THOMSON SURVEY LIMITED

SURVEYORS AND RESOURCE PLANNERS

Our Reference: 10714.1 (FNDC)

2 December 2025

Resource Consents Department
Far North District Council
JB Centre
KERIKERI

Dear Sir/Madam

RE: Proposed Re-development and upgrading of winery & restaurant, at 56 Wiroa Road, Kerikeri – Mike & Shirley Endean Marsden Charitable Trust

I am pleased to submit application on behalf of Mike & Shirley Endean Marsden Charitable Trust, for a proposed re-development and upgrade to the existing winery and restaurant on Wiroa Road, Kerikeri on land zoned Rural Production. The application is a discretionary activity.

The application fee of $2,625 has been paid separately via direct credit.

Regards

Lynley Newport
Senior Planner
THOMSON SURVEY LTD

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Background picture represents a New Zealand surveying trig station, used to beacon control survey marks

Te Kaunihera o Te Hiku o te Ika
Far North District Council

Office Use Only
Application Number:

Application for resource consent or fast-track resource consent

(Or Associated Consent Pursuant to the Resource Management Act 1991 (RMA)) (If applying for a Resource Consent pursuant to Section 87AAC or 88 of the RMA, this form can be used to satisfy the requirements of Form 9). Prior to, and during, completion of this application form, please refer to Resource Consent Guidance Notes and Schedule of Fees and Charges — both available on the Council's web page.

1. Pre-Lodgement Meeting

Have you met with a council Resource Covnsent representative to discuss this application prior to lodgement?

◯ Yes ☑ No

2. Type of consent being applied for

(more than one circle can be ticked):

☑ Land Use
◯ Fast Track Land Use*
◯ Subdivision
◯ Consent under National Environmental Standard (e.g. Assessing and Managing Contaminants in Soil)
◯ Discharge
◯ Change of Consent Notice (s.221(3))
◯ Extension of time (s.125)
◯ Other (please specify) _____

**The fast track is for simple land use consents and is restricted to consents with a controlled activity status.*

3. Would you like to opt out of the fast track process?

☑ Yes ◯ No

4. Consultation

Have you consulted with Iwi/Hapū? ◯ Yes ☑ No

If yes, which groups have you consulted with?

Who else have you consulted with?

For any questions or information regarding iwi/hapū consultation, please contact Te Hono at Far North District Council, tehonosupport@fndc.govt.nz

5. Applicant details

Name/s: Mike & Shirley Endean Marsden Charitable Trust

Email:

Phone number:

Postal address:
(or alternative method of service under section 352 of the act)

Have you been the subject of abatement notices, enforcement orders, infringement notices and/or convictions under the Resource Management Act 1991? ◯ **Yes** ☑ **No**

If yes, please provide details.

6. Address for correspondence

Name and address for service and correspondence (if using an Agent write their details here)

Name/s: Lynley Newport

Email:

Phone number:

Postal address:
(or alternative method of service under section 352 of the act)

All correspondence will be sent by email in the first instance. Please advise us if you would prefer an alternative means of communication.

7. Details of property owner/s and occupier/s

Name and Address of the owner/occupiers of the land to which this application relates (where there are multiple owners or occupiers please list on a separate sheet if required)

Name/s: As per item 5

Property address/
location:

Postcode 293

8. Application site details

Location and/or property street address of the proposed activity:

Name/s: As per property owner listed in item 5

Site address/ location:

Legal description:

Certificate of title:

Please remember to attach a copy of your Certificate of Title to the application, along with relevant consent notices and/or easements and encumbrances (search copy must be less than 6 months old)

Site visit requirements:

Is there a locked gate or security system restricting access by Council staff? ◯ **Yes** ☑ **No**

Is there a dog on the property? ◯ **Yes** ◯ **No**

Please provide details of any other entry restrictions that Council staff should be aware of, e.g. health and safety, caretaker's details. This is important to avoid a wasted trip and having to re-arrange a second visit.

9. Description of the proposal

Please enter a brief description of the proposal here. Please refer to Chapter 4 of the *District Plan, and Guidance Notes*, for further details of information requirements.

Land Use consent for the redevelopment of the existing Marsden Estate Restaurant and Winery, requiring consent as a discretionary activity for the construction of new winery building and re-configuration and modification of existing restaurant building,enabling increased capacity.

If this is an application for a Change or Cancellation of Consent Notice conditions (s.221(3)), please quote relevant existing Resource Consents and Consent Notice identifiers and provide details of the change(s), with reasons for requesting them.

10. Would you like to request public notification?

◯ **Yes** ☑ **No**

11. Other consent required/being applied for under different legislation

(more than one circle can be ticked):

◯ **Building Consent** Enter BC ref # here (if known)

◯ **Regional Council Consent (ref # if known)** Ref # here (if known)

◯ **National Environmental Standard Consent** Consent here (if known)

◯ **Other (please specify)** Specify 'other' here

12. National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health:

The site and proposal may be subject to the above NES. In order to determine whether regard needs to be had to the NES please answer the following:

Is the piece of land currently being used or has it historically ever been used for an activity or industry on the Hazardous Industries and Activities List (HAIL)? ☑ **Yes** ◯ **No** ◯ **Don't know**

Is the proposed activity an activity covered by the NES? Please tick if any of the following apply to your proposal, as the NESCS may apply as a result? ◯ **Yes** ☑ **No** ◯ **Don't know**

◯ **Subdividing land**

◯ **Changing the use of a piece of land**

◯ **Disturbing, removing or sampling soil**

◯ **Removing or replacing a fuel storage system**

13. Assessment of environmental effects:

Every application for resource consent must be accompanied by an Assessment of Environmental Effects (AEE). This is a requirement of Schedule 4 of the Resource Management Act 1991 and an application can be rejected if an adequate AEE is not provided. The information in an AEE must be specified in sufficient detail to satisfy the purpose for which it is required. Your AEE may include additional information such as written approvals from adjoining property owners, or affected parties.

Your AEE is attached to this application ☑ **Yes**

14. Draft conditions:

Do you wish to see the draft conditions prior to the release of the resource consent decision? ☑ **Yes** ◯ **No**

If yes, please be advised that the timeframe will be suspended for 5 working days as per s107G of the RMA to enable consideration for the draft conditions.

15. Billing Details:

This identifies the person or entity that will be responsible for paying any invoices or receiving any refunds associated with processing this resource consent. Please also refer to Council's Fees and Charges Schedule.

Name/s: (please write in full) MIKE AND SHIRLEY ENDEAN MARSDEN CHARITABLE TRUST

Email:

Phone number:

Postal address:
(or alternative method of service under section 352 of the act)

Fees Information
An instalment fee for processing this application is payable at the time of lodgement and must accompany your application in order for it to be lodged. Please note that if the instalment fee is insufficient to cover the actual and reasonable costs of work undertaken to process the application you will be required to pay any additional costs. Invoiced amounts are payable by the 20th of the month following invoice date. You may also be required to make additional payments if your application requires notification.

15. Billing details continued...

Declaration concerning Payment of Fees

I/we understand that the Council may charge me/us for all costs actually and reasonably incurred in processing this application. Subject to my/our rights under Sections 357B and 358 of the RMA, to object to any costs, I/we undertake to pay all and future processing costs incurred by the Council. Without limiting the Far North District Council's legal rights if any steps (including the use of debt collection agencies) are necessary to recover unpaid processing costs I/we agree to pay all costs of recovering those processing costs. If this application is made on behalf of a trust (private or family), a society (incorporated or unincorporated) or a company in signing this application I/we are binding the trust, society or company to pay all the above costs and guaranteeing to pay all the above costs in my/our personal capacity.

Name: (please write in full) Richard George Arnold Palmer

Signature:
(signature of bill payer)

Date 2-12-25

MANDATORY

16. Important Information:

Note to applicant

You must include all information required by this form. The information must be specified in sufficient detail to satisfy the purpose for which it is required.

You may apply for 2 or more resource consents that are needed for the same activity on the same form.

You must pay the charge payable to the consent authority for the resource consent application under the Resource Management Act 1991.

Fast-track application

Under the fast-track resource consent process, notice of the decision must be given within 10 working days after the date the application was first lodged with the authority, unless the applicant opts out of that process at the time of lodgement.

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

Privacy Information:

Once this application is lodged with the Council it becomes public information. Please advise Council if there is sensitive information in the proposal. The information you have provided on this form is required so that your application for consent pursuant to the Resource Management Act 1991 can be processed under that Act. The information will be stored on a public register and held by the Far North District Council. The details of your application may also be made available to the public on the Council's website, www.fndc.govt.nz. These details are collected to inform the general public and community groups about all consents which have been issued through the Far North District Council.

17. Declaration

The information I have supplied with this application is true and complete to the best of my knowledge.

Name (please write in full) Richard G A Palmer

Signature

Date 2-12-25

A signature is not required if the application is made by electronic means

See overleaf for a checklist of your information...

Checklist

Please tick if information is provided

- ◯ Payment (cheques payable to Far North District Council)
- ◯ A current Certificate of Title (Search Copy not more than 6 months old)
- ◯ Details of your consultation with Iwi and hapū
- ◯ Copies of any listed encumbrances, easements and/or consent notices relevant to the application
- ◯ Applicant / Agent / Property Owner / Bill Payer details provided
- ◯ Location of property and description of proposal
- ◯ Assessment of Environmental Effects
- ◯ Written Approvals / correspondence from consulted parties
- ◯ Reports from technical experts (if required)
- ◯ Copies of other relevant consents associated with this application
- ◯ Location and Site plans (land use) AND/OR
- ◯ Location and Scheme Plan (subdivision)
- ◯ Elevations / Floor plans
- ◯ Topographical / contour plans

Please refer to Chapter 4 of the District Plan for details of the information that must be provided with an application. Please also refer to the RC Checklist available on the Council's website. This contains more helpful hints as to what information needs to be shown on plans.

Mike & Shirley Endean Marsden Charitable Trust

RE-DEVELOPMENT OF RESTAURANT/WINERY & CONSTRUCTION OF NEW WINERY BUILDING

56 Wiroa Road, Kerikeri

PLANNER'S REPORT & ASSESSMENT OF ENVIRONMENTAL EFFECTS

Thomson Survey Ltd
Kerikeri

1.0 INTRODUCTION

1.1 The Proposal

The applicant has purchased the Marsden Estate restaurant, winery and vineyards and propose a re-development of the site that will see renovations/alterations to the existing restaurant/winery building, re-configured access and carparking, and construction of a new winery building at the rear of the property, including tank room, cool store and chillers, refrigeration plant, net & barrel storage, machinery and workshop and staff/office facilities. It may also incorporate a bottling plant. Access to the new winery will be by way of new re-aligned metal driveway through the property, with the present driveway being retired.

Augmenting the existing activities taking place on the site, it is proposed to offer the venue for functions, e.g. conferences and weddings; degustation dinners, with functions potentially involving amplified music, but limited to 12 per annum with amplified music ceasing by 10pm. Normal dining will not occur during functions (i.e. it is one activity or the other, not both). Normal dining hours will not change from the existing consented hours for the Marsden Estate restaurant.

The existing waste water treatment and disposal system is being upgraded to cater for the proposed activities. Discharge Consent has been obtained from the Regional Council.

It is proposed to stage the re-development, with the construction and commencement of operations of the relocated and enlarged winery facility being the first stage. The re-development of the restaurant building and changes to activities within that building, will be Stage 2 of the development. Because of this staging, it is requested that the lapse period for giving effect to all consented activities pursuant to a land use consent, be 7 years as opposed to the normal 5 years.

The existing activities on the site are consented by RC 2030473-RMALUC – discussed in more detail later in this report.

Plans and details of the proposal are contained in Appendix 1. A more detailed description of the proposal is contained in section 4. A location map for the development site is attached as Appendix 2. Title information is in Appendix 3.

1.2 Scope of this Report

This assessment and report accompanies the Resource Consent Application, and is provided in accordance with Section 88 and Schedule 4 of the Resource Management Act 1991. The application seeks consent to re-develop and upgrade an existing restaurant/winery activity, as a discretionary activity under the Operative District Plan.

The information provided in this assessment and report is considered commensurate with the scale and intensity of the activity for which consent is being sought. The name and address of the owner of the property is contained in the Form 9 Application form.

2.0 PROPERTY DETAILS

Location:	56 Wiroa Road, Kerikeri
Legal description:	Lot 1 DP 192666, contained in Record of Title NA121C/193 with an area of 6.7108ha.
Zoning:	Rural Production
Resource Features:	Nil

3.0 SITE DESCRIPTION

3.1 Site characteristics

The site is located on the north side of Wiroa Road 560m from the Wiroa Road / State Highway 10 intersection. The contour is gently to moderately sloping. The Whiringatau Stream flows through the lot, including an artificial pond area. The same stream defines the north-western boundary of the property.

The man-made pond with existing restaurant building on the far side

The site is not serviced via any FNDC reticulated sewer, water or stormwater system. The site has Kerikeri Irrigation water supply available.

Soils within the site are Kerikeri Friable clays – well drained and consequently drought prone. In terms of LUC classes, all the property except a small portion in the north west (LUC 4e2), is LUC 2s1 [*source: FNDC online land use map*].

The site accommodates the existing residence / restaurant / winery. A tractor shed (to be removed) and a soakage field associated with the existing wastewater system are located in the north-west of the property. The bulk of the remainder of the property is covered in vineyard with mown grass in between the rows.

The site does not contain any mapped or scheduled historic sites, notable trees, archaeological sites or Sites of Significance to Maori *[source: FNDC online Historic sites map]*, nor any areas of proposed SNA *[source: FNDC online SNA's – proposed maps]*. The property is mapped as being within a 'high density' kiwi area *[source: FNDC online Species distribution maps]*, albeit the owners can attest to the fact that they do not ever hear kiwi.

Stream boundary, west of proposed winery location

NRC on-line hazard maps show that the property is not subject to flood or coastal hazard. The site contains no high or outstanding landscape or natural areas as mapped in either the Far North District Operative District or Regional Policy Statement for Northland.

3.3 Legal Interests

The title is benefitted by a private Land Covenant within Easement Instrument 11217192.1. The burdened property is the adjacent land in CFR 129422. This instrument forms part of Appendix 3.

3.4 Consent History

Building Consent history:

BP2036780	1983	shelter shed;
BC-1994-508	1994	implement shed (at rear of site);
BC-1997-272	1996	winery, restaurant and living accommodation;
BC-2008-182	2007	replace treatment plant (property file indicates this lapsed);
BC-2010-706	2010	new deck with parking under, plus new lean-to canopy.
EBC-2025-931	2025	Replacement / upgraded on site waste water system.

Resource Consent history:

RC 1950424-RMALUC, issued December 1995 for vineyard/winery and restaurant, incorporating wine tasting;
RC 1990051-RMALUC, issued March 1999 extending hours of operation;
RC 2030473-RMALUC, issued August 2003 re-iterating/confirming the activity occurring on site;
RC 2071059-RMASUB, issued June 2008 for a three lot subdivision (lapsed).
RC 2220842-RMASUB, issued April 2023 for a three lot subdivision (not yet given effect to).

Reliance is being placed on RC 2030473-RMALUC to establish a consented baseline for the proposed re-development. A copy of RC 2030473 is attached in Appendix 4.

AUT-CON20110940401, issued by the NRC in October 2011 for the discharge of secondary treated wastewater to land and to discharge contaminants (primarily odour) to air.
And subsequent AUT.009404.01.03 and 02.03, issued March 2023 for variation to the above discharge consent (not given effect to).

Most recently, AUT.046711.01.01 and 02.01 was issued in July 2025 for a new discharge consent. A copy is attached in Appendix 5.

4.0 THE PROPOSAL IN DETAIL

Proposed new winery building – Stage 1

This is to be located towards the rear of the site adjacent to existing vineyard plantings. It will be accessed via a new access road that will replace the existing internal access track. Refer to overall site plan in Appendix 1.

The new building is proposed to be 1,363m^2 building coverage. It will have access to it, and a hard stand all around it, for parking, loading bays and traffic circulation. The existing tractor shed within the proposed new building footprint will be removed. The floor plan is laid out in Appendix 1. The building will have an upper floor accommodating a small mezzanine area.

The building will be 8m high at its highest point. It will be >30m from any property or water boundary. Some of the hardstand area (impermeable coverage) is within 30m of the stream, but no closer than 12m. Survey data does not show the stream as having an average width of 3m or wider.

The new proposed winery will operate 8am to 5pm daily with 3 staff. This will increase to 4 staff working 12-15 hours a day for a period of about 9 weeks during 'harvest'. There will be periodic increases of personnel during picking. There will be no sales from the winery building. There will be the occasional large and small truck deliveries.

It is proposed to re-align and upgrade the internal site access to the rear of the site, removing/retiring existing driveway and culvert, and constructing new driveway and culvert. Access is shown on the site plan in Appendix 1.

