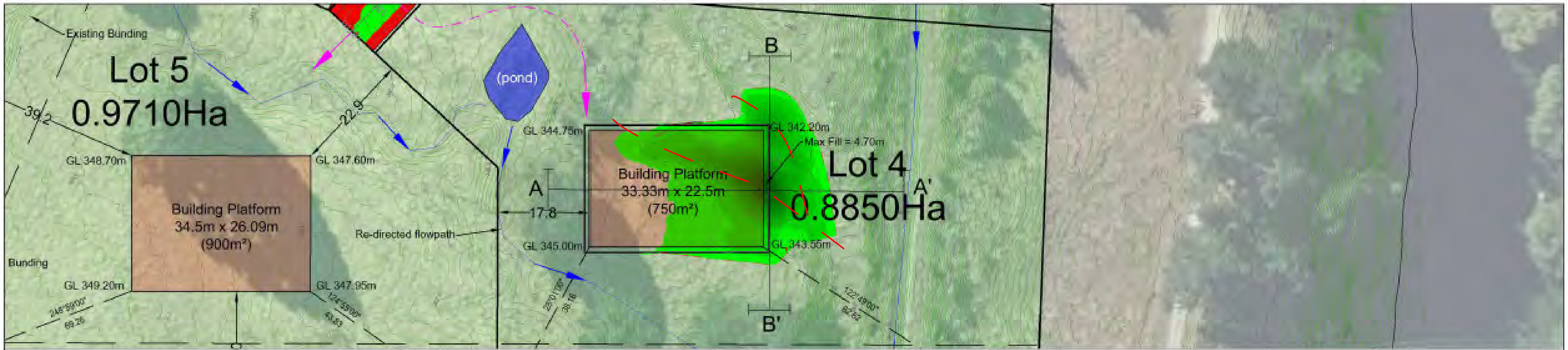
Document Set ID: 7691932
Version: 1, Version Date: 19/07/2023

Appendix 2

Lot 4 Building Platform Design Profiles



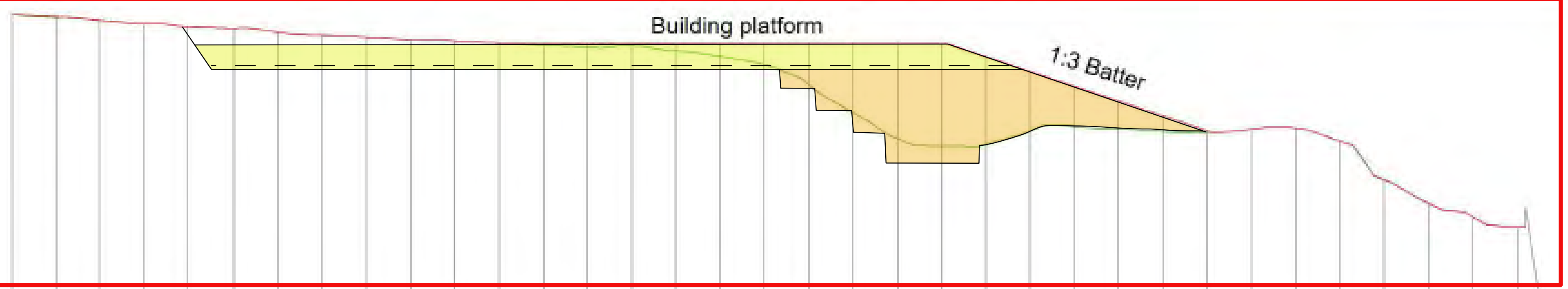
Key:

AP65 or AP40 Surface Fill

AP100 Bulk Fill

Geogrid reinforcement
(Triax 160 or biaxial geogrid)

See next page for Notes.



DATUM R.L.332.00

CHAINAGE	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00	24.00	26.00	28.00	30.00	32.00	34.00
EXISTING GROUND	345.74	345.60	345.47	345.31	345.20	345.11	344.93	344.80	344.72	344.60	344.55	344.45	344.35	344.26	344.32	344.09	343.84	343.46
+ FILL DEPTH - CUT DEPTH	0.00	0.03	0.01	0.00	-0.00	0.00	0.00	-0.00	0.00	0.01	-0.01	-0.00	0.05	0.14	0.08	0.31	0.56	0.94
FINISHED LEVEL	345.74	345.63	345.48	345.32	345.19	345.11	344.93	344.80	344.72	344.61	344.55	344.45	344.40	344.40	344.40	344.40	344.40	344.40

CHAINAGE	36.00	38.00	40.00	42.00	44.00	46.00	48.00	50.00	52.00	54.00	56.00	58.00	60.00	62.00	64.00	66.00	68.00	68.38
EXISTING GROUND	342.59	341.32	340.13	339.79	339.87	340.48	340.69	340.56	340.46	340.43	340.55	340.60	340.01	338.25	337.21	336.60	336.14	336.13
+ FILL DEPTH - CUT DEPTH	1.81	3.08	4.27	4.61	3.95	2.67	1.80	1.26	0.69	0.06	0.00	0.00	0.00	0.01	-0.01	0.00	0.00	0.00
FINISHED LEVEL	344.40	344.40	344.40	344.40	343.82	343.15	342.48	341.82	341.15	340.49	340.55	340.61	340.01	338.27	337.21	336.60	336.14	336.13

Description	Lot 4 Building Platform Design Profile A-A' (Not to scale, for information only)	**Revision**	0
Project	1172 Lake Hawea-Albert Town Road, Lake Hawea	**Date drawn**	19/04/22
Client	Bluesure Developments Ltd c/- IP Solutions Ltd	**Drawn by**	JK
Reference Number	22018_2	**Approved by**	CM

Key:

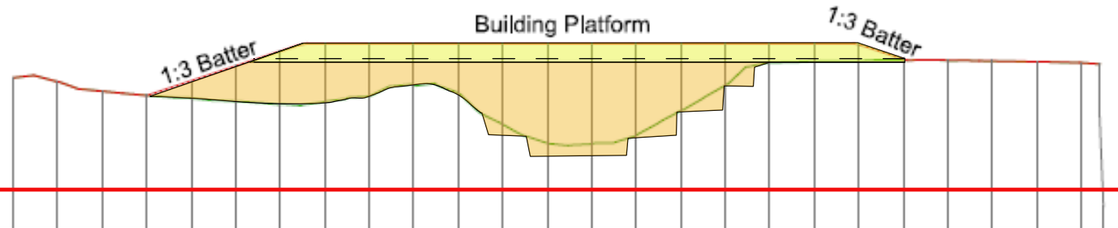
AP65 or AP40 Surface Fill

AP100 Bulk Fill

Geogrid reinforcement
(Triax 160 or biaxial geogrid)

Notes:

- Surface fill layer to be a minimum of 0.8 m thick and to cover entire building platform area
- Geogrid layer to be a minimum of 0.75 m below the top of platform
- Bulk fill to be benched into the gully sides as indicated.
- Bench heights are ~0.75 m based on one lift of fill or 3x 0.25m layers
- Subsurface drainage to be installed in the base of the gullies as directed by the Geotechnical Engineer
- In-situ compaction testing to be carried out per lift of fill. Refer to the Earthworks Specification



DATUM R.L.336.00

EXISTING GROUND	342.79	342.61	342.18	341.99	341.87	341.73	341.59	341.71	341.96	342.46	342.09	340.70	339.85	339.81	340.20	341.29	342.44	343.46	343.53	343.53	343.58	343.56	343.53	343.51	343.46	343.41
+ FILL DEPTH - CUT DEPTH	0.00	0.00	-0.00	0.00	0.78	1.58	2.39	2.62	2.37	1.87	2.24	3.63	4.48	4.53	4.13	3.04	1.90	0.87	0.80	0.75	0.06	0.01	0.01	0.00	-0.00	0.00
FINISHED LEVEL	342.79	342.61	342.18	341.99	342.65	343.31	343.97	344.33	344.33	344.33	344.33	344.33	344.33	344.33	344.33	344.33	344.34	344.34	344.34	344.28	343.64	343.57	343.54	343.52	343.46	343.41
CHAINAGE	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00	24.00	26.00	28.00	30.00	32.00	34.00	36.00	38.00	40.00	42.00	44.00	46.00	48.00	48.84

Description	Lot 4 Building Platform Design Profile B-B' (Not to scale, for information only)	**Revision**	0
Project	1172 Lake Hawea-Albert Town Road, Lake Hawea	**Date drawn**	19/04/22
Client	Bluesure Developments Ltd c/- IP Solutions Ltd	**Drawn by**	JK
Reference Number	22018_2	**Approved by**	CM

RJHall and Associates Ltd
24 Pohutukawa Crescent, Parklands
Cell: 027 444 0137

Date: 14/12/2022

Job Number: 1096-08-22

Dan Curley
IP Solutions,
5 Cliff Street,
WĀNAKA, 9305

Email: <dan@ipsolutions.nz> (letter sent as email)

Dear Dan,

RE: Flood Hazard and Fan Debris Flow Analysis – 1172 Lake Hāwea – Albert Town Road (Subdivision of Section 22 Blk III Hawea SD)

1 EXECTUTIVE SUMMARY

RJHall and Associates Ltd have been engaged to provide an analysis of flood and debris flow hazard at the proposed development of a five lot subdivision at 1172 Lake Hāwea - Alberton Road, for the purpose of residential development.

Flood Hazard

A 2D flood analysis was carried out for the site, to determine the appropriate mitigation steps for residential development. RJHall and Associates Ltd modelled the 1 in 500 year flood (0.2% AEP), to evaluate floor levels and mitigation procedures for flood risk. Results for the proposed lots (Figure 1) are as follows.

The model indicates that Lot 2 and Lot 5 proposed building sites are not anticipated to be flood prone, and accordingly minimum floor levels are proposed at 250mm above ground level.

Lot 3 has some wider flooding over the proposed building footprint area. It is recommended that the buildable areas is moved to the north away from the flood hazard. In this case the building platform is moved north a minimum finished flood level shall be 350mm above ground. If the current building platform is retaining finished floor level heights of 500 mm. It is recommended that some bunding is provided to both scenarios to mitigate flood waters in the event of avulsions occur with a potential to affect the site.

Site filling is proposed on the natural terrace at Lot 4, this will likely remove the flow path north of the proposed building site, and therefore addition of a flood water bypass shall be implemented / carefully considered. In this case, it is suggested that the finished floor level shall be 350mm above existing ground, and subject to confirmation of drainage path changes.

An output of the preliminary flood model is presented in Figure 4, with the results summarised below. It is noted that in general the flooding at the site is typically limited to well channelised conditions, and careful consideration needs to be addressed to ensure that development of the site does not interfere or adversely alter these flood paths affecting the downstream neighbours namely Lot 3 and Lot 4.

Given the degree of conservatism that has been embodied in hydrological assessment, it is opined that the model result presented in this report represent the higher end of the flood level range.

Debris Flow Risk

An analysis of debris flow risk was assessed through the following techniques:

- Melton Ratio
- Fan topography and morphology assessment.
- Debris flow run-out calculation

Conclusions of the analysis indicate that the catchments at the site may have a capacity to develop debris flow, however based very flat fan gradients, significant runout distances anthropomorphic terrain modifications it is anticipated that there is nil – very low risk of debris flood at the site for the proposed lots. It is anticipated that the finished floor levels proposed in the flood analysis adds a level of conservatism to any remnant risk.

In terms of the development, the flood and debris flow risk can be effectively managed with minor earthworks and finished flood levels to meet and exceed the building code requirements E1, and therefore it is anticipated that should not prevent the development from proceeding.

2 SCOPE

RJHall and Associates Ltd has been engaged to prepare a flood assessment and assess debris flow risk for the proposed five lot subdivision at 1172 Lake Hāwea – Albert Town Road referred to herein as "the site". A preliminary layout plan of the site is presented in Figure 1.

The purpose of this investigation is to assess the potential for inundation from flooding and debris flow on the distal fan extents at the site, and where required provide advice on counter measures such as floor levels or other such and hazard mitigation procedures.

RJHall and Associates Ltd have carried out the following work elements for the project:

- Site visit (July 2022);
- Published information review (rainfall, fan morphology, site specific geotechnical report);
- Evaluation hydrology of the catchment and fan for the 500 year recurrence interval;
- Assess effects of the 1 in 500 year flood level for the site (2D flood model HEC Ras 6.3.1);
- Catchment rainfall regression assessment (debris flow assessment);
- Review of debris flow and flood hazard, and commentary;

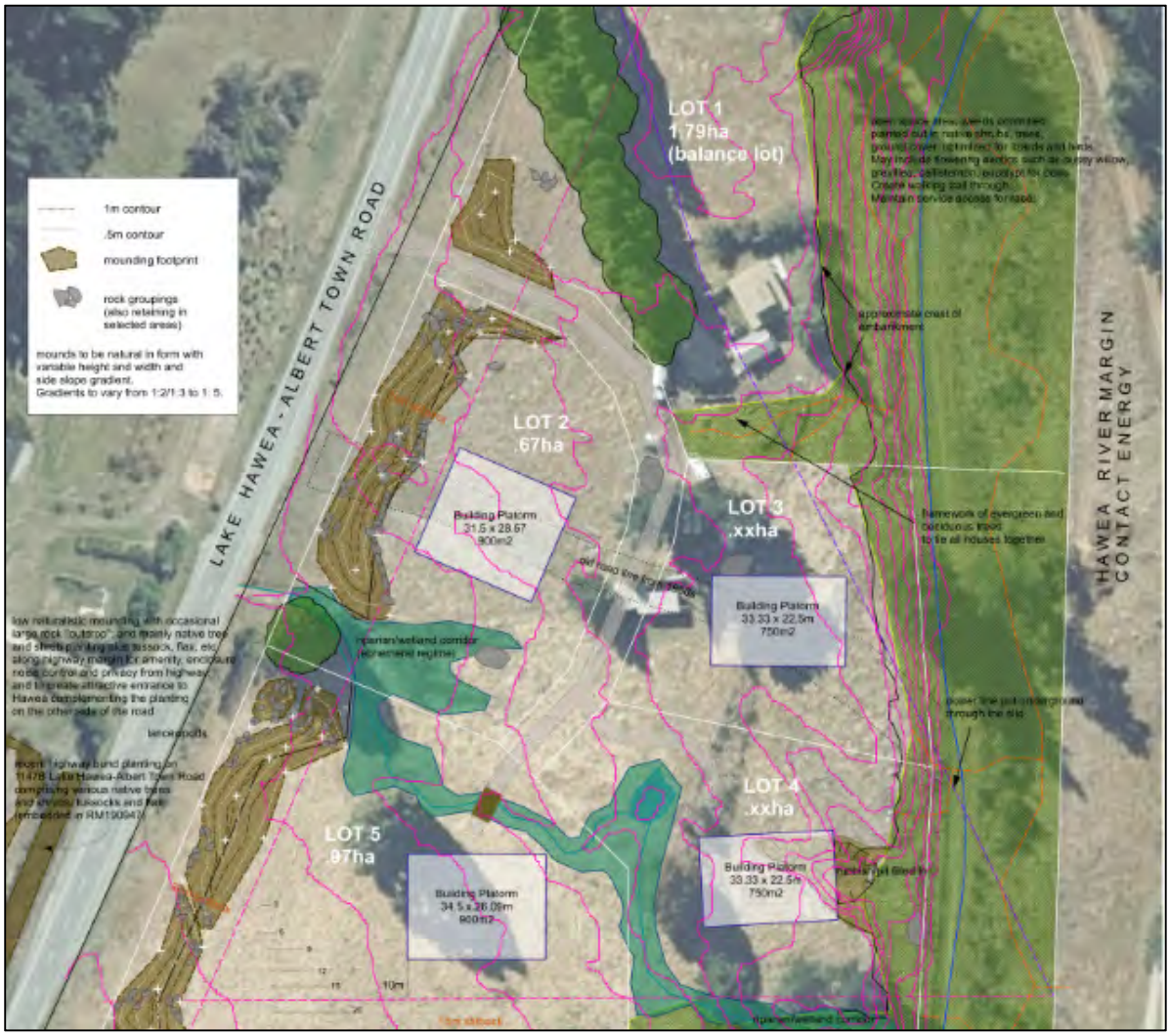


Figure 1 1172 Lake Hāwea –Albert Town Road (Sec 22 BLK III Lower Hawea SD – Proposed Lot Layout)

3 INTRODUCTION

The site is located on Lake Hāwea – Albert town Road, on the north east distal end of and alluvial fan complex.

The wider fan has developed on historic Pleistocene age lateral moraine deposits which developed 18,000 to 20,000 years before present. These moraines have been subsequently down cut by the Hāwea River in the post glacial age some 18,000-12,000 years before present (BP). Fluvial aggradation of fine silt and gravel outwash materials have accumulated on this terrace creating the final fan surface.

The main catchment contributing to development of the wider fan area, rises to some 1300 m vertical to the north-west (Mt Maude), with the site at approximately 350m above mean sea level (ASML).

The upper catchment gradient in steep schist is graded at 25 - 28 degrees, with thin cover of silt and gravels overlying Permian age schist basement rocks. There is some evidence of large scale slow moving translational landslides in the upper catchment. Review of aerial photography indicates the

hillside is generally well covered with small trees and scrub giving way to tussock above 800m. Some localised erosion scars are present.

The catchment upstream of the site is generally characterised into three gradients, upper catchment (23 - 28^{o}), fan head and wider fan complex (3 to 4^{o}), distal fan end (1 to 2^{o}).

A site visit in July 2022 indicated no evidence of debris lobes on the wider alluvial fan, and fan materials were found to be fine sits, sands and gravels.

The site of the subdivision is located on the north eastern and distal end of the fan, on the terrace edge, and down plain of the road. Two drainage locations enter the site, one at the mid point and one to the north. These drainages pick up stormwater from smaller sub catchments (to the west), and stormwater from the road. These drains have been channelised, and head over the site and terrace edge (offsite).

Recent anthropomorphic factors have adjusted or modified the terrain which alter the natural fan process, these are as follows:

- Construction of the Hāwea – Albert Town Road (pre 1950's)
- Installation of access track for the power project (through site – circa 1950's)
- Golf Course development – channelising the main stream to current locations (deeply incised at road location)
- Construction of building and earth bunding west of road (Lot 2 DP 300393 – Black Barn 2019-2021)
- Construction of aesthetic bunding on site (2022)

Proposed Site Development:

The proposed development consists of five new residential lots. This includes a single lot for the existing residential house and appurtenant structures (Lot 1 north) and four new residential lots; Lot 2, Lot 3, Lot 4 and Lot 5 which range from 0.67 to 0.97 ha in plan area (refer Figure 1).

Lot 2 and Lot 5 are located on the fan terrace, and Lot 3 and Lot 4 are located on the terrace edge grading down the true right bank terraces of the Hāwea River.

Proposed Flood Level Determination:

In the planning process it is proposed that building floor levels are set to meet the minimum criteria as follows:

Flood Mitigation - Floor Heights/Location

- *The minimum floor height for habitable residential buildings in areas subject to 'Low Flood Risk' shall be 150mm above floodwaters with a 0.2% annual probability of occurring (i.e. 500 year return period flood)."*

This is generally consistent with other local authority development processes. However, it is noted that these represent minimum requirements, and it easier to provide higher finished floor levels that accommodate uncertainty of flood water due to potential long term change to ground level and vegetation through natural and anthropomorphic influences.

Site Flood Risk

A site visit was undertaken in July 2022 in order to assess the possible hazards at the site. It was apparent from site inspection that alterations to the natural fan geometry through bunding, and road development have limited the potential for flooding at the site from the larger catchment to the south-west (catchment 0).

A 2D flood model was constructed to further assess flooding at the proposed lots to develop finished floor levels for the proposed future buildings.

4 HEC RAS FLOOD MODEL CONSTRUCTION

The 2D hydraulic model was constructed using HEC-RAS 6.3.1. A schematic of the Ras model area is shown in Figure 2. This model covers an extent of approximately 3.5 ha bounding the base of the hillside (west), and the terrace toe (east), and has been confined to the area immediately upstream and at the site; as flood flows over the wider fan from the larger catchment (south-west) cannot enter the site due to earthen bunding at the boundary between Lot 2 and Lot 6 DP 300393, (Light green line Figure 2).

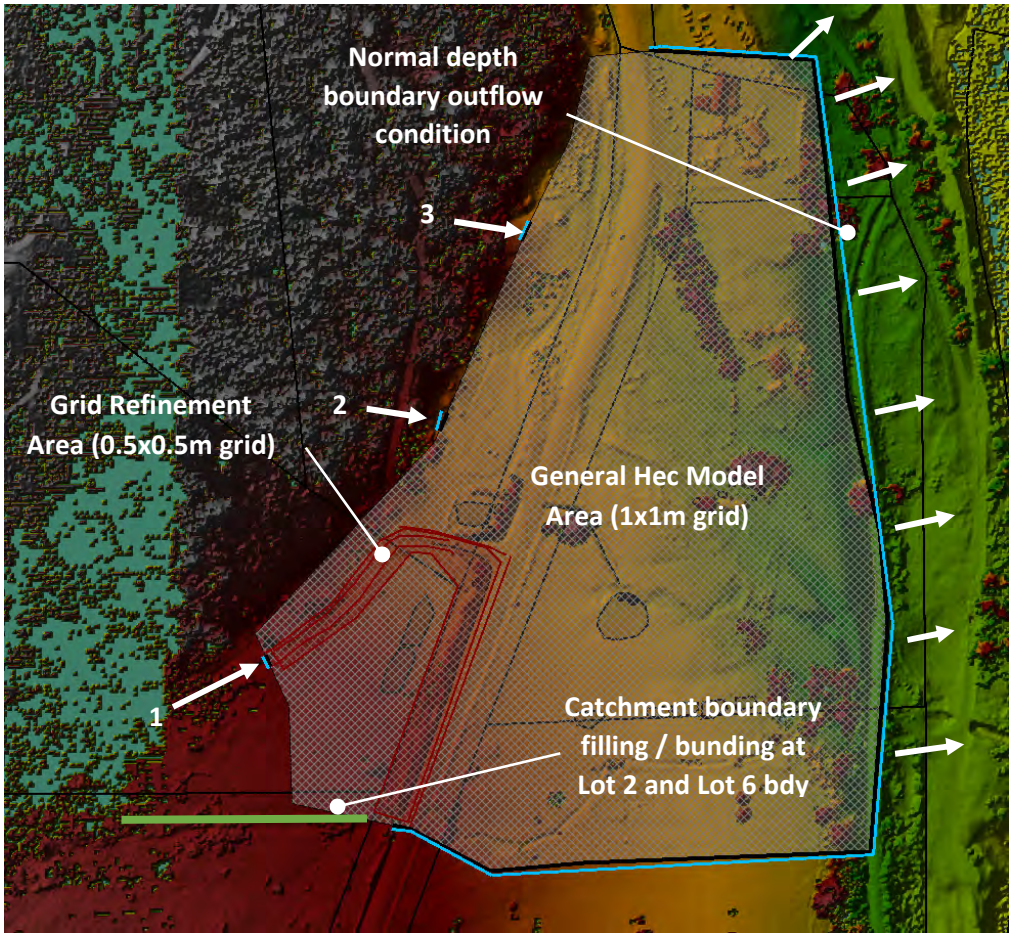


Figure 2 Model Boundary (contributing catchments 1-3, and outflow boundary condition)

4.1 Model Geometry

The model terrain was derived from the publically available LiDAR digital elevation model data (source ORC Spatial Data Hub[1]). This model is representative of ground profiles from 2019.

The digital elevation model (DEM) has a resolution of 1m. The DEM had limited processing and required manual modification to remove surface structures (trees and buildings) and smoothing of no data regions (voids). Manual interpretation of surface profiling was undertaken for this process.

In addition, some manual adjustment of critical conveyance locations was carried out where tree shading caused loss of data. Channel modifications were undertaken to match adjacent channel conditions.

Bunding was manually applied to the DEM surface to replicated recent terrain modifications by the Owner to the upstream boundary of the site.

The grid size for the model area was set to a resolution of 1m, with a refinement region of higher resolution (0.5m) from the head of catchment 1. Break lines were applied to localised high points to align cell boundaries with these features.

The higher resolution grid and break lines provide a more accurate representation of the topographical surface for these key locations of hydraulic conveyance.

In this preliminary site analysis a single DEM representing the existing terrain was unmodified, if future earthworks are proposed the model can be updated to represent site contouring or infrastructure layout.

4.2 Boundary Conditions

Boundary conditions were applied at the locations shown on the model schematic (Figure 2). This included three contributing catchments, and one normal depth boundary applied at the downstream "outflow" of the model. The conclusions derived from this model are not considered sensitive to the downstream boundary, this is due to the relatively steep terrace edge where back water effects will not be critical for the sites of interest.

The determination of the catchment inflows from the three contributing catchments (Catchment 1 to 3) were assessed using the Rational Method (E1 AS1/VM1) with HIRDS 4.0 rainfall data. Theoretical increases in rainfall due to climate change were accounted for by using the RCP 8.5 scenario, representing rainfall for the period 2081-2100.

A generalised rainfall runoff coefficient (c) of 0.45 was used for the catchments to account for a steep, lightly forested catchment, on moderately permeability soils. The storm duration for each of the catchments was developed from time of concertation analysis using three estimation techniques, E1 section 2.3.3, Ramser-Kirpich and US Soil Con, these correlated well, and a storm duration of 10 minutes was selected for each the catchments as a minimum duration as per E1 recommendations.

The rainfall intensity for the 500 year (I_{500}) event was estimated by adjusting the 100 year (I_{100}) rainfall intensity by a factor of 1.5 (i.e. $I_{500}/I_{100} = 1.5$). This is consistent with ECan/ DHI (2021) and Tonkin and

[1] ORC Spatial Data Hub Online source: https://gis-qldc.hub.arcgis.com/pages/open-data

Taylor (2017) maximum Q_{500}/Q_{100}, specific discharge characteristics parameters from the Canterbury region.

As this is and upper bound of catchment discharges for the E1 AS1/VM1 Rational Method analysis are deemed conservative (C.f. McKerchar and Pearson (1989) with climate change adjustment) and therefore no additional increase in factoring has been applied to the peak flows to cover uncertainty in the hydrological assessment process.

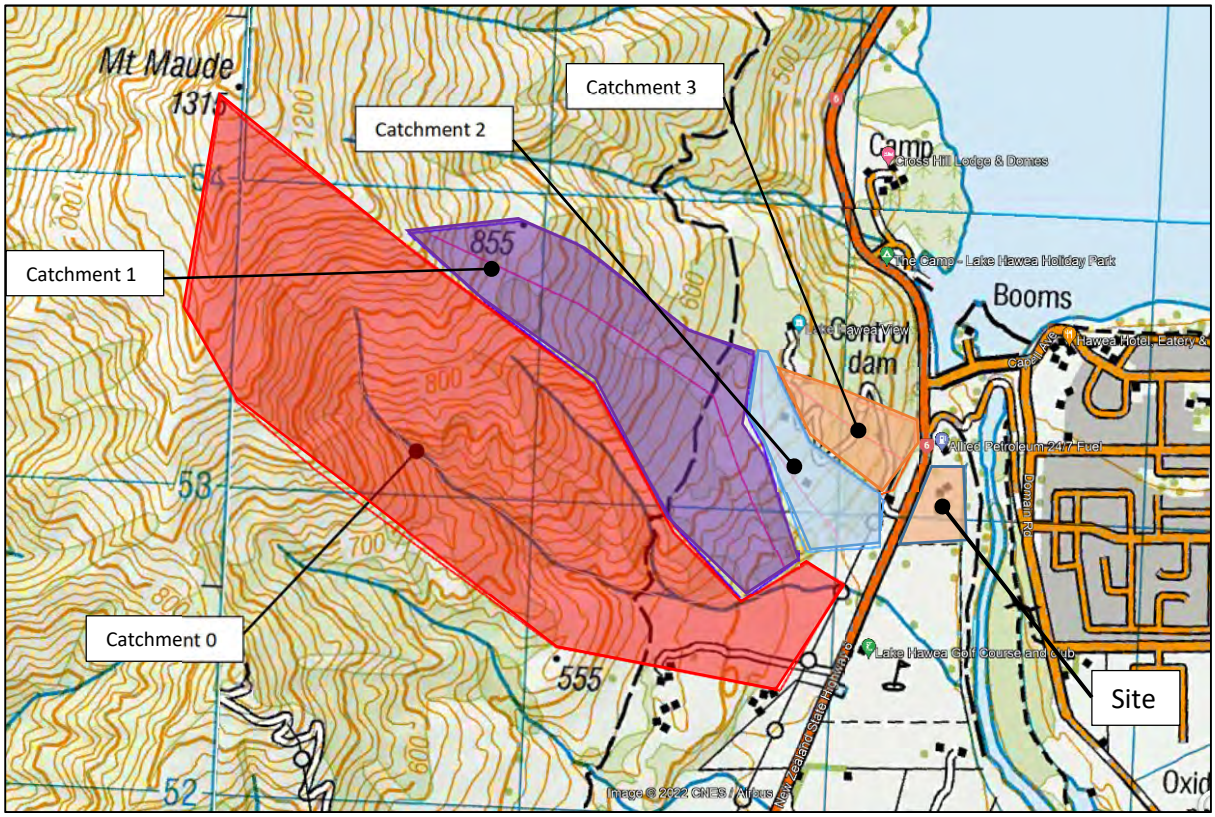


Figure 3 Model Catchment Boundaries.

The flows and effective catchment areas area are presented in Table 1.

Table 1: Catchment parameters

Catchment Number	0*	1	2	3
Q_{500} Catchment Peak Flow (m^3/s) – E1	22	7.1	1.6	1.2
Q_{500} Peak Flow (m^3/s) – M&P	6.2	2.3	4.8	0.5
Effective Area (ha)	160	52	12	8.7
Time of concentration 10 min **C = 0.45, steep catchment, scrub and tree cover.** ***Catchment 0 – analysed but does not contribute to flooding at the site due to bunding between Lot 2 and Lot 6 DP300393.**				

4.3 Alternative Hydrology Assessment

An alternative assessment approach of specific discharge was carried for the catchments using McKerchar and Pearson (1989). McKerchar and Pearson under took a review of New Zealand hydrology in 1989, which assessed specific discharges from gauged catchments of the south island. An evaluation of the mean annual flood, and the Q_{100} was undertaken for the sub catchments above. Adjustment for climate change was applied based on the ration of the HIRDS V4 rainfall intensity (current), and the RCP8.5 value.

A summary of results is presented in Table **2**. Specific discharge values from the table indicate that the Rational Method used for the hydraulic model is a sufficiently conservative approach.

Table 2 McKerchar and Pearson (1989) Catchment Discharge Summary

Catchment Number	Catchment Area (km^2)	McKerchar and Pearson (Q_{100}, m^3/s)	Adjusted Q_{100} (2082-2100)	Estimated Q_{500}, (2082-2100
0	1.6	3.04	4.11	6.16
1	0.52	1.15	1.55	2.33
2	0.12	0.32	0.44	0.65
3	0.09	0.25	0.34	0.51
***Adjusted for climate change RCP8.5 / RCP 0.0 rainfall = 1.35**				
****Adjusted value Q_{500}/Q_{100} = 1.5 (refer report)**				
McKerchar and Pearson Map Values - Q_m = 0.75, q100 = 2.7				

4.4 Model roughness

The model roughness was defined and truthed against aerial imagery, site photos and knowledge of the area. The following Manning's n roughness of 0.045 was applied over the wider model. This takes into account the effects of shallow water discharging over grassed surfaces.

4.5 Additional model parameters

The model was run for a 1 hour duration with the full momentum equations. The full momentum solution is considered a more robust approximation of the shallow water equations than provided by a diffusive wave approach, as it conserves momentum and accounts for critical flows and super elevation.

A computational time step of 0.5 seconds was selected. Given an approximate maximum velocity of 2.0 m/s, this gives a Courant number of:

- 2.5 for the 0.5 m grid; and (channel)
- 1.0 for the 1.0 m grid (main model boundary).

The HEC RAS user manual recommends a courant number no more than five for the full momentum solution. The cumulative mass balance error for all model was 0.17%.

5 RESULTS

5.1 Model Results

The results show that the RJHall and Associates Ltd model is relatively consistent with expected flow paths, whereby discharges are routed by bunding and storage upstream of the Hāwea-Albert Town

Road. Overtopping occurs at the lowest point of the road to the north east of the site, which allows flood waters to cross into the site.

Recent aesthetic bunding application to the site on by the owner has made some minor changes to the flow paths. This change only affects distribution of flood waters over the site due to the down slope gradient eastward.

An output of the preliminary flood model is presented in Figure 4, with the results summarised below. It is noted that in general the flooding at the site is typically limited to channelised conditions, and careful consideration needs to be addressed to ensure that development of the site does not interfere or adversely alter these flood paths affecting the downstream neighbours namely Lot 3 and Lot 4.

If site development could have such results, then appropriate investigation steps need to be taken in order to advert and adverse effects which could result.

Lot 1 Discussion

The development of the new lots do not affect flooding at the existing house site. Buildings at the site are an existing use, and accordingly likely complied with relevant codes at the time of construction, and do not require any further assessment.

Lot 2 and Lot 5 Discussion

The existing proposed building platforms for Lot 2 and Lot 5 are located in areas with no or very low flood risk. It is recommended that the finished floor levels at these sites are set at a minimum of 250mm above ground level in the case of channel avulsion or blockages which could allow flood waters to deviate from their modelled flow paths.

Lot 3 Discussion

The Lot 3 proposed buildable area is located within a flood path. It is recommended that the buildable site is moved to the north away from the surface flooding zone. As water is dispersed in this location, Lot 3 would require a higher finished floor level. And therefore the following is proposed:

- Set min FFL to 450mm above ground level (house site original location per Figure 1) and apply upstream bunding / mitigation measures;
- **OR**, Move proposed house site to north apply FFL 350 above ground level (apply bunding to south to prevent evulsion potential).

Lot 4 Discussion

It is understood that some filling is likely at this site to level the incised channel. This filling will need to be designed, supervised, and certified by a suitable qualified engineering and will likely require a building consent as it will form part of the house foundation system.

The fill levels need to consider the effect to the flow path to the north of the site, and the potential affects to of flood waters at the proposed building platform. Where no filling is to occur at this site then a finished floor level of 350mm above ground level is recommend, this needs to be confirmed with the developer.