Proposed re-development of existing restaurant building – Stage 2

The proposal involves an improvement to the existing entrance such that the angle is reduced, plus improvements to internal access and carpark area, and traffic circulation. These are seen as positive changes to improve access and parking availability and manoeuvrability. The existing carpark accommodates 29 spaces, including accessible, and a new (additional) carpark accommodating 35 more spaces is proposed, bringing total to 64. The existing upstairs residence remains, with its own allocated parking.

The building coverage of the existing restaurant building currently incorporates a winery area and is 824m^2. The proposal removes that winery area and converts this area to conference/dining and tasting/conference use. Existing dining area remains, both internal and external. The proposed building coverage is 879m^2, a small increase of 55m^2.

The restaurant is proposed to have increased capacity for up to 160 for the restaurant's normal dining and for the building to be able to accommodate up to a maximum of 300. Normal dining will not operate during events and there will be no change to the current overall consented hours of operation.

Wine tasting is available when the restaurant is open. Special events, by appointment, between the months of April – November and limited to a maximum of 12 over this period, will extend into the evening and night. Any amplified music at these events, will cease before 10pm. As stated earlier normal dining will not be occurring during functions.

Events may be entirely indoors, or may be indoor/outdoor events, where patrons can enjoy the high amenity outdoor environment provided at the venue.

The increased floor area marked dining/conference will be used for conferences and, when not in use, for overflow dining. The space marked tasting/conference will be used for wine sales/tasting only, unless a conference event requires the spaces. The proposal requires flexibility in the use of spaces.

Across Both Stages –

<u>Impermeable Coverage</u>

Refer to first page of plans in Appendix 1. In summary, the existing impermeable surface coverage on the site is estimated at 3,900m^2 (5.8%). The proposed coverage, post development (both stages) will be 8,888m^2 (13.2%), within the zone's permitted activity threshold. A Stormwater Management Report supports the application.

Building Coverage

Refer to first page of plans in Appendix 1. In summary, the existing building coverage on the site is estimated at 947m^2 (1.4%). The proposed building coverage, post development (both stages) will be 2,242m^2 (3.3%). This remains well within the zone's permitted coverage.

Earthworks

The total volume of earthworks across both stages is estimated at 2,700m^3 of cut at maximum depth of 0.7m; and 3,600m^3 of fill at maximum depth of 1.4m. This equates to a total volume of 6,300m^3.

5.0 SCHEDULE 4 – INFORMATION REQUIRED IN AN APPLICATION

Clauses 2 & 3: Information required in all applications

(1) An application for a resource consent for an activity must include the following:	
(a) a description of the activity: .	Refer Sections 1 and 4 of this Planning Report.
(b) an assessment of the actual or potential effect on the environment of the activity:	Refer to Section 7 of this Planning Report.
(b) a description of the site at which the activity is to occur:	Refer to Section 3 of this Planning Report.
(c) the full name and address of each owner or occupier of the site:	This information is contained in the Form 9 attached to the application.
(d) a description of any other activities that are part of the proposal to which the application relates:	The activity for which consent is being sought is the only activity on the site.
(e) a description of any other resource consents required for the proposal to which the application relates:	Consent is being sought pursuant to the Far North Operative District Plan. Discharge Consent from the Northland Regional Council has been obtained.
(f) an assessment of the activity against the matters set out in Part 2:	Refer to Section 8 of this Planning Report.
(g) an assessment of the activity against any relevant provisions of a document referred to in section 104(1)(b), including matters in Clause (2): (*a) any relevant objectives, policies, or rules in a document; and*	Refer to Sections 7 & 8 of this Planning Report.

(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 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)):	The site supports an existing residence on the upper floor of a consented restaurant/winery. The activity on the site is consented and operating to those consents – refer to section 3.
(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)):	The activities operate pursuant to existing resource consents. The previous owners have invested time and money to develop the site as a vineyard and restaurant/winery and have operated since 1995. This investment should be taken into account when considering/assessing this application for re-development of the site.
(c) if the activity is to occur in an area within the scope of a planning document prepared by a customary marine title group under section 85 of the Marine and Coastal Area (Takutai Moana) Act 2011, an assessment of the activity against any resource management matters set out in that planning document (for the purposes of section 104(2B)).	The site is not within an area subject to a customary marine title group. Not applicable.
(4) 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*	N/A – proposal is not a subdivision

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.	

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:	Refer to Section 7 of this planning report. The activity will not result in any significant adverse effect on the environment.
(b) an assessment of the actual or potential effect on the environment of the activity:	Refer to Section 7 of this planning report.
(c) if the activity includes the use of hazardous installations, an assessment of any risks to the environment that are likely to arise from such use:	Not applicable as the application does not involve hazardous installations.
(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:*	The proposal does not involve any discharge of contaminant.
(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:	Refer to Section 7 of this planning report and appendices.
(f) identification of the persons affected by the activity, any consultation undertaken, and any response to the views of any person consulted:	Refer to Section 10 of this planning report.
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:	No monitoring is required as the scale and significance of the effects do not warrant it.
(h) if the activity will, or is likely to, have adverse effects that are more than	No protected customary right is affected.

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).	

Clause 7: Matters that must be addressed by assessment of environmental effects (RMA)

(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:	Refer to Sections 7 and 10 of this planning report and also to the assessment of objectives and policies in Section 8.
(b) any physical effect on the locality, including any landscape and visual effects:	Refer to Section 7. The site has no outstanding landscape or natural character values.
(c) any effect on ecosystems, including effects on plants or animals and any physical disturbance of habitats in the vicinity:	Refer to Section 7. The proposal has no effect on ecosystems or habitat.
(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:	Refer to Section 7.
(e) any discharge of contaminants into the environment, including any unreasonable emission of noise, and options for the treatment and disposal of contaminants:	The proposal will not result in the discharge of contaminants, nor any unreasonable emission of noise.
(f) any risk to the neighbourhood, the wider community, or the environment through natural hazards or hazardous installations.	The proposed building site is not subject to natural hazards and does not involve hazardous installations.

6.0 COMPLIANCE ASSESSMENT

6.1 Consented baseline

The consented baseline for the activity is as consented in RC's 1950424-RMALUC, and more recently RC 2030473-RMALUC, issued in 2003. Copies of both are contained in Appendix 4.

The following is an analysis of the proposal against the consented baseline.

Although the original land use consent for Marsden Estate to operate was issued in 1995, subsequent consents were issued to increase hours of operation and to provide for functions.

A further land use consent was applied for in 2003 to clarify the nature and extent of activity, specifically to increase the intensity of activity. RC 2030473-RMALUC granted consent to the proposal/activity, described as:

To operate a restaurant / winery containing the following components:

- *Indoor / outdoor restaurant accommodating up to 80 seated guests, with a total limit of 145 guests for restaurant functions.*
- *Dwelling in the first floor.*
- *Production and storage of wine within the winery.*
- *Tasting & sale of wine produced on the site.*

It is proposed to increase the restaurant indoor/outdoor seating capacity to 160, and total limit to 300 guests.

RC 2030473 was subject to several conditions, but fewer than those specified in the original RC 1950424 because a number of those original conditions had already been completed and did not need re-imposing. The latter consent increased the number of guests to be accommodated and incorporated 'functions'. The latter consent also increased operating hours, and included updated plans.

In giving effect to RC 1950424, the consent holders completed entrance works; completed landscaping; erected compliant signage and obtained the necessary discharge consent. As such, none of these conditions requiring repeating in RC 2030473.

Compliance 'comparison':

Condition 1 of 2030473 (Plans):
The plans approved under RC 2030473 will be superseded by those being put forward in this re-development proposal, most notably the construction of an entirely new and separate winery elsewhere on the site; altered restaurant building floor area; increased and revised layout for carparking and modification to access off Wiroa Road and internal to the site.

Condition 2 (hours of operation):
Consented by 2030473 to operate between 0700 hours and 0100 hours the following day, 7 days a week. This is not proposed to change. The current operation does not operate to those hours on a regular basis, however, it is entitled to. The functions now being proposed to be accommodated within the restaurant building, will be restricted to 12 per annum, and will be instead of normal dining, not as well as.

Conditions 3 & 4 (noise levels):
Condition 3 required that no amplified music be permitted on the premises after 7pm. It is proposed to extend this to 10pm for the functions (limited to 12 events per annum). Condition 4 specifies noise limits to 50 dB L_{A10} (day time) and 45 dB L_{A10} (night time). An Acoustics Report supports the application and this recommends new/amended conditions in regard to noise generation and mitigation, differentiating between functions and other activities.

Conditions 5 & 6 (carpark spaces and loading bay):
These require 43 carpark spaces to be clearly marked, plus provision for one loading bay. The re-development proposes increasing carpark capacity at the restaurant to 64 spaces, including accessible, and includes two loading bays. The new winery has its own parking (14 spaces), with two loading bay space(s)

Condition 7 (no parking signs):
This requires signage to stop patrons parking on the roadside verges of Wiroa Road. The re-development will include clear signage to patrons and visitors to the site, directing them to appropriate parking areas.

Condition 8 (wine sales):
This restricts any alcohol retailed for off-site consumption to wine produced on the site. This remains the intention.

In summary, the proposal seeks to re-develop and enhance facilities. Whilst this might not result in any additional rule breaches to those rules originally breached, e.g. scale of activities rule already breached, the extent to which such rules will be breached has increased and built development on the site is altering. A new land use consent application is considered the most appropriate approach to take in securing consent for the proposed activity, rather than a variation, albeit using the conditions in RC 2030473 as the consented baseline from which to work from.

There is no radical change being proposed. The activities remain as described in RC 2030473:

- Indoor/ outdoor restaurant and restaurant functions;
- Dwelling;
- Production and storage of wine within the winery; and
- Tasting and sale of wine produced on the site.

Numbers are increasing, functions are being extended to include functions other than restaurant functions, and the winery component is being separated.

6.2 Operative District Plan

The property is zoned Rural Production in the Far North District Plan and has no Resource Features applying.

Compliance assessment follows:

Far North Operative District Plan:

RURAL PRODUCTION ZONE RULES:		
Permitted Standards	**Comment**	**Compliance Assessment**
8.6.5.1.1 RESIDENTIAL INTENSITY	Single residential unit on	Permitted.

	restaurant building's upper floor	
8.6.5.1.2 SUNLIGHT No part of any building shall project beyond a 45 degree recession plane as measured inwards from any point 2m vertically above ground level on any site boundary	The existing restaurant/winery building is over 20m from nearest boundary (road boundary) and is not being altered in terms of its height. The winery is 8m in height and more than 30m from any boundary.	Permitted.
8.6.5.1.3 STORMWATER MANAGEMENT The maximum proportion or amount of the gross site area covered by buildings and other impermeable surfaces shall be 15%.	Total proposed impermeable surface coverage is estimated to be 13.3% of total site area.	Permitted.
8.6.5.1.4 SETBACK FROM BOUNDARIES No building shall be erected within 10m of any site boundary	The existing restaurant building is more than 20m from boundary and the proposed new winery building is over 30m from boundary.	Permitted.
8.6.5.1.6 KEEPING OF ANIMALS	N/A	N/A
8.6.5.1.7 NOISE (a) All activities except Temporary Military Training Activities shall be so conducted as to ensure that noise from the site shall not exceed the following noise limits as measured at or within the boundary of any other site in this zone, or at any site in the Residential, Coastal Residential or Russell Township Zones, or at or within the notional boundary of any dwelling in any other rural or coastal zone: 0700 to 2200 hours 65 dBA L10 2200 to 0700 hours 45 dBA L10 and 70 dBA Lmax	The existing activity is consented to operate within the zone's permitted noise levels. The Acoustic Assessment supporting the application predicts compliance with the ODP's permitted activity noise levels (<65 dB_{L10} at the boundary (daytime). No amplified music is proposed to extend into the night time hours (past 10pm).	Permitted.
8.6.5.1.8 BUILDING HEIGHT The maximum height of any building shall be 12m.	No building is greater than 12m in height.	Permitted.
8.6.5.1.9 HELICOPTER LANDING AREA	N/A	N/A
8.6.5.1.10 BUILDING COVERAGE Any new building or alteration/addition to an existing building is a permitted activity if the total Building Coverage of a site does not exceed 12.5% of the gross site area.	The proposed building coverage is estimated to be 2,242m^2, or 3.3% of total site area.	Permitted.
8.6.5.1.11 SCALE OF ACTIVITIES For activities other than those	The site is 67,108m^2. The rule	**Cannot comply and exceeds**

provided for in the exemptions below, the total number of people engaged at any one period of time in activities on a site, including employees and persons making use of any facilities, but excluding people who normally reside on the site or are members of the household shall not exceed i. For activities ancillary to farming or plantation forestry activities, 8 persons per site or 2 person per 1 hectare of net site area, whichever is the greater ii. For all other activities, 4 persons per site or 1 person per 1 hectare of net site area, whichever is the greater.	provides for up to 6 persons making use of facilities on the site. The existing activity is consented for a total limit of 145 'guests' for restaurant functions and 80 seated guests at the restaurant. The proposed re-development is intended to increase maximum capacity / number of people able to be on the site at any one time. This rule was already breached with the existing activity and the proposed improvements result in a continued breach.	**the numbers specified in existing consents.** Refer Rule 8.6.5.3.7 (restricted discretionary rule).
8.6.5.1.12 TEMPORARY EVENTS	N/A	N/A
DISTRICT WIDE RULES		
12.1 LANDSCAPE AND NATURAL FEATURES	No Landscape or Natural Feature notation applies	N/A
12.2 INDIGENOUS FLORA & FAUNA	No clearance of indigenous vegetation proposed or required	N/A
12.3.6.1.1 EXCAVATION AND/OR FILLING, EXCLUDING MINING AND QUARRYNG, IN THE RURAL PRODUCTION ZONE Excavation and/or filling, excluding mining and quarrying, on any site in the Rural Production Zone or Kauri Cliffs Zone is permitted, provided that: (a) it does not exceed 5,000m3 in any 12 month period per site; and (b) it does not involve a continuous cut or filled face exceeding an average of 1.5m in height over the length of the face i.e. the maximum permitted average cut and fill height may be 3m.	Excavation and filling volumes combined are estimated at 6,300m^3. There will be no cut/fill face higher than the permitted threshold.	**Cannot comply with part (a).**
12.4 NATURAL HAZARDS	No hazard notation applying to the site; he proposal does not involve a residential unit	N/A
12.5 HERITAGE (including 12.5A and 5B)	No registered Archaeological Site and no Scheduled items as per District Plan rules. No Heritage Precinct.	N/A

12.7 LAKES, RIVERS, WETLANDS and the COASTLINE 12.7.6.1.2 SETBACK FROM SMALLER LAKES, RIVERS AND WETLANDS Any building and any impermeable surface must be set back from the boundary of lakes (where the lake bed has an area of less than 8ha) smaller continually flowing rivers (where the average width of the river bed is less than 3m) and wetlands except that this rule does not apply to man-made private water bodies. The setback shall be: (a) 3 x the area (ha) of the lake (e.g. if the lake is 5ha in area, the setback shall be 15m); and/or (b) 10 x the average width of the river where it passes through or past the site; provided that in both cases the minimum setback shall be 10m and the maximum setback shall be no more than the minimum required by Rule 12.7.6.1.1 above; (c) 30m for any wetland of 1ha or more in area.	Survey data does not show the stream on the boundary as having an average width of 3m wide or greater along the property boundary, so Rule 12.7.6.1.2 does not apply. The stream forming the western boundary near the proposed winery building, would be regarded as a 'smaller river'. Its width varies between 1-3m. The new winery building is more than 30m from this water boundary, however, the impermeable (hardstand) surface around the building is 12m from the stream at its closest point. Although compliance might be achieved, in the interests of taking a conservative approach, a breach of Rule 12.7.6.1.2, insofar as the hardstand area at the winery, is included in this application. The pond below the restaurant is man-made, with the water course leading into and out of it being less than 3m. The water course below the pond is under 2m across. The proposed new carpark (metal surface) is more than 20m from it.	**May not comply with 12.7.6.1.2**
12.7.6.1.4 LAND USE ACTIVITIES INVOLVING DISCHARGES OF HUMAN SEWAGE EFFLUENT Land use activities which produce human sewage effluent (including grey water) are permitted provided that: (a) the effluent discharges to a lawfully established reticulated sewerage system; or	The proposal includes a re-developed effluent treatment and disposal system, for which discharge consent has been granted by NRC. No part of the system will be closer than 30m from the boundary of any river (defined in this instance as 3m	Permitted.

(b) the effluent is treated and disposed of on-site such that each site has its own treatment and disposal system no part of which shall be located closer than 30m from the boundary of any river, lake, wetland or the boundary of the coastal marine area.	average width, of which there is none), lake or wetland.	
12.8 HAZARDOUS SUBSTANCES	I am not aware of any hazardous substances being stored or transported.	N/A
12.9 RENEWABLE ENERGY & ENERGY EFFICIENCY		N/A
15.1 TRAFFIC, PARKING and ACCESS.		
15.1.6A.2.1 TRAFFIC INTENSITY The Traffic Intensity threshold value for a site shall be determined for each zone by Table 15.1.6A.1 above. The Traffic Intensity Factor for a proposed activity (subject to the exemptions identified below) shall be determined by reference to Appendix 3A in Part 4.	Permitted threshold for the Rural Production Zone where access is to a Council road is 60 daily one way traffic movements; with a restricted discretionary threshold of 61-200. At the time of RC 2030473 being assessed/processed, the traffic intensity permitted threshold was 100 (not 60). The estimated TIF, based on restaurant/winery floor area at that time was 180. In summary 2030473 included a breach of the traffic intensity factor. The re-development is deemed to generate 342 daily one way traffic movements (based on Appendix 3A). The residential unit on the site is exempt.	**Cannot comply with permitted or restricted discretionary thresholds, therefore a discretionary activity.**
15.1.6B.1.1 PARKING		
Where: (i) an activity establishes on a site, (ii) the nature of an activity changes, (iii) buildings are altered to increase the number of persons provided for on the site; the minimum number of on-site car parking spaces to be provided for the users of the activity, shall be determined by reference to **Appendix 3C**.	Although this is the re-development of an existing activity, with no 'new' activity proposed and no change to the 'nature' of the activity, the re-development does increase the number of people that are provided for. Based on Appendix 3C; Restaurant 633m2 @ 1 per 10m² GFA = 63 Residential unit @ 2 per unit = 2 Winery 1,420m2 @ 1 per 100m2 GBA = 14	It is proposed to increase car parking spaces at the restaurant building to provide a total of 65 – permitted; 14 carpark spaces can be accommodated at the new winery building – permitted.

15.1.6B.1.4 ACCESSIBLE CARPARKING SPACES	Three of the carparks are to be for accessible carparking.	Permitted.
15.1.6B.1.5 CAR PARKING SPACE STANDARDS	Parking space dimensions and manoeuvring spaces/turning curves can be accommodated on site.	Permitted.
15.1.6B.1.6 LOADING SPACES	Two loading spaces are required at the restaurant. These are provided for at the front of the building. Two loading bays are provided for at the winery.	Permitted.
15.1.6C.1.1 PRIVATE ACCESSWAY IN ALL ZONES	The activity has an existing consented crossing to Wiroa Road. This section of Wiroa Road now has a 60 kph posted speed whereas when the activity first established it was not a restricted speed road at all. The crossing will be double width. It is proposed to do physical works to ensure a better right angled approach/ intersection and a more level area immediately inside the property boundary. Internal access to new winery site will be formed to the appropriate width and surface (not shared by any other property).	Permitted.
15.1.6C.1.3 PASSING BAYS ON PRIVATE ACCESSWAYS IN ALL ZONES	No passing bays required.	N/A
15.1.6C.1.4 ACCESS OVER FOOTPATHS	There is no footpath.	N/A
15.1.6C.1.5 VEHICLE CROSSING STANDARDS IN RURAL AND COASTAL ZONES	See above.	Permitted.
15.1.6C.1.7 GENERAL ACCESS STANDARDS	There is no need for any reversing off the site. Internal access will be able to accommodate a Heavy Rigid Vehicle. Runoff will be appropriately managed.	Permitted.
15.1.6C.1.8 FRONTAGE TO EXISTING ROADS	Not a subdivision. Single road frontage.	Permitted or N/A.
Rules 15.1.6C.1.9; 1.10 and 1.11 do not apply		N/A
16.6.1.1 LIGHT SPILL & GLARE (a) Outdoor lighting used by, or in association with, any activity, including any illuminated sign, shall not exceed the following limits:.....	No known breaches in regard to outdoor lighting.	Can comply.
16.6.1.2 GENERAL REQUIREMENTS	Signage (if any) will be designed	Can comply.

FOR ALL SIGNS	to comply.	
16.6.1.3 MAXIMUM SIGN AREA PER SITE	As above.	Can comply.

In summary, my assessment finds breaches of the following rules:

Zone Rule(s):

8.6.5.1.11 **Scale of Activities** permitted activity rule;

District wide Rules:

12.3.6.1.1(a) **Excavation/Filling permitted volume.**

12.7.6.1.2(b) **setback from a smaller river.**

15.1.6A.2.1 **Traffic Intensity** and associated Table 15.1.6A.1 permitted and restricted discretionary thresholds.

In conclusion I consider the application to be a **discretionary** activity land use activity.

Were the rule breaches limited only to Scale of Activities and Traffic Intensity, I would have recommended to the applicant that they pursue a variation to their existing consent given these are same rule breaches, to the same activity category (discretionary overall).

However, with additional breaches, and an opportunity to better define the level of activity being carried out, and under what conditions, I have recommended a new replacement land use consent be applied for.

6.3 Proposed District Plan (PDP)

The FNDC publicly notified its PDP on 27th July 2022. Whilst the majority of rules in the PDP will not have legal effect until such time as the FNDC publicly notifies its decisions on submissions, there are certain rules that have been identified in the PDP as having immediate legal effect and that may therefore need to be addressed in this application and may affect the category of activity of the application under the Act. An analysis of those rules show that only the following PDP rule has relevance:

Earthworks – Only some rules and standards have legal effect. These are Rules EW-R12 and R13 and related standards EW-S3 and ES-S5 respectively. EW-R12 and associated EW-S3 relate to the requirement to abide by Accidental Discovery Protocol if carrying out earthworks any artefacts are discovered. This requirement can be met and is a requirement under heritage legislation in any event.

EW-13 and associated EW-S5 relate to ensuring Erosion and Sediment Control measures are in place during earthworks. They cite compliance with GD05. This will likely be a requirement of any consent issued.

7.0 ASSESSMENT OF ENVIRONMENTAL EFFECTS

7.1 Positive Effects

The proposal is the re-development / enhancement of a highly successful and popular restaurant/winery activity that has been operating for nearly 30 years. The site not only supports built development, but bases its business on the established vineyard covering the majority of the site. A change in ownership could have seen the dis-establishment of the activity but instead the new owners prefer to further develop the business and provide an enhanced experience for customers/patrons.

This has a positive effect on several fronts:

- retains productive land in productive use;
- continues a successful business activity, thereby contributing to the economic wellbeing of the district;
- enhances the current built environment;
- upgrades / replaces the existing wastewater treatment and disposal system;
- improves access and carparking; and
- encourages investment in the district.

7.2 Rural Amenity and character

The proposal makes very little change to the appearance of the existing restaurant building, other than enhancing that appearance. Additional landscape planting is proposed, particularly at the rear to further enhance the already high amenity outdoor area.

The proposed new winery building is reasonably large, but no larger than what one would expect in a Rural Production (working) zone. I believe the site is large enough to absorb the additional built environment without adversely affecting rural amenity and character. Building coverage remains within the permitted activity threshold.

Part of rural amenity and character is noise. The zone has a reasonably permissive noise threshold applying to it, in recognition of the variety of productive uses likely to occur in a rural production zone.

An Acoustic Report is attached in Appendix 6. This concludes that noise levels would readily comply with the ODP's current day time limits (up to 10pm) of 65 dB_{LA10}, at all surrounding site boundaries, with a margin of around seven decibels. The report notes the more restrictive noise limit imposed on the existing resource consent (not reflecting the permitted noise threshold now in place) and that noise levels would be above those consented levels on the

eastern site boundary. However, compliance could be achieved on this boundary if certain doors were closed and with control of DJ noise levels. In short, the noise levels generated by the proposed activities at the restaurant building will meet the ODP's permitted daytime levels, and can, if certain actions are taken, meet the existing conditions of consent.

Noise levels would also comply with the PDP's daytime noise limit (55 dBL_{Aeq}) at all surrounding site boundaries, with a margin of around three decibels.

It is intended to cease any amplified music at or before 10pm so as not to extend into night time hours. Operative and Proposed District Plan noise limits can be achieved provided music noise levels do not exceed 95 $dBL_{Aeq(15min)}$. This is achievable without any requirement to close the main northern or eastern doors or windows to limit noise before 10pm.

The report proposes conditions of consent in its Section 9.0, including the implementation of a Noise Management Plan. Subject to compliance with those conditions, my conclusion is that the noise levels arising from the proposed activities will have less than minor effects on adjacent properties.

7.3 Traffic & Parking

All required carparking and access works subject to the existing consent were completed to the Council's satisfaction (at that time). The increase in patronage will result in increased traffic movements. To offset this, however, the posted speed restriction on Wiroa Road has decreased from 100kph down to 60kph. In addition, it is proposed to upgrade the entrance, internal to the site such that the crossing is at a better angle to the road carriageway, as opposed to the existing angled entrance. This will make left hand entry and right hand exit turns easier and provide a wider, more level area for waiting vehicles.

Existing accessway into the site, with Wiroa Road at extreme left of picture

Additional parking is proposed to cater for the additional patronage. The existing carparking area at the restaurant building will be extended and parking will be provided at the new winery building.

Existing carparking area

I believe that with the decreased posted (and operating) speed on Wiroa Road, potential conflict with turning traffic is substantially reduced. A less angled entrance will also assist in reducing potential conflict. Improvements to internal access, car park areas and traffic circulation, will also mitigate the effects of additional traffic. I believe that any adverse effects of additional traffic will be no more than minor.

7.4 Earthworks and Construction Effects

A Geotechnical Assessment has also been commissioned, specific to both the new winery building and extensions to the existing building. This includes a section on earthworks. Refer to Appendix 8.

For the new winery building, an engineered cut-fill earthworks in the order of approximately 0.7m cut and 1.3m fill will be required to create a level building platform. As part of the development works, the existing tractor shed will require demolition. For the new extensions, it is generally assumed earthworks will largely be confined to bored footing excavations.

Generally, and as directed by a suitably experienced engineer, all earthworks should be undertaken in accordance with the following standards:

- NZS4431:2022 "Code of Practice for Earth Fill Residential Development,
- Section 2 "Earthworks & Geotechnical Requirements" of NZS4404:2010 "Land Development and Subdivision Infrastructure" and
- Chapter 2 "Site Development Suitability (Geotechnical and Natural Hazards" of the Far North District Council Engineering Standards, (Version 0.6 issued May 2023).

It is recommended that earthworks only be undertaken during prolonged periods of dry forecast conditions. All cut batters up to a height of 1.5m should be battered no steeper than 1V:3H and cuts up to a height of 1m should be battered no steeper than 1V:4H.

Erosion and Sediment control measures will be put in place prior to any works and any stockpiles will be placed in an appropriate manner so that land stability and/or adjacent structures are not compromised.

Provided the recommendations in the Geotechnical and Stormwater Management Reports are adhered to, the adverse effects of earthworks will, in my opinion, be less than minor.

7.5 Stormwater, wastewater and water supply

Stormwater

The application is supported by a Stormwater Management Report by Wilton Joubert Consulting Engineers – refer to Appendix 7. Roof drainage / runoff from the proposed additions to the restaurant building is to be directed to the existing stormwater management system. The existing outlet is to be confirmed on-site as being in working order. The new winery building's roof runoff is to be directed to rainwater tanks for re-use and optional detention via a proprietary gutter system.

An optional water quality volume detention is also discussed in the report.

Runoff from the proposed carpark adjacent to the existing building is to be shaped to shed runoff to catchpits. Runoff is to be directed from catchpits to an outlet in the existing pond/stream north of the building via drainage lines.

A v-channel grassed perimeter swale drain will be installed around the proposed winery access/parking area. This will drain to a low-point on the western side of the paved area at a minimum 1% grade.

Runoff from the perimeter drain will be directed to a discharge point via the continuation of a drain down slope, or to inlet chamber with scruffy dome cover, directing runoff to a discharge point via drainage line.

Runoff from the proposed winery impermeable surface areas is to be directed to a 10m long level spreader trench located downslope to the southwest of the proposed development area. Alternatively, discharge may be directed to a new outlet in the Whiringatau Stream on the western property boundary. A minimum 1m long apron of 6-inch riprap should be placed downstream of the outlet.

The Stormwater Management Report also discusses culvert size and location related to upgrading access internal to the site.

Waste water

As stated earlier, discharge consent has been granted by the NRC. The consented system comprises an Econotreat VBB-C-3000 Trible System to service the main building, including a

grease trap with minimum 5,000 litre capacity. It is understood that Building Consent has been issued for this system. An Econotreat VBB-C or P-2200 system is proposed for the new winery building.

The required disposal field and reserve are set back more than 15m from stream boundary.

Water Supply

Rainwater tanks will be utilised to provide the proposed structures with potable water supply (existing and additional). Fire fighting water supply will be provided as required by NZ Fire Fighting Standards. The site has connection to, and use of, irrigation water from the Kerikeri Irrigation company.

7.7 Land Stability Effects & Potential Hazards

The site is not identified to be at risk of any natural hazard. A Geotechnical Assessment has been commissioned (referred to earlier), specific to both the new winery building and extensions to the existing building.

The report's findings are that the winery can have a reinforced, stiffened raft slab foundation system, or Slab-on-Grade, with deepened perimeter strip footings. Extension foundations can be bored, concrete encased, tanalised timber pile or pole foundations. The report did not identify any ground instability.

National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES-CS)

The site is a HAIL site by definition given that it is an operating vineyard. This proposal does not involve subdivision, nor a change of use as defined under the NES-CS. Soil disturbance at 2,700m^3 (cut volume) is less than the permitted 25m^3 per 500m^2 of a 'piece of land' permitted by the NES-CS. On a property of this size (67,108m^2), up to 3,355m^3 soil disturbance would be permitted. Approximately 670m^3 of soil is able to be removed from the site.

7.8 Effects on Indigenous vegetation and habitat

The re-development does not involve the removal of any indigenous vegetation within the site. All impermeable surfaces are set well back from any water course with stormwater management and attenuation proposed. The existing wastewater treatment and disposal system is being upgraded, with design parameters aimed at ensuring no adverse effects on indigenous vegetation and habitat.

The site is within a high density kiwi area. There is no restriction on the title in regard to the keeping of cats and dogs. The previous owners, having lived and worked on the site for 30 years, had never heard kiwi (anecdotal comment). They advised that all but one of the neighbouring properties had cats and/or dogs. I do not believe this proposal will have any adverse effects on indigenous vegetation or habitat.

7.9 Archaeological/cultural Effects

The site contains none of the following:

- Notable Trees (Appendix 1D of the DP);
- Historic Sites, Buildings of Objects (1E);
- Outstanding Natural Features or Outstanding Landscape Features (1A and 1B);
- Archaeological sites (1G) or Sites of Cultural Significance to Māori (1F).

I do not believe the proposal will have any adverse effects on heritage or cultural values.

7.10 Effects on waterbodies

This is largely addressed earlier in this AEE section. The additional building coverage/ impermeable surfaces will not breach permitted activity thresholds and run off from these surfaces will either be collected off roof surfaces into tanks, with overflow to ground through dispersal, or be collected via cut off drains, and access drains for dispersal. I do not envisage the re-development having any adverse effects on waterbodies of a minor or more than minor nature.

The upgraded wastewater system's disposal fields are no closer than 15m from the nearest watercourse. The upgrade represents an improvement on the current system's functionality.

7.11 Precedent & Cumulative Effects

The activity is a discretionary activity. An assessment of the proposal against the relevant objectives and policies in the Operative and Proposed District Plans follows in Section 8 of this report. I believe the proposal to be consistent with those objectives and policies, noting the existing site's size, physical attributes, and the development already on the site. I do not consider that the granting of this consent will set a precedent that threatens the integrity of the Operative or Proposed District Plan's objectives and policies.

There will be less than minor adverse cumulative visual effects given that the proposal is a re-development as opposed to a new development. While there is a new winery building and overall increase in site coverage, I believe the site can readily and comfortably absorb any visual impact of the proposed re-development.