Table 3: Modelling Output Calibration – Water Level Heights			
Location	Water Surface Level at Building Platform (mm)	Max Water Level at Site Overland Flow (mm)	Proposed Buildable Area FFL above ground level (mm)*
Lot 1	N/A – Existing development		
Lot 2 -	N/A	150 mm	250 mm
Lot 3 -	100 - 300	350 mm	500 mm**
Lot 4 -	150 mm	1.02 m (pond)	350 mm***
Lot 5 -	N/A	580 m	250 mm
NB Relative Finished Floor Level on proposed building platform (mm above ground level)** ****Recommend moving Lot 3 building platform to the north (or filling and bunding to mitigate flooding at the site), finished floor level 350 above ground level new site to north.** ** Finished floor level indicative for existing ground level, where ground filling proposed, this FFL will need to be confirmed.**			

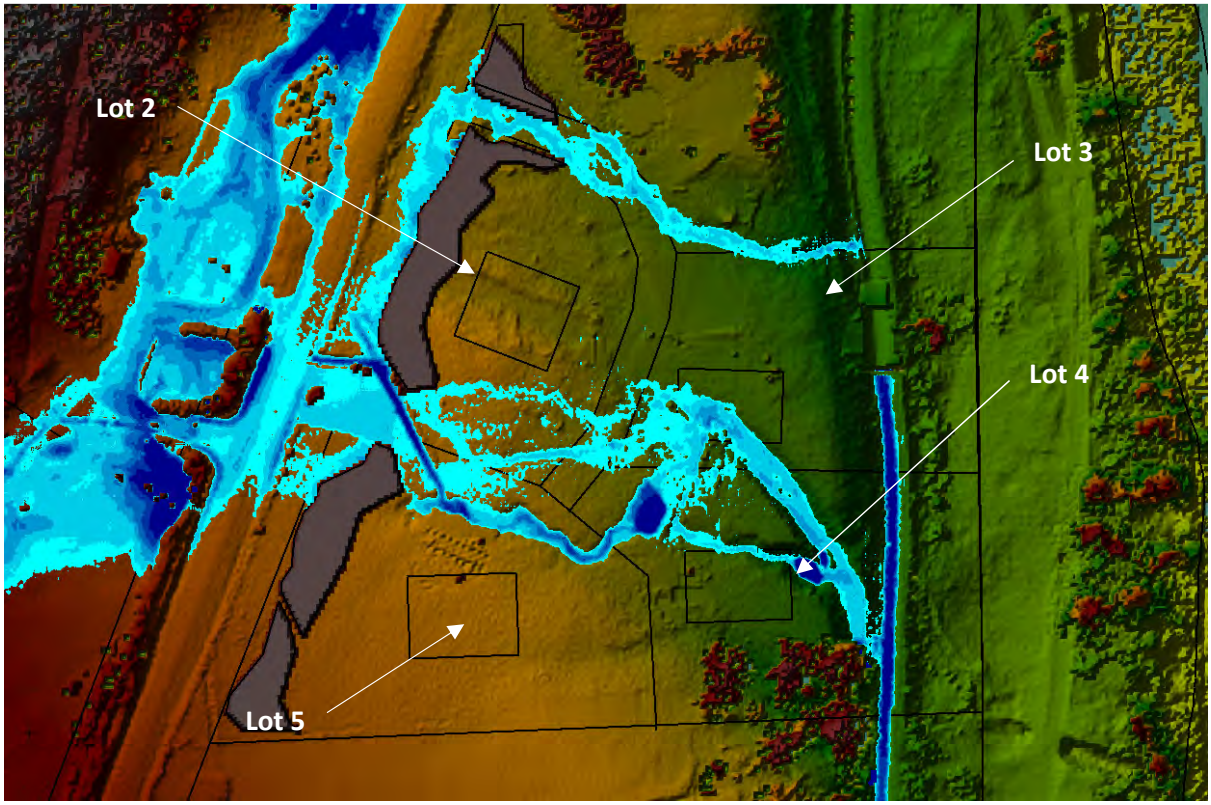


Figure 4 RJHall Flood Model – 500 year flood – Lot Layout

6 DEBRIS FLOW ASSESSMENT

An assessment for the potential for debris flow at the site was carried out. The assessment involved:

- Site walkover and review of site topography;
- Review site geomorphology, assess and review of site specific geotechnical test information;
- Assessment of local rainfall characteristics;
- Review of historic aerial photos;

6.1 Fan Morphology, and Fan Materials

Review of the fan morphology, and test pit data for the site indicated that the site is on the distal end of the fan, in a very low gradient region (gradient less than 2^{o}). The site materials consisted of fine sandy silt, with gravels (inferred fan deposits). This fan material overlaid the more coarse and chaotic moraine deposits. It is noted that only the "*test pits at the south western part of the site displayed a thin veneer of fan alluvium*" (Insight Engineering 2022)

The overall catchment geometry as discussed has be tabulated below:

Table 4: Catchment 0 – Topography

Catchment Number	Vertical Drop	Horizontal Run	Slope (^{o})	Comment
Upper Catchment	1000	1900	25 to 28^{o}	Relatively steep catchment
Fan Head	50	300	5 to 9.5^{o}	In general debris will accumulate at approx. 7 degrees
General Fan	18	290	3.6^{o}	
Distal End of Fan	1	40	1.7^{o}	Low gradients and fan runout – debris flow unlikely deposition in fan head likely.

Melton ratio for the four contributing catchment were assessed, with values ranging from 0.54 for 0.84. In general, sites Melton rations greater than 0.6 typically display dominant debris flows from fluvial processes. However analysis in a NZ southern alps context indicates that fans developed by debris flow tend to have steeper gradient greater than 7 to 8^{o} (DeScally, Owens, 2004). This indicates that natural fluvial processes have developed the fan at site rather than debris flow deposition.

It is noted that catchment 1 and catchment 3 have glacial "stepped terrains", which likely effect the applicability of the Melton ration value (Jackson et at 1987), thus limiting the potential for debris flows from these catchments.

The Melton ratio for the four catchments and the fan gradients at the site have been compared to research from DeScally and Owens 2004, with an overlay of Figure 3.3. The plot indicates that with comparatively low fan angles fluvial flow dominates fan at the site i.e. debris flood have limited potential for affect the site. This is confirmed by limitations for run out predictions for each of the catchments.

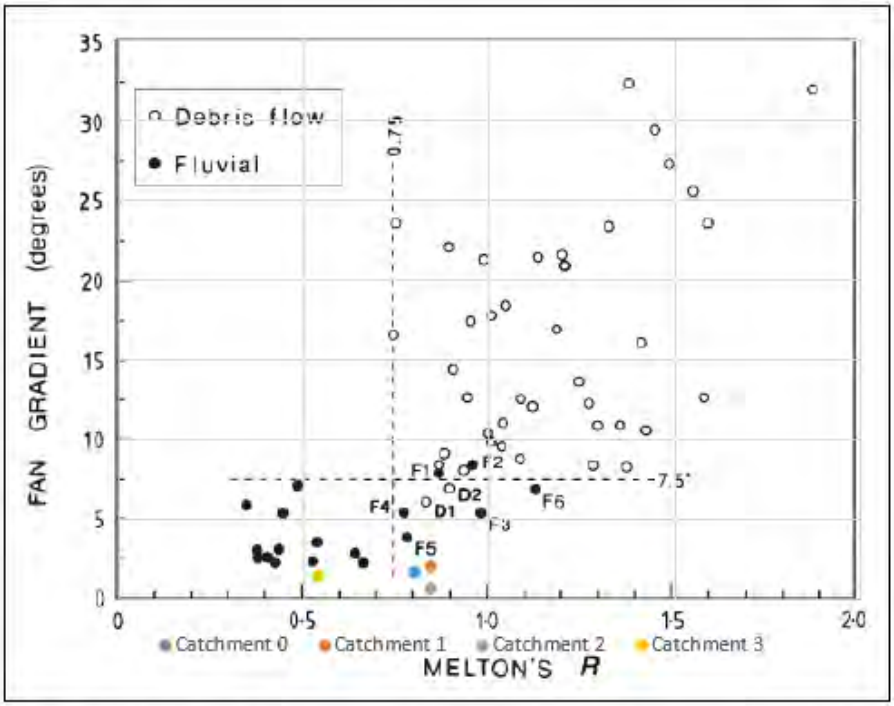


Figure 3.3: Plot of Melton's Ratio and Fan Gradient, showing thresholds used to distinguish debris-flow from fluvially dominated fans (and hence their contributing basins) in the Southern Alps of the South Island New Zealand (De Scally and Owens, 2004).

Anthropomorphic fan modification, such as bunding at the property boundary between Lot 2 DP 300393 and Lot 6 DP 300393, and the development of the Hāwea – Albert town road create barriers for catchment 0, and catchment 3, these provide adequate shielding and or in the case of the road , storage to deflect or detain and debris flood water and sediment.

Historic Aerial aerials from the site show some debris in 1956 and 1964, infer some minor flow crossed the road and into the golf course. The volume of debris appears to be fairly minor, and limited to within the confines of the existing berm area, based on the analysis above, this is likely debris flood deposits, or natural stream aggradation, and not debris flows per se.

Figure 5 - 1956 Minor Flood Debris on now Golf Course Location

Figure 6 - 1964 Flood Debris

7 CONCLUSIONS

RJHall and Associates Ltd has been engaged to prepare a flood assessment and assess debris flow risk for the proposed five lot subdivision at 1172 Lake Hāwea – Albert Town Road.

Results of these components are discussed below.

Flood Modelling

A 2D hydraulic model has been constructed to assess the 1 in 500 year return period flood at the site.

The final model used the Rational Method (E1/AS1/VM1[2]) NIWA's RCP8.5, 2080 – 2100 rainfall intensities[3]. An estimation of the 500 year intensity rainfall was based on Q_{500} / Q_{100} ratio of 1.5, applied with a runoff co efficient of 0.45, and storm duration of 10 minutes.

The model indicates that Lot 2 and Lot 5 proposed building sites are not anticipated to be flood prone, and accordingly minimum floor levels are proposed at 250mm above ground level.

Lot 3 has some wider flooding over the proposed building footprint area. It is recommended that the buildable areas is moved to the north away from the flood hazard. In this case the building platform is moved north a minimum finished flood level shall be 350mm above ground. If the current building platform is retaining finished floor level heights of 500 mm. It is recommended that some bunding is provided to both scenarios to mitigate flood waters in the event of avulsions occur with a potential to affect the site.

Site filling is proposed on the natural terrace at Lot 4, this will likely remove the flow path north of the proposed building site, and therefore addition of a flood water bypass shall be implemented / carefully considered. In this case, it is suggested that the finished floor level shall be 350mm above existing ground, and subject to confirmation of drainage path changes.

An output of the preliminary flood model is presented in Figure 4, with the results summarised below. It is noted that in general the flooding at the site is typically limited to well channelised conditions, and careful consideration needs to be addressed to ensure that development of the site does not interfere or adversely alter these flood paths affecting the downstream neighbours namely Lot 3 and Lot 4.

Given the degree of conservatism that has been embodied in hydrological assessment, it is opined that the model result presented in this report represent the higher end of the flood level range.

Debris Flow and Debris Flood

Debris flow and debris flood analysis have been undertaken for the site, the evaluation took into account historical aerials, site visit information, test pit data, topographical evaluation to assess that sites risk from debris flows.

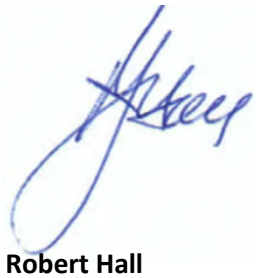
Review of the information indicates that the sites catchment areas may be able to create debris flow conditions (Melton number > 0.6), however, the site is not prone to these flows due to long runout distances, and very flat fan gradients. Debris flood conditions are more likely, where flood conditions typically carry fine sediment rich materials, as evidenced by site specific test pit information provided.

Review of site information, glacial terracing (stepped catchments), and debris flow fan gradients in the NZ context, and site shielding (bunding and road layout) indicates that in such an event, debris flooding would be deflected or captured before reaching the proposed lots.

[2] MBIE (2021) Acceptable Solution and Verification Methods for the NZ Building Code Clause E1 Surface Water (Amendment 11, November 2021)
[3] NIWA High Intensity Rainfall System V4 – Online Source: https://hirds.niwa.co.nz/

Therefore it is anticipated that there is nil – very low risk of debris flood at the site for the proposed lots. It is anticipated that the finished floor levels proposed in the above flood analysis adds a level of conservatism to any remnant risk.

As the site has been assessed for flood and debris flow inundation, and provided the preceding recommendations are applied it is proposed that the sites are able to be developed with adequate provision to mitigate flood and debris flood actions.



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Appendix A – Calculations

- Hydrology Analysis:
  - E1 / Rational Method
  - McKerchar and Pearson Specific Discharge with Climate Change
- Debris Flow Prediction Equations:
  - Melton ratio for sub catchments (Melton, 1965)
  - Evaluation threshold debris flow volume for site / fan run-out (Reckenman, 1999)
  - Debris Flow / Debris Flood assessment using Melton ration / Fan Gradient plots for NZ Southern Alps fan development (deScally, Owens 2004)
  - Evaluation of run-out Predications, plot of site data overlaid.

Appendix B – Site Testing

Appendix C – Fill Lab Test Results

Appendix D – Producer Statement

Appendix B4 – ROONEY EARTHMOVING HDPE LINER TEST REPORT

Appendix B5 – ROONEY EARTHMOVING UNDER DAM HDPE PIPE PRESSURE TEST

Appendix C – AS BUILT DRAWINGS

Appendix D – CONSTRUCTION MATERIALS

Appendix D.1 – DAM BASE DRAINAGE

Appendix D.2 – FLEXIBLE MANHOLE CONNECTORS

Appendix D.3 – MANHOLES

Appendix D.4 – SOLID CARRIER PIPE (BETWEEN MANHOLES) 250OD

Appendix D.5 – MDPE PIPE (BENEATH EMBANKMENT)

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CALCULATION SHEET

Ras Model

$Q = \frac{CiA}{360}$ (E1)

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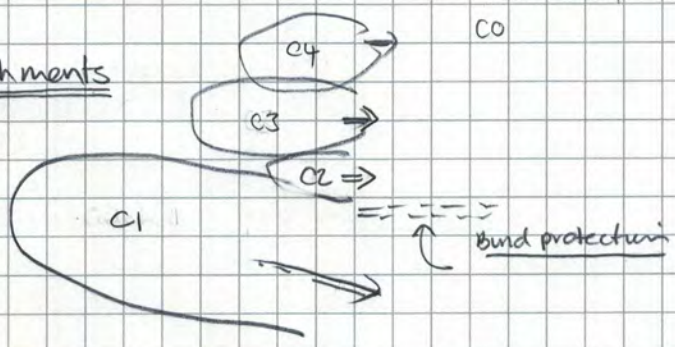
Catchments



RCP 8.5 '82-'100 i = 12.2 mm in 100 comms.

$i = \left(\frac{d}{10} \times 60\right) = \left(\frac{12.2 \text{ mm}}{10} \times 60\right) = 73.2$ mm/hr.

Determination of Q_{100}'s

Catchment #	Area ha	Q_{100}	Q_{500}	Δh (m)	ΔL (m)	t_c (min)
0	160	14.6	22.0	859	2770	13 mins
1	52	4.8	7.1	573	1800	9.7 mins
2	12	1.1	1.6	171	716	5.3 mins
3	8.7	0.8	1.2	160	532	3.5 mins

eg $Q_{100} = \frac{0.45 \times 73.2 \times 160 \text{ ha}}{360} = 14.06 \text{ m}^3/\text{s}$

$Q_{500} = 14.06 \times 1.5 = 22.0 \text{ m}^3/\text{s}$

Assess t_c. E1 (Sec 2.3.5) - Catchment 2

$t_c = 0.0195 \left(\frac{L^3}{H}\right)^{0.385} = 0.0195 \left(\frac{1800^3}{573}\right)^{0.385} = 9.7$ min

therefore min = 10 mins

Ramser - Kirpich $da = \left(\frac{573}{1800}\right) = 0.3183$

$t_c = 0.0195 L^{0.77} da^{-0.385} = 0.0195 \times 1800^{0.77} \times 0.3183^{-0.385} = 9.7$ mins

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$$t_c = \left(0.87 \frac{L^3}{H}\right)^{0.385} = \left(0.87 \times \frac{1.8^3}{573}\right)^{0.385} = 0.162 \text{ hrs}$$

L = Km
H = m.
t_c = hours.

$t_c = (0.162 \times 60) = 9.7$ mins.

t_c (min)

t_c ave = (9.7 + 9.7 + 9.7) = 9.7 min

if t_c ave < 10min, default to 10min

Hirds Hawea Rainfall Parameters

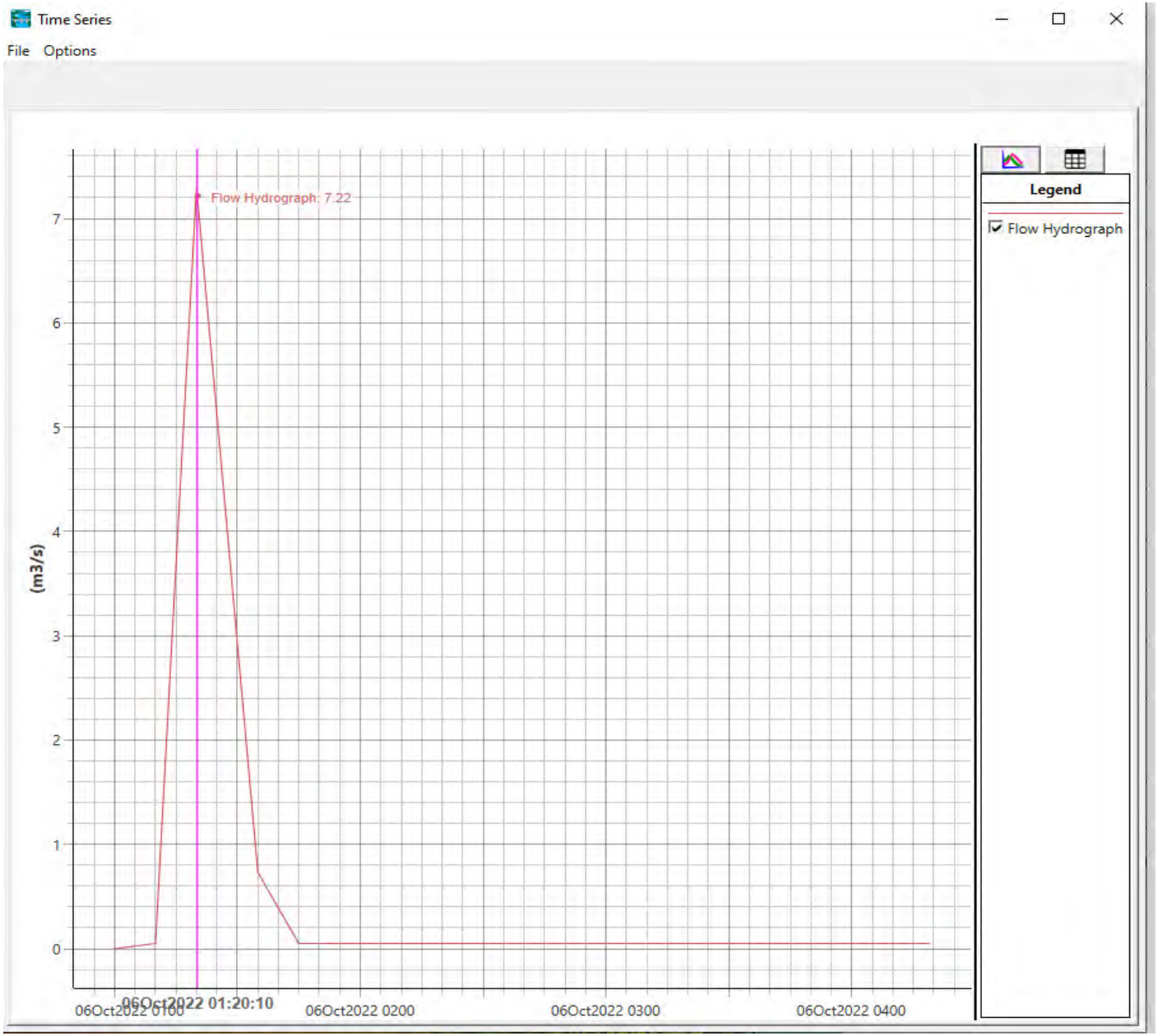
Rainfall depths (mm) :: RCP8.5 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	3.41	5.25	6.81	10.7	16.6	31.4	44.7	61.1	78.1	87	92.6	96.4
2	0.5	3.84	5.89	7.63	12	18.5	34.9	49.6	67.1	85.6	95.4	101	105
5	0.2	5.42	8.23	10.6	16.4	25.2	46.7	65.7	87.8	111	123	130	134
10	0.1	6.71	10.1	13	20	30.4	55.7	77.9	103	130	143	151	156
20	0.05	8.15	12.2	15.6	23.8	36	65.5	90.7	119	149	164	172	177
30	0.033	9.07	13.5	17.2	26.2	39.5	71.4	98.6	129	161	176	185	190
40	0.025	9.75	14.5	18.4	28	42	75.8	104	136	169	185	194	199
50	0.02	10.3	15.3	19.4	29.5	44.2	79.2	109	142	176	192	201	206
60	0.017	10.8	16	20.3	30.7	45.9	82.2	113	147	181	198	207	212
80	0.013	11.6	17.1	21.6	32.7	48.7	86.7	119	154	190	207	216	222
100	0.01	12.2	17.9	22.7	34.2	50.9	90.5	124	160	196	214	224	229
250	0.004	14.9	21.8	27.4	40.9	60.4	106	143	184	224	243	253	258

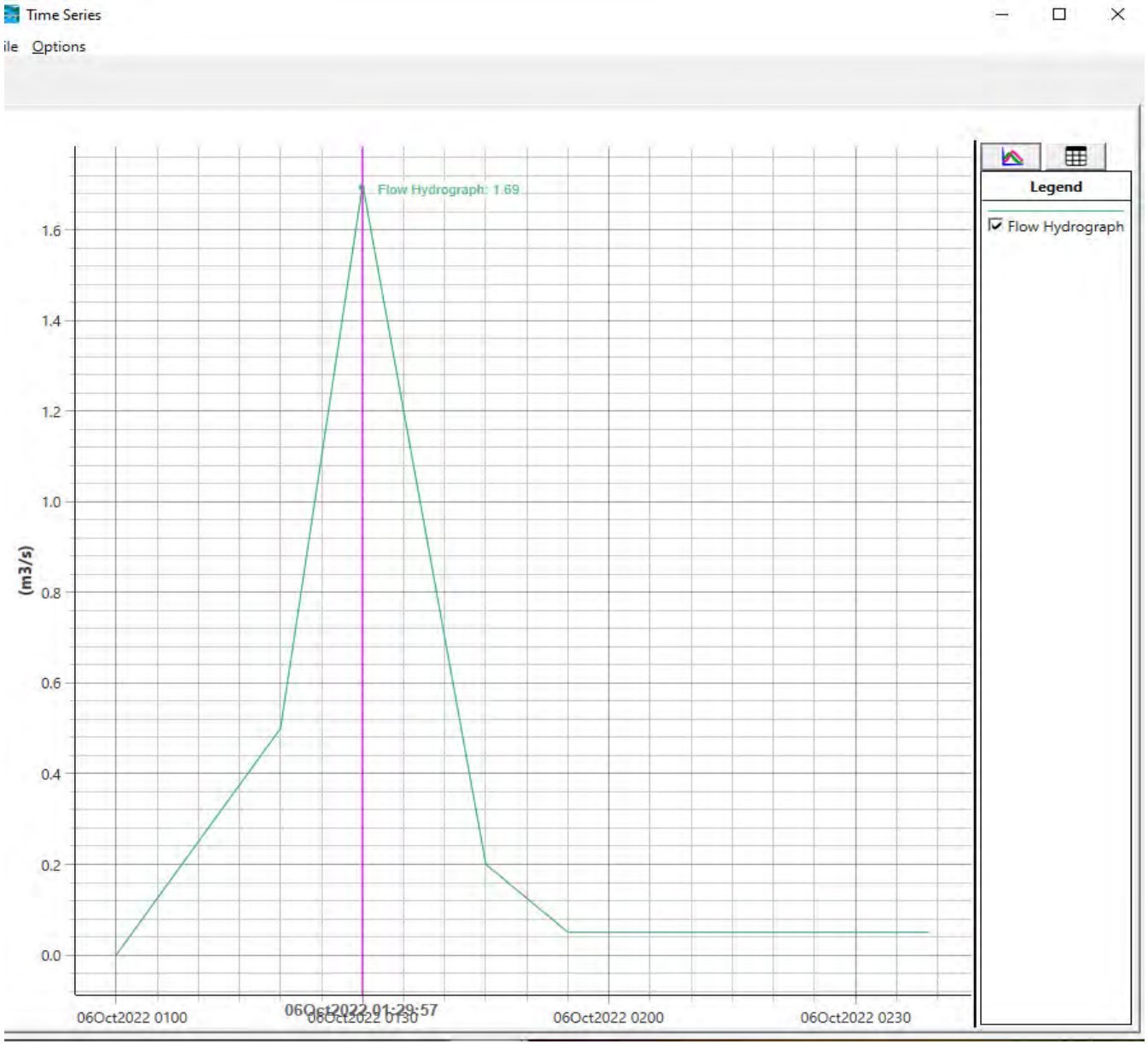
Rational Method - E1 Assessment of 500year Catatchment Discharges

Catchment	c = 0.45	A (ha)	Q_{100} (m^3/s)	Q_{500} (m^3/s)	dH	dL	Sa =	t_{c1} (E1 2.3.6)	t_{c2} (Ramser-Kirpich)	t_{c3} (US Soil Con)	tc (min)
0	0.45	160	14.64	22.0	859	2770	0.31	13.69	13.7	13.69	13.7
1	0.45	52	4.758	7.1	573	1800	0.32	9.73	9.7	9.72	10
2	0.45	12	1.098	1.6	171	716	0.24	5.34	5.3	5.34	10
3	0.45	8.7	0.79605	1.2	160	532	0.30	3.89	3.9	3.89	10

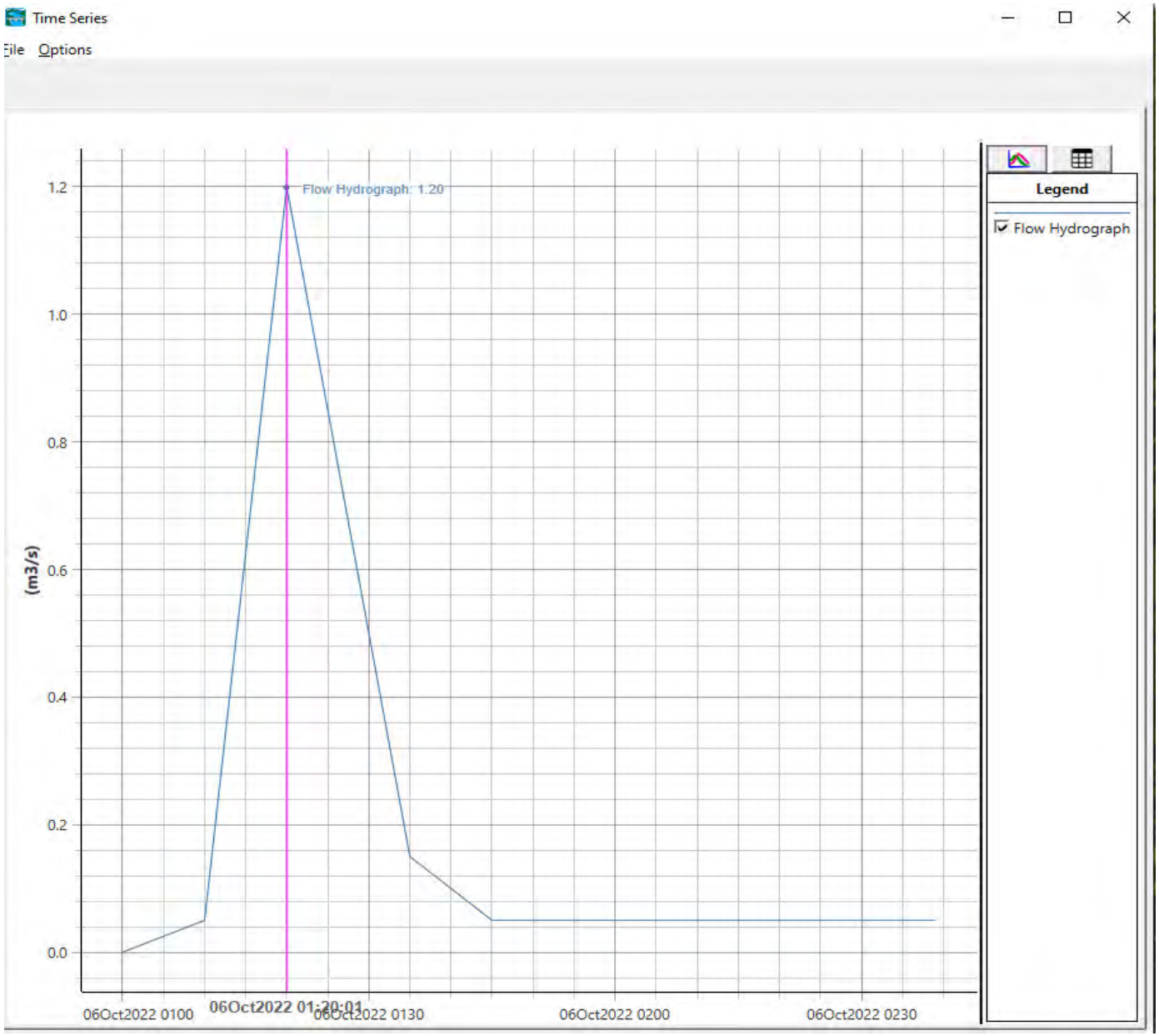
Catchment 1 - Discharge Plot



Catchment 2 - Discharge Plot



Catchment 3 - Discharge Plot



Tonkin and Taylor - Canterbury Flood Assessment 2017 - Review of Q500/Q100 for all catchments

Site no.	River and Site	Basin Area (km^2)	Method and frequency distribution		Flood estimates (ARI)								
					Mean annual	5 yr	10 yr	20 yr	50 yr	100 yr	200 yr	500 yr	1000 yr
2273	Hāpuku at SH1	128.5	Pooled, rainfall adj.	EV1	158	265	355	440	550	630	710	820	900
63201	Kowhai at Below Orange Grove	75	Pooled, rainfall adj.	EV1	93	155	210	260	320	370	420	480	530
163402	Kahutara at Railway Bridge	231.7	Pooled, rainfall adj.	EV1	161	270	360	450	560	645	730	840	920
95	Oaro at SH1	46.2	Pooled, rainfall adj.	EV1	47	80	105	130	165	190	210	250	270
906	Hanmer at Hanmer Road Bridge	109.2	Pooled, rainfall adj.	EV1	61	85	100	120	140	160	180	200	220
64622	Mason at D/S Lottery River confl.	205.3	Pooled, rainfall adj.	EV1	121	175	220	260	315	360	400	450	490
165122	Pāhau at U/S Hurunui Drain confl.	254	Pooled, rainfall adj.	EV1	108	160	200	245	295	335	375	425	465
65109	Hurunui South Branch at Esk Head	305	At Site	EV1	226	300	360	420	495	550	610	680	740
65101	Hurunui at SH1	2518	At Site	LP3	780	1100	1350	1650	1950	2250	2500	2850	3100
165105	Blythe at Napenape Road Bridge	57.3	Pooled, rainfall adj.	EV1	36	60	75	90	110	130	140	165	180
65904	Waipara at Teviotdale	716	At Site	EV1	206	340	440	540	680	770	870	1000	1100
1664395	Kōwai at SH1	180.8	Pooled, rainfall adj.	EV1	70	110	145	180	220	250	280	325	355
166405	Eyre at Trigpole Road ford	18.5	Pooled, rainfall adj.	EV1	15	22	27	32	40	45	50	55	60
66409	Cam at Young's road	43.8	Pooled, rainfall adj.	EV1	19	30	39	47	58	67	75	85	95
N/A	Ohoka at U/S Cust Main Drain	43	Pooled, rainfall adj.	EV1	18	28	35	45	55	60	70	80	90
68005	Hawkins at Willows	14.2	Pooled, rainfall adj.	EV1	9	17	24	30	40	45	50	60	65
68006	Hororata at Mitchells Road	97	Pooled, rainfall adj.	EV1	20	30	40	50	60	70	80	90	100

CRH Calculated Ratios:

Ratios

Q100/Qm	Q200/Qm	Q500/Qm	Q1000/Qm
4.0	4.5	5.2	5.7
4.0	4.5	5.2	5.7
4.0	4.5	5.2	5.7
4.0	4.5	5.3	5.7
2.6	3.0	3.3	3.6
3.0	3.3	3.7	4.0
3.1	3.5	3.9	4.3
2.4	2.7	3.0	3.3
2.9	3.2	3.7	4.0
3.6	3.9	4.6	5.0
3.7	4.2	4.9	5.3
3.6	4.0	4.6	5.1
3.0	3.3	3.7	4.0
3.5	3.9	4.5	5.0
3.3	3.9	4.4	5.0
5.0	5.6	6.7	7.2
3.5	4.0	4.5	5.0

Q500/Q100 Ratio Summary:

Stand Dev:	0.053
Min	1.2
Mean	1.3
Max	1.5

Q200/Q100	Q500/Q100	Q1000/Q100
1.1	1.3	1.4
1.1	1.3	1.4
1.1	1.3	1.4
1.1	1.3	1.4
1.1	1.3	1.4
1.1	1.3	1.4
1.1	1.3	1.4
1.1	1.2	1.3
1.1	1.3	1.4
1.1	1.3	1.4
1.1	1.3	1.4
1.1	1.3	1.4
1.1	1.2	1.3
1.1	1.3	1.4
1.2	1.3	1.5
1.1	1.3	1.4
1.1	1.3	1.4

1680108	Waianiwaniwa at Coal Track Rd	117.3	Pooled, rainfall adj.	EV1	36	60	75	90	110	130	140	165	180	3.6	3.9	4.6	5.0	1.1	1.3	1.4
67805	Halswell at Ryans Bridge	44.8	At Site	EV1	6	9	11	13	15	17	19	22	24	2.8	3.2	3.7	4.0	1.1	1.3	1.4
N/A	Woolshed Crk at Sth Ashburton confl.	49	Pooled, rainfall adj.	EV1	40	60	80	100	120	140	160	180	200	3.5	4.0	4.5	5.0	1.1	1.3	1.4
68806	Sth Ashburton at Mt Somers	539	At Site	TCEV	90	130	180	230	310	370	430	510	570	4.1	4.8	5.7	6.3	1.2	1.4	1.5
68805	Sth Ashburton at Valetta	656	Scaled from Mt Somers	TCEV	103	150	210	270	360	430	500	590	660	4.2	4.9	5.7	6.4	1.2	1.4	1.5
68801	Ashburton at SH1	1579	At Site	TCEV	300	390	540	680	850	1000	1150	1350	1450	3.3	3.8	4.5	4.8	1.2	1.4	1.5
69101	Hinds Sth Branch at Syphon	65.5	At Site	EV1	42	65	85	100	130	145	165	185	205	3.5	3.9	4.4	4.9	1.1	1.3	1.4
69104	Hinds at Mayfield	165	Pooled, rainfall adj.	EV1	74	125	165	200	250	290	330	375	415	3.9	4.5	5.1	5.6	1.1	1.3	1.4
69102	Hinds at Poplar Road	320	Pooled, rainfall adj.	EV1	135	225	300	370	460	525	595	685	750	3.9	4.4	5.1	5.6	1.1	1.3	1.4
69644	Hae Hae Te Moana at Glentohi	67.8	At Site	LP3	66	100	160	200	260	310	350	410	460	4.7	5.3	6.2	7.0	1.1	1.3	1.5
69645	Kakahu at Mulvihills	43.7	At Site	EV1	51	80	120	155	205	240	270	320	350	4.7	5.3	6.3	6.9	1.1	1.3	1.5
169623	Kakahu at Earl Rd	166.5	Pooled, rainfall adj.	EV1	115	230	325	415	530	620	710	820	910	5.4	6.2	7.1	7.9	1.1	1.3	1.5
69618	Opihi at Rockwood	406	At Site	TCEV	150	200	300	450	720	920	1120	1390	1600	6.1	7.5	9.3	10.7	1.2	1.5	1.7
69650	Opihi at Saleyards Bridge	1680	Scaled from SH1 site	EV1	416	730	1160	1700	2550	3210	3620	4350	4900	7.7	8.7	10.5	11.8	1.1	1.4	1.5
69607	Opihi at SH1	1744	At Site	EV1	426	750	1200	1750	2600	3300	3700	4500	5000	7.7	8.7	10.6	11.7	1.1	1.4	1.5
69635	Te Ana a Wai at Cave Picnic Grounds	486	At Site	TCEV	240	360	600	850	1150	1400	1600	1900	2150	5.8	6.7	7.9	9.0	1.1	1.4	1.5
69621	Rocky Gully at Rockburn	23	At Site	TCEV	17	25	45	60	85	105	120	145	165	6.2	7.1	8.5	9.7	1.1	1.4	1.6
70105	Pareora at Huts	425	At Site	TCEV	275	380	600	750	1000	1200	1450	1650	1850	4.4	5.3	6.0	6.7	1.2	1.4	1.5
70303	Otaio at Gorge	54	At Site	LP3	85	145	200	250	310	350	390	430	460	4.1	4.6	5.1	5.4	1.1	1.2	1.3
1865	Makikihi at SH1	98	Pooled, rainfall adj.	EV1	74	135	185	230	290	335	380	440	485	4.5	5.1	5.9	6.6	1.1	1.3	1.4
70703	Hook at Hook beach road	67	Pooled, rainfall adj.	EV1	53	95	130	165	205	240	270	310	345	4.5	5.1	5.8	6.5	1.1	1.3	1.4
70902	Waihao at McCullough's Bridge	488	At Site	EV1 - Biennial	315	500	750	950	1250	1450	1650	1950	2150	4.6	5.2	6.2	6.8	1.1	1.3	1.5
														#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!			