8.0 STATUTORY ASSESSMENT

8.1 Operative District Plan Objectives and Policies

Relevant Rural Production Zone objectives and policies include:

Objectives: *8.6.3.1 To promote the sustainable management of natural and physical resources in the Rural*	The continuation and enhancement of an existing successful activity/business on the site is considered to promote sustainable management

Production Zone. *8.6.3.2 To enable the efficient use and development of the Rural Production Zone in a way that enables people and communities to provide for their social, economic, and cultural well being and for their health and safety.* *8.6.3.3 To promote the maintenance and enhancement of the amenity values of the Rural Production Zone to a level that is consistent with the productive intent of the zone.* *8.6.3.4 To promote the protection of significant natural values of the Rural Production Zone.* *8.6.3.6 To avoid, remedy or mitigate the actual and potential conflicts between new land use activities and existing lawfully established activities (reverse sensitivity) within the Rural Production Zone and on land use activities in neighbouring zones.* *8.6.3.7 To avoid remedy or mitigate the adverse effects of incompatible use or development on natural and physical resources.* *8.6.3.8 To enable the efficient establishment and operation of activities and services that have a functional need to be located in rural environments.* *8.6.3.9 To enable rural production activities to be undertaken in the zone.*	of natural and physical resources. It is also considered to be an efficient use and development within the RP Zone, that will enable people and the community to provide for their social, economic and cultural well being. There will be additional built development in the form of a separate and additional winery building towards the rear of the site This is effectively the only change to the physical aspects of the site. The additional building, whilst quite large, is not overly dominant. It will be constructed in recessive shades. It is well internalised within the site and fully compliant with the zone's bulk and location rules. In summary I believe the proposal will maintain amenity values, and potentially enhance amenity values due to planned site improvements by the new owner. Regarding 8.6.3.4, the site does not have 'significant natural values'. Objectives 8.6.3.6-8.6.3.9 are in regard to reverse sensitivity matters. The nature of the activity is not changing. As such, the re-development proposal will not generate any additional reverse sensitivity effects.
And policies *8.6.4.1 That a wide range of activities be allowed in the Rural Production Zone, subject to the need to ensure that any adverse effects on the environment, including any reverse sensitivity effects, on the environment resulting from these activities are avoided, remedied or mitigated and are not to the detriment of rural productivity.* *8.6.4.2 That standards be imposed to ensure that the off site effects of activities in the Rural Production Zone are avoided, remedied or mitigated.* *8.6.4.3 That land management practices that avoid, remedy or mitigate adverse effects on natural and physical resources be encouraged.* *8.6.4.4 That the type, scale and intensity of development allowed shall have regard to the maintenance and enhancement of the amenity*	The proposal is the re-development of an existing activity on a rural site. It will not increase reverse sensitivity effects. Off site effects can be avoided, remedied or mitigated. Whilst the intensity of the activity is proposed to be increased, the type of activity is not. The proposal remains consistent with the productive intent of the zone and will maintain amenity values associated with the zone. The proposal is considered an efficient use and development of natural and physical resources.

values of the Rural Production Zone to a level that is consistent with the productive intent of the zone. *8.6.4.5 That the efficient use and development of physical and natural resources be taken into account in the implementation of the Plan.* *8.6.4.7 That although a wide range of activities that promote rural productivity are appropriate in the Rural Production Zone, an underlying goal is to avoid the actual and potential adverse effects of conflicting land use activities.* *8.6.4.8 That activities whose adverse effects, including reverse sensitivity effects cannot be avoided remedied or mitigated are given separation from other activities* *8.6.4.9 That activities be discouraged from locating where they are sensitive to the effects of or may compromise the continued operation of lawfully established existing activities in the Rural Production zone and in neighbouring zones.*	

Also relevant, in regard to breaches of Part 3 (District Wide rules), are the following objectives and policies (relating to Chapter 12.3 Soils and Minerals (earthworks) and Chapter 15.1 Traffic, Parking and Access).

12.3.3 OBJECTIVES *12.3.3.1 To achieve an integrated approach to the responsibilities of the Northland Regional Council and Far North District Council in respect to the management of adverse effects arising from soil excavation and filling, and minerals extraction.* *12.3.3.2 To maintain the life supporting capacity of the soils of the District.* *12.3.3.3 To avoid, remedy or mitigate adverse effects associated with soil excavation or filling.* *12.3.3.4 To enable the efficient extraction of minerals whilst avoiding, remedying or mitigating any adverse environmental effects that may arise from this activity.*	12.3.3.1 is an objective aimed at consent authorities rather than an individual project. The nature of the proposal is such that the life supporting capacity of soils is not adversely affected. Cut and fill earthworks will be carried out in accordance with accepted practice with Erosion and Sediment Controls in place. 12.3.3.4 is not relevant.
12.3.4 POLICIES *12.3.4.1 That the adverse effects of soil erosion are avoided, remedied or mitigated.* *12.3.4.2 That the development of buildings or impermeable surfaces in rural areas be managed so as to minimise adverse effects on the life supporting capacity of the soil.*	The site is not erosion prone. The proposed earthworks will not result in any adverse effects on the life supporting capacity of soil. The works will be carried out in such a way so as not to create any adverse effects on people or the environment.

12.3.4.4 That soil excavation and filling, and mineral extraction activities be designed, constructed and operated to avoid, remedy or mitigate adverse effects on people and the environment.	

15.1.3 OBJECTIVES *15.1.3.1 To minimise the adverse effects of traffic on the natural and physical environment.* *15.1.3.3 To ensure that appropriate provision is made for on-site car parking for all activities, while considering safe cycling and pedestrian access and use of the site.* *15.1.3.4 To ensure that appropriate and efficient provision is made for loading and access for activities.* *15.1.3.5 To promote safe and efficient movement and circulation of vehicular, cycle and pedestrian traffic, including for those with disabilities.*	The existing activity's consent included access formation and upgrade to mitigate potential adverse effects of additional traffic movements entering and leaving the site. The re-development proposes further improvements to the site entrance to further mitigate additional traffic movements. Additional on-site parking, and loading space, are proposed. A revised layout for traffic circulation associated with the restaurant building will promote the safe and efficient movement and circulation of traffic, and the moving of the winery away from the restaurant onto its own access road will also help with vehicle circulation.
15.1.4 POLICIES *15.1.4.1 That the traffic effects of activities be evaluated in making decisions on resource consent applications.* *15.1.4.2 That the need to protect features of the natural and built environment be recognised in the provision of parking spaces.* *15.1.4.3 That parking spaces be provided at a location and scale which enables the efficient use of parking spaces and handling of traffic generation by the adjacent roading network.* *15.1.4.4 That existing parking spaces are retained or replaced with equal or better capacity where appropriate, so as to ensure the orderly movement and control of traffic.* *15.1.4.5 That appropriate loading spaces be provided for commercial and industrial activities to assist with the pick-up and delivery of goods.* *15.1.4.6 That the number, size, gradient and placement of vehicle access points be regulated to assist traffic safety and control, taking into consideration the requirements of both the New*	The proposal will likely result in an increase in traffic movements compared to the existing level of activity, but not to a significant degree, noting that the special functions and normal dining will not co-exist. Traffic effects have been considered in the design of an upgraded entrance. Carpark spaces will not impact on the natural environment, nor any built environment. The location of carpark spaces is an efficient use of space. Existing parking spaces for the restaurant/winery are proposed to be retained for the most part. Loading spaces can be provided. There is a single existing entrance to the property, with no additional or re-located entranceways proposed.

Zealand Transport Agency and the Far North District Council. *15.1.4.7 That the needs and effects of cycle and pedestrian traffic be taken into account in assessing development proposals*	

8.2 Proposed District Plan Objectives and Policies

The property is proposed to have a Rural Production Zone under the Proposed District Plan (PDP).

Objectives *RPROZ-O1* *The Rural Production zone is managed to ensure its availability for primary production activities and its long-term protection for current and future generations.* *RPROZ-O2* *The Rural Production zone is used for primary production activities, ancillary activities that support primary production and other compatible activities that have a functional need to be in a rural environment.* *RPROZ-O3* *Land use and subdivision in the Rural Production z one:* *a.protects highly productive land from sterilisation and enables it to be used for more productive forms of primary production;* *b.protects primary production activities from reverse sensitivity effects that may constrain their e ffective and efficient operation;* *c.does not compromise the use of land for farming activities, particularly on highly productive land;* *d.does not exacerbate any natural hazards; and* *e. is able to be serviced by on-site infrastructure.* *RPROZ-O4* *The rural character and amenity associated with a rural working environment is maintained.*	The site supports existing vineyard and this will remain the case. The site supports an existing commercial activity related to that vineyard. This activity will also continue. Because the proposal continues an existing activity there is little risk of reverse sensitivity effects arising. Productive land will continue to be used for productive purposes. The proposal does not exacerbate natural hazards. Rural character and amenity will be maintained.
Policies *RPROZP1* *Enable primary production activities, provided they internalise adverse effects onsite where practicable while recognising that typical adverse effects associated with primary production should be anticipated and accepted within the Rural Production Zone.*	The existing primary production activity (vineyard) carried out on the site will continue. So too will the existing activity, albeit re-developed /enhanced. The proposal will not increase the risk of reverse sensitivity effects given that the same type of activity

	that currently operates will continue to operate.
RPROZP2 *Ensure the Rural Production zone provides for activities that require a rural location by:* *a.enabling primary production activities as the predominant land use;* *b. enabling a range of compatible activities that support primary production activities, including ancillary activities, rural produce manufacturing, rural produce retail, visitor accommodation and home businesses.*	The scale of built environment is modest as a percentage of total site area, maintaining rural character and amenity. The activity is not considered incompatible with the purpose, character or amenity of the zone. Given the proposal is focused on re-developing and enhancing an existing activity, there is a functional need for the proposal to be on the site. There is no loss of productive capacity.
RPROZP3 *Manage the establishment, design and location of new sensitive activities and other non-productive activities in the Rural Production Zone to avoid where possible, or otherwise mitigate, reverse sensitivity effects on primary production activities.*	The proposal will not exacerbate hazards. The site can be serviced with on-site infrastructure.
RPROZP4 *Land use and subdivision activities are undertaken in a manner that maintains or enhances the rural character and amenity of the Rural Production zone, which includes:* *a. a predominance of primary production activities;* *b. low density development with generally low site coverage of buildings or structures;* *c. typical adverse effects such as odour, noise and dust associated with a rural working environment;* *and* *d. a diverse range of rural environments, rural character and amenity values throughout the District.*	
RPROZP5 *Avoid land use that:* *a. is incompatible with the purpose, character and amenity of the Rural Production zone;* *b. does not have a functional need to locate in the Rural Production zone and is more appropriately located in another zone;* *c. would result in the loss of productive capacity of highly productive land;* *d. would exacerbate natural hazards; and* *e. cannot provide appropriate on-site infrastructure.*	
RPROZP7 *Manage land use and subdivision to address the effects of the activity requiring resource consent, including (but not limited to) consideration of the following matters where relevant to the application:* *a. whether the proposal will increase production potential in the zone;*	This policy is of limited value because the activity does not require any consent under the PDP. Be that as it may, the existing production activity on the site will continue; Although there will be increased building coverage I believe the activity remains generally consistent with the existing consented activity and maintains the

b. whether the activity relies on the productive nature of the soil; *c. consistency with the scale and character of the rural environment;* *d. location, scale and design of buildings or structures;* *e. for subdivision or non-primary production activities: ... (not relevant)* *f. at zone interfaces: (not relevant)* *g. the capacity of the site to cater for on-site infrastructure associated with the proposed activity, including whether the site has access to a water source such as an irrigation network supply, dam or aquifer;* *h. the adequacy of roading infrastructure to service the proposed activity;* *i.Any adverse effects on historic heritage and cultural values, natural features and landscapes or indigenous biodiversity;* *j.Any historical, spiritual, or cultural association held by tangata whenua, with regard to the matters set out in Policy TW-P6.*	character of the rural environment. I consider the road network adequate to service the proposed activity; The site displays no historic heritage or cultural values, nor any natural features, landscape or indigenous biodiversity that will be adverse affected by the proposal.

8.3 Part 2 Matters

5 Purpose

(1) The purpose of this Act is to promote the sustainable management of natural and physical resources.

(2) In this Act, sustainable management means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while—

(a) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and

(b) safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and

(c) avoiding, remedying, or mitigating any adverse effects of activities on the environment.

The proposal is considered to provide for the sustainable management of natural and physical resources. It provides for existing development on the site to continue operating, with improved facilities.

6 Matters of national importance

In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall recognise and provide for the following matters of national importance:

(a) the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development:

(b) the protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development:
(c) the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna:
(d) the maintenance and enhancement of public access to and along the coastal marine area, lakes, and rivers:
(e) the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga:
(f) the protection of historic heritage from inappropriate subdivision, use, and development:
(g) the protection of protected customary rights:
(h) the management of significant risks from natural hazards.

I consider the proposal to be an appropriate level of development for a site of this nature. The site is not coastal and does not display any outstanding natural or landscape values. There are no areas of significant indigenous vegetation affected and no requirement for any public access. The proposal re-develops/ enhances an existing consented activity and does not adversely impact on the relationship of Maori and their culture and traditions. The site has no historic heritage values and there are no significant risks from natural hazards.

7 Other matters

In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall have particular regard to—

(a) kaitiakitanga:
(aa) the ethic of stewardship:
(b) the efficient use and development of natural and physical resources:
(ba) the efficiency of the end use of energy:
(c) the maintenance and enhancement of amenity values:
(d) intrinsic values of ecosystems:
(e) [Repealed]
(f) maintenance and enhancement of the quality of the environment:
(g) any finite characteristics of natural and physical resources:
(h) the protection of the habitat of trout and salmon:
(i) the effects of climate change:
(j) the benefits to be derived from the use and development of renewable energy.

The proposal is an efficient use and development of the site and natural and physical resources. Amenity values will be maintained. The proposal will not adversely affect the intrinsic values of ecosystems, not the overall quality of the environment.

8 Treaty of Waitangi

In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi).

The principles of the Treaty of Waitangi have been considered and it is believed that this proposal does not offend any of those principles.

In summary, it is considered that all matters under s5-8 inclusive have been adequately taken into account.

8.4 National Policy Statements and National Environmental Standards

The NPS for Highly Productive Land is relevant given that there are LUC class 1, 2 or 3 soils within the site and it is zoned for rural production. The proposal neither fragments (subdivides) nor sterilises (removes from production) any highly productive land currently in vineyards. The proposal represents a no change situation. Reverse sensitivity effects are not increased.

The NES CS has been addressed earlier. I do not believe the proposed land use requires consent under the NES CS. However, in proposing (and being granted) a subdivision in 2023, the previous owners commissioned a DSI and this identified two small isolated 'hot spots' where arsenic was found in levels exceeding the NES CS standard. The primary 'hot spot' is located outside of any area likely to be disturbed in giving effect to the proposed re-redevelopment, being near support poles in the large vineyard area along the north east side of the site. The second 'hot spot' had a much lower reading and could be statistically defendable as requiring no remediation, only included in the DSI's remediation because remediation was already required for the other 'hot spot', should a subdivision ever proceed (not intended by the new owner). This second 'hot spot' was also around new support structures, and near some of the new access works, but not thought to have been affected by those works.

8.5 Regional Policy Statement for Northland

In preparing this application, the Regional Policy Statement for Northland has been considered, in particular those Objectives and Policies relevant to enabling economic well being and to the use of productive land.

Relevant objectives and policies are discussed below.

Objective 3.5 Enabling economic wellbeing

Northland's natural and physical resources are sustainably managed in a way that is attractive for business and investment that will improve the economic wellbeing of Northland and its communities.

I believe the proposed development is a sustainable use of the site and provides for the property owners' social and economic wellbeing and contributes to the economy of the district.

3.12 Regional form

Northland has sustainable built environments that effectively integrate infrastructure with subdivision, use and development, and have a sense of place, identity and a range of lifestyle, employment and transport choices.

The site is already developed and the proposal is a re-development, utilising existing buildings and building a new building, and in doing so results in a more effective integration of infrastructure. The activity has an established 'identify' within the district and it is a positive effect to be able to retain this.

The objective and policies in the RPS also seek to ensure that productive land is not subject to fragmentation and/or sterilisation to the extent that it materially affects productive potential; and that reverse sensitivity effects are avoided, remedied or mitigated. For reasons already outlined in this report, the proposal is not considered to fragment or sterilise productive land and reverse sensitivity effects are not increased.

8.6 Proposed Regional Plan (Appeals Version)

The new effluent treatment and disposal system will require consent from the Northland Regional Council due to anticipated volume of discharge and the commercial nature of the activity. This application has been lodged by others.

9.0 CONSULTATION & S95 ASSESSMENT

9.1 S95A Public Notification Assessment

A consent authority must follow the steps set out in s95A to determine whether to publicly notify an application for a resource consent. Step 1 specifies when public notification is mandatory in certain circumstances. No such circumstance exists and therefore public notification is not mandatory. Step 2 of s95A specifies the circumstances that preclude public notification. None of these circumstances exist and therefore public notification is not precluded. This means that Step 3 of s95A must be considered. This specifies that public notification is required in certain circumstances, neither of which exists. In summary public notification is not required pursuant to Step 3 of s95A.

9.2 S95B Limited Notification Assessment

A consent authority must follow the steps set out in s95B to determine whether to give limited notification of an application for a resource consent, if the application is not publicly notified pursuant to s95A. Step 1 identifies certain affected groups and affected persons that must be notified. No such group of persons exist and limited notification is therefore not mandatory. Step 2 of s95B specifies the circumstances that preclude limited notification. Neither circumstance exists and limited notification is not precluded. Step 3 of s95B must be considered. This specifies that certain other affected persons must be notified, specifically where the activity is a boundary activity (which this is not) and whether a person is an affected person pursuant to 95E – see below. In summary I do not believe limited notification is required.

9.3 S95D Level of Adverse Effects

The AEE in this report assesses effects on the environment and concludes that these will be no more than minor.

9.4 S95E Affected Persons

A person is an 'affected person' if the consent authority decides that the activity's adverse effects on the person are minor or more than minor (but are not less than minor). A person is not an affected person if they have provided written approval for the proposed activity. No written approvals have been sought in this instance.