71117	Twizel River at Lake Poaka	121	At Site	EV1 Biennial	60	85	120	150	190	220	250	290	320	3.7	4.2	4.8	5.3	**1.1**	**1.3**	**1.5**
														#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!			
71136	Omarama at Wardells	281	Scaled from Omarama at Tara Hills using $A^{0.8}$	TCEV	26	35	65	95	130	160	175	220	245	6.2	6.7	8.5	9.4	**1.1**	**1.4**	**1.5**
														#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!			
														#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!			
71189	Omarama at/above Tara Hills	177	At Site	TCEV	18	25	45	65	90	110	120	150	170	6.1	6.7	8.3	9.4	**1.1**	**1.4**	**1.5**

McKerchar and Pearson Flood Flow Analysis

Project Number:					
Site:	Hawea Flat Road		RCP8.5/RCP0	1.35	
Date:	9.12.2022		Q500/Q100 =	1.5	
Client Name:	Dan Curley				
				Today	RCP8.5
A =	0.09	km²	Q100 =	0.252	0.341
$\bar{Q} / A_{0.866}$ =	0.75	From Fig 3.5	Q500=	0.377	0.511
q100 =	2.7	From Fig 4.9 Map			

McKerchar and Pearson (1989) Summary

Catchment	A (km²)	Q100	$Q_{100,2082\text{-}2100}$	$Q_{500,2082\text{-}2100}$
1	1.6	3.04	4.11	6.16
2	0.52	1.15	1.55	2.33
3	0.12	0.32	0.44	0.65
4	0.09	0.25	0.34	0.51

*Adjusted for climatechange RCP8.5 / RCP 0.0 rainfall = 1.35

**Adjusted vaule Q_{500}/Q_{100} = 1.5 (refer report)

*** Q/A^0.866 = 0.75

**** q100 = 2.7

Debris Flow Prediction

Catchment	Acatch (m^2)	Height (m)	Length (m)	Melton Ratio	Grade - Fan Distal End (^{o})	Comments
0	919607	765	2095	0.80	1.7	Bunding to Lot 2 and Lot 6 300393
1	531718	613	1667	0.84	1.7	NB Terrace at mid catchment height
2	117836	216	716	0.63	1.7	NB Terrace Step at mid Point
3	86910	159	530	0.54	1.7	NB Road catches debris flood material

Comment:

-Melton rations of > 0.6 are indicative of potential debris flow hazard at the site.

-Catchment 0 is limited from getting to the site due to bunding at Lot 2 DP 300393, and Lot 6 DP 300393 boundary

-Catchment 1, and 2 have terraces at intermediate heights (which would interfere or stop upper part of catchment from developing debris flows to site.

Catchment 3 is prevent from entering the site due to an effective storage estimated 3500 m^3 up stream of the road.

Max Runout Predictions L = 1.9*V^0.16*H^0.83 Model:

Assess Max Volume to create flooding at the site.

Pg 308 Debris Flow Book Reckenman 1999

Catch 0 Debris Volume	11381.4 m^3
Catch 1 Debris Volume	8608.7 m^3
Catch 2 Debris Volume	9795.3 m^3
Catch 3 Debris Volume	7324.3 m^3

Comment: These are significant debris volumes to get a runout length as specified in the equation (to meet the site boundary). In a event this large accumulation of gravels and debris would be visible on the fan surface (assumed), if it had occurred. Lobate deposits may be present at the fan head but not this far down the slope.

Evaluation of Fan Gradient and Melton Ratio for Catchments
Plot overlain on NZ Fan Context South Island (deScally, Owens 2004 Plot)
Figure 3.3 Below:

	Fan Gradient form 1m DEM		
	Fan Head	Fan Mid	Fan Distal
Catchment	Grade deg.	Grade deg.	Grade deg.
0	5	3.6	1.7
1	3.1	2.3	2
2	1.03		0.7
3	5.4		1.5

Final Column "Distal Fan" Plotted on Figure 3.3 Below

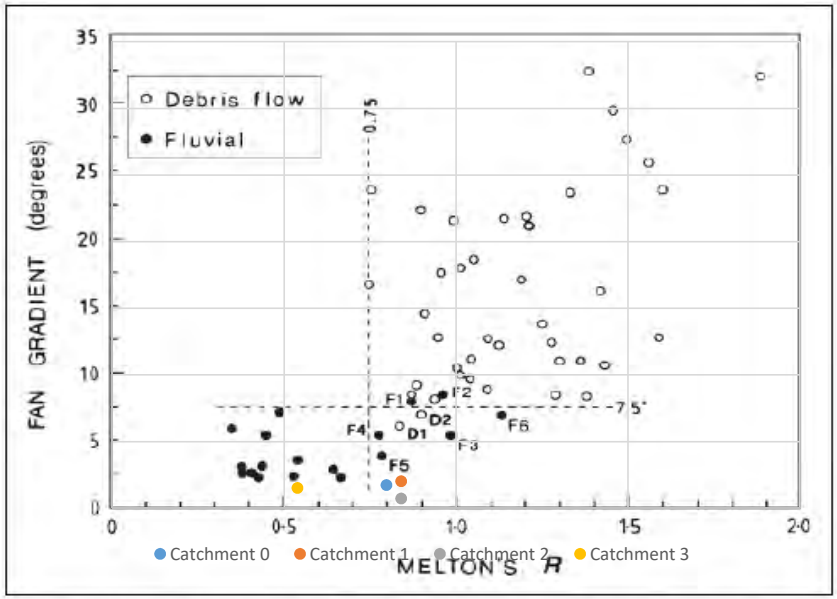


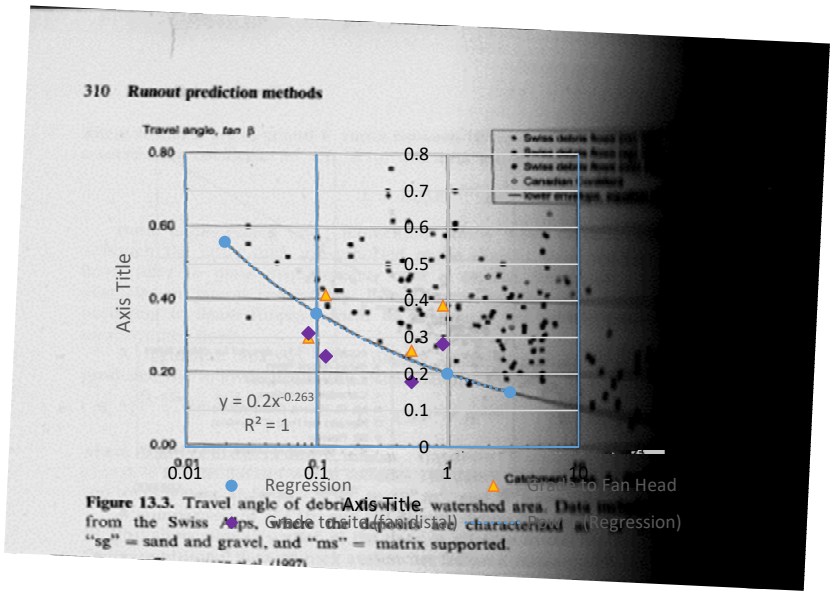
Figure 3.3: Plot of Melton's Ratio and Fan Gradient, showing thresholds used to distinguish debris-flow from fluvially dominated fans (and hence their contributing basins) in the Southern Alps of the South Island New Zealand (De Scally and Owens, 2004).

53

Evaluation of Runout Scenarios c.f. Swiss Alps Cases:

Debris Flow Prediction for Site		Fan Head				Fan Distal			
Catchment	Acatch (m²)	Height (m)	L (m)	H/L	Overall Grade atan(H/L)	Height (m)	L (m)	H/L	Grade to Fan Distal - Gradient
0	0.92	810	2095	0.39	21.14	890	3161	0.28	15.72
1	0.53	131	498	0.26	14.74	161	902	0.18	10.12
2	0.12	54	130	0.42	22.56	86	346	0.25	13.96
3	0.09	159	532	0.30	16.64	177	569	0.31	17.28

This is difficult to see, but I have overlaid the "Fan Head" (purple square) and "Fan Distal" (orange triagle) on Figure 13.3 below. This is a polt of debris flows runout distances for Swiss Alps Data (height/length - y axis) that have occurred compared to the catchment area (x axis). We see at the fan head that the majority of the values plot above the line indicating that the fan head are within "typical" runout distances.
The purple squares represent the site at the distal end. These show that the majority plot below the line, indicating that the site is outside the "typical" runout distances.
NB: only one plots above the line, this is catchment 0. - and runouts from this catchment would be prevented from entering the site by bunding upstream of the road.



Issue 1
July 20, 2022

River Ridge Subdivision

Infrastructure Feasibility Report

Prepared by: Civilised Ltd

Civilised Ltd

PO Box 1461
Queenstown
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River Ridge Subdivision

Infrastructure Feasibility Report

Report prepared For: Bluesure Developments Ltd

Report Prepared By: John McCartney
john@civilised.nz

Report Reference: QM044
2022-07-20 Infrastructure Report.docx

Date: 20th July 2022

Issue	Details	Date
1	Draft for comment	20th July 2020

Executive Summary

Bluesure Developments Ltd propose to create a five-lot subdivision on their land at 1172 Lake Hawea-Albert Town Road (State Highway 6) near Lake Hawea. Civilised Ltd have assessed the necessary development infrastructure in relation to:

- Wastewater disposal
- Stormwater runoff

We confirm that it is feasible to provide the necessary development infrastructure to service the proposed subdivision.

Wastewater can be treated and soaked to ground on site by way of a communal on-site wastewater treatment and disposal system. The suitability of the ground for receiving the wastewater flows has been confirmed following test pitting carried out on site.

Stormwater runoff from impervious areas constructed on the site will also be soaked to ground by use of roadside swales and specifically constructed soakage galleries.

Table of Contents

1 Introduction

Bluesure Developments Ltd have engaged Civilised Limited to investigate and report on the feasibility of providing utility services and the necessary development infrastructure for their proposed subdivision development on land at 1192 Lake Hawea – Albert Town Road, near Lake Hawea.

This report considers the nature of the proposed development, the site conditions affecting the implementation of the necessary development infrastructure and describes the proposed implementation of the following elements;

- Wastewater collection and disposal
- Stormwater control

The report is to supplement and support the planning submissions made on behalf of Bluesure Developments Ltd with regard to the application for consent to subdivide.

2 Description of Proposal

Bluesure Developments Ltd propose to subdivide their property at 1192 Lake Hawea – Albert Town Road, near Lake Hawea. The land is currently zoned Rural General Zone under the Queenstown Lakes District Council (QLDC) Operative District Plan and Rural under the QLDC Proposed District Plan. A total of five rural residential allotments are proposed, four with a dedicated Building Platform and the fifth balance lot has the existing house. An additional access allotment is also proposed. The allotments range in size as follows:

- Lot 1 – 1.7890 Ha – balance lot containing the existing house
- Lot 2 – 0.6700 Ha
- Lot 3 – 0.7180 Ha
- Lot 4 – 0.8850 Ha
- Lot 5 – 0.9710 Ha
- Lot 100 – 0.2010 Ha – Access allotment

The new building platforms on Lots 2 - 5 are to be created on relatively flat ground within each new allotment. The proposed new lots are intended for rural lifestyle development. A scheme plan showing the indicative layout of the proposed subdivision is contained in Appendix A.

We note that this assessment of the necessary development infrastructure is limited to consideration of the scale of the subdivision as it is currently proposed.

3 Site Description

The proposed development is located on terrain to the east of the Lake Hawea – Albert Town Road (State Highway 6). The site has frontage to Lake Hawea – Albert Town Road.

The site consists of paddocks currently used for stock grazing and steeper ground that drops towards Hawea River which runs adjacent to the site to the east. There is an existing curtilage area and associated landscaping around the existing dwelling (on proposed Lot 1).

Grades in the vicinity of the proposed new building platforms on Lots 2 – 5 can be described as flat to gently sloping.

The subject site of the development is contained within the following Certificate of Title:

- OT9C/457 (Sec 22 Blk III Lower Hawea SD) – 5.233 ha

The elevation of the proposed lot is approximately RL 350m above Mean Sea Level (MSL).

Generally, the land within the proposed new allotment area may be described as pasture and includes trees and brush.

During our site visits no evidence of large scale land instability was identified within the boundaries of the proposed rural development. The proposed development has been subject to geotechnical reporting by others.

The land receives approximately 700mm of rainfall per annum and may be subject to drought conditions during the summer months.

4 Wastewater Disposal

4.1 General

No community or Council scheme is available for connection near the subject site. It is not sustainable to remove waste from site therefore on-site wastewater disposal (OSWWD) must be examined.

The existing dwelling on proposed Lot 1 has an existing wastewater treatment and disposal system. No change to this system is proposed.

It can be shown that the development of Lots 2 – 5 may be advanced based on on-site wastewater disposal systems on a communal basis within Lot 1 or Lot 5. The feasibility of such a system is discussed below.

4.2 Site and Soil Assessment

A site and soil assessment has been undertaken and the report for this is included in Appendix B of this report. This assessment has been based on the guidelines of AS/NZS 1547:2012. The site and soil assessment was carried out by undertaking a site visit with a detailed walkover inspection along with the excavation of a series of test pits across the site. A copy of the test pit logs are included in the Insight Engineering report that accompanies the application to subdivide. A drawing showing the relevant site features is included in Appendix C.

The site and soil assessment notes that:

- Treatment system should be designed by a suitably qualified and experienced person.
- A secondary treatment system is required due to the soils and proximity to water courses nearby.
- At the time of design, consideration should be given to tertiary treatment to ensure pathogen removal.

4.3 Conclusions

Based on our investigations to date the soils on the site have sufficient capacity to facilitate the disposal of effluent to land via sub-soil soakage methods, however the presence of sensitive receivers (being groundwater and surface water bodies) requires that the effluent receive some form of treatment prior to discharge.

We confirm that based on our assessment of the likely loadings, on-site wastewater treatment and disposal systems may be designed to provide the necessary level of treatment such that the risk of causing significant adverse environmental effects is minimised.

For this particular development, given the size of the lots to be created and the proximity of water courses, it is recommended that the on-site sewage and disposal system would be a communal treatment and disposal system.

We confirm that a tank system, including both primary and secondary treatment elements, may be designed, implemented and maintained to ensure a “means of treating and disposing of sewage which is consistent with maintaining public health and avoids or mitigates adverse effects on the environment”, therefore satisfying council policy.

4.4 Recommendations

Given the proximity of water courses, both ephemeral and permanent, we believe it is appropriate and feasible to consider a communal system for this development.

It is expected that the detailed design of the communal system will be further assessed during the detailed design phase for the project.

A communal system that would provide sufficient renovation to effluent from on-site wastewater disposal for this development prior to discharge to land are summarised as follows;

4.4.1 Communal System

The communal lot system would comprise a septic tank to each lot with effluent from this tank pumped or drained under gravity to a communal secondary treatment system. Treated effluent from the treatment system would be pump dosed at a controlled daily rate to a disposal field of shallow depth. This system could be designed to provide sufficient treatment/renovation of effluent prior to discharge to land.

The final disposal of effluent into the soils underlying the site can be undertaken in two differing methods. Traditional disposal beds would allow for a smaller footprint. Shallow dripper irrigation will be larger but more straightforward to construct. Provision should be made at site planning stage for a minimum disposal field area of either:

- 125 m² and a reserve field area of 125 m² if traditional disposal beds are adopted; or
- 1,250 m² and a reserve field area of 1,250 m² if shallow dripper irrigation is adopted.

Disposal fields for such a system should be located so that separation distances from permanent and ephemeral watercourses, and water bores are maximised. As pump dosing of fields is required for adequate system performance, locating fields upslope of any treatment plant is not seen as an obstacle. A drawing showing possible locations for disposal areas within Lots 1 and 5 is included with this report in Appendix C.

To maintain high effluent quality, such a communal system would require the following;

- Specific design by a suitably qualified professional engineer.
- Resource consent from the Otago Regional Council for effluent disposal of a volume greater than 2,000 litres per day.
- A requirement that such a system achieves the levels of treatment determined by the specific design.
- A requirement that the system include a secondary treatment system.
- Regular inspection, monitoring and maintenance in accordance with the recommendations of the system designer.
- Intermittent effluent quality checks to ensure compliance with the system designers specification.
- Provision of either suitable separation distances or tertiary treatment to ensure pathogen removal from the treated effluent.
- Siting of disposal fields greater than 50m from any surface watercourse or water bore.

5 Stormwater Disposal

The intended access arrangements and the development of dwellings and associated buildings on the proposed building platforms on the site will alter the existing stormwater run-off patterns from the site catchment.

The proposed stormwater infrastructure on the site will comprise two primary elements as follows:

1) Roadside drainage swales to receive and dispose of the runoff from the proposed accesses for the building platforms on Lots 1 to 5.

2) Future soak pits to be constructed to drain runoff from buildings developed on the site.

The driveway swales will be used to convey stormwater flows either to the lower parts of the site and to provide soakage to allow runoff to drain to ground. Subject to detailed design, roadside drainage swales may include specifically constructed soak pits.

The future dwellings and any associated buildings will primarily reticulate roof runoff to water supply tanks. However, there will be various impermeable parts of the site that will need to direct runoff to specifically constructed soakage galleries to dispose of runoff. These areas will include paved areas and overflow provisions from water tanks to allow for rainwater runoff from rooves when the water storage tanks are full.

Subject to specific design in conjunction with the dwelling or associated building designs, the drainage of impermeable paved areas will be able to be drained to ground by the use of an appropriately design stormwater soak pit. Test pits that were excavated on site as part of the site geotechnical assessment confirm that ground conditions are suitable for stormwater disposal by soakage to ground.

It is expected that the requirement for future lot owners to construct soak pits in association with new dwellings on the lots will be included in a consent notice registered against the new titles.

6 Limitations

This report has been written for the particular brief to Civilised Ltd from their client and no responsibility is accepted for the use of the report for any other purpose, or in any other context or by any third party without prior review and agreement.

In addition, this report contains information and recommendations based on information obtained from a variety of methods and sources including inspection, sampling or testing at specific times and locations with limited site coverage and by third parties as outlined in this report. This report does not purport to completely describe all site characteristics and properties and it must be appreciated

that the actual conditions encountered throughout the site may vary, particularly where ground conditions and continuity have been inferred between test locations. If conditions at the site are subsequently found to differ significantly from those described and/or anticipated in this report, Civilised Ltd must be notified to advise and provide further interpretation.

Appendix A

Proposed Subdivision Drawing

Notes:
- Boundary information sourced from SO 18261.
- Adjoining boundaries sourced from LINZ XML.
- Levels in terms of OIT III SO 18261 @ 362.29m.
- Contours produced from QLDC Lidar 2019 1m x 1m.
- Contours = 1.0m/0.5m.
- Areas & dimensions subject to final LT Survey.
- See Record of Title OT9C/457 for details of any existing Easements, Consent Notices and Land Covenants.
- Some internal fences are scaled from aerial image.

iP solutions

Section 20

Approved Transit NZ Access Point (5034528.3)

Lot 100
0.2010Ha
Lot 100 hereon (Legal Access) to be held to four undivided one fourth shares by the owners of Lots 2 - 5 hereon as tenants in common in the said shares.

Lot 1
DP 300393

Lot 1
1.7890Ha

Water Race protected by Easement (H Transfer 819525)

Ex. Dwelling

Ex. Garage

Lake Hawea-Albert Town Road (SH 6)

Lot 2
0.6700Ha

20m setback

Building Platform
31.5m x 28.57m
(900m²)

Section 22
Block III Lower Hawea SD
5.2330Ha
OT9C/457

Lot 2
DP 25173

Approved Transit NZ Access Point (5034528.4)

Building Platform
33.33m x 22.5m
(750m²)

Lot 3
0.7180Ha

(pond)

Lot 5
0.9710Ha

Building Platform
34.5m x 26.09m
(900m²)

15m setback

Lot 4
0.8850Ha

Building Platform
33.33m x 22.5m
(750m²)

Lot 6
DP 26200

MEASURED LAND SURVEYS

Scheme Plan

Lots 1-5 & 100 being a Subdivision of Section 22 Block III Lower Hawea SD

(1172 Lake Hawea-Albert Town Road)

Client: Simon		COPYRIGHT© This drawing and parts thereof are copyright to Measured Land Surveys Limited and shall not be reused, copied or reproduced without the written permission of Measured Land Surveys Limited. CSNZ THE CONSULTING SURVEYORS OF NEW ZEALAND — A DIVISION OF THE NEW ZEALAND INSTITUTE OF SURVEYORS	
Scale: 1 : 1000 @ A3			Sheet: 1 of 1
Surveyed: ST 29/10/21	Drawn: ST 01/07/22	Datum: Lindis Peak 2000/NZVD 2016	Job #: 21111_S1 / Rev: A

Rev	Description	Date
A	ORIGINAL	01/07/22

Appendix B

Site and Soil Assessment

Onsite Wastewater Disposal Site & Soils Assessment

QUEENSTOWN LAKES DISTRICT COUNCIL

Use for Subdivision or Land Use Resource Consent

The design standard for waste water treatment and effluent disposal systems is AS/NZS 1547:2012. All references in this form relate to this standard.

Applications should provide sufficient information to demonstrate that all lots will be capable of accommodating an on-site system.

Site Description

Property Owner: Bluesure Developments Ltd

Location Address: 1172 Lake Hawea – Albert Town Road
State Highway 6
Lake Hawea

Legal Description (eg Lot3 DP1234) : Section 22 Block III Lower Hawea SD

List any existing consents related to waste disposal on the site: Nil

General description of development / source of waste water: Creation of four additional Rural residential allotments and new building platforms.

The number and size of the lots being created: Four new residential allotments - 0.67 ha to 0.971 ha

Site Assessment (refer to Tables R1 & R2 for setback distances to site features)

Land use: Farmland

Topography: Varies from flat to gently sloping in the area of the proposed building platforms. Steeper ground on east side of site.

Slope angle: Max: 0 to 1:5 approximately

Aspect: Generally northeast

Vegetation cover: Grass, some trees and scrub

Areas of potential ponding: Ephemeral pond – refer drawing

Ephemeral streams: Within the site – refer drawing

Drainage patterns and overland paths: Sheet flow leading to gullys and off site eventually draining to the Hawea River.

Flood potential (show with return period on site plan): Nil

Distance to nearest water body: > 150 m from disposal field

Water bores with 50m (reference ORC Maps): Nil (closest is ~220m and upslope of from disposal field)

Other Site Features: Nil

Slope stability assessment details – summarise any areas unsuitable for waste water irrigation. (Attach report if applicable): No slope stability issues noted on site.

(Highest potential) Depth to ground water:

Summer > 4m

Winter > 4m

Information Source Assessed given the test pit and topography

What is the potential for waste water to short circuit through permeable soils to surface and / or ground water?
With appropriate design and disposal field siting, potential for short circuiting will be minimal.

Soil Investigation (Appendix C)

Field investigation date: May 2021 by Insight Engineering

Number of test pit bores (C3.5.4): 8 test pits

Soil investigation addendum to be attached that includes a plan showing test pit or bore location, log results and photos of the site profile.

If fill material was encountered during the soil investigation state how this will impact on the waste water system:
No fill encountered on site.

Average depth of topsoil: 250mm

Indicative permeability (Appendix G) : > 1000 mm/day

Percolation test method (refer to B6 for applicability) : Assessed
(attach report if applicable)

Soil Category *(Table 5.1)*	Soil Texture *(Appendix E)*	Drainage	Tick One
1	Gravel and sands	Rapid	
2	Sandy loams	Free	
3	Loams	Good	✓
4	Clay loams	Moderate	
5	Light clays	Moderate to slow	
6	Medium to heavy clays	Slow	

Reasons for placing in stated category:
Site is underlain by either glacial till or fan deposits.
It is anticipated that disposal will be into soils overlying the glacial till layer.

Loading rate, DLR (Table L1): 40 mm/day

Explanation for proposed loading rate: This is a conservative design loading rate for secondary treated effluent draining into structured category 3 soils.

Recommendations from site and soils assessment

Specify any design constraints
Specify any areas unsuitable for location of the disposal field
Specify any unsuitable treatment and/or disposal systems
Propose suitable mitigation to enable successful effluent treatment

1) The estimated wastewater generation from the future dwellings is a total of 5,000 litres based on 1,000 litres per day per dwelling (based on five people at 200 litres per person per day).

2) The loading rate in the disposal trenches will be 40mm/day (or 4mm/day for drip irrigation).

3) The area of the disposal field for trenches or beds will be 125m².

4) The area of the disposal field for shallow drip irrigation will be 1,250 m².

Attachments Checklist

- [X] Copy of existing consents
- [✓] Soil investigation addendum — refer Insight Engineering report
- [✓] To scale site plan, the following must be included on the plan:
  - Buildings
  - Boundaries
  - Retaining Walls
  - Embankments
  - Water bodies
  - Flood potential
  - Other septic tanks / treatment systems
  - Water bores
  - Existing and proposed trees and shrubs
  - Direction of ground water flow
  - North arrow

Note that an Otago Regional Council (ORC) consent may also be required to discharge domestic waste water to land if any of the following apply:

- Daily discharge volume exceeds 2,000 litres per day
- Discharge will occur in a groundwater protection zone
- Discharge will occur within 50 metres of a surface water body (natural or manmade)
- Discharge will occur within 50 metres of an existing bore/well
- Discharge will result in a direct discharge into a drain/water ace/ground water
- Discharge may runoff onto another persons' property

If any of these apply then we recommend that you correspond with the ORC;

Otago Regional Council
"The Station" (upstairs)
Cnr. Camp and Shotover Streets
P O Box 958
Queenstown 9300

Tel: 03 442 5681

I believe to the best of my knowledge that the information provided in this assessment is true and complete. I have the necessary experience and qualifications as defined in Section 3.3 AS/NZS 1547:2012 to undertake this assessment in accordance with the requirements of AS/NZS 1547:2012:

Company: Civilised Limited

Email: john@civilised.nz

Phone number: 027 2233036

Name: John McCartney

Signature: 

Date: 20th July 2022

Queenstown Lakes District Council
Private Bag 50072
10 Gorge Road
QUEENSTOWN 9348

Phone: 03 441 0499
Fax: 03 442 4778
Email: services@qldc.govt.nz
Website: www.qldc.govt.nz

Appendix C

Wastewater Feasibility Drawings

REV	DATE	DESCRIPTION	APPROVED
A	20/07/2022	Initial Issue	JFM

CONSULTANT

Civilised Ltd

CIVILISED LTD
PO BOX 1461
QUEENSTOWN 9348

T: 027 223 3036
E: john@mccartneys.nz

JFM	20/07/2022
DESIGN	DATE
JFM	20/07/2022
DRAWN	DATE
JFM	20/07/2022
CHECKED	DATE

CLIENT

BLUESURE
DEVELOPMENTS
LIMITED

PROJECT/LOCATION

PROPOSED SUBDIVISION
RIVER RIDGE, LAKE HAWEA

CONTRACT NUMBER: -

SCALE (AT A3): 1:2,000

TITLE

WASTEWATER DISPOSAL FEASIBILITY
OVERALL AERIAL VIEW

DRAWING NUMBER: QM044-F-510

REVISION: A

REV	DATE	DESCRIPTION	APPROVED
A	20/07/2022	Initial Issue	JFM

CONSULTANT

Civilised Ltd

CIVILISED LTD
PO BOX 1461
QUEENSTOWN 9348

T: 027 223 3036
E: john@mccartneys.nz

JFM	20/07/2022
DESIGN	DATE
JFM	20/07/2022
DRAWN	DATE
JFM	20/07/2022
CHECKED	DATE

CLIENT

BLUESURE
DEVELOPMENTS
LIMITED

PROJECT/LOCATION

PROPOSED SUBDIVISION
RIVER RIDGE, LAKE HAWEA

CONTRACT NUMBER: -

SCALE (AT A3): 1:2,000

TITLE

WASTEWATER DISPOSAL FEASIBILITY
POSSIBLE DISPOSAL AREAS

DRAWING NUMBER: QM044-F-520

REVISION: A

Chorus New Zealand Limited

27 February 2023

Chorus reference: 10384953

Attention: Nicole Malpass

Quote: New Property Development

4 connections at 1172 Lake Hawea-Albert Town Road , Albert Town, Queenstown-Lakes District, 9382

Thank you for your enquiry about having Chorus network provided for the above development.

Chorus is pleased to advise that, as at the date of this letter, we are able to provide reticulation for this property development based upon the information that has been provided:

Copper network	$12,935.00

The total contribution we would require from you is **$14,875.25 (including GST)**. This fee is a contribution towards the overall cost that Chorus incurs to link your development to our network. This quote is valid for 90 days from 27 February 2023. This quote is conditional on you accepting a New Property Development Contract with us for the above development.

If you choose to have Chorus provide reticulation for your property development, please log back into your account and finalise your details. If there are any changes to the information you have supplied, please amend them online and a new quote will be generated. This quote is based on information given by you and any errors or omissions are your responsibility. We reserve the right to withdraw this quote and requote should we become aware of additional information that would impact the scope of this letter.

Once you would like to proceed with this quote and have confirmed all your details, we will provide you with the full New Property Development Contract, and upon confirmation you have accepted the terms and paid the required contribution, we will start on the design and then build.

For more information on what's involved in getting your development connected, visit our website www.chorus.co.nz/develop-with-chorus

Kind Regards

Chorus New Property Development Team

AURORA ENERGY LIMITED
PO Box 5140, Dunedin 9058
PH 0800 22 00 05
WEB www.auroraenergy.co.nz

27 February 2023

Nicole Malpass
IP Solutions

Sent via email only: nicole@ipsolutions.nz

Dear Nicole,

ELECTRICITY SUPPLY AVAILABILITY FOR A PROPOSED FIVE LOT SUBDIVISION.
1172 LAKE HAWEA – ALBERT TOWN ROAD, LAKE HAWEA. SECTION 22 BLOCK III LOWER HAWEA SD.

Thank you for your inquiry outlining the above proposed development.

Subject to technical, legal and commercial requirements, Aurora Energy can make a Point of Supply[1] (PoS) available for this development.

Disclaimer

This letter confirms that a PoS can be made available. This letter does not imply that a PoS is available now, or that Aurora Energy will make a PoS available at its cost.

Next Steps

To arrange an electricity connection to the Aurora Energy network, a connection application will be required. General and technical requirements for electricity connections are contained in Aurora Energy's Network Connection Standard. Connection application forms and the Network Connection Standard are available from www.auroraenergy.co.nz.

Yours sincerely

Niel Frear

CUSTOMER INITIATED WORKS MANAGER

[1] Point of Supply is defined in section 2(3) of the Electricity Act 1993.

Subject: FW: Riverridge - Utilising existing access point
Date: Monday, 27 February 2023 at 10:56:30 AM New Zealand Daylight Time
From: Dan Curley
To: Nicole Malpass
Attachments: image002.jpg, image003.jpg, image004.jpg, image005.jpg, Diagram E 1 of 2.pdf, Diagram E 2 of 2.pdf, image001.png

Dan Curley
Managing Director

5 Chalmers St, Wanaka 9305, New Zealand
P / +64 27 601 5074 | **E /** dan@ipsolutions.nz
W / www.ipsolutions.nz

From: Julie McMinn <Julie.McMinn@nzta.govt.nz>
Date: Tuesday, 31 May 2022 at 3:46 PM
To: Dan Curley <dan@ipsolutions.nz>
Subject: FW: Riverridge - Utilising existing access point

Hi Dan
I have some comment back from our Safety Engineer and Network Manager. As this has taken some time to come back, I wanted to update you prior to preparing suggested conditions, their conclusions were:

- For the southern access which we understand is proposed to service 4 rural living activities, which assume is 4 separate lots for 4 dwellings? It would be good to have this confirmed so we can accurately determine vehicle movements and the standard to which the access should be constructed to.
- From a safety perspective Waka Kotahi prefer not to have accesses directly opposite to one another as it can be a problem for through traffic if both accesses have vehicles turning at the same time. For this site the southern access will be almost opposite another access which has been widened to accommodate development on the western side of the highway.

Hence the recommendation is to shift the southern access approximately 100m north, clear of the seal widening on the other side of the road. At this point we are assuming the new access would be constructed to a Diagram E standard.

I will prepare our suggested conditions for you to consideration and send them on in a separate email. I have also attached the Diagram E requirements FYI.

Kind regards
Julie

Julie McMinn I Consultant Planner
Poutiaki Taiao I Environmental Planning

DDI 64 3 955 2926

E julie.mcminn@nzta.govt.nz / **w nzta.govt.nz**

Dunedin Office / AA Centre, 450 Moray Place,
PO Box 5245, Dunedin 9058, New Zealand

NOTE: I only work 9-3pm Monday -Thursday

From: Julie McMinn <Julie.McMinn@nzta.govt.nz>
Sent: Monday, 2 May 2022 9:14 AM
To: Environmental Planning <EnvironmentalPlanning@nzta.govt.nz>
Subject: FW: Riverridge - Utilising existing access point

Hi please set up in CAPS and return to me.

Thanks
Julie

Julie McMinn I Consultant Planner
Poutiaki Taiao I Environmental Planning

DDI 64 3 955 2926

E julie.mcminn@nzta.govt.nz / **w nzta.govt.nz**

Dunedin Office / AA Centre, 450 Moray Place,
PO Box 5245, Dunedin 9058, New Zealand

NOTE: I only work 9-3pm Monday -Thursday

From: Dan Curley <dan@ipsolutions.nz>
Sent: Thursday, 28 April 2022 4:41 PM
To: Julie McMinn <Julie.McMinn@nzta.govt.nz>
Cc: Nicole Malpass <Nicole@ipsolutions.nz>
Subject: Riverridge - Utilising existing access point

Hi Julie,

Hope you're well and having a good week.

We have a client wishing to utilise an existing crossing place at their property in Hawea. Our Client is Bluesure Development Ltd. We have not lodged a consent yet with Council.

The crossing place is detailed/marked on the attached plan. The southern most crossing (marked as 5034528.4) is where we would like to construct an entrance to NZTA standards, to service 4 rural living activities.

Obviously we would seek formal approval once the application is lodged with QLDC, but see respectfully request your consideration of utilising this crossing for 4 lots, once upgraded to NZTA standards.