The activity is for the re-development of a site rather than a new development. The site supports a long established restaurant and winery activity (30 years' operation), and will continue to support a restaurant/winery activity. The differences are that the winery component will move to another part of the site within a proposed new custom built facility; this will enable greater seating capacity within the restaurant component, i.e. more patrons/customers at any one time. Hours of operation are proposed to remain within existing consented hours. Live music associated with normal dining will remain limited to a 7pm stopping time, with special functions (limited to 12 per annum) ceasing amplified music by 10pm.

The zone has no limit on hours of operation. The daytime noise threshold applies through to 10pm (2200 hours). In short, it is an expectation in this zone that an activity on a property may operate for extended hours, often beyond daylight, generating noise, e.g. crop harvesters; machinery.

I believe the visual effects of the re-development are less than minor in regard to adjacent properties. The site is zoned rural and large buildings (such as the winery) are an accepted (and permitted) component of that zone. Traffic movements will marginally increase during construction and thereafter will be greater than those generated by the current level of activity. However, improvements to access and entrance and to internal parking will help mitigate any additional effects. Sediment and Erosion Control measures will be in place during all earthworks such that there are no adverse off site effects..

In summary, I have not identified any adjacent properties as affected persons. No Written Approval from adjacent property owners has been considered necessary.

10.0 POTENTIAL CONDITIONS OF CONSENT

With the proposal to be in two separate stages, there will be conditions of consent that would be applicable to each of those stage, as well as general conditions that would apply across both.

In regard to the Plans and drawings provided in Appendix 1, those relevant to Stage 1, Winery only, are:

Drawing 1 Site Plan (overall)
Drawing 2 Stage 1 – Part Site Plan
Drawing 4 Stage 1 – New Building – Ground Floor Plan
Drawing 5 Stage 1 – New Building – First Floor Plan
Drawing 6 Stage 1 – New Building – Elevations (east and north)
Drawing 7 Stage 1 – New Building – Elevations (west and south)
Drawing 8 Stage 1 – New Building – Cross Sections
Drawing 9 Cross Sections (specifically S4 & S5)

Drawings relevant to Stage 2, redevelopment of restaurant building:

Drawing 1 Site Plan (overall)
Drawing 3 Stage 2 – Part Site Plan
Drawing 9 Cross Sections (specifically S1, S2 and S3)
Drawing 10 Stage 2 – Restaurant – Existing Floor Plans
Drawing 11 Stage 2 – Restaurant – Proposed Ground Floor Plan
Drawing 12 Stage 2 – Restaurant – Proposed First Floor Plan
Drawing 13 Stage 2 – Restaurant – Elevations (north and east)
Drawing 14 Stage 2 – Restaurant – Elevations (south and west)

Supporting technical reports (both Geotechnical and Stormwater Management) are applicable to both stages.

Stage 1, construction of a new winery building could be subject to a requirement to provide a construction management plan to Council for approval, along with appropriate earthworks conditions, e.g. Erosion and Sediment Control Plan installed prior to works, and remaining in place for duration of works.

I do not believe there needs to be any specific condition relating to hours of operation or noise relating to Stage 1. No condition is required in regard to the removal of the existing shed because this will have to occur in order to give effect to the consent in any event (within same footprint for proposed winery).

No condition is required for on-site wastewater for the winery as this has already been consented by Regional Council. No condition required in regard to the property's existing entrance because Stage 1 does not increase traffic movements (given the site already has a 'winery').

Stage 2 relates to the existing restaurant and associated activities. Conditions of consent will include general accordance with plans, including carpark number and layout. Conditions can include the formation of new carparking and internal traffic circulation (access) associated with the restaurant building and activities, and It is at this stage that

improvements to the alignment of the existing crossing into the site could be required as a condition of consent.

Stage 2 will also have earthworks, so conditions of consent could require the establishment of Erosion and Sediment Controls prior to works commencing, and these to remain in place throughout the works.

General conditions to apply will include hours of operation – no change from those already consented:

"That the operating hours of the activities consented under this consent be limited to between 7.00am and 1.00am the following day, seven days per week."

General conditions will also include the proposed noise conditions as contained in section 9.0 of the Marshall Day Acoustic Report supporting the application.

There is no need for a condition relating to on-site wastewater treatment and disposal for Stage 2 works as discharge consent has already been issued by Regional Council.

11.0 CONCLUSION

The site is considered suitable for the proposed re-development, and effects on the wider environment are no more than minor. The proposal is consistent with the relevant objectives and policies of the Operative and Proposed District Plans, other relevant National Policy Statements, and the Regional Policy Statement, as well as Part 2 of the Resource Management Act.

There is no District Plan rule or national environmental standard that requires the proposal to be publicly notified and no persons have been identified as adversely affected by the proposal. No special circumstances have been identified that would suggest notification is required.

It is therefore requested that the Council grant approval to consent on a non notified basis, subject to appropriate conditions.

Lynley Newport Date 2nd December 2025
Senior Planner
Thomson Survey Ltd

12.0 APPENDICES

Appendix 1 Architectural and Site Plans

Appendix 2 Location Map

Appendix 3 Record of Title and Relevant Instruments

Appendix 4 Historic Resource Consents

Appendix 5 Discharge Consent

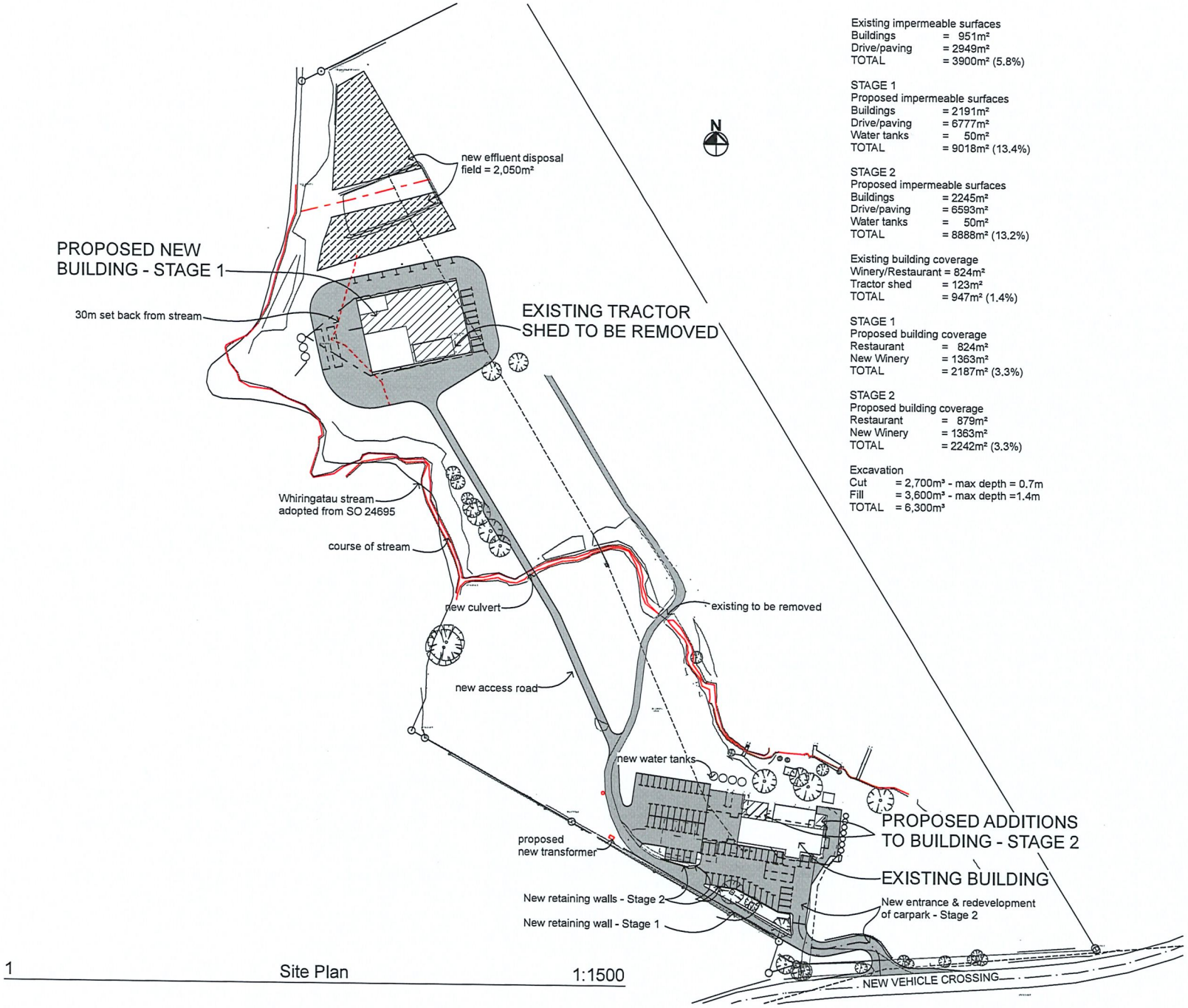
Appendix 6 Acoustic Assessment Report

Appendix 7 Stormwater Management Report

Appendix 8 Geotechnical Assessment Report

Appendix 1

Architectural and Site Plans



1 Site Plan 1:1500

Existing impermeable surfaces
Buildings = 951m²
Drive/paving = 2949m²
TOTAL = 3900m² (5.8%)

STAGE 1
Proposed impermeable surfaces
Buildings = 2191m²
Drive/paving = 6777m²
Water tanks = 50m²
TOTAL = 9018m² (13.4%)

STAGE 2
Proposed impermeable surfaces
Buildings = 2245m²
Drive/paving = 6593m²
Water tanks = 50m²
TOTAL = 8888m² (13.2%)

Existing building coverage
Winery/Restaurant = 824m²
Tractor shed = 123m²
TOTAL = 947m² (1.4%)

STAGE 1
Proposed building coverage
Restaurant = 824m²
New Winery = 1363m²
TOTAL = 2187m² (3.3%)

STAGE 2
Proposed building coverage
Restaurant = 879m²
New Winery = 1363m²
TOTAL = 2242m² (3.3%)

Excavation
Cut = 2,700m³ - max depth = 0.7m
Fill = 3,600m³ - max depth =1.4m
TOTAL = 6,300m³

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Always Check the LBP Register to ensure your building practitioner is licensed

No.	Date	Revision Detail

Check all dimensions on site before construction, Use figured dimensions in preference to scaling, All construction to comply with NZS 3604: 2011 and/or NZBC

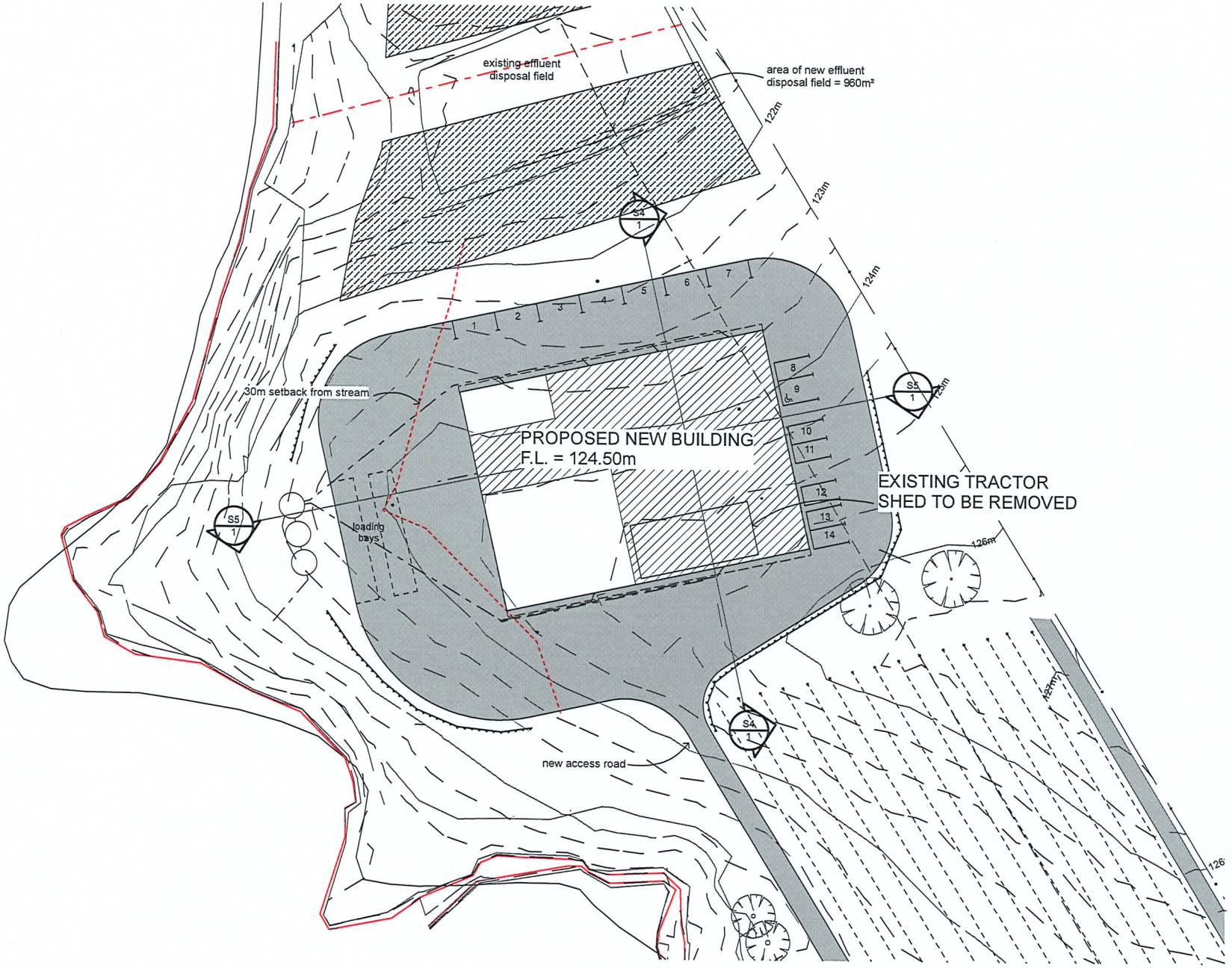
PROJECT:
Proposed New Building
M & S Endean Marsden Charitable Trust

PROJECT ADDRESS:
56 Wiroa Road Kerikeri

DRAWING:
Site Plan

Drawn:	Date:
BH	7/10/2025
SCALE: 1:1500	DRAWING No: 1 of 14
PROJECT No: 1800	

Total Design BUILDING & LANDSCAPE DESIGN
National Bank Building, 90 Kerikeri road, P.O.Box 575, KERIKERI 0245
Tel. (09) 407 7049, Mobile. (021) 241 6879
E-mail. brian@totaldesign.co.nz



1 Part Site Plan 1:500

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No.	Date	Revision Detail

Check all dimensions on site before construction.
Use figured dimensions in preference to scaling.
All construction to comply with NZS 3604: 2011 and/or NZBC

PROJECT:
Proposed New Building
M & S Endean Marsden Charitable Trust

PROJECT ADDRESS:
56 Wiroa Road Kerikeri

DRAWING:
Stage 1 - Part Site Plan

Drawn:	Date:
BH	7/10/2025
SCALE: 1:500	DRAWING No: 2 of 14
PROJECT No: 1800	

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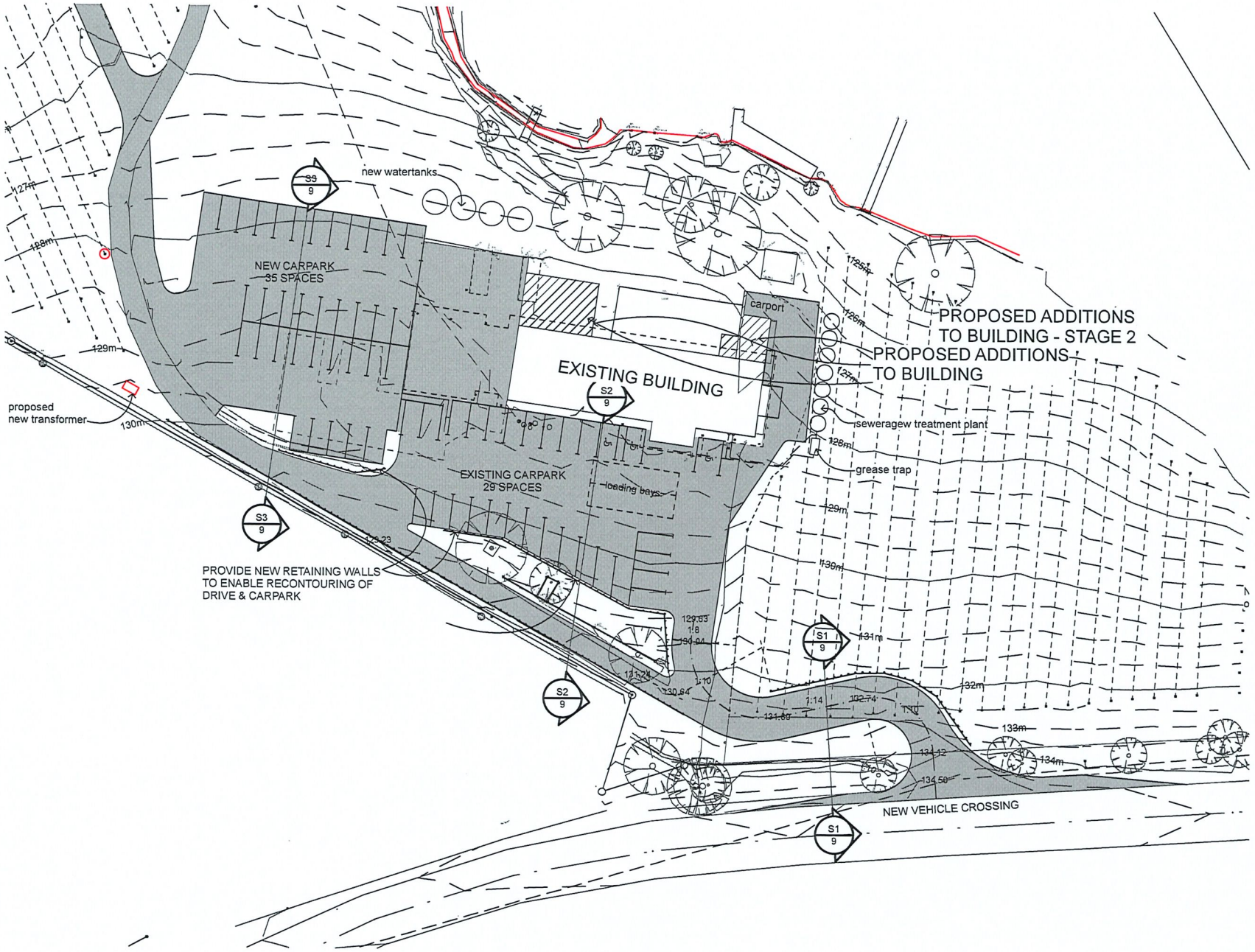