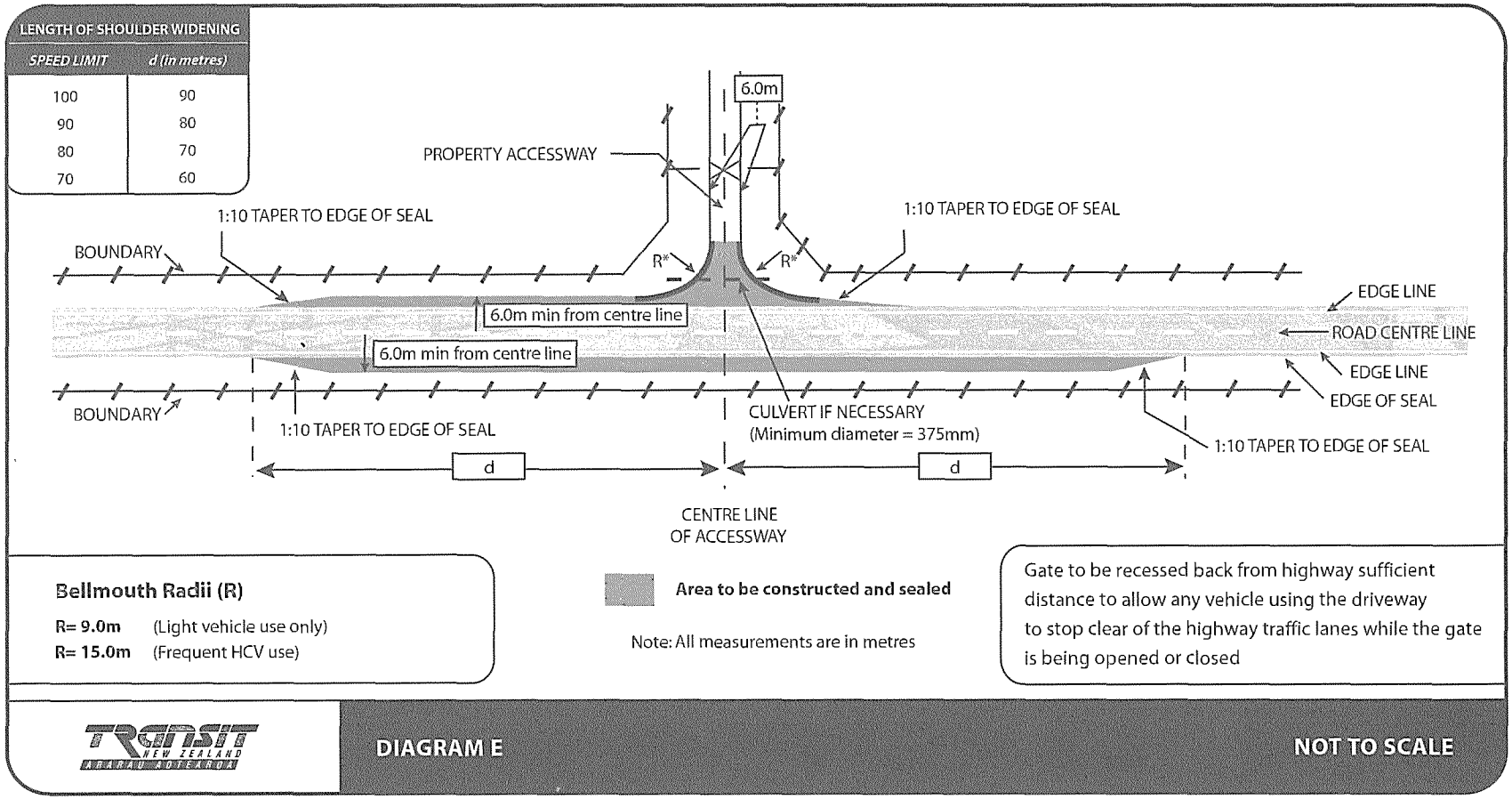
Please could you assess and report to me on NZTA's position on utilising this existing crossing point.

Thanks very much in advance,
Dan.

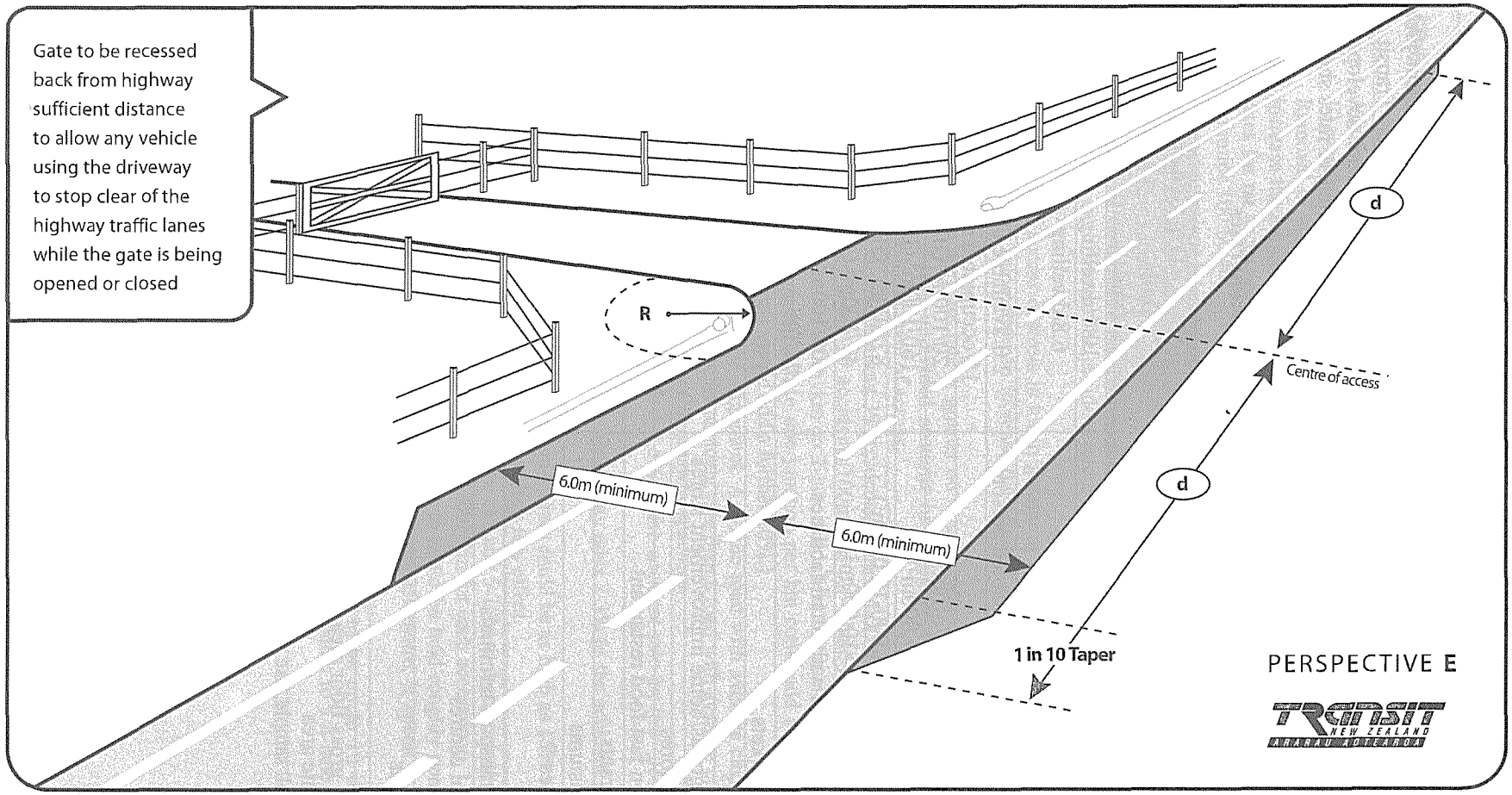
Dan Curley
Managing Director

15 Cliff Wilson St, Wanaka 9305, New Zealand
P / +64 27 601 5074 | **E /** dan@ipsolutions.nz
W / www.ipsolutions.nz

Refer to Table App5B/4 for when this accessway type should be applied



Refer to Table App5B/4 for when this accessway type should be applied



26 April 2023

Bluesure Developments Limited
c/- IP Solutions
5 Chalmers Street
Wanaka 9305

Re. Preliminary Environmental Site Investigation at 1172 Lake Hawea-Albert Town Road, Hawea

Our Reference: 22012_1

1 Introduction

Dan Curley of IP Solutions, on behalf of Bluesure Developments Limited, requested that JKCM Ltd, trading as Insight Engineering (IE), undertake a preliminary environmental site investigation (PSI) of 1172 Lake Hawea-Albert Town Road, Hawea (herein referred to as "the site") as outlined in our Short Form Agreement (reference P22012, fully executed on 22 March 2022).

Figure 1 (under Appendix 1) indicates the location of the site, which we understand is proposed to be developed for residential subdivision, development and use. The proposed development plans are provided in Appendix 2.

The purpose of this PSI was to assess the suitability of the site for residential subdivision, development and use, as required by the Resource Management (*National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health*) Regulations [1] (herein referred to as the NES). This investigation was undertaken in general accordance with the Ministry for the Environment (MfE) *Contaminated Land Management Guidelines No. 1: Reporting on Contaminated Sites in New Zealand* [2].

2 Objectives of the Investigation

The objective was to determine if potentially contaminating historical activities pose an unacceptable risk to human health during and post site development.

2.1 Approach

IE completed the following scope of work to satisfy the investigation objectives:

2.1.1 Review of Site Information

Several sources were contacted for information relating to the sites past and present uses and to identify any other environmental issues which may be on record. This consisted of:

- Undertaking a site walkover to describe current site conditions and assess whether any visual or olfactory evidence of contamination is present at the site;

- Interviewing a worker involved with managing the property, to obtain information relating to potentially contaminating activities that may have been undertaken at the site;
- Review of publicly available data describing the local geology and hydrogeology;
- Review of the Otago Regional Council Hazardous Activities, Industries and Bore Search database in terms of any property specific records of hazardous activities or industries that are held in their database of potentially contaminated sites;
- Reviewing the Queenstown Lakes District Council online property files to determine whether any records of contamination, or potentially contaminating activities, at the site are held in their database; and
- Reviewing publicly available historical aerial photographs and maps of the site and surrounding area;

3 Site Description

Site information is summarised in Table 1.

Table 1: Site Information

Location	1172 Lake Hawea-Albert Town Road, Hawea
Legal Description	Section 22 Block III Lower Hawea SD
Property Ownership	Bluesure Developments Limited
Current Site Use	Agricultural (pastoral grazing)
Proposed Site Use	Residential
Property Area	Approximately 52,330 m^2 (5.2 ha)
Territorial Authorities	Queenstown Lakes District Council (QLDC) Otago Regional Council (ORC)
Zoning	Rural

The site setting is summarised in Table 2.

Table 2: Site Setting

Topography	Moderate to minor slopes exist in localised areas in the western third of the site. Steeper slopes are located towards the east, where the ground surface drops to just above river level. A water race runs roughly north / south in the eastern third of the site. Remnant cuts through the slope are located in the south eastern portion of the site, where a historical road crossed the site from the south east to the centre west boundary. Surface water channels, which were dry during our walkover inspection, cross the site generally from the west towards the east. An erosion feature, associated with one of the channels, is located near to the south eastern corner of the site.

Table 2: Site Setting (cont.)

Local Setting	The site is located approximately 2.3 km west of the outskirts of Lake Hawea. The site is surrounded by forestry and agricultural properties towards the west and south west, recreational land (golf course) towards the south, recreational land (walking track) towards the east and a petrol station with an attached vehicle workshop and transport depot towards the north.
Nearest Surface Water & Use	The Hawea River, used for recreational purposes and as a source of water for hydro-power generation as well as private irrigation schemes, is located approximately 33 m towards the east in the northern portion of the site.
Geology	The GNS New Zealand Geology Webmap[3] indicates that the site is located within the "Late Pleistocene river deposits" geological unit of the Albert Town Advance described as '*Unweathered to slightly weathered, well sorted, sandy gravel forming large outwash terraces in Clutha catchment*'. The surface material observed over the majority of the site during the walkover is broadly described as light brown gravelly sand with minor silt.
Hydrogeology	According to a report completed by ORC[4], the site is located within the Hawea Basin Aquifer. "*Groundwater flow in the aquifer is driven by seepage from Lake Hawea alongside runoff and land surface recharge. The overall groundwater flow direction in the aquifer is to the southwest, with groundwater eventually discharging into the Clutha River, to which the aquifer is well connected.*"
Groundwater Abstractions [5]	The following current or historical groundwater abstraction consents were issued for properties located at, or within 250 m of, the site: • Consent number 1458 was issued in 1977 for Timsfield Farms Limited to 50,000 litres per hour (.5 cusec) from the Hawea River for irrigation, stockwater and household supply until 1 May 1998. The location of the consent is recorded on the north eastern corner of the site and was described as: "reserve (approximately 200m downstream of Lake Hawea Control Dam). The Consent was replaced by Consent number 98174 on an unspecified date, which allowed the taking of up to 50,000 litres per hour from Hawea River during times of low water levels in Creeks No 1 and No 2 for the purpose of irrigation, light industrial use and communal water supply for 14 properties.
Discharge Consents [5]	The following current or historical discharge consents were issued for properties located at, or within 250 m of the site: • Consent number 2006.C18 was issued in 2006 for Allied Petroleum to discharge stormwater, associated with an existing service station forecourt area, to land at 176 Lake Hawea-Albertown Road.

3.1 Current Site Conditions

Claude Midgley of IE completed a site walkover inspection on 16 May 2022. Observations made at that time are summarised in Table 3 and photographs are presented in Appendix 3.

Table 3: Current Site Conditions

Site description	A tree-lined driveway provides access from the north western corner to a dwelling and garage located near the centre of the northern third of the site. Two very old timber sheds were located approximately 20 m and 30 m south west of the dwelling. A relatively small timber shearing shed is located approximately 70 m south of the dwelling. The majority of the remainder of the site consists of fenced paddocks used to grow pasture for grazing sheep. Soil stockpiles were present along the majority of the western site boundary and these are understood to have been imported from a subdivision at 180 Capell Avenue in Lake Hawea.
Visible signs of contamination	• Anthropogenic waste and animal carcasses were observed in the erosion feature near to the south eastern corner of the site. • Metal drums, plastic and treated timber posts were observed beneath a cluster of bushes just west of the erosion feature.
Surface water appearance	Water in the race was clear but no flow was occurring as the inlet was sealed at the time of our inspection.
Current surrounding land use	Mixed agricultural, recreational and low density rural residential land is located towards the east, west and south. Commercial land is located toward the north.
Local sensitive environments	The Hawea River and the surrounding riparian zone, located east of the site, is considered a sensitive environment.
Visible signs of plant stress	No visible signs of plant stress were noted within the site boundaries.
Other	Lead based paint could potentially have been used on the two old timber sheds near to the existing dwelling. The timber boards of the sheds had minor amounts of remnant paint, which suggests that paint flakes could have accumulated around the base of each shed.

3.2 Interview with the Former Site Owner

Kevin Capell (*pers. comm.*), who owned the property between 1978 and 2021, provided the following information:

- Mr Capell's family owned the property since 1920.
- The majority of the property had been used as pastoral grazing for low numbers of livestock, including cows, horses and donkeys.
- Fertilisers were not applied to the site due to its low production value.
- Rabbits were controlled by shooting.
- The drums left in the bushes in the southern portion of the site were used to hold ash from the fireplace in the dwelling.
- The soil stockpiles along the western boundary are made up of spoil excavated from 180 Capell Avenue in Lake Hawea. That property was only used for grazing horses and donkeys, as well as a few cows in more recent years. Fertilisers were not used at that property.
- Mr Capell was not aware of any other activities that could have resulted in contamination impacts within the site boundary.

3.3 ORC Property Database

IE reviewed the ORC Hazardous Activities, Industries and Bore Search database[6] on 29 May 2022. The search confirmed that site is not currently on the ORC database. However the neighbouring property towards the north has been recorded on the database. Site number "HAIL.00067.01" is recorded as being a verified Hazardous Activities and Industries[7] (HAIL) site for a Category F4 (Motor vehicle workshops) and Category F7 (Service stations including retail or commercial refuelling facilities) activities. The area has not been investigated.

3.4 QLDC Property File

The property file[8] contained documents relating to the construction of the dwelling and garage, as well as installation of a wood burner between 1989 and 1999.

An application for the construction of an implement shed and helipad was made in 2006, however the application appears to have been on hold since that time without and further progress.

No information relevant to potential site contamination was contained in the property file.

No known preliminary or detailed site investigations could be found on the property file.

3.5 Review of Historical Aerial Photographs and Maps

Photographs in the Crown Collection[9] and Google Earth[10], as well as topomaps on the MapsPast[11] website, have been reviewed to obtain information on the past uses of the site. Aerial photographs taken between 1956 and 2016, as well as maps created between 1939 and 2009, have been reviewed. Table 4 summarises the features visible in each image.

Table 4: Historical Aerial Photographs

1929 [11]	The site is part of a larger block, labelled with "11" and "320,0,0", that extends further west and south of the current property boundaries. Three black lines, likely representing stormwater flow paths, cross the site from west to east and terminate at the Hawea River. A block just beyond the northern site boundary is labelled "Bridge Res. Gaz. 1882 p.195". No other significant features are visible on the map.
1939 [11]	No significant changes are visible, compared with the 1929 map.
1949 [11]	No significant changes are visible, compared with the 1939 map.
1955 [9]	A track crosses the southern third of the site from the south eastern corner to the centre west boundary. Some trees and bushes are scattered in the north eastern quarter of the site. In the surrounding land, a rectangular building is visible on the neighbouring property towards the north. A bridge crosses the Hawea River north of that property. No other significant features are visible at the site or in the surrounding land.
1956 [9]	Apart from a bridge being constructed across the Hawea River just south east of the south eastern corner of the site, there are no significant changes compared with the 1955 photograph.
1958 [9]	There are no significant changes compared with the 1956 photograph.
1964 [9]	The trees in the north eastern quarter of the site have grown significantly. The bridge located south east of the site has been removed and it appears that the track crossing the site is no longer used. A surface water / stormwater flow path in the southern portion of the site appears to have resulted in erosion of a part of the former track, near to the south eastern corner of the site. In the surrounding land, several new buildings are visible on the neighbouring property towards the north.

Table 4 (cont.): Historical Aerial Photographs

1964 (cont.) [9]	There are no other significant changes compared with the 1958 photograph.
1966 [9]	Apart from a water race being constructed along a roughly north / south axis in the eastern third of the site, no other significant changes are apparent at the site or in the surrounding area.
1968 [9]	There are no significant changes compared with the 1966 photograph.
1969 [11]	The site now only has one black line crossing from west to east and terminating at the Hawea River. A large tree-shaped symbol indicates the presence of trees near the centre of the site. A water race is marked with a blue line and “WR” in the eastern portion of the site. Four black squares, representing buildings, are present ion the property just north of the site. No other significant features are visible, compared with the 1949 map.
1974 [9]	There are no significant changes compared with the 1968 photograph.
1976 [9]	The majority of the trees in the north eastern quarter have been felled. Trees are still visible in the area where the track crossed the site in the southern third of the site, as well as near to the northern and north eastern boundaries.
1979 [11]	Apart from a track that crosses through the southern portion of the site from the south east to the centre west, there are no significant changes compared with the 1969 map.
1983 [9]	There are no significant changes compared with the 1976 photograph.
1984 [9]	Apart from a new light-coloured rectangular object near to the centre of the site, in a similar location to the shearing shed, no significant changes are apparent at the site or in the surrounding area.
1986 [9]	Apart from the removal of a few trees from the western site boundary, no significant changes are apparent at the site or in the surrounding area.
1989 [11]	There are no significant changes compared with the 1979 map.
1999 [11]	The track has been removed from the site and it has been replaced by a green polygon, potentially representing an area of bush. The neighbouring property towards the north now has only two black squares. No other significant changes are visible, compared with the 1989 map.
2003 [9]	A tree-lined driveway is visible from the north western corner of the site, to what appears to be a building platform. Most trees have been removed from the centre of the site. No other significant changes are apparent at the site or in the surrounding area.
2005 [9]	Buildings are visible in the location of the building platform that was visible in the 2003 photograph. Bushes / shrubs have covered the majority of the eastern half of the site. The hardfill surface of the neighbouring property towards the north has been extended across the boundary, onto the northern 35 m of the site. No other significant changes are visible, compared with the 2003 photograph.
2007 [10]	No significant changes are apparent at the site or in the surrounding area.
2009 [11]	The site contains two black squares, representing buildings, as well as a few green squares, representing trees. There are no other significant changes compared with the 1999 map.
2011 to 2019[10]	No significant changes are visible, compared with the 2007 photograph.
2019 [11]	There are no significant changes compared with the 2009 map.

Table 4 (cont.): Historical Aerial Photographs

2021 [10]	No significant changes are visible, compared with the 2019 photograph.

3.6 Summary of Identified Hazardous Activities and Industries

The following activities noted on the MfE Hazardous Activities and Industries List[7] (HAIL) have been identified during review of the site history:

Category A18 – Wood treatment or preservation including commercial use of anti-sapstain chemicals during milling, or bulk storage of timber outside.

This category is represented by a small stack of treated timber posts in the bushes west of the erosion feature near to the south eastern corner of the site. Minor impacts are considered likely to have occurred in very localised areas e.g. in the immediate surroundings of treated timber fence posts. This activity is not considered likely to result in significant risks to human health.

Category F8 – Transport depots or yards including areas used for refuelling or the bulk storage of hazardous substances.

This category is represented by the area near to the northern site boundary that was incorporated into the transport depot on the neighbouring property towards the north between 2007 and 2011. The risks to human health from this activity are considered likely to be minor.

Category G5 - Waste disposal to land (excluding where biosolids have been used as soil conditioners).

This category is represented by the small amounts of timber and metal waste disposed of in the bushes west of the erosion feature, as well as in the erosion feature near to the south eastern corner of the site. A few other waste objects (car tyres, metal and plastic objects, as well as disused chicken coups, were scattered across the site and are not considered likely to pose a significant risk to human health.

Category I - Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment.

This category is represented by the potential for lead paint to have been used on the sheds near to the dwelling. If the paint was lead based, impacts could be present within 500mm around the perimeter of the sheds.

According to Regulation 5 of the NES, the Regulations apply if a HAIL activity has been undertaken, or currently is being undertaken on the property.

4 Conceptual Site Model

A contamination conceptual site model, presented in Table 5, consists of three primary components to allow the potential for risk to be determined. These are:

- Source of contamination;
- Pathway to allow the contamination to mobilise; and
- Sensitive receptors which may be impacted by the contamination.

Table 5: Conceptual Site Model

Source	Pathway	Receptor
Heavy metals (treated timber, waste metal objects, potential lead paint)	Inhalation of dust Dermal absorption (direct contact) Ingestion of soil and / or produce grown in the soil	Maintenance / Excavation workers Site construction workers Future residents
Acceptable risk to human health?	Earthworks associated with land development, as well as future Residential use Acceptable under certain conditions: The potential risks to human health are not considered significant if the potentially impacted areas are covered with at least 0.5 m of cleanfill.	

5 Conclusions

Information obtained as part of this investigation (refer to Section 3) indicates that the site has been used for grazing of livestock and for residential purposes.

Evidence of four HAIL activities was found on the site (refer to Section 3.6) and minor impacts from those activities are considered likely to have occurred in localised areas (refer to Figure 1).

Soil has been imported to the site from a nearby property (180 Capell Avenue) in Lake Hawea township. Information obtained from the site owner about the use of that property indicates that contamination impacts are highly unlikely. Furthermore, we understand that the soil will be used to form bunds along the western property boundary and it is considered highly unlikely that there will be a risk to human health from the presence of the soil in that part of the site.

Based on the current contamination status of the site, given the potential sources identified, it is considered highly unlikely that there will be a risk to human health if the site is subdivided, developed and used for residential purposes as long as the potentially impacted areas are either covered with at least 0.5 m of cleanfill, or if the material is disposed of off-site.

6 Recommendations

It is recommended that subdivision, development and use of the land for residential purposes be allowed as a Permitted Activity under the NES[1], because the requirements of Regulation 8(4) have been met.

It is noted that the proposed subdivision and development requires earthworks that exceed the Permitted Activity volumes provided under Regulation 8(3) of the NES. Regardless of the volume, it is recommended that the earthworks are allowed as a Discretionary Activity under Regulation 11 of the NES due to the low likelihood of contamination impacts resulting in risks to worker health. Evidence of disposal to a suitable facility with appropriate consents to accept soil containing anthropogenic waste should be required as a Condition of Consent, if off-site disposal of impacted material is required.

If any material that shows signs of significant contamination (visual or olfactory indicators such as chemical odours or abnormal stains) is unearthed in other parts of the site during the development,

work should stop immediately and a suitably qualified environmental practitioner should be engaged to assess the risk to human health prior to recommencing earthworks.

7 References

1. Ministry for the Environment 2012: Users' Guide National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health
2. Ministry for the Environment 2021: Contaminated Land Management Guidelines No.1: Reporting on Contaminated Sites in New Zealand
3. GNS Webmap Institute of Geological and Nuclear Sciences 2013: 1:250,000 Geology. Viewed at: http://data.gns.cri.nz/geology/
4. Otago Regional Council 2021: State of the Environment Groundwater Quality in Otago.
5. Otago Regional Council 2022: Otago Regional Council Resource Consent Database. Viewed at: http://data.orc.govt.nz/
6. Otago Regional Council 2022: Mapping Resource Hazardous Activities, Industries and Bores Search. Viewed at: https://maps.orc.govt.nz/portal/apps/MapSeries/index.html?appid=052ba04547d74dc4bf070e8d97fd6819
7. Ministry for the Environment 2011: Ministry for the Environment Hazardous Activities and Industries List.
8. Queenstown Lakes District Council 2022: eDocs Portal. Viewed at: http://edocs.qldc.govt.nz/
9. Local Government Geospatial Alliance 2022: Retrolens - Historical Image Resource Project. Viewed at: http://retrolens.nz
10. Google Earth v7.3.4.8573. Lake Hawea, Central Otago, New Zealand. -44.614320° lon, 169.248354° lat, Eye alt 493 m. DigitalGlobe 2022. http://www.earth.google.com. [May 2022]
11. Mapspast 2022: Current and Historical Topographic Maps (Topomaps) of New Zealand. Viewed at: http://www.mapspast.org.nz/

8 Limitations

i. We have prepared this report in accordance with the brief as provided. This report has been prepared for the use of our clients, Bluesure Developments Limited, their professional advisers and the relevant Territorial Authorities in relation to the specified project brief described in this report. No liability is accepted for the use of any part of the report for any other purpose or by any other person or entity.

ii. The recommendations in this report are based on the ground conditions indicated from published sources, site assessments and subsurface investigations described in this report based on accepted normal methods of site investigations. Only a limited amount of information has been collected to meet the specific financial and technical requirements of the client's brief and this report does not purport to completely describe all the site characteristics and properties. The nature and continuity of the ground between test locations has been inferred using experience and judgement and it should be appreciated that actual conditions could vary from the assumed model.

iii. Subsurface conditions relevant to construction works should be assessed by contractors who can make their own interpretation of the factual data provided. They should perform any additional tests as necessary for their own purposes.

iv. This Limitation should be read in conjunction with the IPENZ/ACENZ Standard Terms of Engagement.

v. This report is not to be reproduced either wholly or in part without our prior written permission.

We trust that this information meets your current requirements. Please do not hesitate to contact the undersigned on 021 556 549 if you require any further information. The author is a Certified Environmental Practitioners (CEnvP) under the Environment Institute of Australia and New Zealand (EIANZ) accreditation system.

Report prepared by

Claude Midgley, CEnvP

Associate Environmental Scientist

APPENDIX 1

Figures

Description	Site Location	**Figure Number**	1
Project	Preliminary Site Investigation 1172 Lake Hawea-Albert Town, Lake Hawea	**Date**	Jun-22
Client	Bluesure Developments Limited	**Drawn by**	CM
Project Number	22012_1	**Approved by**	JK

APPENDIX 2

Proposed Subdivision Scheme Plan

Notes:
- Boundary information sourced from SO 18261.
- Adjoining boundaries sourced from LINZ XML.
- Levels in terms of OIT III SO 18261 @ 362.29m.
- Contours produced from QLDC Lidar 2019 1m x 1m.
- Contours = 1.0m/0.2m.
- Areas & dimensions subject to final LT Survey.
- See Record of Title OT9C/457 for details of any existing Easements, Consent Notices and Land Covenants.
- Some internal fences are scaled from aerial image.

iP solutions

Section 20

Approved Transit NZ Access Point (5034528.3)

89°58'00" 110.70

23°19'40" 11.89

163°29'10" 55.68

186°10'40" 42.65

Lot 100
0.2010Ha
Lot 100 hereon (Legal Access) to be held to four undivided one fourth shares by the owners of Lots 2 - 5 hereon as tenants in common in the said shares.

Lot 1
1.7890Ha

Lot 1
DP 300393

Existing Bunding

Water Race protected by Easement (H Transfer 819525)

Ex. Dwelling

Ex. Garage

Lake Hawea-Albert Town Road (SH 6)

12

Existing Bunding

20m setback

Lot 2
0.6700Ha

GL 346.85m

25.0

GL 345.90m

13.9

Building Platform
31.5m x 28.57m
(900m²)

GL 348.25m

23°20'50" (301.95)

240°34'20" 41.32

GL 347.30m

192°56'00" 36.54

Section 22
Block III Lower Hawea SD
5.2330Ha
OT9C/457

Lot 2
DP 25173

11.9

GL 344.75m

GL 343.80m

60°22'00" 66.65

Building Platform
33.33m x 22.5m
(750m²)

Lot 3
0.7180Ha

GL 344.90m

GL 344.35m

10.0

99°28'40" 58.16

182°09'40" (193.12)

Approved Transit NZ Access Point (5034528.4)

Existing Bunding

Lot 5
0.9710Ha

39.2

22.9

GL 348.70m

GL 347.60m

(pond)

GL 344.75m

GL 342.20m

Building Platform
34.5m x 26.09m
(900m²)

17.8

Building Platform
33.33m x 22.5m
(750m²)

Lot 4
0.8850Ha

Re-directed flowpath

GL 345.00m

GL 343.55m

Existing Bunding

GL 349.20m

248°59'00" 69.26

GL 347.95m

124°55'00" 43.83

28°01'00" 38.16

122°49'00" 62.62

25.0

15m setback

270°08'10" (238.95)

Lot 6
DP 26200

MEASURED LAND SURVEYS

Scheme Plan

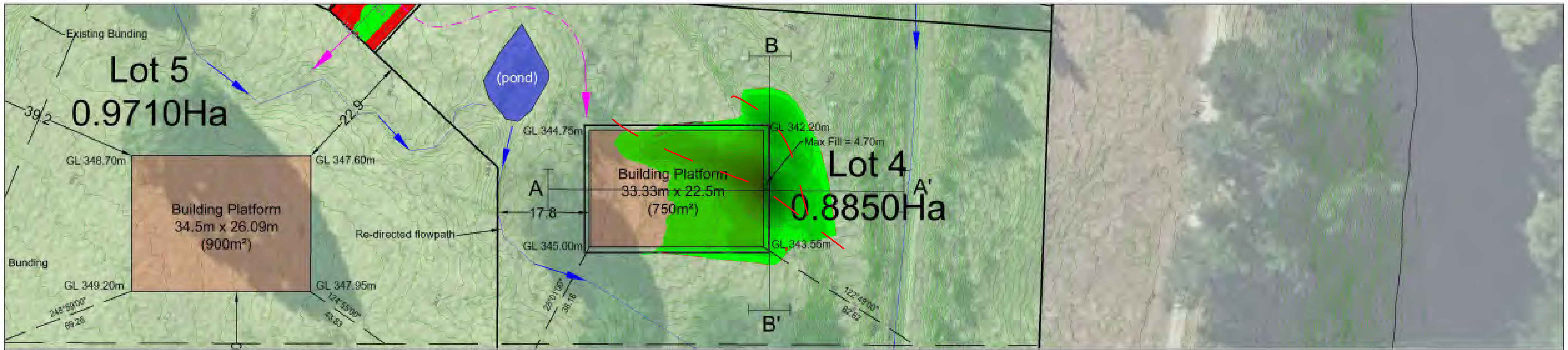
Lots 1-5 & 100 being a Subdivision of Section 22 Block III Lower Hawea SD

(1172 Lake Hawea-Albert Town Road)

Client:	Simon
Scale:	1 : 1000 @ A3
Surveyed:	ST 29/10/21
Drawn:	ST 01/09/22
Datum:	Lindis Peak 2000/NZVD 2016
Job #:	21111_S1
Rev:	B
Sheet:	1 of 1

CSNZ THE CONSULTING SURVEYORS OF NEW ZEALAND
A DIVISION OF THE NEW ZEALAND INSTITUTE OF SURVEYORS

Rev	Description	Date
A	ORIGINAL	01/09/22
B	Contour update	31/01/23



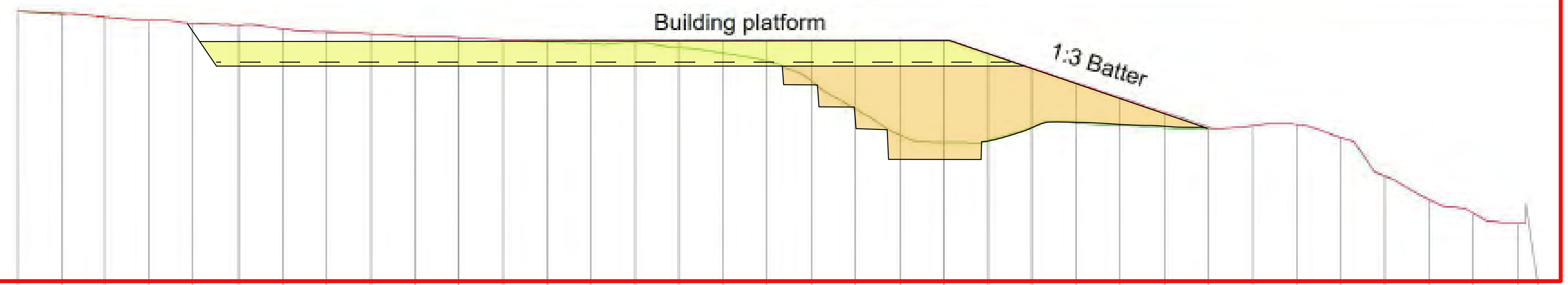
Key:

AP65 or AP40 Surface Fill

AP100 Bulk Fill

Geogrid reinforcement
(Triax 160 or biaxial geogrid)

See next page for Notes.



DATUM R.L.332.00

EXISTING GROUND	345.74	345.60	345.47	345.31	345.20	345.11	344.93	344.80	344.72	344.60	344.55	344.45	344.35	344.26	344.32	344.09	343.84	343.46	342.59	341.32	340.13	339.79	339.87	340.48	340.69	340.56	340.46	340.43	340.55	340.60	340.01	338.25	337.21	336.60	336.14	336.13
+ FILL DEPTH - CUT DEPTH	0.00	0.03	0.01	0.00	-0.00	0.00	0.00	-0.00	0.00	0.01	-0.01	-0.00	0.05	0.14	0.08	0.31	0.56	0.94	1.81	3.08	4.27	4.61	3.95	2.67	1.80	1.26	0.69	0.06	0.00	0.00	0.00	0.01	-0.01	0.00	0.00	0.00
FINISHED LEVEL	345.74	345.63	345.48	345.32	345.19	345.11	344.93	344.80	344.72	344.61	344.55	344.45	344.40	344.40	344.40	344.40	344.40	344.40	344.40	344.40	344.40	344.40	343.82	343.15	342.48	341.82	341.15	340.49	340.55	340.61	340.01	338.27	337.21	336.60	336.14	336.13
CHAINAGE	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00	24.00	26.00	28.00	30.00	32.00	34.00	36.00	38.00	40.00	42.00	44.00	46.00	48.00	50.00	52.00	54.00	56.00	58.00	60.00	62.00	64.00	66.00	68.00	68.38

Description	Lot 4 Building Platform Design Proole A-A' (Not to scale, for information only)	**Revision**	0
Project	1172 Lake Hawea-Albert Town Road, Lake Hawea	**Date drawn**	19/04/22
Client	Bluesure Developments Ltd c/- IP Solutions Ltd	**Drawn by**	JK
Reference Number	22018_2	**Approved by**	CM

APPENDIX 3

Site Photographs

Photo 1: Panoramic view of the site, viewed from the north eastern corner facing west.

Photo 2: North eastern portion of the site, viewed from the north facing south.

Photo 3: South western portion of the site, viewed from the south facing north.

Photo 4: Stormwater pond in the southern portion of the site, viewed from the north facing south.

Description	Site Photographs	**Photos**	1 to 4
Project	Preliminary Site Investigation 1172 Lake Hawea-Albert Town, Lake Hawea	**Date Taken**	16/05/22
Client	Bluesure Developments Limited	**Taken by**	CM
Project Number	22012_1	**Approved by**	JK

Photo 5: Old sheds near to the dwelling, viewed from the west facing south east.

Photo 6: Paint flakes on one of the old sheds near to the dwelling.

Photo 7: Shearing shed near to the centre of the site.

Photo 8: Old chicken coups south of the dwelling.

Photo 9: Stockpiles of imported soil along the western site boundary, viewed from the site facing north.

Photo 10: Stockpiles of imported soil along the western site boundary, viewed from the site facing north.

Description	Site Photographs	**Photos**	5 to 10
Project	Preliminary Site Investigation 1172 Lake Hawea-Albert Town, Lake Hawea	**Date Taken**	16/05/22
Client	Bluesure Developments Limited	**Taken by**	CM
Project Number	22012_1	**Approved by**	JK

Photo 11: North eastern site boundary, showing land that was used as part of the transport depot.

Photo 12: South eastern portion of the site, viewed from the south facing north.

Photo 13: Terrace edge in the eastern third of the site, viewed from the south facing north.

Photo 14: Stormwater flow pathways in the western portion of the site.

Photo 15: Waste metal object in the eastern portion of the site.

Photo 16: Treated timber posts in the bushes west of the erosion feature.

Description	Site Photographs	**Photos**	11 to 16
Project	Preliminary Site Investigation 1172 Lake Hawea-Albert Town, Lake Hawea	**Date Taken**	03/06/21
Client	Bluesure Developments Limited	**Taken by**	CM
Project Number	22012_1	**Approved by**	JK

Photo 17: Waste disposal within the erosion feature.

Photo 18: Waste disposal within the erosion feature.

Photo 19: Waste disposal in the bushes west of the the erosion feature.

Photo 20: Waste disposal in the bushes west of the the erosion feature.

Photo 21: Waste disposal in the bushes west of the the erosion feature.

Photo 22: Waste disposal in the bushes west of the the erosion feature.

Description	Site Photographs	**Photos**	17 to 22
Project	Preliminary Site Investigation 1172 Lake Hawea-Albert Town, Lake Hawea	**Date Taken**	03/06/21
Client	Bluesure Developments Limited	**Taken by**	CM
Project Number	22012_1	**Approved by**	JK

Environmental Management Plan (Rev A)

Bluesure Developments Limited

May 2023

Document Control	
Title	Bluesure Developments Limited - Environmental Management Plan
Address	1172 Lake Hawea – Albert Town Road
Consent Number	TBC
Client	Bluesure Developments Limited
Our Reference	23057
Prepared by	 **Tom Grandiek** (BAppSc, CEnvP) Senior Environmental Consultant 

Document Control			
Revision	Revision Date	Revision Details	Prepared by
A	11/05/2023	Prepared for client	TG

Table of Contents

Appendices	
Appendix 1	Erosion and Sediment Control Plan Drawings
Appendix 2	Calculations for Erosion and Sediment Controls
Appendix 3	Environmental Induction Handout
Appendix 4	Environmental Induction Register
Appendix 5	Weekly Environmental Inspection Form
Appendix 6	Environmental Incident Report
Appendix 7	Complaints Register
Appendix 8	Environmental Non-Conformance Register
Appendix 9	Water Quality Monitoring Results Form
Appendix 10	Archaeological Discovery Protocol

Disclaimer

Enviroscope has exercised due skill, care, and attention in preparing this EMP on the basis of their understanding of the subject site through their own site visits as well as information provided by the client and its consultants. Enviroscope has no control over the physical actions, detailed design, equipment, services, and methodologies undertaken by the client or other third parties tasked with implementing Enviroscope's instructions or recommendations. Enviroscope does not accept any responsibility for any environmental incidents or other defects of control measures if there is any departure or variance from the measures detailed in this EMP and any supporting documentation.

Emergency Contacts

Contact made with any of the following shall be undertaken with due consultation of the Environmental Representative or Project Manager.

Element	Emergency Contact	Details
Pollution incident	Otago Regional Council (ORC) Spill Hotline	0800 800 033 compliance@orc.govt.nz
Environmental complaint	Environmental Representative	TBC upon appointment of contractor.
Discovery of contaminated land	Environmental Representative	
Unexpected heritage finds	Environmental Representative	
Human remains	New Zealand Police	111
Fire including bushfire	Fire and Emergency New Zealand (FENZ)	111
Public utilities	Queenstown Lakes District Council (QLDC)	(03) 441 0499 rcmonitoring@qldc.govt.nz
Internal contacts	Project Manager	Dan Curly IP Solutions 027 601 5074
Internal contacts	Environmental Consultant	Tom Grandiek Enviroscope 027 2633 113

1.0 INTRODUCTION

1.1 Purpose and Scope

On behalf of Bluesure Developments Limited, Enviroscope has prepared this Environmental Management Plan (EMP) for earthworks relating to the formation of an access and building platform part of a five-lot sub-division at 1172 Lake Hawea – Albert Town Road. This EMP aims to reduce the effects of the project's construction activities on the environment and sensitive receptors.

This EMP is prepared according to the Queenstown Lakes District Council (QLDC) *QLDC Guidelines for Environmental Management Plans*, *June 2019* (EMP Guidelines). It is considered to have a 'Medium' environmental risk level as per the risk categories outlined in the EMP Guidelines.

This document will also ensure that the project aligns with the objectives and policies of the Otago Regional Council's (ORC) Plan Change 8, specifically Topic 7: Part G: Sediment from earthworks for residential development.

The purpose of this EMP is to be an effective and practical reference manual for construction personnel that applies to all project activities during the construction phase and includes the following:

- Strategies to manage environmental aspects and risks, based on associated best practice.
- Provides for contingency planning.
- Provides a framework for monitoring, reporting, review and continual improvement.
- Defines roles and responsibilities.
- Procedures to investigate and resolve environmental non-conformances and initiate corrective and preventative actions.

An overview of the project and sequencing can be found in the construction methodology at Section 2.0.

1.2 Site Overview

The site is formally addressed as 1172 Lake Hawea – Albert Town Road. (State Highway 6) is located along the western site boundary, a fuel station is adjacent to the northern site boundary and the Lake Hawea Golf Club towards the south. The site can be considered significantly modified with an existing dwelling located in the northern area of the site, with farm accessory sheds located throughout the property. The remainder of the site is utilised for agricultural grazing with exotic grasses and mature exotic trees the dominant vegetative covers.

The site is generally flat in nature with some undulating features. The majority of the property lies on an elevated river terrace, before sloping down the Hawea River to the east.

This is shown in **Figure 1** below.

Figure 1: Location of the site (Source: QLDC GIS)

1.2.1 Soils and Geotechnical Summary

A geotechnical report has been prepared by Jana Kruyshaar of Insight Engineering dated 8th June 2022 which details site investigations and reports on the geotechnical conditions. The report notes that "test pits were terminated in native deposits at depths ranging between 0.7 m and 2.3 m. Under the topsoil, we generally encountered variable soil comprising unsorted, angular to subrounded schist gravel, cobbles and boulders in a sandy silt matrix. Neither groundwater nor bedrock was encountered in any of the test pits".

"The site is positioned on a relatively flat terrace of outwash/till deposits, and consistent with the elevation across the river. From the information presented herein, we consider that the site subsoils are likely glacial till or near moraine outwash in origin".

Subsoils encountered across the Hawea river terraces generally demonstrates high levels of ground permeability and soakage capabilities.

1.2.2 Summary of Earthworks

A total of approximately 1400 m^3 of material will be excavated, with the balance being retained on site. The plans show that the accessway is to be formed by cut and fill placement to form the access surface. The maximum depth of excavation is shown as 1.3 m and the maximum height of fill is shown as 1.05 m for the access.

The plans show the earthworks for proposed Lot 4 as fill only, to a maximum height of 4.7 m. The access area exposed will be a modest 2270 m^2 with the Lot 4 fill area encompassing a 920 m^2 area. The extent of earthworks is depicted on the Erosion and Sediment Control (ESCP) drawing in **Appendix 1**.

1.3 Associated Resource Consents

This EMP has been prepared to ensure that all relevant conditions of associated resource consents are addressed. Provided the project undertakes its operations in accordance with this EMP, it will comply with the relevant conditions. The resource consents associated with this project are given in **Table 1**.

Table 1: Associated resource consents

Resource Consent Number	Related Council	Activity Description	Date of Decision Issue
TBC			

1.4 Suitably Qualified and Experienced Professional

This EMP has been prepared by Tom Grandiek of Enviroscope Limited. Tom is a certified Environmental Professional (CEnvP) and holds a Bachelor of Applied Sciences degree, majoring in Environmental Management. He spent five years working in RMA compliance with local government. Tom has extensive experience in the preparation and monitoring of EMPs and ESCPs.

Tom meets the criteria of a Suitably Qualified and Experienced Professional (SQEP) for the purposes of preparing this EMP and overseeing the environmental aspects of this project.

2.0 CONSTRUCTION METHODOLOGY

2.1 Sequencing of Works

The following sequencing will ensure the earthworks are undertaken efficiently while ensuring good environmental outcomes. This is a preliminary staging methodology and may be subject to change based onsite conditions encountered during construction. This methodology shall be read in conjunction with the Erosion and Sediment Control Plan (ESCP) attached as **Appendix 1**.

Preliminary works and site establishment

- Ensure the current EMP is available onsite.
- Complete site induction with Environmental Representative.
- Establish site laydown.
- Construct decanting earth bund in accordance with **Appendix 2** design specifications.
- Install silt fence below lot 4 building platform, fill area. Excavate 1.0m x1.0m x 1.0m drop out pit in front of silt fence.

Earthworks

- Ensure roadside swale and overland flow path through the site remain clear of any debris at all times.
- Undertake access earthworks. The earthworks area is to be accessed from the existing site driveway. Excavate from the DEB, upwards of the alignment. Place topsoil on upward site of the access.
- Cart excess material to Lot 4 building platform.
- Stabilise access base as soon as reasonably possible with AP65 aggregate sub-base.

Landscaping and revegetation

- Undertake final landscaping and revegetation of any remaining exposed areas.

Decommissioning

- Remove erosion and sediment control devices once stabilisation has occurred across the entire site. This is generally defined as 80% vegetative cover.

2.2 Hours of Operation

Construction activities and the associated hours of operation shall comply with *NZS 6803:1999 Acoustics - Construction Noise Guidelines*. Site works may be undertaken between 0730 and 1800 hours, Monday to Saturday. No works are to be undertaken on Sundays or Public Holidays. However, this does not preclude any emergency works or works required for incident investigation or response. Additional detail relating to noise-producing activities are to be undertaken in accordance with Section 7.0 of this EMP.

3.0 EMP IMPLEMENTATION

3.1 Environmental Roles and Responsibilities

3.1.1 Project Manager

The Project Manager is responsible for the effective implementation of the EMP and has overall responsibility for the environmental performance of the project. Duties include:

- Ensuring adequate resources are in place to implement the EMP.
- Ensuring all staff and sub-contractors operate within the guidelines of the EMP.
- Ensuring that an EMP is prepared and that environmental standards, processes and procedures meet relevant resource consent conditions.
- Overseeing the successful implementation, monitoring and review of the EMP.
- Ensuring that inspections are carried out in accordance with the relevant EMP.
- Restricting or stopping any activity that has the potential to or has caused adverse environmental effects.
- Providing notification and reporting of Environmental Incidents to Council and other environmental reports as required by The Guidelines.
- Delegating authority of the above responsibilities.

3.1.2 Environmental Representative

The Environmental Representative supports the Project Manager in the day-to-day implementation of the EMP. Duties include:

- Ensuring the installation of environmental controls as per the EMP.
- Undertaking environmental site inspections.
- Overseeing the maintenance and improvement of defective environmental controls.
- Providing environmental inductions to all staff and sub-contractors.
- Assisting the project leadership in attending to Environmental Incidents and Complaints.

The Environmental Representative shall be familiar with environmental risks associated with the project, the EMP and best practice erosion and sediment control principles and practices.

3.1.3 Environmental Consultant

The Environmental Consultant (SQEP) will provide technical environmental management advice as required. Key tasks include delivering the Site Environmental Induction to core staff and providing as-built confirmation of erosion and sediment controls to Council, if required.

3.1.4 All Staff and Sub-Contractors

All staff and sub-contractors have a responsibility to undertake all activities in accordance with the requirements of this EMP. This includes reporting any activity that has the potential to or has resulted in an Environmental Incident to the Project Manager or Environmental Representative.

3.2 Site Environmental Induction

All staff and subcontractors shall attend an Environmental Induction to ensure they are aware of the project's environmental risks as well as their responsibilities to help manage these risks. Prior to ground-disturbing activities, the Environmental Representative will deliver the induction to core staff. During the project, the Environmental Representative will induct sub-contractors and new staff.

The site induction handout is attached as **Appendix 3** and all persons inducted will be recorded on the Induction Register attached as **Appendix 4**.

3.3 Environmental Inspections

Table 3 outlines the regular environmental inspections to be undertaken.

Table 3: Environmental inspections

Environmental Inspection	Timing	Purpose
Weekly Inspection	Every seven days	A comprehensive environmental inspection will: • Confirm that all environmental controls are present, functional, and adequate. • Identify any activities that may cause an environmental incident or actual or potential environmental effects. • Identify maintenance requirements for implemented management measures. All weekly inspections shall be recorded on the Weekly Site Inspection form attached as **Appendix 3**.
Pre-Event Inspection	Prior to a significant rain event[1]	To ensure that erosion and sediment controls are present, functional, and adequate for forecast rain event. This inspection will inform any preventative work required and may result in the Rapid Response Procedure being implemented (see Section 4.6).

[1] A significant rain event is defined as any rain event that can generate overland flow, noting that this varies seasonally.

Environmental Inspection	Timing	Purpose
Rain Event Monitoring	During a significant rain event	To ensure that: • Erosion and sediment control devices continue to function correctly and inform any necessary emergency responses. • Sediment retention devices are functioning effectively and have capacity available. • No dirty[2] water is crossing the boundary of the site. Observations and remediation measures taken will be recorded in a daily job diary.
Post-Event Inspection	Immediately following a significant rain event	Any observations and corrective actions should be recorded in a daily job diary.

3.4 Environmental Incident Management

Environmental incidents shall be responded to as soon as the project team becomes aware of them occurring. The response will generally involve oversight by the Environmental Consultant and will involve:

- Immediate cessation of the activity that caused the incident.
- Investigation into the cause of the incident.
- Initial response to bring the incident under control.
- Implement any remediation works.

The Project Manager shall notify QLDC and ORC of the details of any Environmental Incident within 12 hours of becoming aware of the incident. Notification will be through a phone call to Council monitoring staff (see Emergency Contacts on page four).

The Project Team shall provide an Environmental Incident Report within ten working days of the incident occurring. The Incident Report form is attached as **Appendix 6**.

3.5 Complaints Procedure

Any complaint received will be recorded and an investigation will be carried out. The complainant will be provided with a response acknowledging receipt of the complaint and outlining corrective actions to be implemented. After the investigation,

[2] 'Dirty water' is defined as water that exceeds the maximum allowable water quality value outlined in the Discharge Criteria at Section 5.2.

any necessary corrective actions will be carried out and a follow-up of the original complaint is to be conducted to ensure the actions implemented have been effective.

All complaints will be recorded on the Complaints Register attached as **Appendix 7**.

3.6 EMP Non-Conformance and Corrective Actions

EMP non-conformances found during site inspections, monitoring or as a result of environmental incidents or complaints shall be recorded in the EMP Non-Conformance Register. The non-conformance register attached as **Appendix 8** will detail when corrective actions are due, how they are to be carried out and the close out date.

The non-conformance register ensures that issues do not escalate or are missed, as well as, providing a clear record of evidence that can be used to defend any potential complaint or formal enforcement action.

3.7 Records and Registers

The records listed below will be collated onsite. If a request is made by a QLDC and ORC official, the records shall be made available to the official within 24 hours of the request being made.

- Environmental Induction Register - **Appendix 4**.
- Weekly Environmental Inspection Form - **Appendix 5**.
- Environmental Incident Reports - **Appendix 6**.
- Complaints Register - **Appendix 7**.
- EMP Non-Conformance Register - **Appendix 8**.
- Water Quality Monitoring Results - **Appendix 9**.

3.8 EMP Updates

The EMP will be regularly reviewed throughout the project to ensure the document remains fit for purpose and to drive continual improvement. This may be initiated by:

- Significant changes to the construction methodology.
- Improvements identified as a result of an Environmental Incident or Corrective Action.
- Where directed by QLDC and/or ORC's Monitoring and Enforcement team.

All EMP updates will be managed through the document control table on page one and shall be submitted to QLDC and ORC for acceptance.

4.0 EROSION AND SEDIMENT CONTROL MEASURES

4.1 Performance Criteria

Design, install and maintain erosion and sediment controls in accordance with industry best practices. Generally, *Erosion and Sediment Control Guidelines for Land Disturbing Activities in the Auckland Region 2016* (Auckland Council Guideline Document GD2016/005).

4.2 Erosion and Sediment Control Principles

Erosion and sediment control ('ESC') devices shall be installed, maintained and decommissioned in accordance with the following principles:

- Erosion and sediment controls are integrated with construction planning.
- A 'treatment train' approach so that the sediment retention devices operate as efficiently and effectively as possible.
- Separation of 'clean' and 'dirty' water with clean water to be diverted around the site to minimise the volume of dirty water needing management onsite.
- The extent and duration of soil exposure is minimised.
- Controls are always maintained in proper working order.
- Progressively stabilise and revegetate disturbed or completed areas.
- The site is monitored, and erosion and sediment control practices are adjusted to maintain the required performance standard.
- Soil erosion is minimised as far as reasonable and practical.
- Avoidance of sediment discharge off-site and protection of receiving environments.

4.3 Guidance on Erosion and Sediment Control Devices

The effective control of surface water shall be achieved through the utilisation of carefully selected erosion and sediment control devices to achieve a specific purpose. These guidelines for the devices employed on this project shall be read in conjunction with the ESCP attached as **Appendix 1** of this document.

4.3.1 Site Definition

At the commencement of the project, the following components onsite will be clearly defined as detailed in **Table 5**.

Table 5: Site definition specifications

Site component	Method of Demarcation
Designated site access	Installation of stabilised access/signs
Internal 'no-go' areas (protected or sensitive areas)	Bunting or flagging tape with waratahs

4.3.2 Stabilised Entranceway

The stabilised access will be located off the existing site access which is a metaled driveway which extends 50 metres into the site. The stabilised entranceway will be constructed in accordance with the schematic diagram in, **Appendix 1** (complete guidelines on pages 60-65 of GD05).

4.3.3 "Clean Water" Diversion Channels and Bunds

Clean water diversions exist with the state highway roadside swale sitting above the site boundary, directing flows via an overland flow path through the site. The site is flat in nature with limited catchment area, and permeable soil types. Additional clean water diversions are not considered necessary. If deemed necessary through on site observations, GD05 design standard clean water diversion bunds are recommended to be installed. CWDB's will be constructed in accordance with the schematic diagram in, **Appendix 1.**

4.3.4 "Dirty Water" Diversion Channels and Bunds

Due to the flat nature of the site, the access road will be cut at a lower level, and convey any flows from the access towards the DEB. Formalised dirty water diversion channels will be formed within the road alignment swale.

4.3.5 Drop-Out Pits

Drop-out pits will be used below the Lot 4 building platform to capture any flows off the fill and allow flows to be contained and permeate through the subsoil surface.

- To allow the heavier coarse sediments to drop out, preventing them from entering the sediment retention devices, and reducing loads on these devices.

Drop-out pits will be constructed in accordance with the image reference in, **Appendix 1** (complete guidelines on page 45 of GD05).

4.3.6 Temporary Culvert

Culverts shall be used onsite to transport clean water from one side of the haul road alignment to the other. A culvert will be installed under the newly formed access in accordance with the engineer design approval. The culvert should be installed initially to convey clean water flows from the roadside swale, past the site.

4.3.7 Decanting Earth Bund

One decanting earth bund (DEB) will be used to capture flows from the road access and allow sediment to settle out of the water column. A DEB decants off the cleaner water at the top of the water column i.e. the live storage range. The subsoil profile appears permeable in nature and high soakage rates will likely be encountered once this is formed, providing additional capacity. The DEB has been sized for the contributing catchment area.

Full design specifications based on GD05 including depth, width and length are given in **Appendix 2**. The DEB will be constructed in accordance with the schematic diagram in, **Appendix 1** (complete guidelines on pages 106-112 of GD05).

4.3.8 Standard Silt Fence

A standard silt fence will be used to capture potential sheet flows from the fill area on Lot 4. This will be used in conjunction with the drop out pit.

The silt fence will be installed in accordance with the schematic diagram in, **Appendix 1** (complete guidelines on pages 112-119 of GD05).

4.3.9 Temporary Stockpiles

Temporary topsoil stockpile may be formed as part of earthworks. An area has been nominated for the topsoil strip to be located while bulk earthworks are completed. This in on the upward side of the access so any runoff can be accumulated in the DEB. This will then be re-spread accordingly.

4.3.10 Progressive Rehabilitation

Progressive stabilisation of earthworks is to occur promptly as areas are finished to minimise the area of exposed soil and thus the generation of sediment-laden water. Prior to final landscaping, this can comprise temporary grassing, turfing or clean aggregate.

4.4 As-Built Verification

The Environmental Consultant can provide the Council with as-built confirmation to verify that the erosion and sediment controls have been installed in accordance with the approved ESCP.

4.5 Maintenance of Erosion and Sediment Control Devices

Ongoing maintenance of the site shall be undertaken as follows:

- Clean out sediment of erosion and sediment control as soon as 20% capacity has been reached.
- Any mucked-out sediment shall be stockpiled, dried and reused as planting media for revegetation.

4.6 Rapid Response Procedure for Significant Rain Events

The Environmental Representative will stay vigilant of weather forecasts. If a significant rain event is imminent, all works will cease in sufficient time for staff to inspect and maintain erosion and sediment control devices and undertake any stabilisation required. Observations will continue through the rain event to ensure the functioning of erosion and sediment control devices.

4.7 Decommissioning and Removal

Erosion and sediment control devices will remain in place until 'stabilisation' of the site has been achieved. This is generally defined as 80% vegetative cover as depicted in **Figure 2**.

It is noted that the removal of controls may result in minor soil exposure. Any soils exposed during decommissioning will be stabilised with either grass, mulch or other appropriate erosion control.

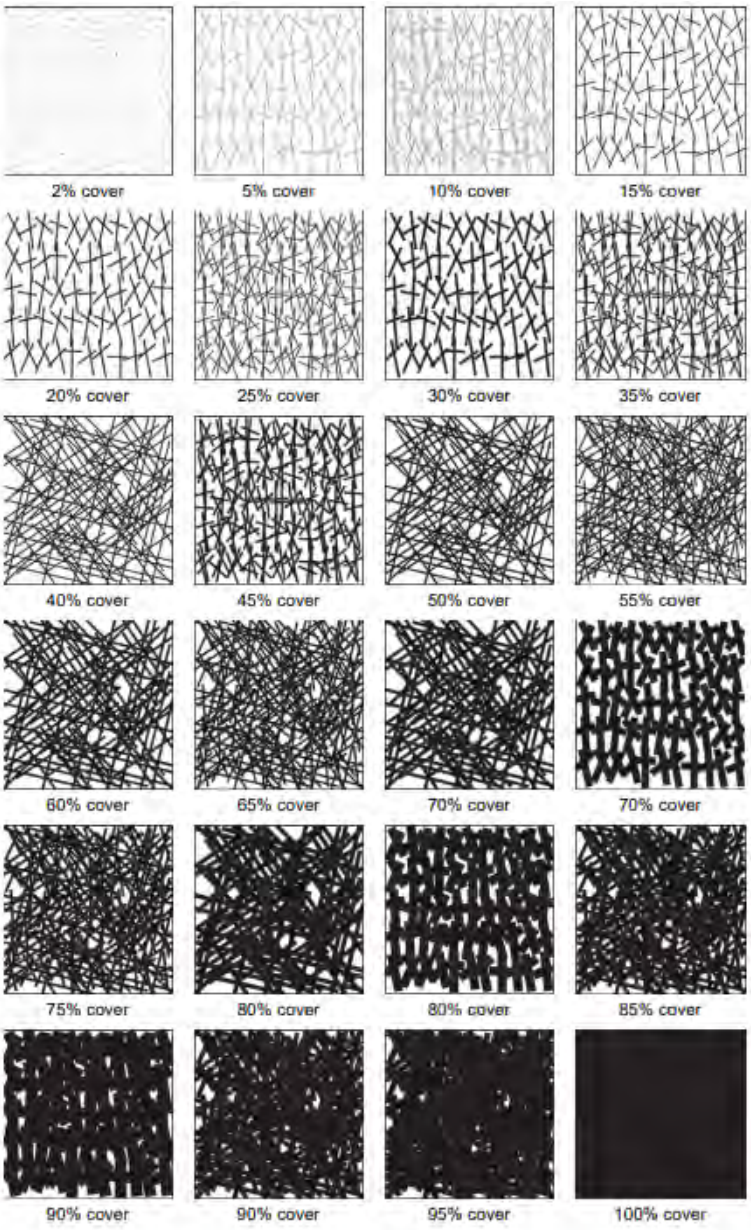


Figure 2: Visual cover estimation (Source: Catchments and Creeks Pty Ltd)

4.8 Inspections and Monitoring

Details of inspections and monitoring are stated in Section 3.3.

4.9 Contingency Measures

The following contingency measures in **Table 6** shall be deployed as required.

Table 6: Erosion and sediment control contingency measures

Issue	Contingency Measure
Sediment-laden stormwater flowing across the site boundary	Undertake measures to stop the flow immediately. Ensure controls are installed according to the ESCP. Contact the Environmental Consultant (SQEP) who will initiate the incident response.
Controls do not appear to be working as intended	Contact Environmental Consultant (SQEP) to inspect, advise and revise ESCP as required.
The site is inappropriately exposed prior to imminent rain event	Cease works and shift effort to checking erosion and sediment controls and stabilisation via the Rapid Response Procedure outlined in Section 4.6.
Sediment retention devices are near capacity and more rain is forecast	Contact the Environmental Consultant (SQEP) immediately for advice.
Abatement notice issued by Council	Contact the Environmental Consultant (SQEP) immediately to advise on methods to meeting abatement notice requirements within the time stated by the abatement notice.

4.10 Erosion and Sediment Control Incident

An erosion or sediment control incident is considered to have occurred where performance criteria outlined in Section 4.1 is not met. The incident procedures outlined in Section 3.4 shall commence.

5.0 WATER QUALITY MANAGEMENT

Surface water bodies (rivers, streams, lakes and wetlands) provide important habitats for many species of plants, fish, birds and animals, some of which are endemic and/or threatened. To protect these values, water quality must be safeguarded, and the natural flow of the watercourse maintained to the greatest possible extent. Where flow must be reduced or diverted, mitigation is required to ensure the values of the watercourse are not degraded.

5.1 Receiving Waterbodies

The site sits on an elevated Terrace above the upper reaches of the Hawea River. Hawea River is approximately 50 m from the eastern site boundary. A water race formed as part of the Hawea hydro dam scheme is located within an easement alongside the eastern property boundary.

A shallow manmade channel is visible at the western boundary and connects to the ephemeral overland flow path shown in **Figure 3**. This flow path terminates from the hillside adjacent to the property and likely contains flows in significant rainfall events.

Figure 3: Waterways within and in proximity to the site

5.2 Performance Criteria

Any waters flowing across the site boundaries will meet the criteria in **Table 7**.

Table 7: Water quality discharge criteria

Parameter	Discharge Criteria
Turbidity	≤ 100 NTU[3]
Or…	
Comparative Visual Clarity (mm)[4]	TBC
If turbidity or visual clarity is exceeded, test for…	
Total Suspended Sediment (TSS)	≤ 50 mg/L
pH[5]	5.5 – 8.5
Hydrocarbons or tannins	No visible trace
Waste	No waste or litter is visible

5.3 Management Measures

The following measures will be deployed to ensure the protection of water quality:

- Erosion and sediment controls will be implemented and maintained in accordance with the Erosion and Sediment Control Measures in Section 4.0.
- Refuelling, servicing and storage of hydrocarbons will be in accordance with the relevant procedures in the Chemicals and Fuels Management in Section 10.0.
- All plant and equipment onsite will be inspected regularly to ensure they are of an acceptable standard.

[3] Turbidity can be instantly measured using a nephelometer. This is considered desirable as opposed to testing TSS which requires laboratory testing and can take several days. Turbidity can be inferred from the relationship with TSS via linear regression. If the specified turbidity value is not met, a water sample will be collected and sent for TSS laboratory testing.

[4] In the absence of a turbidity measure, visual clarity can be inferred from the relationship with turbidity via linear regression. If the specified visual clarity value is not met, a water sample will be collected and sent for TSS laboratory testing.

[5] pH to be tested only when chemical treatment is undertaken.

5.4 Monitoring

Water quality will be monitored in accordance with **Table 8**.

Table 8: Water quality monitoring measures

Sampling Scope	
Objective	To confirm that all controlled and uncontrolled water flowing from the site meets the Discharge Criteria referred to in Section 5.2.
Spatial boundaries	All water that enters and exits the site from rainfall or overland flow.
Frequency	At the time water flows cross the boundary of the site. Where a Significant Rain Event occurs through the night, monitoring shall be undertaken the following morning.
Sampling Design	
Water Quality Criteria	As outlined in the Discharge Criteria referred to in Section 5.2.
Sampling Locations	At boundaries of the site where any water is flowing, specifically the following point discharges: • DEB outlet • Silt fence
Sampling Method	• TSS – Registered laboratory • Turbidity (NTU) – Nephelometer • pH – pH meter – only if utilising chemical treatment • Gross pollutants – visual observations • Tannins – visual observations (any unusual darkening of waters?) • Hydrocarbons – visual observations (is there any oily film[6] on surface or smell?)
Quality Control	Any water quality meter will be calibrated according to manufacturer instructions. All observations will be recorded and analysed.
Recording	
Recording Results	All results will be entered into a spreadsheet and kept onsite (form attached as **Appendix 9**).
Actions	

[6] Some bacteria produce a naturally occurring film on the water surface. Bacteria films breaks apart in angular shapes when disturbed whereas hydrocarbon film separates as globules.

Non-conformances	Any exceedances observed will be reported to the Project Manager/ Environmental Consultant who will investigate and ensure appropriate corrective actions are implemented immediately.

5.5 Contingency Measures

The following contingency measures in **Table 9** shall be adopted if required.

Table 9: Water quality contingency measures

Issue	Contingency Measure
Exceedance of water quality criteria	• Contact the Project Manager and Environmental Consultant (SQEP) immediately. • Works will cease or be modified to remove further risk of contamination. • QLDC and ORC will be verbally notified. • The Environmental Incident procedure will commence. • Remedial measures will be implemented, and the Environmental Incident will be closed out by the Environmental Consultant (SQEP), with a copy of an Environmental Incident report to the Project Manager, QLDC and ORC.

5.6 Water Quality Incidents

A water quality incident is considered to have occurred where the water quality performance criteria outlined in Section 5.2 is breached. The incident procedures outlined at Section 3.4 shall commence.

6.0 DUST MANAGEMENT

Dust from construction activities, vehicle movements and stockpiles can contribute to sediment runoff and create a nuisance to the public, neighbouring properties, adjoining roads and service infrastructure. The key risks associated with dust occur during the bulk earthworks phase of the project.

There are a range of activities that may produce dust onsite including:

- General disturbance of soil (particularly during drier months).
- Inappropriate staging that does not seek to minimise the extent of exposed soil.
- Vehicle movements along haul roads.
- Sediment-tracking onto surrounding roads.
- Stockpiling of topsoil or subsoil.
- Slow or ineffective revegetation procedures.

6.1 Sensitive Receptors

Key sensitive receptors to protect from the effects of dust include pedestrians, cyclists and motorists on State Highway 6. The prevailing wind during the drier summer months is from the north-west, off Lake Hawea. The project shall ensure the site is prepared appropriately to manage potential dust effects.

6.2 Performance Criteria

The project must ensure that reasonable and practical measures are taken to avoid dust moving across the boundaries of the site at all times.

6.3 Management Measures

The following measures will be deployed to ensure dust generation onsite is minimised:

- Stage works where possible to minimise soil exposure extents and timeframes.
- Revegetate disturbed areas progressively throughout construction.
- Dust suppression of exposed areas and stockpiles by water trucks or other methods (e.g., k-lines) approved by the Environmental Representative.[7]
- If dust activities cannot be controlled during high winds, works will cease until favourable conditions return.
- Only designated access points and haul routes are to be used.
- Site access to be constructed in accordance with GD05 (detail at Section 4.3.2).
- All site access and surrounding roads to be swept clean regularly.
- To avoid spillage risks, trucks will not be overloaded.
- All trucks must have tail gates up and swept or cleaned prior to entering external roads.

[7] Ensure a consented water take permit is approved by the local authority. If taking water from lakes and or rivers, ensure that the permitted volume of water is taken.

- Stockpile heights are to be minimised where possible (< three metres) unless they are covered (e.g. an erosion blanket, chemical sealant, temporary cover crop or mulched).
- Long-standing stockpiles (greater than six weeks) shall be appropriately stabilised.
- Within two weeks of completion, all earth worked areas will be sown out with grass, landscaped or otherwise stabilised by an appropriate erosion control.

6.4 Monitoring

Site staff will maintain continual vigilance for any increases in wind to ensure measures are deployed prior to dust crossing site boundaries. Weekly Environmental Inspections ensure that the management measures described above are sufficient and performing effectively.

6.5 Contingency Measures

The contingency measures in **Table 10** shall be adopted if required.

Table 10: Dust contingency measures

Issue	Contingency Measure
Excessive dust creation from soil disturbance	• Increase frequency of water truck spraying or increase irrigation. • Spray down excavation areas and activities where excavator bucket is operating. • Cease excavation during high winds, particularly if wind direction is likely to impact sensitive receivers.
Excessive dust creation from hauling operations	• Cover or spray down loads causing dust impacts. • Apply skim of aggregate over the haul road surface.
Excessive dust creation from stockpiles	• Spray stockpiles with water or apply a temporary polymer. • Hydro-mulch, seed or stabilise stockpiles, cover stockpiles with geofabric. • Locate stockpiles further away from sensitive receptors.
Abatement notice issued by Council	Contact the Environmental Consultant (SQEP) immediately to advise on methods to meeting abatement notice requirements within the time stated by the abatement notice.

6.6 Dust Incident

A dust incident is considered to have occurred where:

- Dust is observed crossing the boundary into sensitive receptors or,
- A justified complaint is received regarding dust emissions across the boundary of the site.

The incident procedures outlined at Section 3.4 shall commence.

7.0 NOISE AND VIBRATION MANAGEMENT

Noise and vibration generated during construction has the potential to impact sensitive receivers by reducing comfort, impeding communication, causing cosmetic damage to structures and damaging household possessions.

The following assessment and management measures are intended for standard construction equipment that is not expected to induce noise or vibration beyond the maximum limits in the QLDC District Plan. Where upper noise and vibration levels of district plans will be breached, an Acoustic Specialist may need to be engaged to assist with the management of these nuisance effects.

Potential noise and/or vibration effects may be generated by the following:

- Excavation and earth moving plant
- Light vehicles near sensitive receptors
- Ancillary plant and equipment
- Compaction equipment
- Reversing alarms

7.1 Sensitive Receptors

There are no nearby receptors within direct proximity of the proposed works area that are likely to experience adverse effects related to noise and vibration. The extent and footprint of the earthworks is relatively small in nature, with surrounding residential dwellings located some distance away from the site.

7.2 Performance Criteria

1. Construction activities shall meet relevant noise limits specified under Rule 36.5.13 of the Queenstown Lakes Proposed District Plan. This rule requires Construction sound at any point within the site must comply with the limits specified in Tables 2 and 3 of *NZS 6803:1999 Acoustics - Construction Noise*, when measured and assessed in accordance with that standard (see **Table 11** below).
2. Construction activities shall meet relevant vibration limits specified under Rule 36.5.10 of the Queenstown Lakes Proposed District Plan. This rule requires vibration from any activity must not exceed the guideline values given in *DIN 4150-3:1999 Effects of vibration on structures* on any structures or buildings on any other site.
3. Construction activities shall be undertaken in accordance with the permitted hours of operation outlined at Section 2.2 above.