1 Part Site Plan 1:500

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No.	Date	Revision Detail

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Use figured dimensions in preference to scaling.
All construction to comply with NZS 3604: 2011 and/or NZBC

PROJECT:
Proposed New Building
M & S Endean Marsden Charitable Trust

PROJECT ADDRESS:
56 Wiroa Road
Kerikeri

DRAWING:
Stage 2 - Part Site Plan

Drawn:	Date:
BH	7/10/2025
SCALE: 1:500	DRAWING No: 3 of 14
PROJECT No: 1800	

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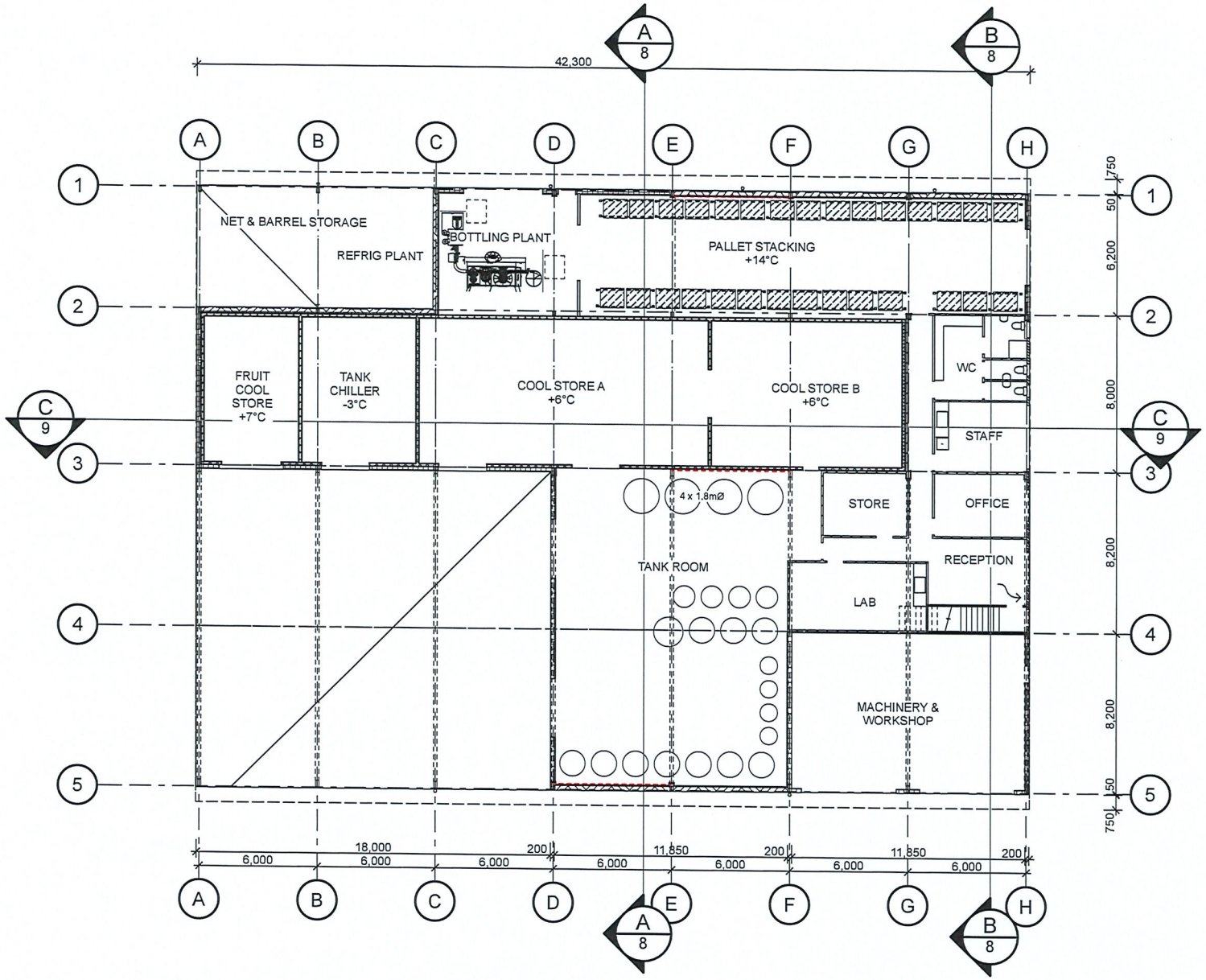

1 Ground Floor Plan 1:200

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BUILDING CONFIDENCE

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No.	Date	Revision Detail

Check all dimensions on site before construction.
Use figured dimensions in preference to scaling.
All construction to comply with NZS 3604: 2011 and/or NZBC

PROJECT:
Proposed New Building
M & S Endean Marsden Charitable Trust

PROJECT ADDRESS:
56 Wiroa Road Kerikeri

DRAWING:
Stage 1 - New Building - Ground Floor Plan

Drawn:	Date:
BH	7/10/2025
SCALE: 1:200	DRAWING No: 4 of 14
PROJECT No: 1800	

Total Design BUILDING & LANDSCAPE DESIGN
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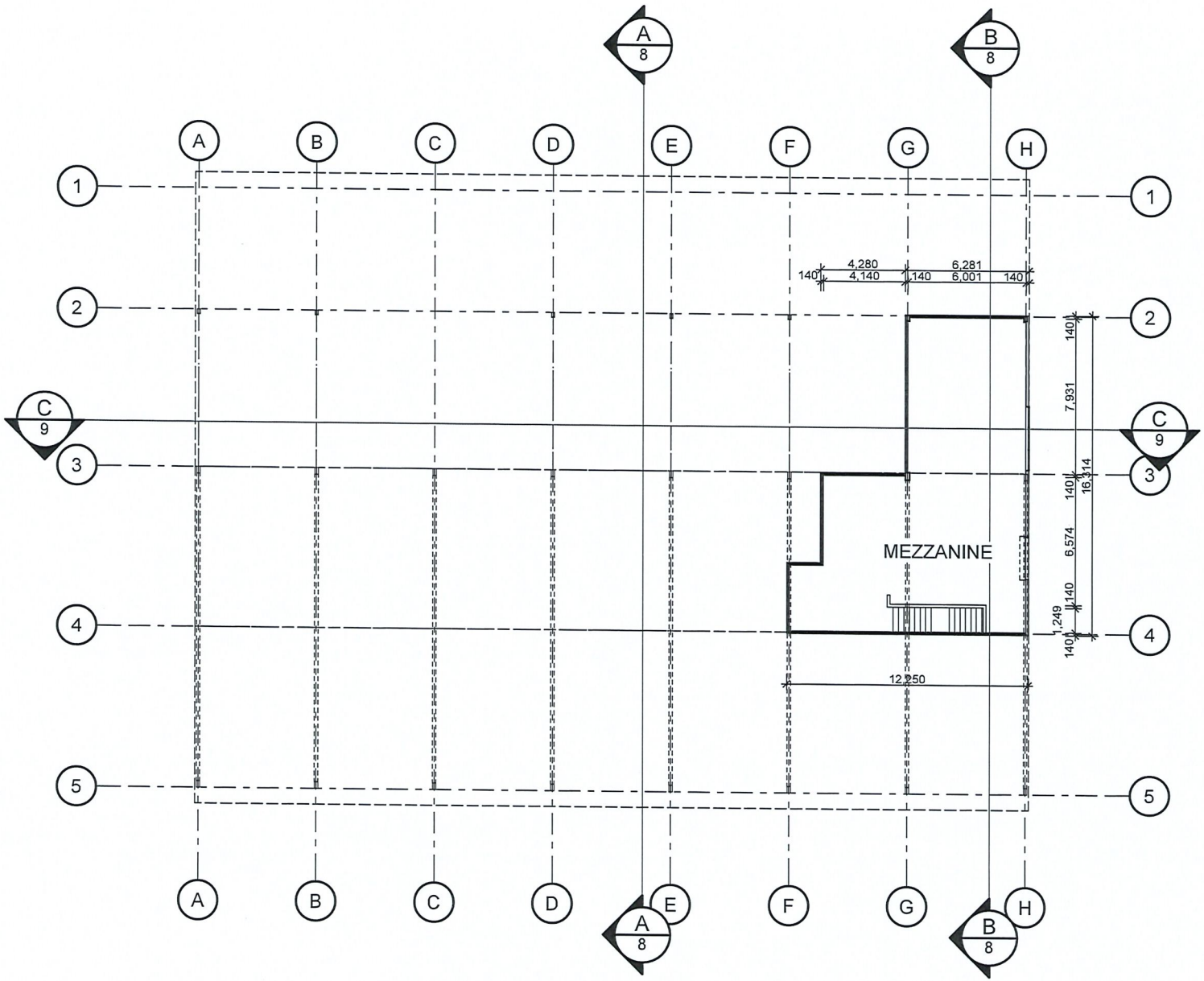

1 First Floor Plan 1:200

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BUILDING CONFIDENCE

Always Check the LBP Register to ensure your building practitioner is licensed

No.	Date	Revision Detail

Check all dimensions on site before construction.
Use figured dimensions in preference to scaling.
All construction to comply with NZS 3604: 2011 and/or NZBC

PROJECT:
Proposed New Building
M & S Endean Marsden Charitable Trust

PROJECT ADDRESS:
56 Wiroa Road Kerikeri

DRAWING:
Stage 1 - New Building - First Floor Plan

Drawn:	Date:
BH	7/10/2025
SCALE: 1:200	DRAWING No: 5 of 14
PROJECT No: 1800	

Total Design
BUILDING & LANDSCAPE DESIGN
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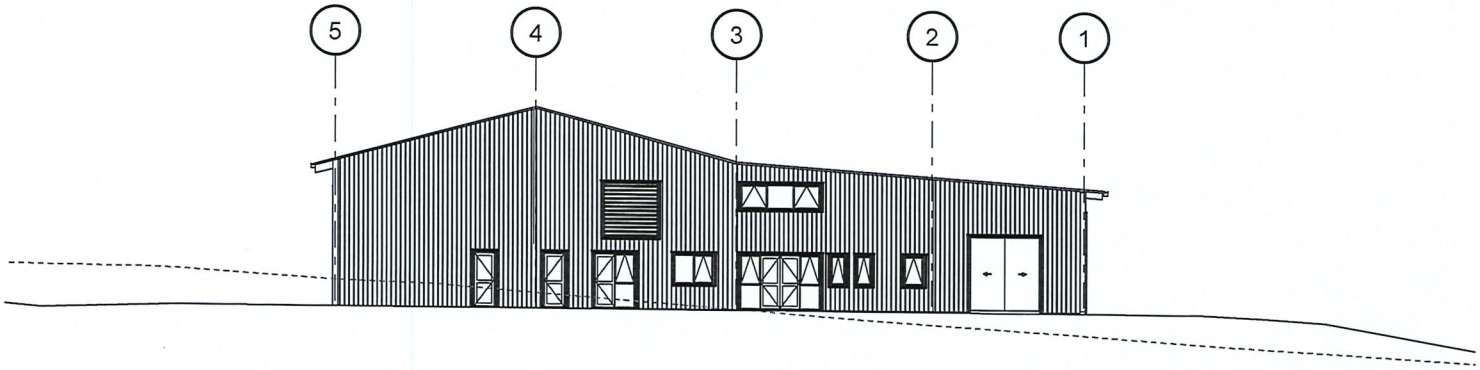
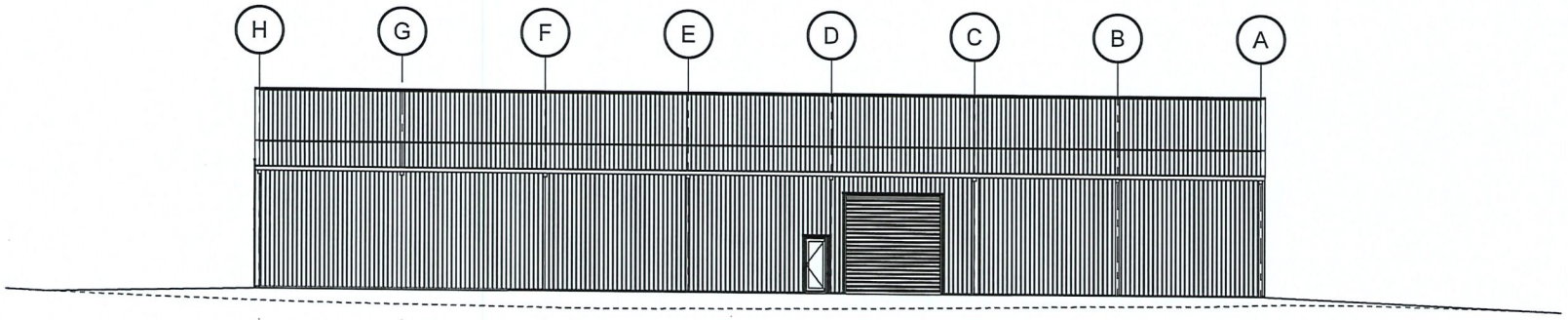
E-mail. brian@totaldesign.co.nz



E-02 East Elevation 1:200



E-01 North Elevation 1:200

LICENSED BUILDING PRACTITIONER
www.dbh.govt.nz
BUILDING CONFIDENCE

Always Check the LBP Register to ensure your building practitioner is licensed

No.	Date	Revision Detail

Check all dimensions on site before construction.
Use figured dimensions in preference to scaling.
All construction to comply with NZS 3604: 2011 and/or NZBC

PROJECT:
Proposed New Building
M & S Endean Marsden Charitable Trust

PROJECT ADDRESS:
56 Wiroa Road Kerikeri

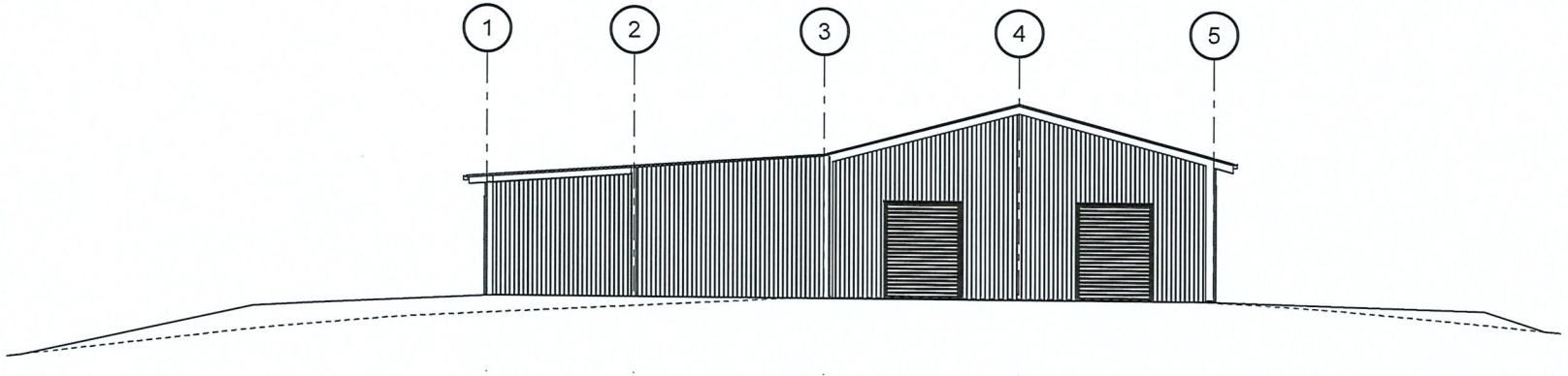
DRAWING:
Stage 1 - New Building - Elevations