Table 11: Upper limits in dB(A) for construction work noise in residential areas for less than 20 weeks

Time of Week	Time Period	$L_{Aeq(t)}$	L_{Afmax}
Weekdays	0630 – 0730	60 dB	75 dB
	0730 – 1800	75 dB	90 dB
	1800 – 2000	70 dB	85 dB

Saturdays	0630 – 0730	45 dB	75 dB
	0730 – 1800	75 dB	90 dB

Table 12: Vibration Thresholds for Structural Damage (PPV mm/s)

	Short Term				Long-Term
	At Foundation			Uppermost Floor	Uppermost Floor
Types of Structures	0 to 10 HZ	10 to 50 Hz	50 to 100 HZ	All Frequencies	All Frequencies
Commercial/Industrial	20	20 to 40	40 to 50	40	10
Residential	5	5 to 15	15 to 20	15	5
Sensitive/Historic	3	3 to 8	8 to 10	8	2.5

Note: When a range of velocities is given, the limit increases linearly over the frequency range.

7.3 Management Measures

The following measures will be deployed to ensure noise and/or vibration associated with the project are appropriately mitigated:

- Notify surrounding sensitive receptors prior to commencing particularly noisy or vibration inducing activities.
- Where practicable, select lower noise producing equipment or use lower noise generating alternatives.
- Regularly service equipment to ensure plant is running optimally.
- Plant and equipment to be fitted with noise control/attenuation devices as appropriate and maintained and operated in accordance with manufacturer's specifications.
- Revving of engines will be limited. All plant and vehicles will be turned off when not in use and if safe to do so.
- The use of audible alarms on mobile equipment will be limited, and two-way communication will be used.
- Undertake activities that may lead to noise or vibration effects, during reasonable and practical hours.

7.4 Monitoring

All earthworks activity will be closely monitored by the operator to ensure that noise and vibration remains within the required limits. If monitoring finds the activity cannot comply with performance criteria, an Acoustic Specialist may need to be engaged to assess the project and provide appropriate mitigation measures and monitoring. Weekly Environmental Inspections shall include an assessment of the site to determine the effectiveness of noise and vibration management controls.

7.5 Contingency Measures

The following contingency measures in **Table 13** shall be adopted if required.

Table 13: Noise and vibration contingency measures

Issue	Contingency Measure
Noise and/or vibration complaint received	Manage the complaint in accordance with the Environmental Complaints procedure in Section 3.5
Exceedance of performance requirement criteria	The Environmental Consultant (SQEP), in consultation with the Environmental Representative, will investigate and implement actions to reduce noise and/or vibration levels to below criteria levels.
Ongoing noise and/or vibration issues	Where noise or vibration emissions consistently exceed the performance criteria despite the site staff's best efforts, an Acoustic Specialist will be engaged to assist.
Abatement notice issued by Council	Contact the Environmental Consultant (SQEP) immediately to advise on methods to meeting abatement notice requirements within the time stated by the abatement notice.

7.6 Noise and Vibration Incident

A noise or vibration incident is considered to have occurred when a justified complaint is received and on investigation is found to exceed the performance criteria. The environmental incident procedures outlined in Section 3.4 shall commence.

8.0 CULTURAL HERITAGE MANAGEMENT

The loss or damage of cultural heritage items could be caused by construction activities. The damage or loss of artefacts can lead to the loss of culturally or historically significant items and information.

Examples of cultural heritage items include:

- Koiwi tangata (human skeletal remains).
- Waahi taoka (resources of importance).
- Waahi tapu (places or features of special significance).
- Māori artefact material.
- A feature or archaeological material predating 1900.
- Unidentified archaeological or heritage site.

8.1 Location of Known Cultural Heritage Significance

A search of QLDC's database indicates there are no known items of cultural or heritage significance on the site. A portion of the eastern boundary of the property is located within the margins of the Hawea River, Wahi Tupuna.

8.2 Performance Criteria

- The protection of cultural heritage artefacts and places in accordance with the *Heritage New Zealand Pouhere Taonga Act, 2014*.
- Strict adherence to Heritage New Zealand's *Archaeological Discovery Protocol* (attached as **Appendix 10**) in the case of unexpected finds.

8.3 Management Measures

All works on this project will be undertaken in accordance with the obligations of the *Heritage New Zealand Pouhere Taonga Act*, 2014.

8.4 Monitoring

Weekly inspections shall include a visual assessment of the site to ensure that no new significant artefacts have been encountered. However, operators must remain vigilant for such encounters as they occur.

8.5 Accidental Finds

If any unknown artefacts are uncovered, the project will work to Heritage New Zealand's *Archaeological Discovery Protocol* (attached as **Appendix 10**).

9.0 CHEMICALS AND FUELS MANAGEMENT

Hazardous substances can endanger both human health and the environment. Used incorrectly they can cause catastrophic accidents, such as fires and explosions, and serious harm to people who are exposed to them.

9.1 Sensitive Receptors

Key sensitive environmental receptors include staff members working on the site and the adjacent Hawea River and water race.

9.2 Performance Criteria

- Chemicals and fuels are stored and used in a manner that avoids contamination of site and surrounding environment.
- All spills are cleaned up immediately and the contaminated soils/waters disposed of appropriately.

9.3 Management Measures

The following measures will be deployed to ensure chemicals and fuels associated with the project are appropriately managed.

- All hazardous substances to be stored, transported and used according to the safety data sheet requirements.
- Storage of chemicals and fuels shall be located as far as practicably possible from waterways and concentrated flows.
- Refuelling of vehicles and plant onsite will occur in the designated refuelling bay as shown in **Appendix 1**.
- One 240 L Oil and Hydrocarbon spill kit and one 240 L Chemical spill kit will be located in close proximity to the location of liquid hazardous materials storage and refuelling areas.
- The volumes of the hazardous substances listed in **Table 14** will not be exceeded.

Table 14: Maximum volumes of chemicals and fuels

Chemicals and Fuels	Maximum Volume	Storage Location
Diesel	1,000 L	Fuel tank or Jerry cans in lockable container
Unleaded Fuel	60 L	Jerry cans in lockable container
Oil	10 L	Packaging in lockable container
Lubricant (WD40 or similar)	Six Cans	Packaging in lockable container
Grease	5 L	Packaging in lockable container
Spot marking paint	2 L	Packaging in lockable container

9.4 Monitoring

Weekly Environmental Inspections shall include a visual assessment of the site to determine the effectiveness of chemicals and fuels management.

9.5 Contingency Measures

The following contingency measures in **Table 15** shall be adopted if required.

Table 15: Chemicals and fuels contingency measures

Issue	Contingency Measure
Spills response	• Stop works in proximity to the spill and assess the safety of all personnel. • Take immediate action to contain the spill to prevent discharge into stormwater drains or natural waterways. • Use spill kits to contain and treat the spill. • Notify Environmental Consultant to advise on next steps. • If necessary, notify the Regional Council spill response unit. • Remove contaminated material to a suitable contained location for remediation/disposal (require any necessary approvals/permits from ORC). • The spill kits shall be replaced by an approved supplier.
Inappropriate storage	• Upgrade facility. • Clean-up of storage area. • Notify and train staff.
Inappropriate handling/transport	• Notify and train staff through toolbox meetings on the appropriate handling and transport methods.
Inadequate spill kit materials	• Order more materials. • Investigate types of chemicals onsite and consult a supplier for advice on appropriate equipment. • Develop or revise spill material monitoring and ordering system.
Inappropriate disposal of chemicals or fuels	• Provide appropriate disposal facilities or service providers. • Notify and train staff.
Inaccurate or insufficient records	• Advise staff and update records. • Monitor through inspections.

9.6 Chemicals and Fuels Incident

A chemicals and fuels incident is considered to have occurred where:

- A spill more than five litres has occurred.
- A situation is discovered where a spill of more than five litres would likely have occurred before it happens where the management measures listed above have not been followed.

The environmental incident procedures outlined at Section 3.4 shall commence.

10.0 WASTE MANAGEMENT

Waste from construction activities can create a nuisance to the public, neighbouring properties, and adversely affect flora and fauna.

10.1 Sensitive Receptors

Key sensitive environmental receptors include staff members working on the site and the adjacent Hawea River and water race.

10.2 Performance Criteria

- Non-recyclable waste generation is minimised, and the site and surrounds are kept free from waste at all times.
- Wastes shall be stored safely and in an organised manner until recycling, reuse, or disposal.

10.3 Management Measures

The following measures will be deployed to ensure waste management associated with the project is appropriately mitigated:

- The Waste Management Hierarchy philosophy will be implemented, as illustrated in **Figure 4**.

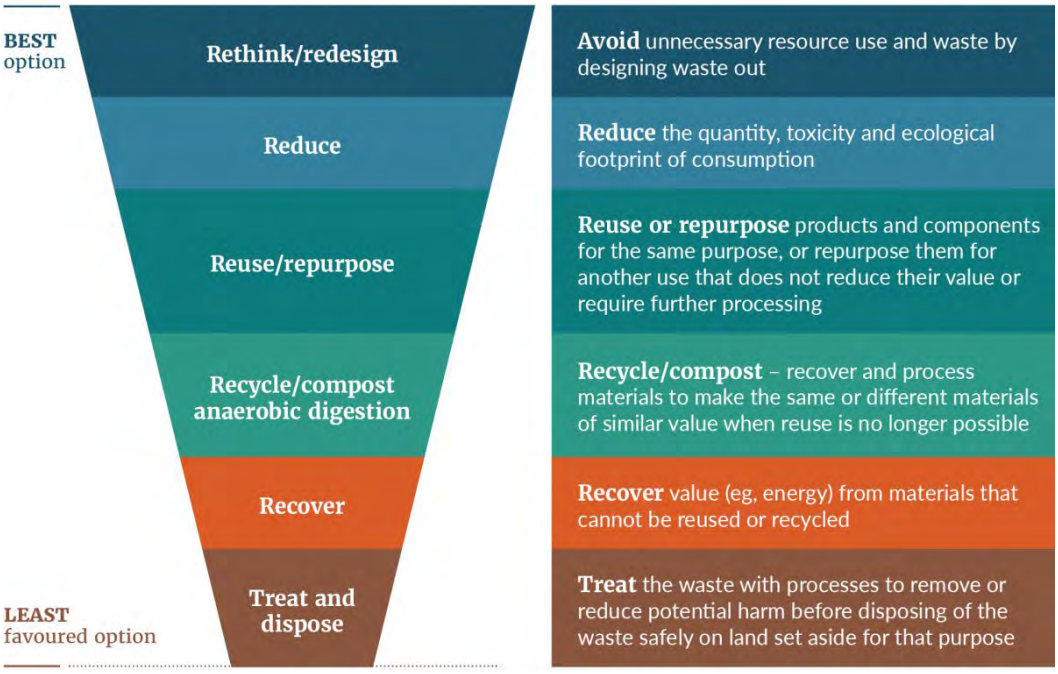


Figure 4: The Waste Hierarchy (Source: Ministry for the Environment).

- Measures will be implemented to ensure the site is maintained in a safe, clean and tidy state.
- Where possible, waste shall be segregated into labelled bins with lids: General, Hazardous and Recyclables.

- Wastes onsite shall be suitably contained and prevented from migrating offsite.
- The waste is to be contained so it doesn't contaminate soil, surface or ground water, create unpleasant odours or attract vermin.
- Any material dropped in or adjacent to open drains shall be recovered immediately after it occurs.
- Waste storage is not permitted in or near drainage paths.
- The burning of waste is strictly prohibited.
- No wastes shall be disposed of onsite.
- Wastes shall be removed from site regularly and at completion of works.

10.4 Monitoring

Site staff will be briefed on waste processes prior to works commencing and shall maintain continual vigilance for excess waste around the site and following appropriate disposal procedures. Weekly Environmental Inspections shall include a visual assessment of the site to determine the effectiveness of waste management controls.

10.5 Contingency Measures

If waste items are accumulating or are stockpiled, the following contingency measures will be adopted:

- Arrange for collection by approved licensed contractor.
- Provide additional bins with lids if available.
- Remove waste offsite as soon as possible.

10.6 Waste Incident

A waste incident is considered to have occurred where:

- Waste from the site is found within a sensitive environment or where it may reasonably migrate to a sensitive environment,
- A complaint is received regarding inappropriate management of waste and on investigation is warranted.

The environmental incident procedures outlined at Section 3.4 shall commence.

11.0 CONTAMINATED SITE MANAGEMENT

A preliminary site investigation has been completed by Claude Midgley of Insight Engineering. The investigation indicates that the site has been used for grazing of livestock and for residential purposes.

Evidence of four HAIL activities was found on the site and minor impacts from those activities are considered likely to have occurred in localised areas. Based on the current contamination status of the site, given the potential sources identified, it is considered highly unlikely that there will be a risk to human health if the site is subdivided, developed and used for residential purposes as long as the potentially impacted areas are either covered with at least 0.5 m of cleanfill, or if the material is disposed of off-site.

11.1 Sensitive Receptors

No sensitive receptors have been identified in relation to contaminated materials.

11.2 Performance Criteria

- Effectively identify and manage any sites where contaminants are found and ensure they do not contaminate beyond the location they are found (including offsite) or present a risk to human health.
- Undertake all earthworks activities in accordance with the recommendations made within the PSI by Insight Engineering.

11.3 Management Measures

The following measures will be deployed to ensure contaminated soil associated with the project is appropriately mitigated:

- If any evidence of contamination be noticed in the field, the personnel noting the contamination shall immediately notify the Environmental Representative who should engage the CL-SQEP.
- All imported fill material from off-site sources will be procured from a project approved quarry/source. Records of quantity and location shall be managed by the Project Engineer.
- Many of the controls required to manage potential for effects associated with low level contaminated soil is based on best practice erosion and sediment control and dust management techniques. These are outlined in Section 4.3 (erosion and sediment controls) and Section 6.4 (dust controls). Both sections cover management of stockpiles.
- All surplus fill material requiring removal shall meet the Ministry for Environment definition of clean fill, as specified in Section 2.2 of the report “A Guide to the Management of Cleanfills”, prepared by *Beca Carter Hollings & Ferner Ltd for the Ministry for the Environment and dated January 2002.*
- If materials have been approved to be removed from site, materials will be transported to the approved disposal location.

11.4 Monitoring

Unless any higher-level contamination is accidentally found during earthworks, no specific monitoring of soil, groundwater or water quality will occur (other than what is detailed in the water quality criteria outlined at Section 5). If material is found it is expected that monitoring may be required but this shall be at the direction of the soil contamination expert.

11.5 Contingency Measures

It is not expected that contaminated material will be encountered, however this cannot be ruled out. If a potential contaminated site is identified (e.g., by landfilled waste, odour) during construction works, the following contingency measures will be undertaken:

- Immediately notify the Environmental representative.
- Prevent spread of contamination by installation of silt fencing, covering material with plastic or geofabric material.
- Engage the Environmental Consultant who will advise on the engagement of a Contaminated Soil expert.
- EMP to be amended to manage any new contaminated soil encountered in coordination with the contaminated soil expert (if engaged).

11.6 Contamination Incident

An environmental incident is considered to have occurred where inspection finds that excavation or other work continues within contaminated soil without report or remedial action.

The environmental incident procedures outlined in Section 3.4 shall be followed.

APPENDIX 1 Erosion and Sediment Control Plan Drawing

Notes:
- Boundary information sourced from SO 18261.
- Adjoining boundaries sourced from LINZ XML.
- Levels in terms of OIT III SO 18261 @ 362.29m.
- Contours produced from QLDC Lidar 2019 1m x 1m.
- Contours = 1.0m/0.2m.
- Areas & dimensions subject to final LT Survey.
- See Record of Title OT9C/457 for details of any existing Easements, Consent Notices and Land Covenants.
- Some internal fences are scaled from aerial image.

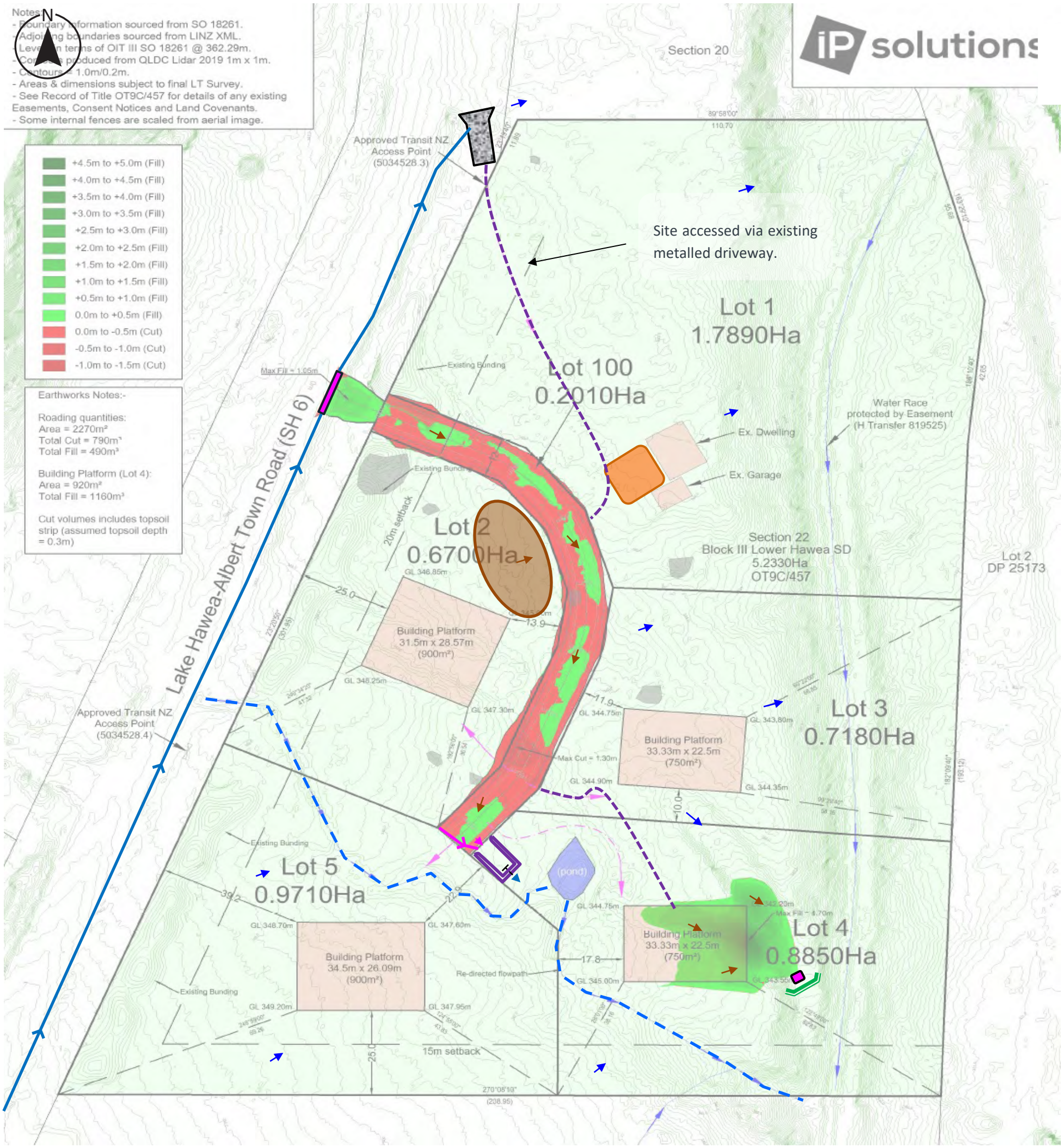
+4.5m to +5.0m (Fill)
+4.0m to +4.5m (Fill)
+3.5m to +4.0m (Fill)
+3.0m to +3.5m (Fill)
+2.5m to +3.0m (Fill)
+2.0m to +2.5m (Fill)
+1.5m to +2.0m (Fill)
+1.0m to +1.5m (Fill)
+0.5m to +1.0m (Fill)
0.0m to +0.5m (Fill)
0.0m to -0.5m (Cut)
-0.5m to -1.0m (Cut)
-1.0m to -1.5m (Cut)

Earthworks Notes:-

Roading quantities:
Area = 2270m²
Total Cut = 790m³
Total Fill = 490m³

Building Platform (Lot 4):
Area = 920m²
Total Fill = 1160m³

Cut volumes includes topsoil strip (assumed topsoil depth = 0.3m)



Legend:

	Stabilised access		Decanting Earth Bund
	Clean water overland flow		Silt fence
	Dirty water overland flow		Drop out pit
	Overland flow path		Culvert (Engineer design)
	Dirty water diversion channel		Laydown area
	Temporary access		Stockpile
	Roadisde swale		

Notes:

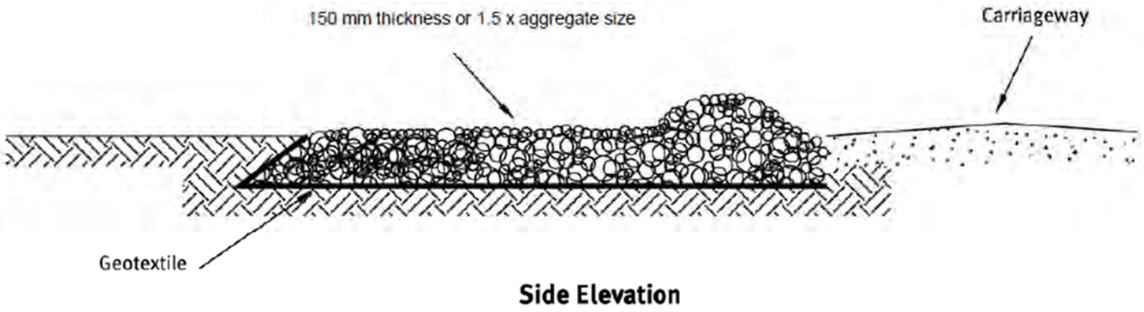
1. This plan is to be read in conjunction with the Environmental Management Plan document prepared by Enviroscope:
2. All location of erosion and sediment control (ESC) devices are indicative and exact placement to be confirmed onsite.
3. ESC devices to be installed and maintained in accordance with *Guidance Document 2016/005: Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region* (GD05) and manufacturer's instructions where relevant.
4. All exposed areas to be revegetated as soon as possible.
5. All devices are to be inspected daily and pre and post-rain event to ensure they are fully functional.
6. All devices to remain in place until stabilisation has been achieved (i.e. hard surfacing or 80% vegetative cover).

	Date	Drawing No	Revision	Drawn by	Approved by
Project: 1172 Lake Hawea – Albert Town Road					
Description: Erosion and Sediment Control Plan	11/05/2023	ESCP-001	A	**TG**	**TG**

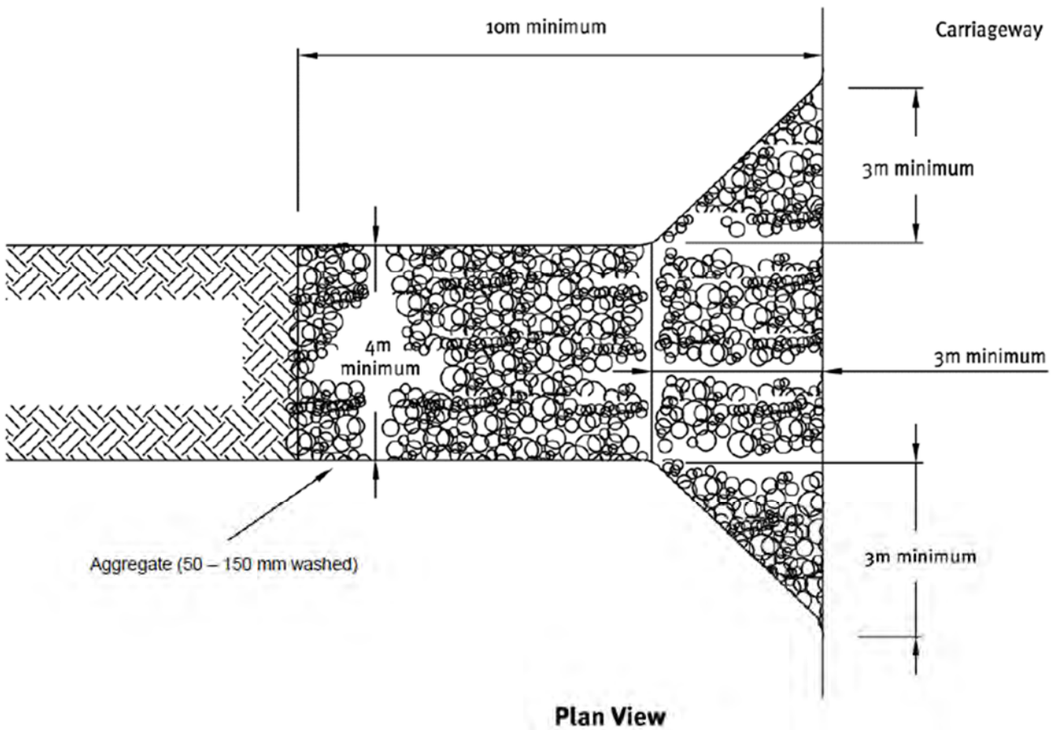
enviroscope	**Project:** 1172 Lake Hawea – Albert Town Road	**Date**	**Drawing No**	**Revision**	**Drawn by**	**Approved by**
	Description: Sub-Division Layout	11/05/2023	ESCP-002	A	**TG**	**TG**

STABALISED ACCESS

(Page 60 from GD05)



Side Elevation



Plan View

Design Parameter	Specification
Aggregate size	50-150 mm washed aggregate
Minimum thickness	150 mm
Minimum length	10 m
Minimum width	4 m

- Additional aggregate may need to be added to the stabilised entranceway throughout the project to maintain the thickness.
- Any sediment that has been tracked onto the surrounding roads must be swept away at regular intervals.

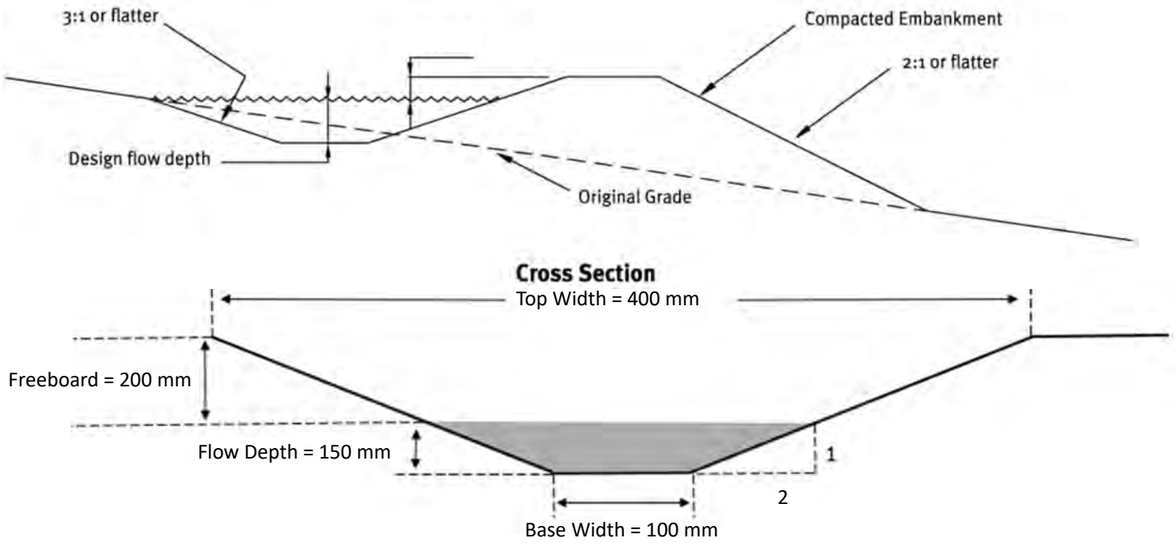
Project: 1172 Lake Hawea – Albert Town Road

Description: Erosion and Sediment Control Plan - Schematics

Drawn	Approved	Date	Drawing Number	Revision
TG	TG	11.05.2023	ECSP - 003	A

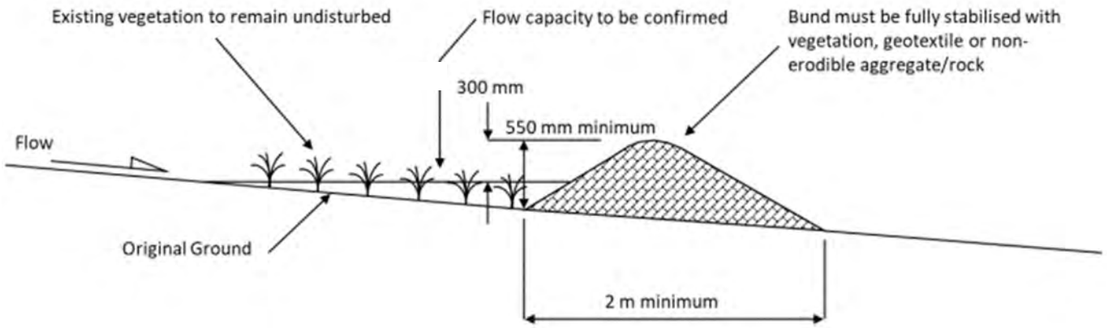
DIRTY WATER DIVERSION CHANNEL

(Pages 43-46 from GD05)



'CLEAN WATER' DIVERSION BUND

(Page 38-43 from GD05)



- Ensure bund is well compacted and stabilised.
- Monitor the inlet and outlet for scour.
- Ensure there are no areas of ponding or blockages along the length of the bund.

enviroscope

Project: 1172 Lake Hawea – Albert Town Road

Description: Erosion and Sediment Control Plan - Schematics

Drawn	Approved	Date	Drawing Number	Revision
TG	TG	11.05.2023	ECSP - 004	A

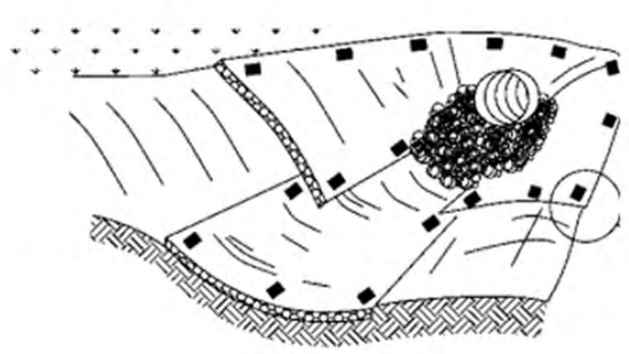
DROP-OUT PIT

Page 45 from GD05

- Drop out pits should be one metre deep by one-metre-wide cube.
- As a contingency measure, drop out pits can be increased in size and lined to prevent any scour of the pit.

TEMPORARY CULVERT

(Diagram from TP90 – now GD05)



- To be non-perforated concrete, PVC or plastic drainage coil.
- Geofabric and rock should be placed at the outlet to prevent scour from the higher velocity water exiting the culvert.

TRAFFICABLE SWALE

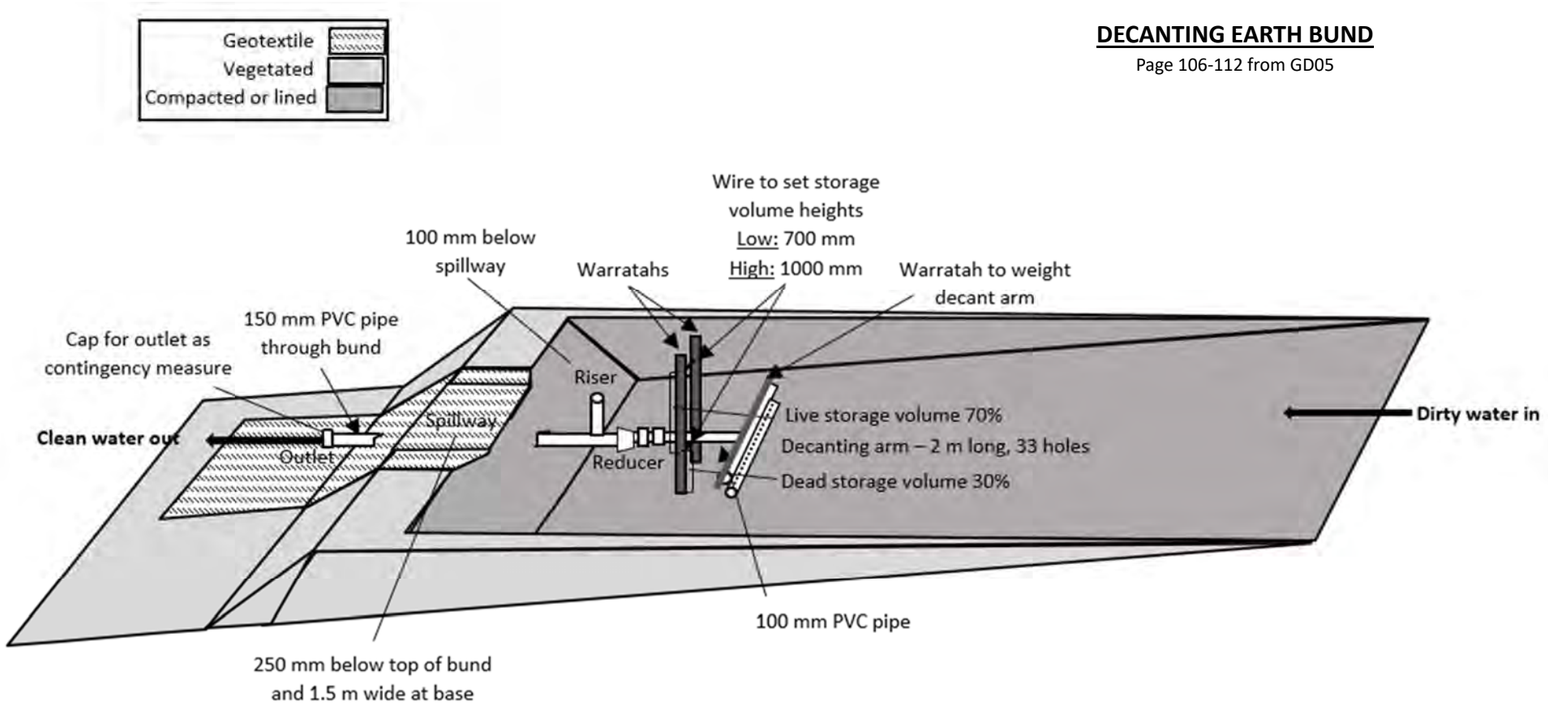
Image from Enviroscope

- Trafficable swales should be constructed by mounding and compacting soil diagonally across the road to direct water in the direction required.
- Vehicles should be able to cross trafficable swales often.
- Rock-lining may need to be added if the swale structure is continuing to degrade by trafficking.

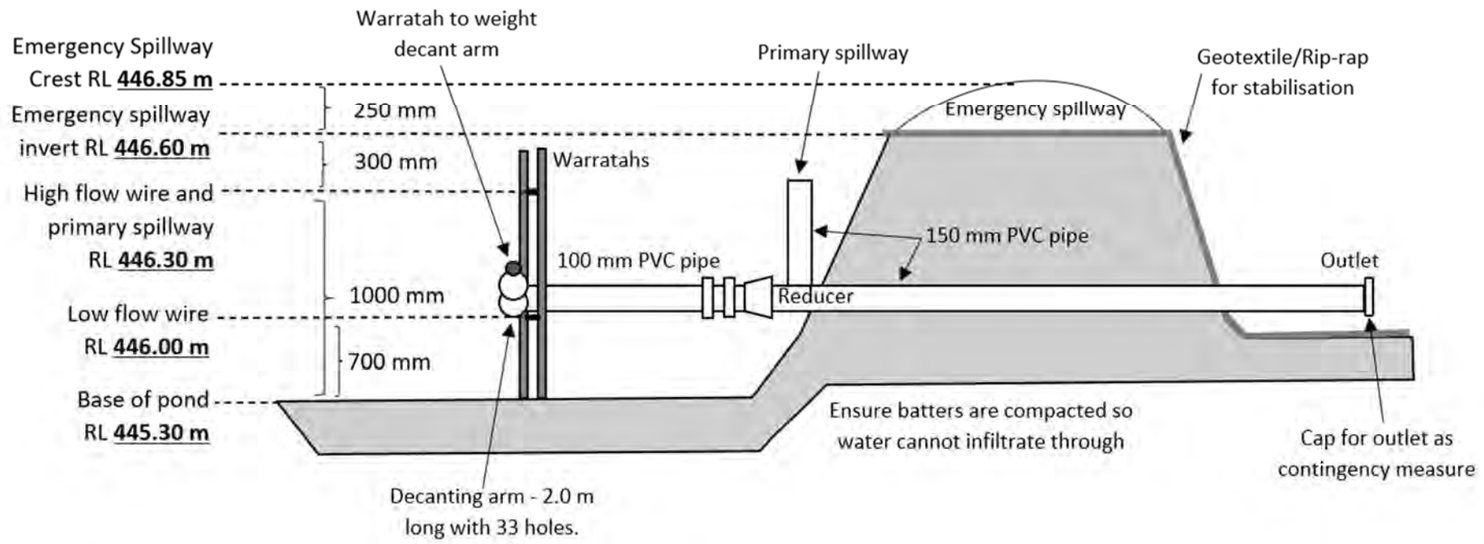
enviroscope	**Project:** 1172 Lake Hawea – Albert Town Road **Description:** Erosion and Sediment Control Plan - Schematics				
	Drawn	**Approved**	**Date**	**Drawing Number**	**Revision**
	TG	TG	11.05.2023	ECSP - 005	A

DECANTING EARTH BUND

Page 106-112 from GD05



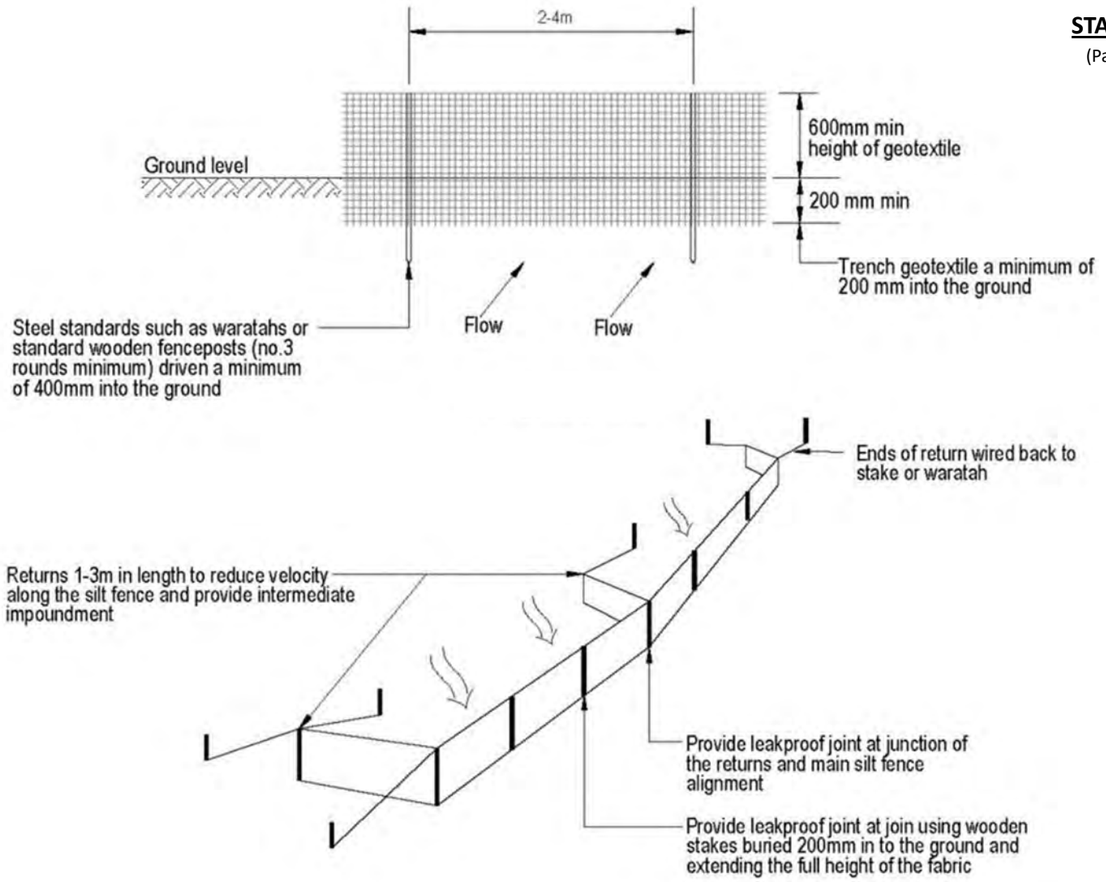
- See Appendix 2 for full calculations.

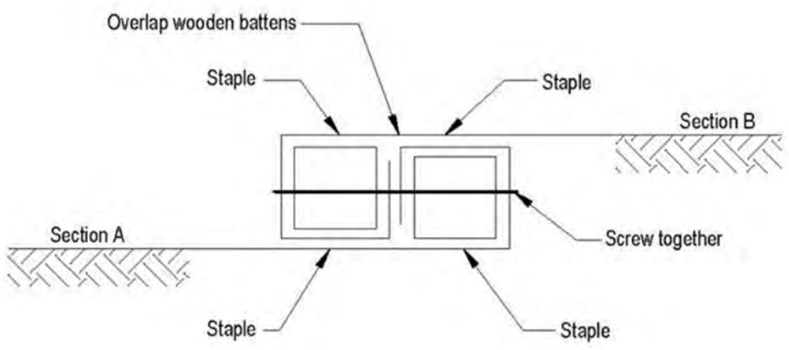


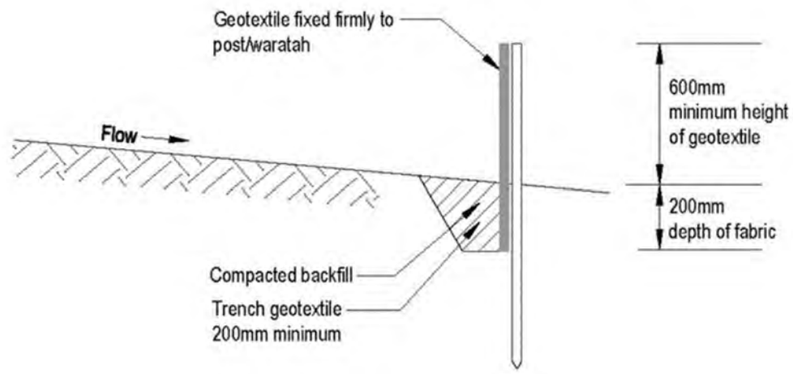
enviroscope	**Project:** 1172 Lake Hawea – Albert Town Road **Description:** Erosion and Sediment Control Plan - Schematics				
	Drawn	**Approved**	**Date**	**Drawing Number**	**Revision**
	TG	TG	11.05.2023	ECSP - 006	A

STANDARD SILT FENCE

(Page 112-119 from GD05)







Slope steepness (%)	Slope length (m) (maximum)	Spacing of returns (m)	Silt fence length (m) (maximum)
Less than 2%	Unlimited	N/A	Unlimited
2- 10%	40	60	300
10- 20%	30	50	230
20- 33%	20	40	150
33- 50%	15	30	75
Greater than 50%	6	20	40

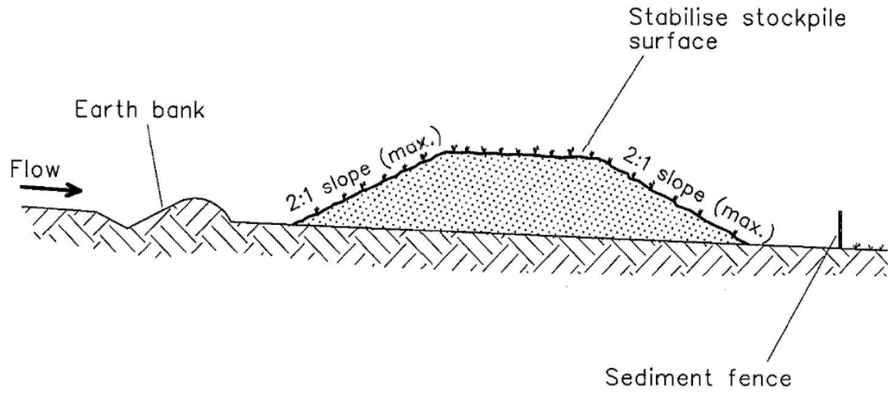
- Ensure the silt fence is ‘keyed’ into the ground to form a good seal at ground level to capture water and avoid undermining.
- Silt fences should be 600 mm above ground level and 200 mm below ground level.
- Supporting waratahs should be placed at 2-4 m intervals.
- Returns should be formed at either end facing upslope to contain flows.
- It is also important that silt fences are installed along the contour of the slope to prevent ponding of water in a concentrated area of the fence.
- To be mucked out once 20% capacity reached.

Project: 1172 Lake Hawea – Albert Town Road

Description: Erosion and Sediment Control Plan - Schematics

Drawn	Approved	Date	Drawing Number	Revision
TG	TG	11.05.2023	ECSP - 007	A

TEMPORARY STOCKPILES



- Temporary stockpiles should be a maximum height of two metres to mitigate wind effects and to preserve the quality of the topsoil as future planting media for revegetation.
- If the stockpile is to be left insitu for a period of 12 weeks or more it shall be seeded with grass or erosion control matting to provide erosion and dust protection.
- A silt fence should be installed on the downslope of the stockpile.

Project: 1172 Lake Hawea – Albert Town Road

Description: Erosion and Sediment Control Plan - Schematics

Drawn	Approved	Date	Drawing Number	Revision
TG	TG	11.05.2023	ECSP - 008	A

REFUELING BAY

- Locate the hardstand as far as practicably possible from waterways and concentrated flows.
- Ensure spill kit is located nearby.

SPILL KITS

CONCRETE WASHOUT PIT

- The concrete wash out pit consists of a plastic-lined bunded pit constructed with fill or straw bales.
- After concrete washout any water shall be left to evaporate.
- Cured concrete is to be disposed of within the plastic sheet to a licensed facility.

WASTE

- Where possible, waste shall be segregated into labelled bins.
- Wastes on site will be suitably contained and prevented from escaping off site. This may include covering skip bins during high winds.
- Waste storage is not permitted in or near drainage paths.
- Wastes will be removed from site when bin is full.

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Project: 1172 Lake Hawea – Albert Town Road

Description: Erosion and Sediment Control Plan - Schematics

Drawn	Approved	Date	Drawing Number	Revision
TG	TG	11.05.2023	ECSP - 009	A

APPENDIX 2 Calculations for Erosion and Sediment Controls

DECANTING EARTH BUND

Specification	Value	Value2	Value3	Units	Source / Notes / Reference
Site details					
Contributing catchment			2,300.00	m2	Survey Plan
			0.23	ha	Survey Plan
Slope gradient			4.00	%	Survey Plan
Slope length			150.00	m	Survey Plan
Percentage volume factor			2.00	%	
Queenstown Lakes Correction Applied?			2.00	No	
Project duration			0.10	years	Duration of approximatley one month
GD05 DEB Sizing Requirements					
Theoretical DEB volume required			46.00	m3	
Decanting Earth Bund Design Specifications	**Total Storage**	**Dead Storage**	**Live Storage**		
Required volume	46.00	13.80	32.20	m3	Dead storage is 30% of total, live storage is 70% of total
Top length (A)	12.50	10.10	12.50	m	
Top width (B)	5.50	4.30	5.50	m	
Base length (a)	8.50	8.50	10.10	m	
Base width (b)	3.50	3.50	4.30	m	
Depth (h)	1.00	0.40	0.60	m	
Internal batter ratio= 1 to	1	1	1	ratio	Inlet batter is 1:3, Less than 2:1 requires lining
Actual volume (v)	47.92	14.55	33.37	m3	
Width to length ratio	2.3:1	2.3:1	2.3:1	ratio	Length to width ratio between 3:1 to 5:1
Buffer	4.17%			%	
Percentage of total DEB	100.00%	30.37%	69.63%	%	Total must be 100% +/- 0.5%, dead and live must be 30% and 70% +/- 3%
External batter ratio= 1 to	2	2	2	ratio	
T-bar/ Decant details		**Reduced Level (RL)**			
RL at base of Pond		347.10		m	
Bottom of decanting arm range		347.50	0.40	m	
Top of decanting arm range		348.10	1.00	m	
T-bar diameter			0.15	m	
Decant arm length			2.00	m	
Decant rate			3.00	L/sec/1000m2	
Number of holes on T-bar			31	Holes	10 mm diameter holes
Primary spillway details					
RL at primary spillway		348.10		m	0.3 m lower than emergency spillway invert and 0.1 m lower than emergency spillway crest
Outlet pipe diameter			150.00	mm	
Emergency spillway					
RL at emergency spillway invert		348.40		m	
RL at emergency spillway crest		348.65		m	0.25 m higher than emergency spillway invert
Spillway width at invert			1.50	m	Minimum 1.5 m or width of pond

APPENDIX 3 Environmental Site Induction Handout

ENVIRONMENTAL SITE INDUCTION HANDOUT

Key Roles and Responsibilities

Role	Responsibilities
Project Manager	The Project Manager is responsible for the effective implementation of the EMP and has overall responsibility for the environmental performance of the project. Duties include: • Ensuring adequate resources are in place to implement the EMP. • Ensuring all staff and sub-contractors operate within the guidelines of the EMP. • Ensuring that an EMP is prepared and that environmental standards, processes and procedures meet relevant resource consent conditions. • Overseeing the successful implementation, monitoring and review of the EMP. • Ensuring that inspections are carried out in accordance with the relevant EMP. • Restricting or stopping any activity that has the potential to or has caused adverse environmental effects. • Providing notification and reporting of Environmental Incidents to Council and other environmental reports as required by The Guidelines. • Delegating authority of the above responsibilities.
Environmental Representative	The Environmental Representative supports the Project Manager in the day-to-day implementation of the EMP. Duties include: • Ensuring the installation of environmental controls as per the EMP. • Undertaking environmental site inspections. • Overseeing the maintenance and improvement of defective environmental controls. • Providing environmental inductions to all staff and sub-contractors. • Assisting the project leadership in attending to Environmental Incidents and Complaints. The Environmental Representative shall be familiar with environmental risks associated with the project, the EMP and best practice erosion and sediment control principles and practices.
All staff and sub-contractors	All staff and sub-contractors have a responsibility to undertake all activities in accordance with the requirements of this EMP. This includes reporting any activity that has the potential to or has resulted in an Environmental Incident to the Project Manager or Environmental Representative.

Key Environmental Locations

Environmentally sensitive receptors: Hawa River and water race.

Key Resource Consent Conditions

TBC

The site **EMP provides direction** for how this is to be achieved.

Limits of Clearing and Importance of Staging

The staging and sequencing of works is a key component to ensure that environmental effects of construction are appropriately managed. It is imperative that the sequencing outlined in Section 2.1 of the EMP is followed so that the site is stabilised in the most efficient manner.

All staff should be familiar with this sequence. Any potential changes to that sequence need to be approved by the Project Manager which will be discussed first with the Environmental Consultant.

Key Environmental Management Measures in EMP

Erosion and Sediment Control (Section 4 of EMP)

- Direction provided in Erosion and Sediment Control Plan (ESCP) in Appendix 1 of EMP.
- Separation of clean and dirty water is the most important principle to ensure that the contributing catchment of dirty water that needs to be treated is as small as possible.
- Progressive stabilisation (revegetation) of disturbed areas will ensure that the extent and duration of exposed soil is minimised. Keep it covered!
- All controls to be checked immediately before storm events to ensure they are in good-working order.
- Erosion and sediment control devices to remain in place until site is stabilised (defined as 80% vegetative cover).

Any works that disturb the controls outlined on the ESCP must be reinstated before moving to the next task.

Water Quality Management (Section 5 of EMP)

- Any water caught in the sediment devices to be re-used in dust suppression where possible and if required.
- Any observations of dirty water running offsite to be reported directly to the Project Manager.

Dust Management (Section 6 of EMP)

- Dust suppression should occur on any exposed soil on unsealed roads, this can be done using the water caught in the retention basin.
- Avoid all unnecessary vegetation clearing that exposes soil and work should be conducted in stages as this can increase the impact from dust in the event of strong winds.
- During high wind events and dust suppression is becoming difficult works must cease until more favourable weather conditions.
- Constant vigilance should be maintained onsite to ensure that dust is appropriately managed and weekly monitoring should be completed to ensure that management measures are effective.

Noise and Vibration Management (Section 7 of EMP)

- Noise producing works only be undertaken during the hours of 0730-1800 from Monday-Saturday and no works to be completed on Sundays or public holidays.
- Particularly noisy work should be completed during the middle of the day during business hours.
- Noise dampening should occur when possible.

- Weekly site inspections should be undertaken by the Environmental Representative to ensure the strategies in place are effective.

Historic Heritage Management (Section 8 of EMP)

- If any artefacts are found works must stop within 20 meters of the discovery and the site manager notified immediately.
- The site manager must then secure the area and notify the Heritage New Zealand Regional Archaeologist, who will advise when works can begin again.

Chemicals and Fuel Management (Section 9 of EMP)

- Chemicals and fuels are stored and used so not to cause contamination of works areas and surrounding environment.

Waste Management (Section 10 of EMP)

- Waste management on site will ensure wastes are stored safely and in an organised manner until recycling, reuse or disposal.

Contaminated Land Management (Section 11 of EMP)

- Prevent spread of contamination.
- Engage the Environmental Consultant (SQEP) to ensure that the site can be managed in accordance with statuary requirements (i.e., National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health).

Environmental Incidents

The procedure for managing environmental incidents is outlined in Section 3.4 of the EMP, however these can be summarised as follows:

- Environmental incidents must be reported as soon as they occur, and the Project team must respond immediately to mitigate further environmental impacts.
- Investigation into the cause of the incident should be completed and a solution should be constructed to remediate the Environmental damage.
- The Project Manager must then notify the QLDC and/or the ORC of the details of the incident within 12 hours of being made aware of the incident.

Rapid Response for Storm Events

The procedure for rapid response to storm events is outlined in Section 4.6 of the EMP, however these can be summarised as follows:

- The Project Manager will observe and understand the **weather forecast** throughout the project to ensure appropriate preparation onsite.
- If a **significant storm** event is forecast all works should stop within an appropriate amount of time to inspect ESC devices and undertake any maintenance or site stabilisation required.

- The sediment controls should be in operating condition and fully functional.
- Dirty water contour drains should be proactively installed prior to rainfall event.
- During the storm event the site should be monitored to sure the functioning of the ESC devices and maintained if required.

When storms are forecast it is crucial that tools are downed in time for the rapid response procedure to be implemented. This will help avoid environmental incidents, potential enforcement action and site shutdown.

APPENDIX 4 Environmental Site Induction Register

1172 Lake Hawea – Albert Town

ENVIRONMENTAL SITE INDUCTION REGISTER

Name	Organisation	Date Inducted	Induction Delivered by	Signature

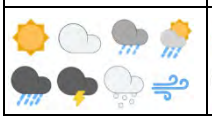
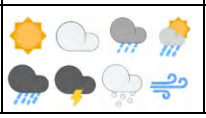
APPENDIX 5 Weekly Environmental Site Inspection Form

1172 Lake Hawea – Albert Town

WEEKLY ENVIRONMENTAL SITE INSPECTION FORM

Environmental Representative: Date:

Item	Yes	No	Comment
General			
Is the EMP available onsite?	☐	☐	
Have any environmental incidents occurred during the week? If so, provide details	☐	☐	*If yes, complete environmental incident report.
Complete description of weather for upcoming week – circle applicable			

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
						

Are there any rain events forecasted for the coming week?	☐	☐	
Have pre rain event inspections been completed?	☐	☐	
Have post rain event inspections been completed?	☐	☐	
Water Quality			
Is water quality monitoring occurring when water is flowing across the site boundaries?	☐	☐	*If yes, complete water quality monitoring form
Is there visual evidence of sediment from the construction site entering waterways/drainage lines?	☐	☐	
Does water in sediment retention devices meet water quality criteria before being discharged?	☐	☐	
Erosion and Sediment Control			
Are works contained within the current stage and site boundaries?	☐	☐	
Are completed areas being progressively stabilised?	☐	☐	
Is there any new evidence of erosion?	☐	☐	
Are erosion and sediment controls installed as per the ESCP?	☐	☐	
Is dirty water entering dirty water diversion channels during rain events?	☐	☐	
Do sediment controls have over 80% capacity?	☐	☐	

1172 Lake Hawea – Albert Town

Item	Yes	No	Comment
Cultural Heritage			
Have any finds of cultural significance been found?	☐	☐	
Noise and Vibration			
Have any complaints been received during the week?	☐	☐	*If yes, complete Complaints Register
Are nearby sensitive receptors being notified before significant noise and/or vibration causing activities?	☐	☐	
Are works only occurring within the hours of operation?	☐	☐	
Dust			
Have any complaints been received during the week?	☐	☐	*If yes, complete Complaints Register
Are works being staged to minimise soil exposure?	☐	☐	
Have completed areas been revegetated or stabilised?	☐	☐	
Is dust suppression of disturbed work areas and stockpiles occurring?	☐	☐	
Are works ceasing during high winds?	☐	☐	
Are only designated access points and haul routes being used?	☐	☐	
Is the site access and surrounding roads swept clean of sediment?	☐	☐	
Vegetation			
Are areas of vegetation being maintained?	☐	☐	
Contaminated Soils			
Have any potential contaminants been uncovered?	☐	☐	
Chemicals and Fuels			
Are all hazardous substances on site stored, transported and used according to the safety data sheet requirements?	☐	☐	
Are vehicles and plant being refuelled in the refuelling bay?	☐	☐	
Is concrete washing being undertaken in the concrete wash-out pit?	☐	☐	
Is there an adequate supply of spill kits onsite? Have any used materials been replaced?	☐	☐	
Waste			

Item	Yes	No	Comment
Is the site in a safe, clean and tidy state?	☐	☐	
Are wastes segregated into labelled bins with lids?	☐	☐	
Are skip bins not overfilled?	☐	☐	
Is waste removed from open drains and drainage paths?	☐	☐	

Actions resulting from this inspection must be forwarded to the Project Manager any actions should be recorded in the Non-Conformance Register – Appendix 8.

Additional Comments:

Names and Signatures of inspection attendees:

APPENDIX 6 Environmental Incident Report Form

1172 Lake Hawea – Albert Town

ENVIRONMENTAL INCIDENT REPORT FORM

Project Address:	**Consent Number:**
Brief Project Description:	

Instructions- Complete this form for all environmental incident that cause contaminants (including sediment) or environmental nuisance to leave the site. Be succinct, stick to known facts and do not make assumptions. Once completed submit to the Regulatory team at Queenstown Lakes District Council at RCMonitoring@qldc.govt.nz. Call the Regulatory team immediately on 03 441 0499 for any serious or ongoing incidents that cannot be brought under immediate control.

Date and Time	Date: XX/XX/XXX Time: XX:XX hours
Description? Provide a brief and factual description of what happened during the incident, include relevant details such as: - The activity being undertaken when the incident occurred - The estimated distance to nearest waterway (include stormwater and dry courses) - The estimated distance to the nearest sensitive receiver Sketches/diagrams/photos may be referenced and appended to this report to aid in the description of the incident.	
Exact Location of the incident? Include address, landmarks, features, nearest tree, etc. Maps and plans can be attached.	
Quantity or volume of material escaped or causing incident? (provide and estimate quantity)	
Who identified the incident?	Contractor ☐ Council ☐ Community ☐ Other ☐

What immediate actions/control measures were taken to rectify or contain the incident?
What initial corrective action will be taken to prevent similar incidents recurring in the near future?
Has the Otago Regional Council been notified? Yes ☐ No ☐ Will be notified ☐

Environmental Representative/person making report:	
Name……	Signature……
Organisation……	Date……
Mobile phone number……	
Project Manager:	
Name……	Signature……
Organisation……	Date……
Mobile phone number……	

APPENDIX 7 Environmental Complaints Register

1172 Lake Hawea – Albert Town

ENVIRONMENTAL COMPLAINTS REGISTER

Complaint #	Date and Time Received	Complainant details (name, address, phone number)	Details of Complaint	Investigation and Findings	Outcome	Close out Date

APPENDIX 8 Environmental Non-Conformance Register

1172 Lake Hawea – Albert Town

ENVIRONMENTAL NON-CONFORMANCE REGISTER

Ref Number	Date Observed	Found via (e.g., inspection, monitoring, complaint?)	Details of Non-conformance	Corrective Actions	Updated by	Close out Date

APPENDIX 9 Water Quality Monitoring Results Form

1172 Lake Hawea – Albert Town

WATER QUALITY MONITORING RESULTS FORM

Date		Monitoring Trigger		Location Description	
			Yes	No	Measurement
Is the clarity of the water more than 100 mm?			☐	☐	____ mm
Is turbidity less than 100 NTU?*			☐	☐	____ NTU
Is the pH of the water between 5.5-8.5?*			☐	☐	pH ____
Are total suspended solids less than 50 mg/L?*			☐	☐	____ mg/L
Are hydrocarbons visible?			☐	☐	
Are tannins visible in the water?			☐	☐	
Is there any waste in the water?			☐	☐	
Description of any non-conformance and actions required: •					
Include images of sampling location:					

*Enviroscope can provide Water Quality Monitoring services to measure turbidity and pH. If 100 NTU is exceeded, collect a water sample to send to laboratory for TSS measurement.

APPENDIX 10 Archaeological Discovery Protocol

HERITAGE NEW ZEALAND
POUHERE TAONGA

Heritage New Zealand Pouhere Taonga Archaeological Discovery Protocol

Under the Heritage New Zealand Pouhere Taonga Act (2014) an archaeological site is defined as any place in New Zealand that was associated with human activity that occurred before 1900 and provides or may provide, through investigation by archaeological methods, evidence relating to the history of New Zealand. For pre-contact Maori sites this evidence may be in the form of bones, shells, charcoal, stones etc. In later sites of European/Chinese origin, artefacts such as bottle glass, crockery etc. may be found, or evidence of old foundations, wells, drains or similar structures. Burials/koiwi tangata may be found from any historic period.

In the event that an unidentified archaeological site is located during works, the following applies;

1. Work shall cease immediately at that place and within 20m around the site.

2. The contractor must shut down all machinery, secure the area, and advise the Site Manager.

3. The Site Manager shall secure the site and notify the Heritage New Zealand Regional Archaeologist. Further assessment by an archaeologist may be required.

4 If the site is of Maori origin, the Site Manager shall notify the Heritage New Zealand Regional Archaeologist and the appropriate iwi groups or kaitiaki representative of the discovery and ensure site access to enable appropriate cultural procedures and tikanga to be undertaken, as long as all statutory requirements under legislation are met (*Heritage New Zealand Pouhere Taonga Act*, *Protected Objects Act*).

5. If human remains (koiwi tangata) are uncovered the Site Manager shall advise the Heritage New Zealand Regional Archaeologist, NZ Police and the appropriate iwi groups or kaitiaki representative and the above process under 4 shall apply. Remains are not to be moved until such time as iwi and Heritage New Zealand have responded.

6. Works affecting the archaeological site and any human remains (koiwi tangata) shall not resume until Heritage New Zealand gives written approval for work to continue. Further assessment by an archaeologist may be required.

7. Where iwi so request, any information recorded as the result of the find such as a description of location and content, is to be provided for their records.

8. Heritage New Zealand will determine if an archaeological authority under the *Heritage New Zealand Pouhere Taonga Act* 2014 is required for works to continue.

It is an offence under S87 of the *Heritage New Zealand Pouhere Taonga Act 2014* to modify or destroy an archaeological site without an authority from Heritage New Zealand irrespective of

whether the works are permitted or a consent has been issued under the Resource Management Act.

Heritage New Zealand Regional archaeologist contact details:

Dr Matthew Schmidt
Regional Archaeologist Otago/Southland
Heritage New Zealand
PO Box 5467
Dunedin
Ph. +64 3 470 2364, mobile 027 240 8715
Fax. +64 3 4773893
mschmidt@heritage.org.nz

AFFECTED PERSON'S APPROVAL

FORM 8A

QUEENSTOWN LAKES DISTRICT COUNCIL

Resource Management Act 1991 Section 95

RESOURCE CONSENT APPLICANT'S NAME AND/OR RM

Bluesure Development Limited

AFFECTED PERSON'S DETAILS

I/We Diane Kenton and Lee-Ann Tombling

Are the owners/occupiers of

1147B Lake Hawea-Albert Town Road, Lake Hawea (Lot 2 DP 300393)

DETAILS OF PROPOSAL

I/We hereby give written approval for the proposal to:

Subdivide property into 5 separate titles with building platforms for single storied dwellings, with the entrance being shifted 100m north from the current NZTA approved entrance

at the following subject site(s):

1172 Lake Hawea- Albert Town Road, Lake Hawea (Sec 22 Block III Lower Hawea SD)

☑ I/We understand that by signing this form Council, when considering this application, will not consider any effects of the proposal upon me/us.

☑ I/We understand that if the consent authority determines the activity is a deemed permitted boundary activity under section 87BA of the Act, written approval cannot be withdrawn if this process is followed instead.

WHAT INFORMATION/PLANS HAVE YOU SIGHTED

☑ I/We have sighted and initialled ALL plans dated and approve them.

March, April, May 2023

APPROVAL OF AFFECTED PERSON(S)

The written consent of all owners / occupiers who are affected. If the site that is affected is jointly owned, the written consent of all co-owners (names detailed on the title for the site) are required.

A

Name (PRINT)
Diane Kenton

Contact Phone / Email address
021607006 di.kenton@xtra.co.nz

Signature

Date 14/4/2023.

B

Name (PRINT)
Leeann Robyn Tambling.

Contact Phone / Email address
021 026 91344

Signature

Date 6/4/23.

C

Name (PRINT)

Contact Phone / Email address

Signature

Date

D

Name (PRINT)

Contact Phone / Email address

Signature

Date

Note to 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.

Notes:
- Boundary information sourced from SO 18261.
- Adjoining boundaries sourced from LINZ XML.
- Levels in terms of OIT III SO 18261 @ 362.29m.
- Contours produced from QLDC Lidar 2019 1m x 1m.
- Contours = 1.0m/0.2m.
- Areas & dimensions subject to final LT Survey.
- See Record of Title OT9C/457 for details of any existing Easements, Consent Notices and Land Covenants.
- Some internal fences are scaled from aerial image.

Signatures and Date

Diane Kenton:

Leeann Robyn Tombling: 31/5/23

Section 20

Approved Transit NZ Access Point (5034528.3)

Lot 100
0.2010Ha
Lot 100 hereon (Legal Access) to be held to four undivided one fourth shares by the owners of Lots 2 - 5 hereon as tenants in common in the said shares.

Lot 1
2.2730Ha

Existing Building

Water Race protected by Easement (H Transfer 819525)

Ex. Dwelling

Ex. Garage

Lake Hawea-Albert Town Road (SH 6)

Lot 2
0.6700Ha

20m setback

Building Platform
31.5m x 28.57m
(900m²)
Max height 351.15m

Section 22
Block III Lower Hawea SD
5.2330Ha
OT9C/457

Lot 2
DP 25173

Lot 3
0.4760Ha

Building Platform
33.33m x 22.5m
(750m²)
Max height 350.30m

Approved Transit NZ Access Point (5034528.4)

Existing Building

Lot 5
0.9710Ha

Building Platform
34.5m x 26.09m
(900m²)
Max height 352.85m

15m setback

Lot 4
0.6420Ha

(pond)

Building Platform
33.33m x 22.5m
(750m²)
Max height 349.75m

Lot 6
DP 26200

MEASURED LAND SURVEYS

Scheme Plan

Lots 1-5 & 100 being a Subdivision of Section 22 Block III Lower Hawea SD

(1172 Lake Hawea-Albert Town Road)

Client:	Simon
Scale:	1 : 1000 @ A3
Surveyed:	ST 29/10/21
Drawn:	ST 04/05/23
Datum:	Lindis Peak 2000/NZVD 2016
Job #:	21111_S1
Rev:	B
Sheet:	1 of 1

CSNZ THE CONSULTING SURVEYORS OF NEW ZEALAND

Rev	Description	Date
A	ORIGINAL	01/09/22
B	Contour update	04/05/23

Notes:
- Boundary information sourced from SO 18261.
- Adjoining boundaries sourced from LINZ XML.
- Levels in terms of OIT III SO 18261 @ 362.29m.
- Contours produced from QLDC Lidar 2019 1m x 1m.
- Contours = 1.0m/0.2m.
- Areas & dimensions subject to final LT Survey.
- See Record of Title OT9C/457 for details of any existing Easements, Consent Notices and Land Covenants.
- Some internal fences are scaled from aerial image.

+4.5m to +5.0m (Fill)
+4.0m to +4.5m (Fill)
+3.5m to +4.0m (Fill)
+3.0m to +3.5m (Fill)
+2.5m to +3.0m (Fill)
+2.0m to +2.5m (Fill)
+1.5m to +2.0m (Fill)
+1.0m to +1.5m (Fill)
+0.5m to +1.0m (Fill)
0.0m to +0.5m (Fill)
0.0m to -0.5m (Cut)
-0.5m to -1.0m (Cut)
-1.0m to -1.5m (Cut)

Earthworks Notes:-

Roading quantities:
Area = 2270m²
Total Cut = 790m³
Total Fill = 490m³

Building Platform (Lot 4):
Area = 920m²
Total Fill = 1160m³

Cut volumes includes topsoil strip (assumed topsoil depth = 0.3m)

Signatures and Date

Diane Kenton:

Leeann Robyn Tombling: 31/5/23.