Drawn:	Date:
BH	7/10/2025
SCALE: 1:200	DRAWING No: 6 of 14
PROJECT No: 1800	

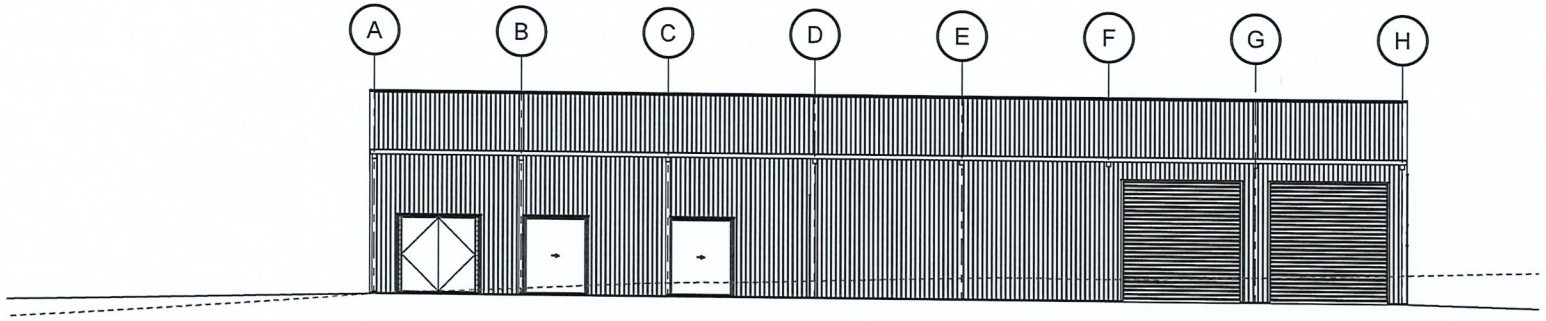
Total Design
BUILDING & LANDSCAPE DESIGN

National Bank Building
90 Kerikeri road,
P.O.Box 575
KERIKERI 0245

Tel. (09) 407 7040
Mobile. (021) 241 6679
E-mail. brian@totaldesign.co.nz



E-04 West Elevation 1:200



E-03 South Elevation 1:200

LICENSED BUILDING PRACTITIONER
www.dbh.govt.nz
BUILDING CONFIDENCE

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No.	Date	Revision Detail

Check all dimensions on site before construction.
Use figured dimensions in preference to scaling.
All construction to comply with NZS 3604: 2011 and/or NZBC

PROJECT:
Proposed New Building
M & S Endean Marsden Charitable Trust

PROJECT ADDRESS:
56 Wiroa Road Kerikeri

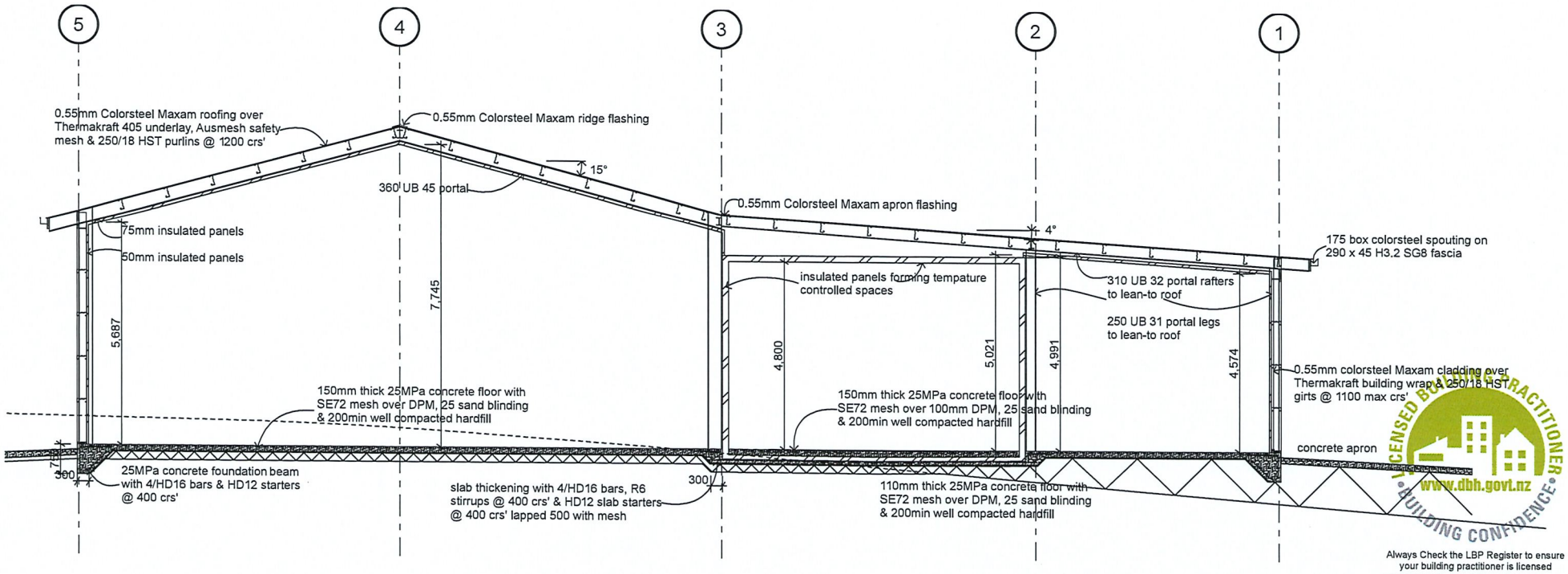
DRAWING:
Stage 1 - New Building - Elevations

Drawn:	Date:
BH	7/10/2025
SCALE: 1:200	DRAWING No: 7 of 14
PROJECT No: 1800	

Total Design
BUILDING & LANDSCAPE DESIGN

National Bank Building
90 Kerikeri road,
P.O.Box 575
KERIKERI 0245

Tel. (09) 407 7049
Mobile. (021) 241 8679
E-mail. brian@totaldesign.co.nz



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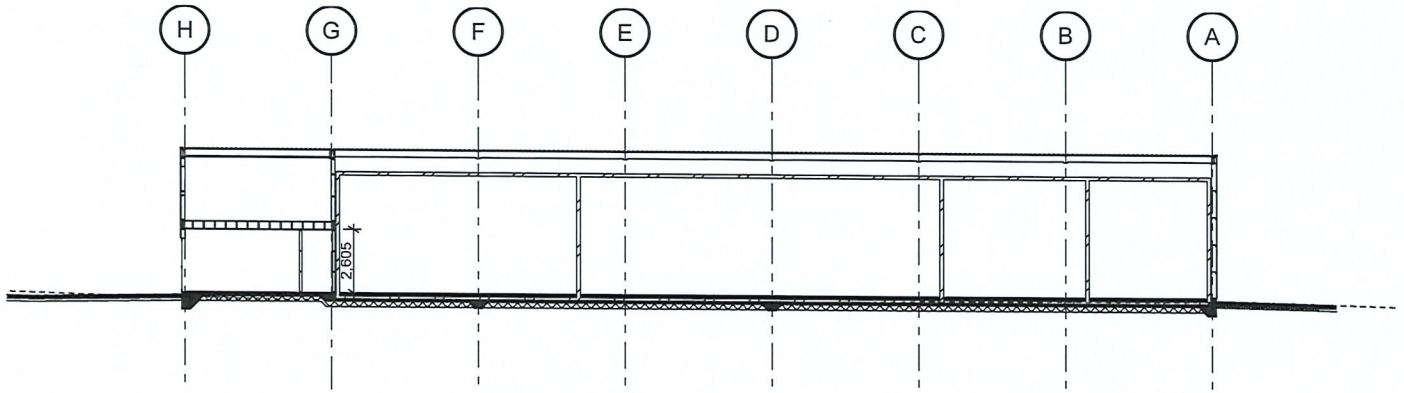

2 Section C - C 1:200

LICENSED BUILDING PRACTITIONER
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No.	Date	Revision Detail

Check all dimensions on site before construction.
Use figured dimensions in preference to scaling.
All construction to comply with NZS 3604: 2011 and/or NZBC

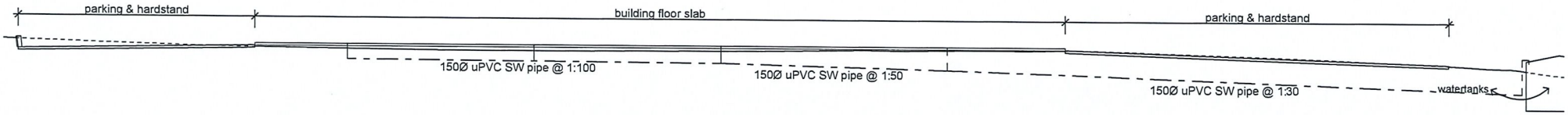
PROJECT:
Proposed New Building
M & S Endean Marsden Charitable Trust

PROJECT ADDRESS:
56 Wiroa Road Kerikeri

DRAWING:
Stage 1 - New Building - Cross Sections

Drawn:	Date:
BH	7/10/2025
SCALE: 1:100, 1:200	DRAWING No: 8 of 14
PROJECT No: 1800	

Total Design BUILDING & LANDSCAPE DESIGN
National Bank Building
90 Kerikeri road,
P.O.Box 575
KERIKERI 0245
Tel. (09) 407 7049
Mobile. (021) 241 8679
E-mail. brian@totaldesign.co.nz



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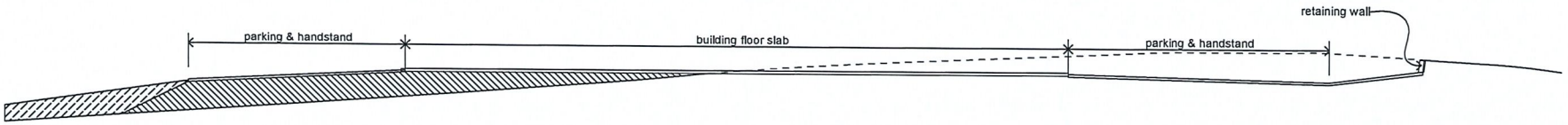

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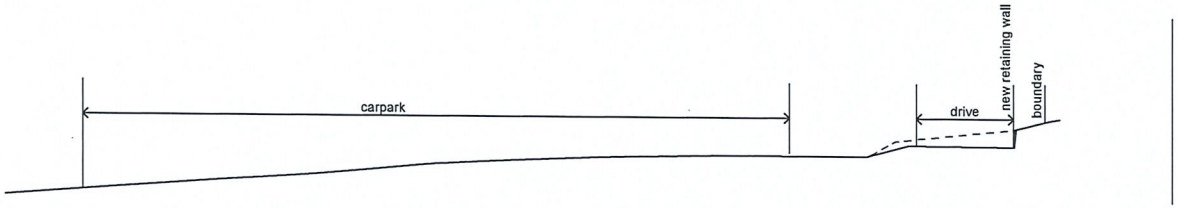
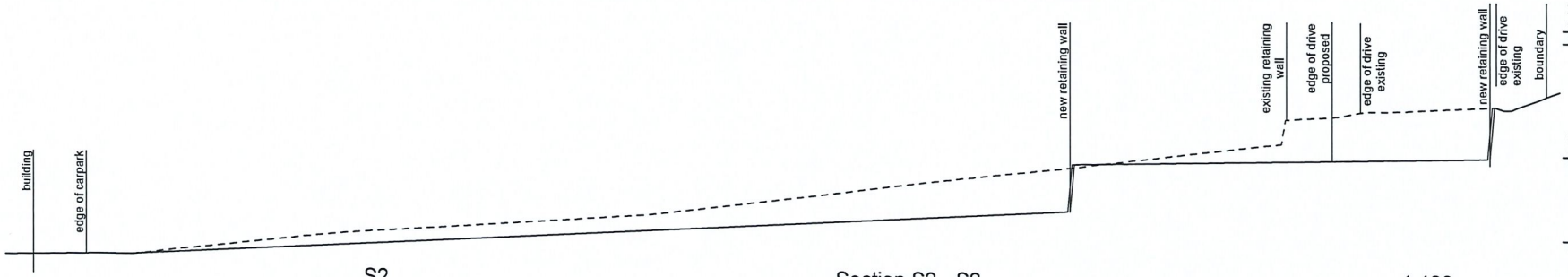


S3 Section S3 - S3 1:200



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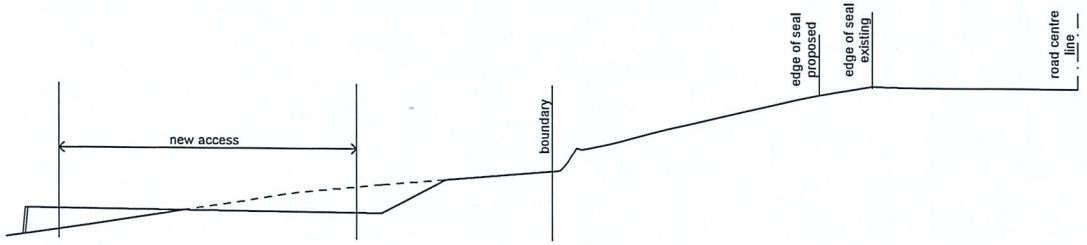

S1 Section S1 - S1 1:100

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No.	Date	Revision Detail

Check all dimensions on site before construction.
Use figured dimensions in preference to scaling.
All construction to comply with NZS 3604: 2011 and/or NZBC

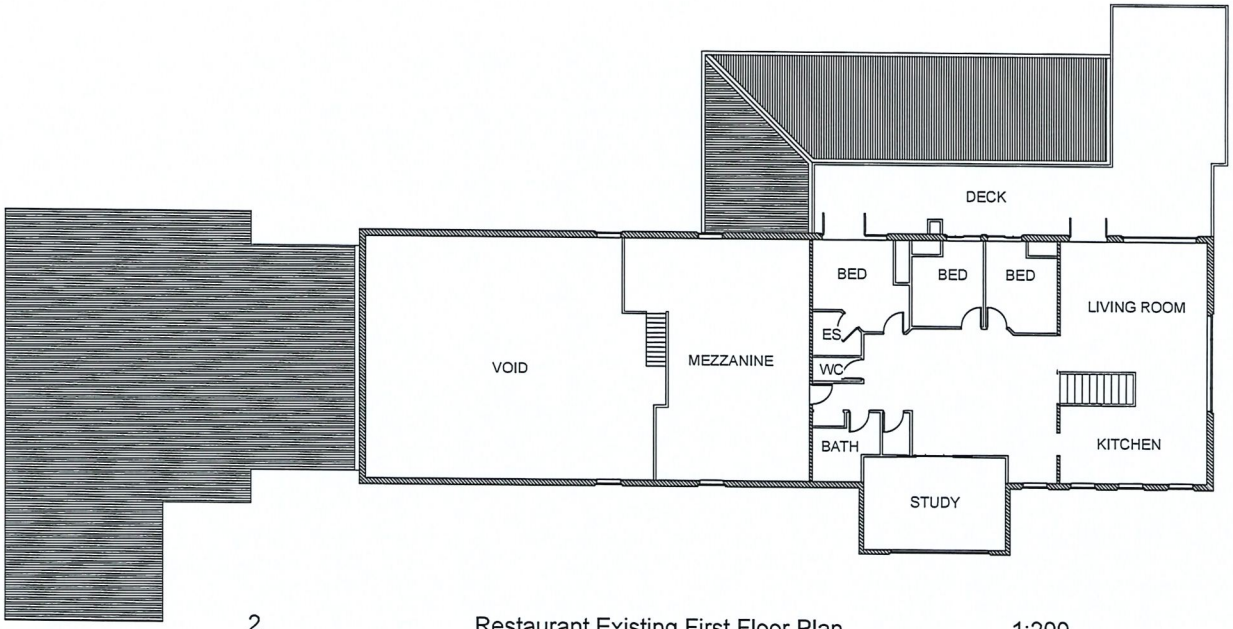
PROJECT:
Proposed New Building
M & S Endean Marsden Charitable Trust