Section 20

Approved Transit NZ Access Point (5034528.3)

Lot 1
1.7890Ha

Lot 100
0.2010Ha

Existing Building

Max Fill = 1.05m

Lake Hawea-Albert Town Road (SH 6)

Water Race protected by Easement (H Transfer 819525)

Ex. Dwelling

Ex. Garage

Existing Building

20m setback

Lot 2
0.6700Ha

Section 22
Block III Lower Hawea SD
5.2330Ha
OT9C/457

Lot 2
DP 25173

Building Platform
31.5m x 28.57m
(900m²)

Lot 3
0.4760Ha

Building Platform
33.33m x 22.5m
(750m²)

Max Cut = 1.38m

Approved Transit NZ Access Point (5034528.4)

Existing Building

Lot 5
0.9710Ha

Building Platform
34.5m x 26.09m
(900m²)

Re-directed Footpath

Existing Building

15m setback

Lot 4
0.6420Ha

(pond)

Building Platform
33.33m x 22.5m
(750m²)

A

A'

B

B'

Lot 6
DP 26200

MEASURED
LAND SURVEYS

Earthworks Plan

Lots 1-5 & 100 being a Subdivision of Section 22 Block III Lower Hawea SD

(1172 Lake Hawea-Albert Town Road)

Client:	Bluesure Developments Limited
Scale:	1 : 1000 @ A3
Surveyed:	ST 29/10/21
Drawn:	RC 04/05/23
Datum:	Lindis Peak 2000/NZVD 2016
Job #:	21111_E1
Rev:	A
Sheet:	1 of 2

CSNZ THE CONSULTING SURVEYORS OF NEW ZEALAND

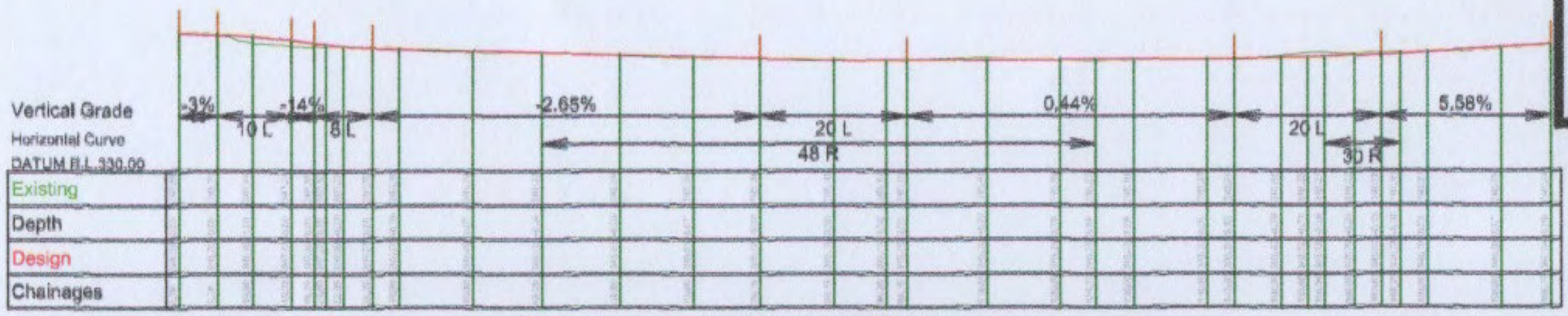
Rev	Description	Date
A	ORIGINAL	04/05/23

Signatures and Date

Diane Kenton:

31/5/23

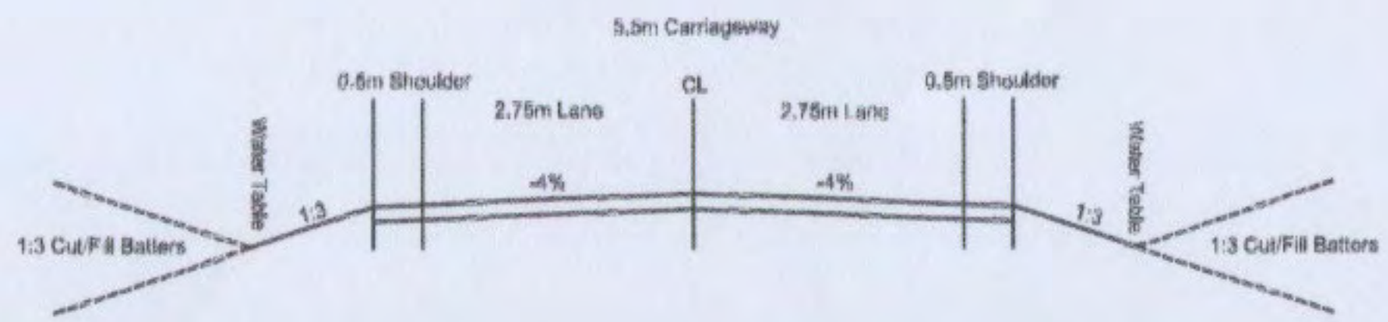
Leeann Robyn Tombling: *



LONGITUDINAL SECTION Road 1

Horizontal Scale 1 : 750
Vertical Scale 1 : 750

Typicall Section - Road 1



MEASURED LAND SURVEYS

www.measuredlandsurveys.co.nz info@measuredlandsurveys.co.nz

Rev	Description	Date
A	ORIGINAL	17/03/23

Roading Sections
Lots 1-5 & 100 being a Subdivision of Section 22 Block III Lower Hawea SD
(1172 Lake Hawea-Albert Town Road)

Client: Bluesure Developments Limited

Scale: 1 : 1000 @ A3

Surveyed: Drawn: RC 17/03/23

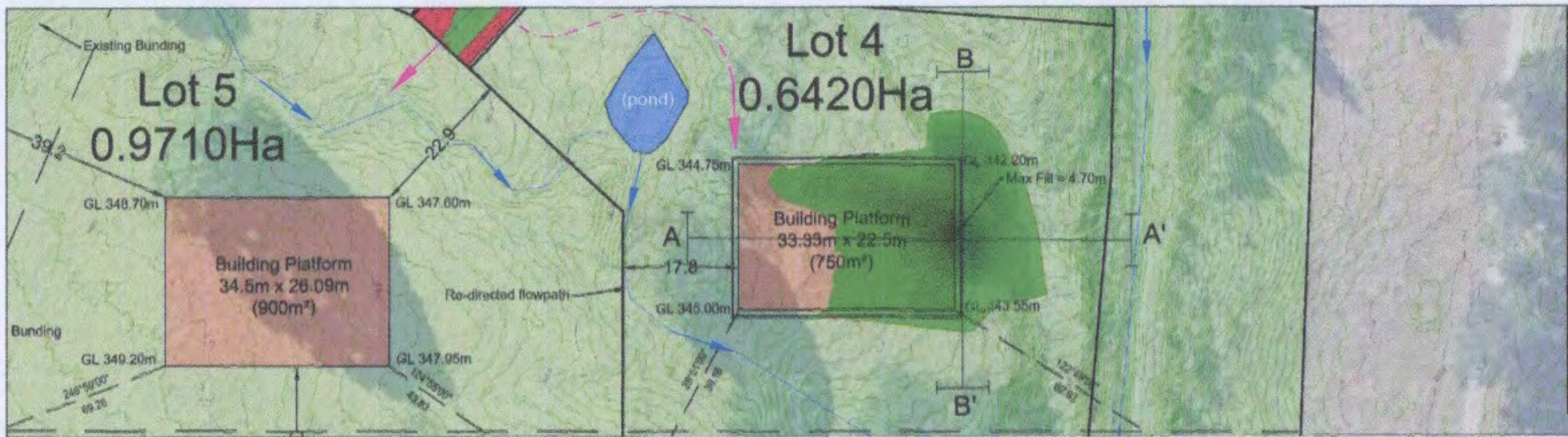
CSNZ THE CONSULTING SURVEYORS OF NEW ZEALAND
A DIVISION OF THE NEW ZEALAND INSTITUTE OF SURVEYORS

Datum: Lindis Peak 2000

Sheet: 2 of 2

Job #: 21111_E1

Rev: A



Signatures and Date

Diane Kenton: [signature] 31/5/23

Leeann Robyn Tombling: [signature]

DATUM R.L.332.00

CHAINAGE	EXISTING GROUND	+ FILL DEPTH / - CUT DEPTH	FINISHED LEVEL
0.00	345.74	0.00	345.74
2.00	345.60	0.03	345.63
4.00	345.47	0.01	345.48
6.00	345.31	0.00	345.32
8.00	345.20	-0.00	345.19
10.00	345.11	0.00	345.11
12.00	344.93	0.00	344.93
14.00	344.80	-0.00	344.80
16.00	344.72	0.00	344.72
18.00	344.60	0.01	344.61
20.00	344.55	-0.01	344.55
22.00	344.45	-0.00	344.45
24.00	344.35	0.05	344.40
26.00	344.26	0.14	344.40
28.00	344.32	0.08	344.40
30.00	344.09	0.31	344.40
32.00	343.84	0.56	344.40
34.00	343.46	0.94	344.40
36.00	342.59	1.81	344.40
38.00	341.32	3.08	344.40
40.00	340.13	4.27	344.40
42.00	339.79	4.61	344.40
44.00	339.87	3.95	343.82
46.00	340.48	2.67	343.15
48.00	340.69	1.80	342.48
50.00	340.56	1.26	341.82
52.00	340.46	0.69	341.15
54.00	340.43	0.06	340.49
56.00	340.55	0.00	340.55
58.00	340.60	0.00	340.61
60.00	340.01	0.00	340.01
62.00	338.25	0.01	338.27
64.00	337.21	-0.01	337.21
66.00	336.60	0.00	336.60
68.00	336.14	0.00	336.14
68.38	336.13	0.00	336.13

Hz Scale 1:500 @ A3
Vert Scale 1:500 @ A3

Cross Section A-A'

MEASURED LAND SURVEYS

www.measuredlandsurveys.co.nz info@measuredlandsurveys.co.nz

Rev	Description	Date
A	ORIGINAL	13/04/23

Cross Sections
Lots 1-5 & 100 being a Subdivision of Section 22 Block III Lower Hawea SD
(1172 Lake Hawea-Albert Town Road)

Client: Bluesure Developments Limited

Scale: 1 : 500 @ A3

Surveyed:

Drawn: RC 13/04/23

CSNZ THE CONSULTING SURVEYORS OF NEW ZEALAND
A DIVISION OF THE NEW ZEALAND INSTITUTE OF SURVEYORS

Datum: Lindis Peak 2000

Sheet: 1 of 2

Job #: 21111_M1

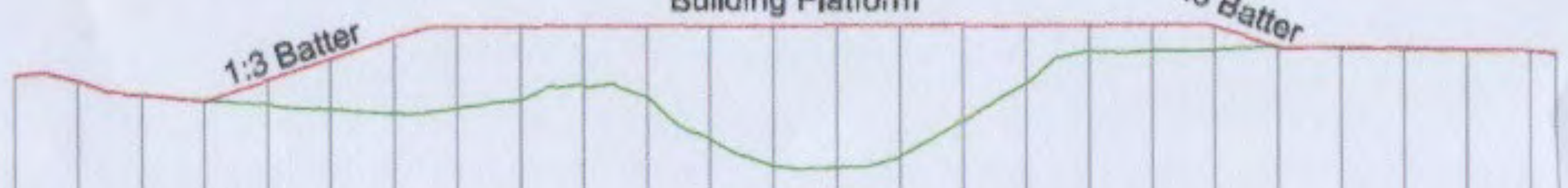
Rev: A

Signatures and Date

Diane Kenton:

31/5/23

Leeann Robyn Tombling:



DATUM R.L.336.00

CHAINAGE	EXISTING GROUND	+ FILL DEPTH - CUT DEPTH	FINISHED LEVEL
0.00	342.79	0.00	342.79
2.00	342.61	0.00	342.61
4.00	342.18	-0.00	342.18
6.00	341.99	0.00	341.99
8.00	341.87	0.78	342.65
10.00	341.73	1.58	343.31
12.00	341.59	2.39	343.97
14.00	341.71	2.62	344.33
16.00	341.96	2.37	344.33
18.00	342.46	1.87	344.33
20.00	342.09	2.24	344.33
22.00	340.70	3.63	344.33
24.00	339.85	4.48	344.33
26.00	339.81	4.53	344.33
28.00	340.20	4.13	344.33
30.00	341.29	3.04	344.33
32.00	342.44	1.90	344.34
34.00	343.46	0.87	344.34
36.00	343.53	0.80	344.34
38.00	343.53	0.75	344.28
40.00	343.58	0.06	343.64
42.00	343.56	0.01	343.57
44.00	343.53	0.01	343.54
46.00	343.51	0.00	343.52
48.00	343.46	-0.00	343.46
48.84	343.41	0.00	343.41

Hz Scale 1:500 @ A3
Vert Scale 1:500 @ A3

Cross Section B-B'

MEASURED LAND SURVEYS

www.measuredlandsurveys.co.nz info@measuredlandsurveys.co.nz

Rev	Description	Date
A	ORIGINAL	13/04/23

Cross Sections

Lots 1-5 & 100 being a Subdivision of Section 22 Block III Lower Hawea SD

(1172 Lake Hawea-Albert Town Road)

Client: Bluesure Developments Limited

Scale: 1 : 500 @ A3

Surveyed:

Drawn: RC 13/04/23

CSNZ THE CONSULTING SURVEYORS OF NEW ZEALAND
A DIVISION OF THE NEW ZEALAND INSTITUTE OF SURVEYORS

Datum: Lindis Peak 2000

Sheet: 2 of 2

Job #: 21111_M1

Rev: A

AFFECTED PERSON'S APPROVAL

FORM 8A

QUEENSTOWN LAKES DISTRICT COUNCIL

Resource Management Act 1991 Section 95

RESOURCE CONSENT APPLICANT'S NAME AND/OR RM

Bluesure Developments Ltd

AFFECTED PERSON'S DETAILS

I/We Davida, Nicola & Thomas Mead

Are the owners/occupiers of

Hawea Golf Course, Lake Hawea-Albert Town Road, Rd 2, Wanaka, 9382 (Pt Lot 6 DP 26200-FARM).

DETAILS OF PROPOSAL

I/We hereby give written approval for the proposal to:

A 5-lot subdivision with 4 associated building platforms as well as associated earthworks, servicing (including access) and landscaping.

at the following subject site(s):

1172 Lake Hawea-Albert Town Road, Rd 2, Wanaka, 9382

☑ PLEASE TICK I/We understand that by signing this form Council, when considering this application, will not consider any effects of the proposal upon me/us.

N/A PLEASE TICK I/We understand that if the consent authority determines the activity is a deemed permitted boundary activity under section 87BA of the Act, written approval cannot be withdrawn if this process is followed instead.

WHAT INFORMATION/PLANS HAVE YOU SIGHTED

☑ PLEASE TICK I/We have sighted and initialled ALL plans dated and approve them.

March, April & May 2023

// October 2017

Notes:
- Boundary information sourced from SO 18261.
- Adjoining boundaries sourced from LINZ XML.
- Levels in terms of OIT III SO 18261 @ 362.29m.
- Contours produced from QLDC Lidar 2019 1m x 1m.
- Contours = 1.0m/0.2m.
- Areas & dimensions subject to final LT Survey.
- See Record of Title OT9C/457 for details of any existing Easements, Consent Notices and Land Covenants.
- Some internal fences are scaled from aerial image.

Signatures and Date

Davida Mead:

Nicole Mead:

Thomas Mead:

iP solutions

Section 20

Approved Transit NZ Access Point (5034528.3)

Lot 100
0.2010Ha
Lot 100 hereon (Legal Access) to be held to four undivided one fourth shares by the owners of Lots 2 - 5 hereon as tenants in common in the said shares.

Lot 1
2.2730Ha

Existing Bunding

Water Race protected by Easement (H Transfer 819525)

Ex. Dwelling

Ex. Garage

Lake Hawea-Albert Town Road (SH 6)

Lot 2
0.6700Ha

20m setback

Building Platform
31.5m x 28.57m
(900m²)
Max height 351.15m

GL 346.85m
GL 345.90m
GL 348.25m
GL 347.30m

Section 22
Block III Lower Hawea SD
5.2330Ha
OT9C/457

Lot 2
DP 25173

Lot 3
0.4760Ha

Building Platform
33.33m x 22.5m
(750m²)
Max height 350.30m

GL 344.75m
GL 343.80m
GL 344.90m
GL 344.35m

Approved Transit NZ Access Point (5034528.4)

Existing Bunding

Lot 5
0.9710Ha

Building Platform
34.5m x 26.09m
(900m²)
Max height 352.85m

GL 348.70m
GL 347.60m
GL 349.20m
GL 347.95m

Re-directed flowpath

(pond)

Lot 4
0.6420Ha

Building Platform
33.33m x 22.5m
(750m²)
Max height 349.75m

GL 344.75m
GL 342.20m
GL 345.00m
GL 343.55m

15m setback

Lot 6
DP 26200

MEASURED
LAND SURVEYS

Scheme Plan

Lots 1-5 & 100 being a Subdivision of Section 22 Block III Lower Hawea SD

(1172 Lake Hawea-Albert Town Road)

Client:	Simon
Scale:	1 : 1000 @ A3
Surveyed:	ST 29/10/21
Drawn:	ST 04/05/23
Datum:	Lindis Peak 2000/NZVD 2016
Sheet:	1 of 1
Job #:	21111_S1
Rev:	B

CSNZ THE CONSULTING SURVEYORS OF NEW ZEALAND
A DIVISION OF THE NEW ZEALAND INSTITUTE OF SURVEYORS

Rev	Description	Date
A	ORIGINAL	01/09/22
B	Contour update	04/05/23

APPROVAL OF AFFECTED PERSON(S)

The written consent of all owners / occupiers who are affected. If the site that is affected is jointly owned, the written consent of all co-owners (names detailed on the title for the site) are required.

A

Name (PRINT): Davida Mead

x Contact Phone / Email address: 027253 3636

x Signature: D Mead — Date: x 18-6-23

B

Name (PRINT): Nicola Mead

x Contact Phone / Email address: 03 443 9694

x Signature: N Mead — Date: x 18-6-23

C

Name (PRINT): Thomas Mead

x Contact Phone / Email address: guymeade xtra.co.nz

x Signature: T S Mead — Date: x 18-6-23

D

Name (PRINT):

Contact Phone / Email address:

Signature: — Date:

Note to person signing written approval

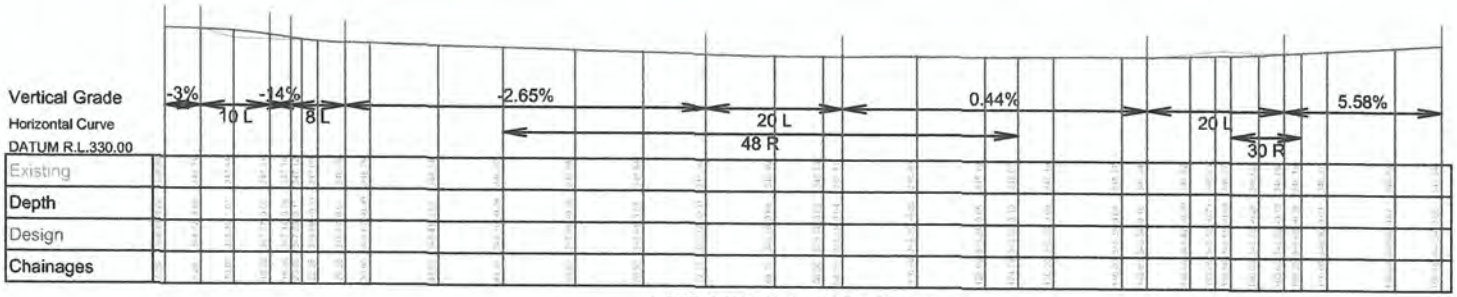
Conditional written approvals cannot be accepted.
There is no obligation to sign this form, and no reasons need to be given.
If this form is not signed, the application may be notified with an opportunity for submissions.
If signing on behalf of a trust or company, please provide additional written evidence that you have signing authority.

Signatures and Date

Davida Mead:

Nicola Mead:

Thomas Mead:

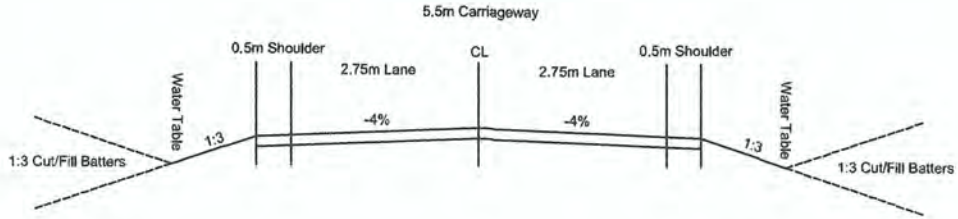


LONGITUDINAL SECTION Road 1

Horizontal Scale 1 : 750

Vertical Scale 1 : 750

Typicall Section - Road 1



MEASURED LAND SURVEYS

www.measuredlandsurveys.co.nz info@measuredlandsurveys.co.nz

Rev	Description	Date
A	ORIGINAL	17/03/23

Roading Sections
Lots 1-5 & 100 being a Subdivision of Section 22 Block III Lower Hawea SD
(1172 Lake Hawea-Albert Town Road)

Client: Bluesure Developments Limited

Scale: 1 : 1000 @ A3

Surveyed:

Drawn: RC 17/03/23

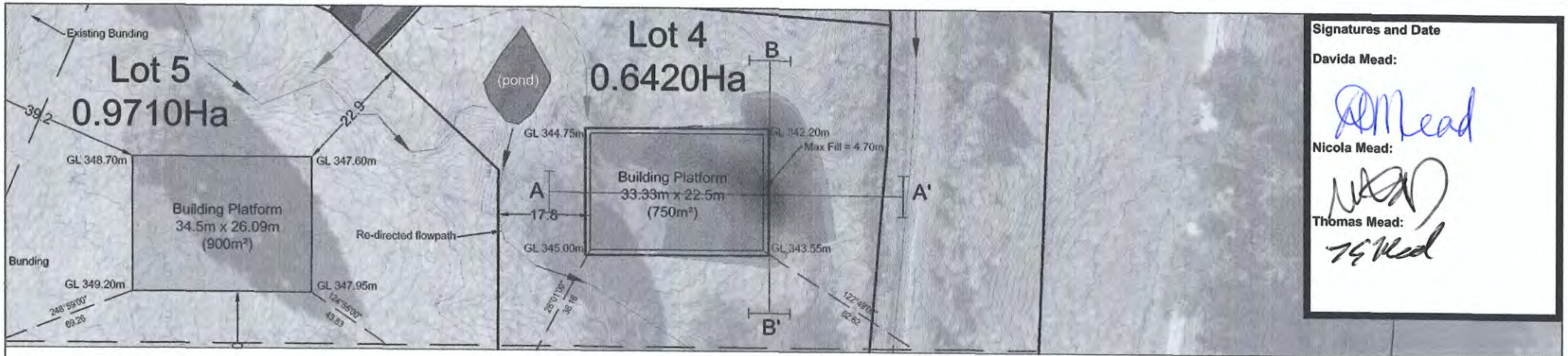
Datum: Lindis Peak 2000

CSNZ THE CONSULTING SURVEYORS OF NEW ZEALAND
A DIVISION OF THE NEW ZEALAND INSTITUTE OF SURVEYORS

Sheet: 2 of 2

Job #: 21111_E1

Rev: A

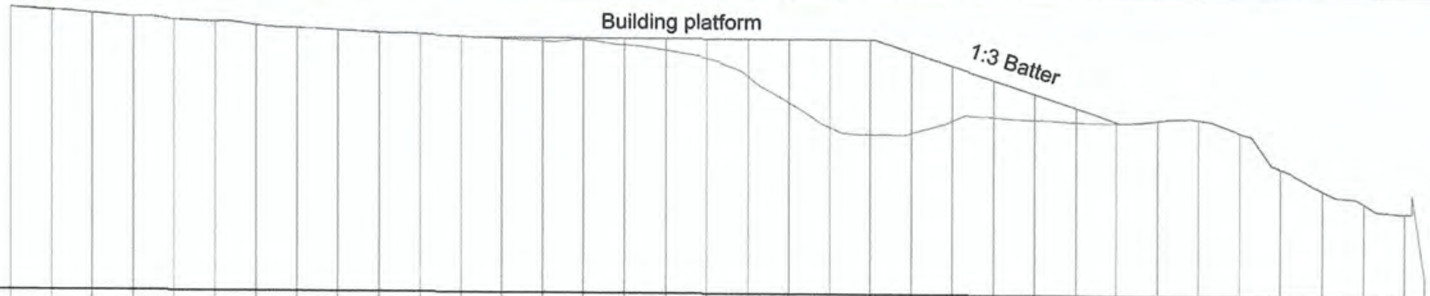


Signatures and Date

Davida Mead:

Nicola Mead:

Thomas Mead:



DATUM R.L.332.00

CHAINAGE	FINISHED LEVEL	+ FILL DEPTH / - CUT DEPTH	EXISTING GROUND
0.00	345.74	0.00	345.74
2.00	345.63	0.03	345.60
4.00	345.48	0.01	345.47
6.00	345.32	0.00	345.31
8.00	345.19	-0.00	345.20
10.00	345.11	0.00	345.11
12.00	344.93	0.00	344.93
14.00	344.80	-0.00	344.80
16.00	344.72	0.00	344.72
18.00	344.61	0.01	344.60
20.00	344.55	-0.01	344.55
22.00	344.45	-0.00	344.45
24.00	344.40	0.05	344.35
26.00	344.40	0.14	344.26
28.00	344.40	0.08	344.32
30.00	344.40	0.31	344.09
32.00	344.40	0.56	343.84
34.00	344.40	0.94	343.46
36.00	344.40	1.81	342.59
38.00	344.40	3.08	341.32
40.00	344.40	4.27	340.13
42.00	344.40	4.61	339.79
44.00	343.82	3.95	339.87
46.00	343.15	2.67	340.48
48.00	342.48	1.80	340.69
50.00	341.82	1.26	340.56
52.00	341.15	0.69	340.46
54.00	340.49	0.06	340.43
56.00	340.55	0.00	340.55
58.00	340.61	0.00	340.60
60.00	340.01	0.00	340.01
62.00	338.27	0.01	338.25
64.00	337.21	-0.01	337.21
66.00	336.60	0.00	336.60
68.00	336.14	0.00	336.14
68.38	336.13	0.00	336.13

Hz Scale 1:500 @ A3
Vert Scale 1:500 @ A3

Cross Section A-A'

MEASURED LAND SURVEYS

www.measuredlandsurveys.co.nz info@measuredlandsurveys.co.nz

Rev	Description	Date
A	ORIGINAL	13/04/23

Cross Sections
Lots 1-5 & 100 being a Subdivision of Section 22 Block III Lower Hawea SD
(1172 Lake Hawea-Albert Town Road)

Client: Bluesure Developments Limited
Scale: 1 : 500 @ A3
Surveyed:
Drawn: RC 13/04/23

CSNZ THE CONSULTING SURVEYORS OF NEW ZEALAND
A DIVISION OF THE NEW ZEALAND INSTITUTE OF SURVEYORS

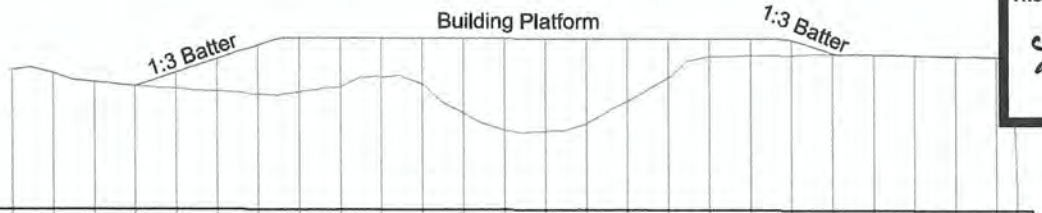
Datum: Lindis Peak 2000
Sheet: 1 of 2
Job #: 21111_M1
Rev: A

Signatures and Date

Davida Mead:

Nicola Mead:

Thomas Mead:



DATUM R.L.336.00

EXISTING GROUND	342.79	342.61	342.18	341.99	341.87	341.73	341.59	341.71	341.96	342.46	342.09	340.70	339.85	339.81	340.20	341.29	342.44	343.46	343.53	343.53	343.58	343.56	343.53	343.51	343.46	343.41						
+ FILL DEPTH - CUT DEPTH	0.00	0.00	-0.00	0.00	0.78	1.58	2.39	2.62	2.37	1.87	2.24	3.63	4.48	4.53	4.13	3.04	1.90	0.87	0.80	0.75	0.06	0.01	0.01	0.00	-0.00	0.00						
FINISHED LEVEL	342.79	342.61	342.18	341.99	342.65	343.31	343.97	344.33	344.33	344.33	344.33	344.33	344.33	344.33	344.33	344.33	344.34	344.34	344.34	344.28	343.64	343.57	343.54	343.52	343.46	343.41						
CHAINAGE	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00	24.00	26.00	28.00	30.00	32.00	34.00	36.00	38.00	40.00	42.00	44.00	46.00	48.00	48.84						

Hz Scale 1:500 @ A3
Vert Scale 1:500 @ A3

Cross Section B-B'

MEASURED LAND SURVEYS

www.measuredlandsurveys.co.nz info@measuredlandsurveys.co.nz

Rev	Description	Date
A	ORIGINAL	13/04/23

Cross Sections
Lots 1-5 & 100 being a Subdivision of Section 22 Block III Lower Hawea SD
(1172 Lake Hawea-Albert Town Road)

Client: Bluesure Developments Limited

Scale: 1 : 500 @ A3

Surveyed:

Drawn: RC 13/04/23

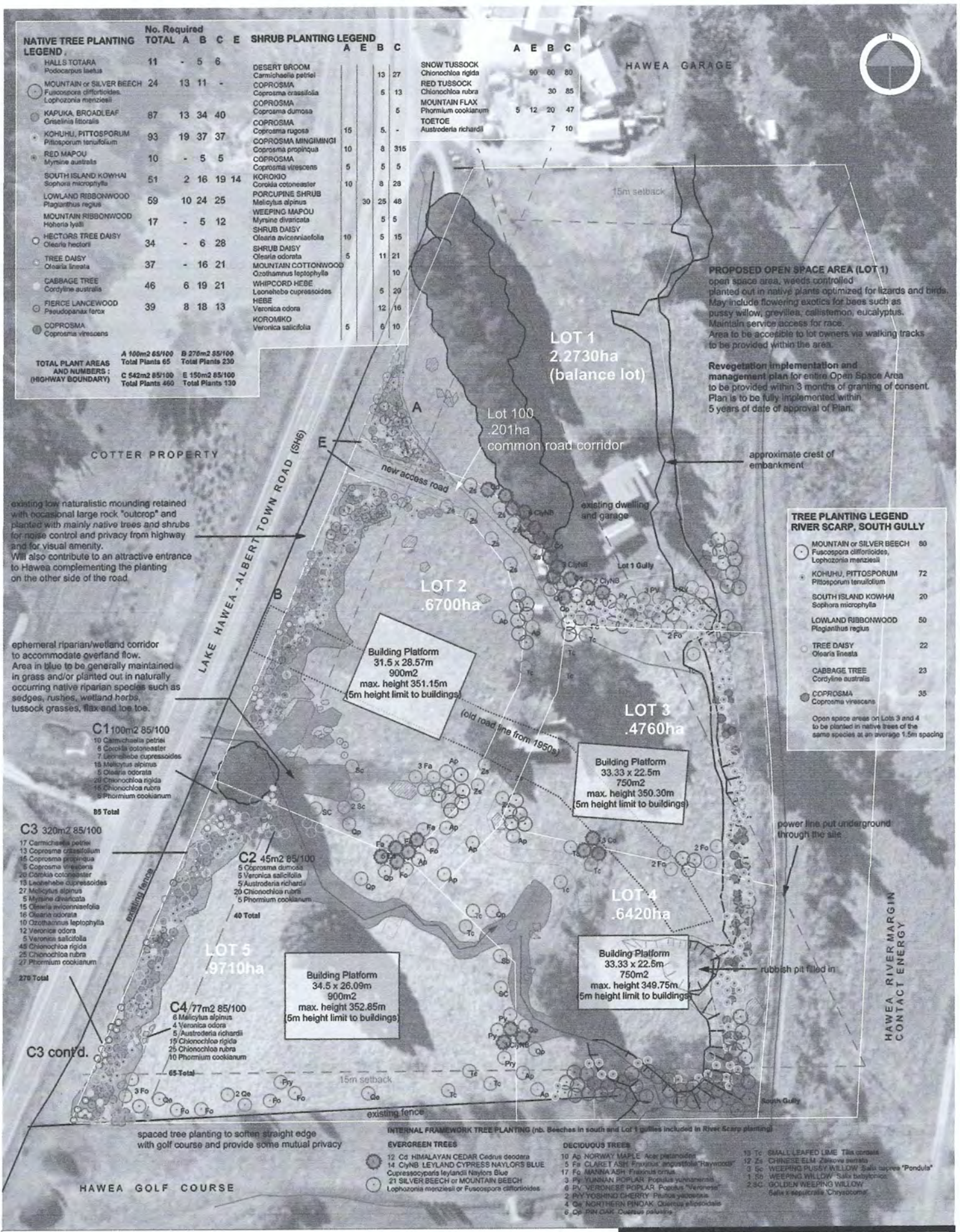
Datum: Lindis Peak 2000

CSNZ THE CONSULTING SURVEYORS OF NEW ZEALAND
A DIVISION OF THE NEW ZEALAND INSTITUTE OF SURVEYORS

Sheet: 2 of 2

Job #: 21111_M1

Rev: A



Anne Steven LANDSCAPE ARCHITECT

prepared by Anne Steven
Registered Landscape Architect
WANAKA

May 2023

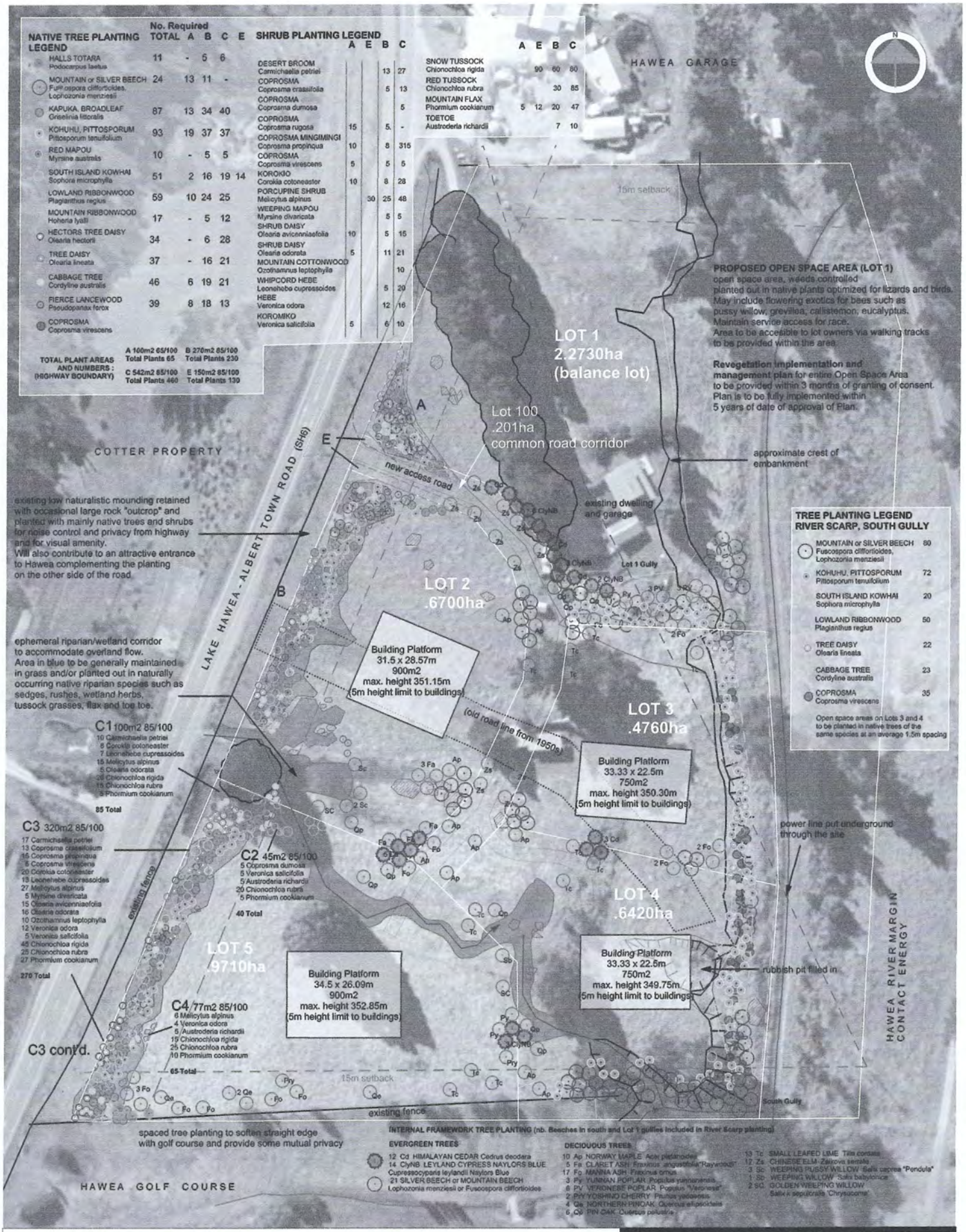
LAND DEVELOPMENT CONCEPT FOR
1172 Lake Hawea-Albert Town Road (SH6)
Bluesure Developments Ltd

Signatures and Date

Davida Mead: DMead

Nicola Mead:

Thomas Mead:



prepared by Anne Steven
Registered Landscape Architect
WANAKA

May 2023

LAND DEVELOPMENT CONCEPT FOR
1172 Lake Hawea-Albert Town Road (SH6)
Bluesure Developments Ltd

Signatures and Date

Davida Mead: DMead

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