PROJECT ADDRESS:
56 Wiroa Road Kerikeri

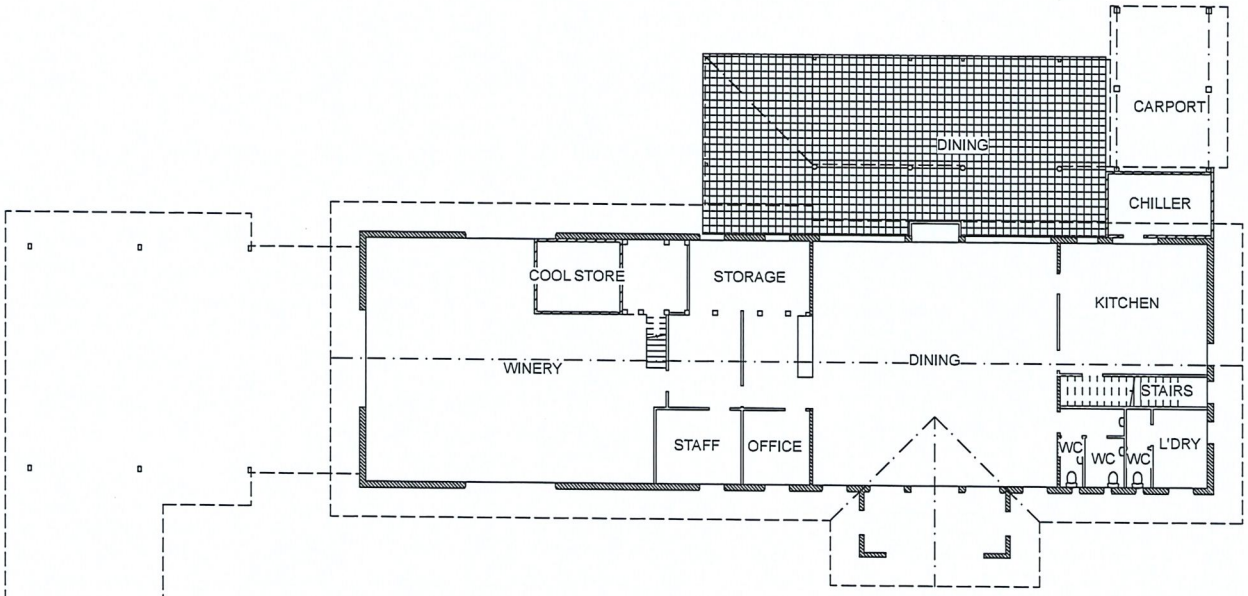
DRAWING:
Cross Sections

Drawn:	Date:
BH	7/10/2025
SCALE: 1:100, 1:200	DRAWING No: 9 of 14
PROJECT No: 1800	

Total Design
BUILDING & LANDSCAPE DESIGN
National Bank Building
90 Kerikeri road,
P.O.Box 575
KERIKERI 0245
Tel. (09) 407 7049
Mobile, (021) 241 9879
E-mail. brian@totaldesign.co.nz



2 Restaurant Existing First Floor Plan 1:200



1 Restaurant Existing Ground Floor Plan 1:200

LICENSED BUILDING PRACTITIONER
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BUILDING CONFIDENCE

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No.	Date	Revision Detail

Check all dimensions on site before construction.
Use figured dimensions in preference to scaling.
All construction to comply with NZS 3604: 2011 and/or NZBC

PROJECT:
Proposed New Building
M & S Endean Marsden Charitable Trust

PROJECT ADDRESS:
56 Wiroa Road Kerikeri

DRAWING:
Stage 2 - Restaurant - Existing Floor Plans

Drawn:	Date:
BH	7/10/2025
SCALE: 1:200	DRAWING No: 10 of 14
PROJECT No: 1800	

Total Design
BUILDING & LANDSCAPE DESIGN
National Bank Building
90 Kerikeri road,
P.O.Box 575
KERIKERI 0245
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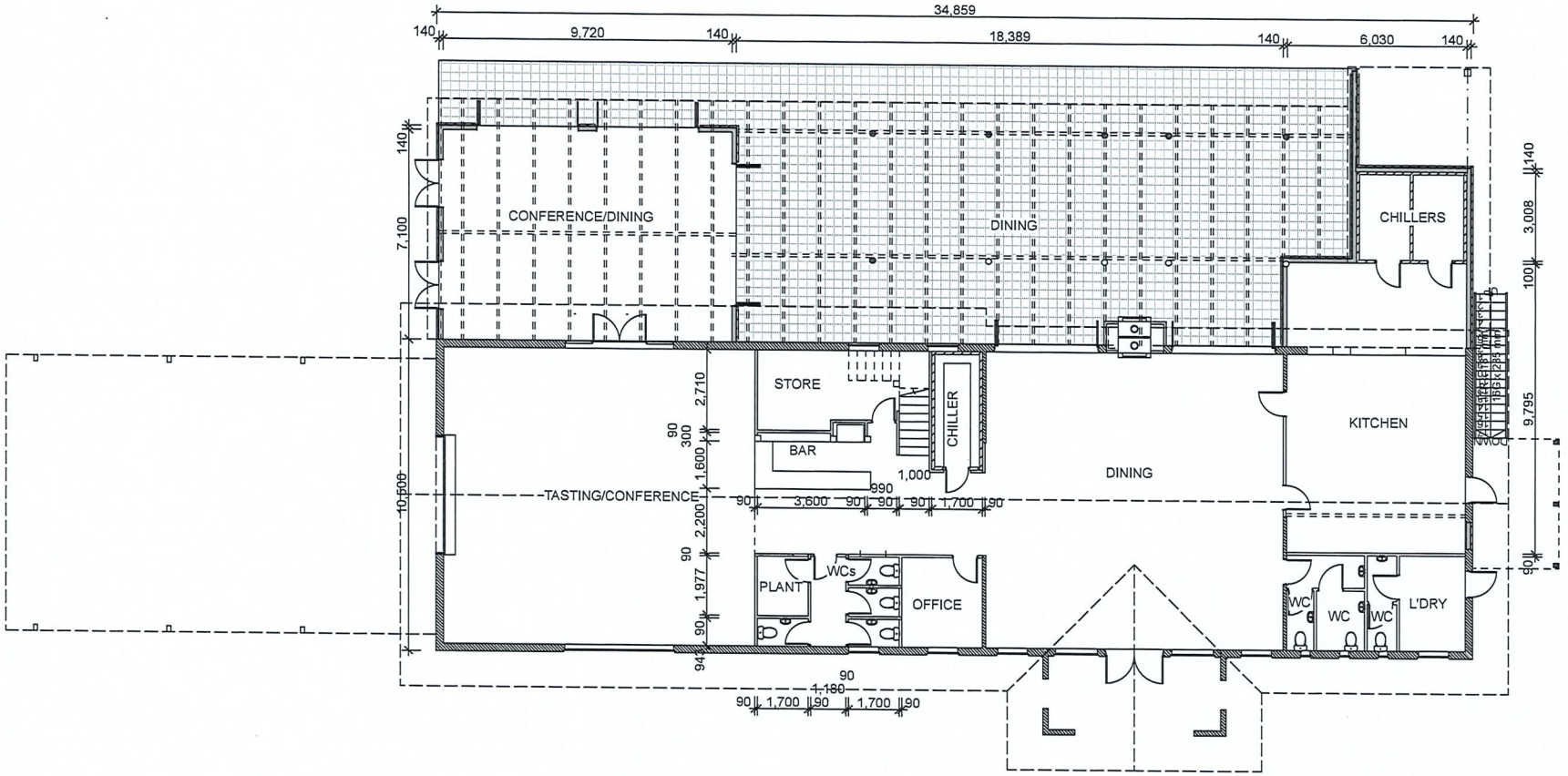
E-mail. brian@totaldesign.co.nz



1 Restaurant Ground Floor 1:150

LICENSED BUILDING PRACTITIONER
www.dbh.govt.nz
BUILDING CONFIDENCE

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No.	Date	Revision Detail

Check all dimensions on site before construction. Use figured dimensions in preference to scaling. All construction to comply with NZS 3604: 2011 and/or NZBC

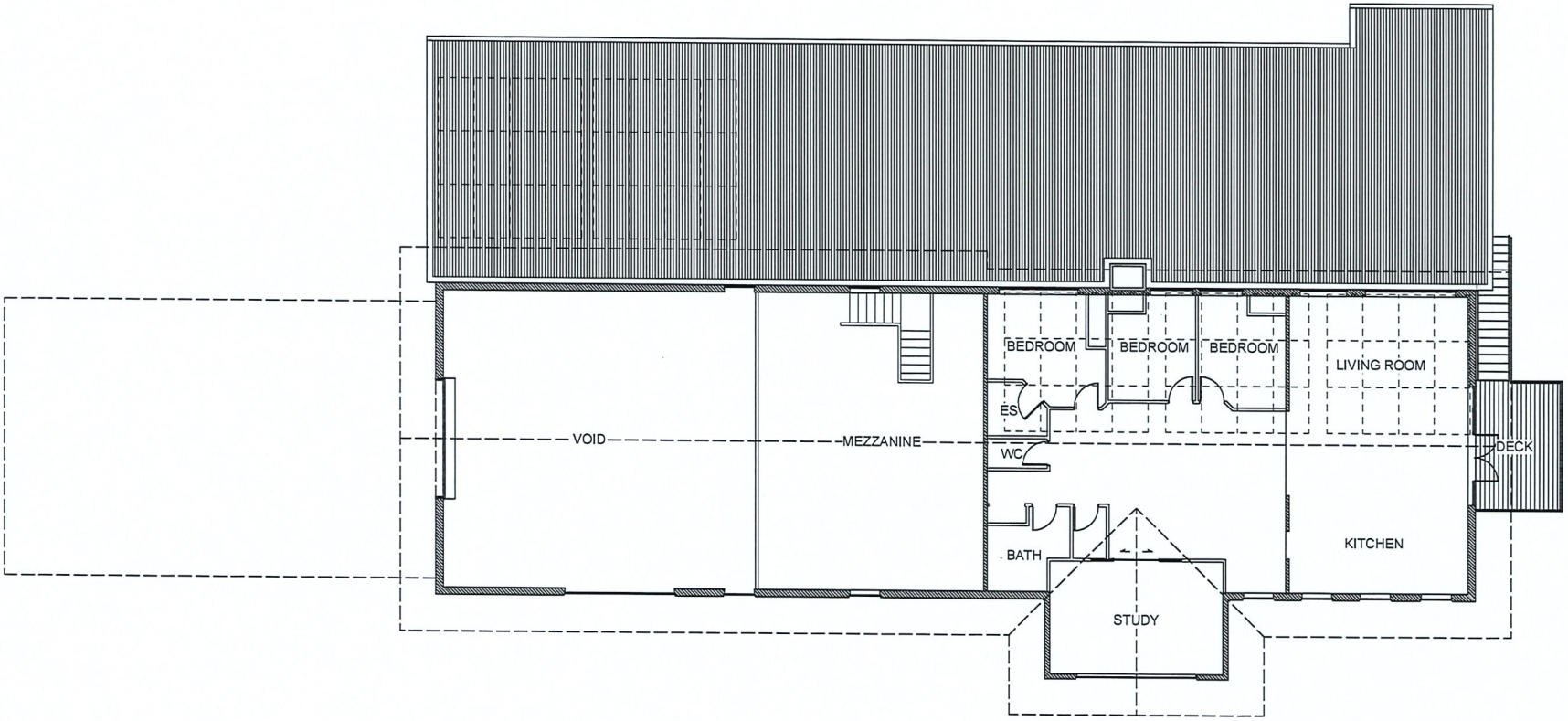
PROJECT:
Proposed New Building
M & S Endean Marsden Charitable Trust

PROJECT ADDRESS:
56 Wiroa Road Kerikeri

DRAWING:
Stage 2 - Restaurant - Proposed Ground Floor Plan

Drawn:	Date:
BH	7/10/2025
SCALE: 1:150	DRAWING No: 11 of 14
PROJECT No: 1800	

Total Design
BUILDING & LANDSCAPE DESIGN
National Bank Building
90 Kerikeri road,
P.O.Box 575
KERIKERI 0245
Tel. (09) 407 7049
Mobile. (021) 241 6879
E-mail. brian@totaldesign.co.nz



1 Restaurant First Floor 1:150

LICENSED BUILDING PRACTITIONER
www.dbh.govt.nz
BUILDING CONFIDENCE

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No.	Date	Revision Detail

Check all dimensions on site before construction.
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All construction to comply with NZS 3604: 2011 and/or NZBC

PROJECT:
Proposed New Building

M & S Endean Marsden Charitable Trust

PROJECT ADDRESS:
56 Wiroa Road Kerikeri

DRAWING:
Stage 2 - Restaurant - Proposed First Floor Plan

Drawn:	Date:
BH	7/10/2025
SCALE: 1:150	DRAWING No: 12 of 14
PROJECT No: 1800	

Total Design
BUILDING & LANDSCAPE DESIGN

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KERIKERI 0245

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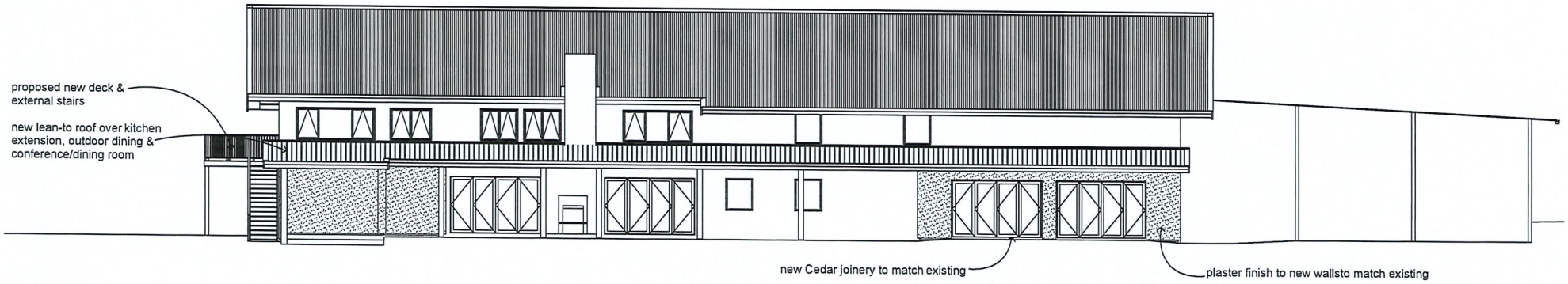
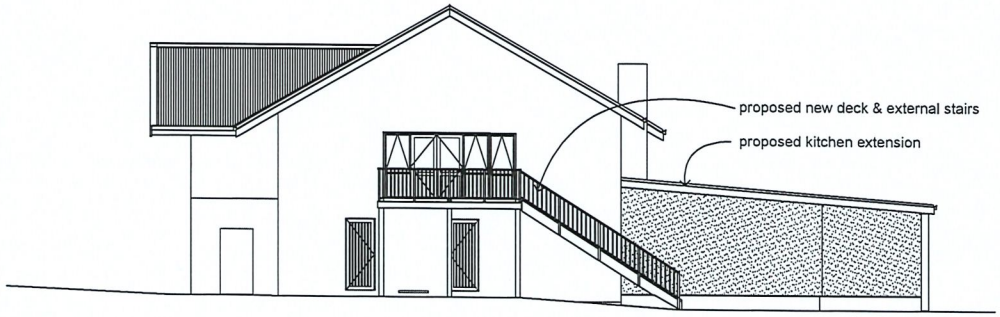


E-05 North Elevation 1:150



E-06 East Elevation 1:150

LICENSED BUILDING PRACTITIONER
www.dbh.govt.nz
BUILDING CONFIDENCE

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PROJECT:
Proposed New Building
M & S Endean Marsden Charitable Trust

PROJECT ADDRESS:
56 Wiroa Road Kerikeri

DRAWING:
Stage 2 - Restaurant - Elevations

Drawn:	Date:
BH	7/10/2025
SCALE: 1:150	DRAWING No: 13 of 14
PROJECT No: 1800	

Total Design
BUILDING & LANDSCAPE DESIGN

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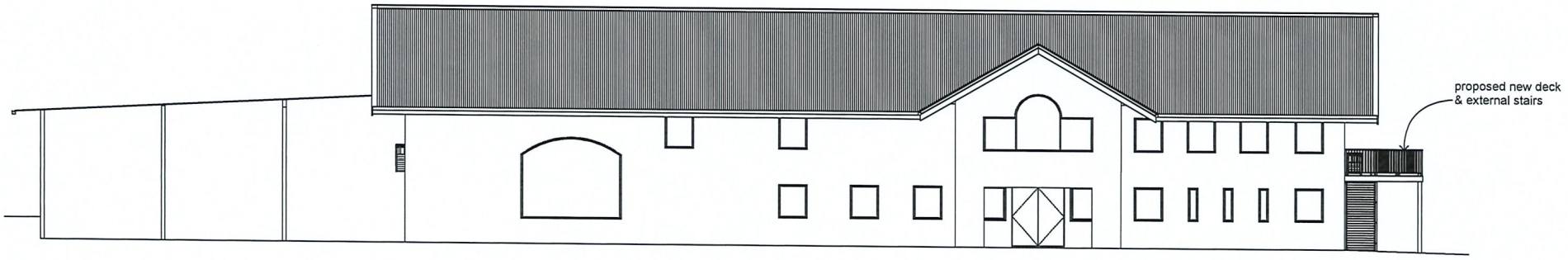
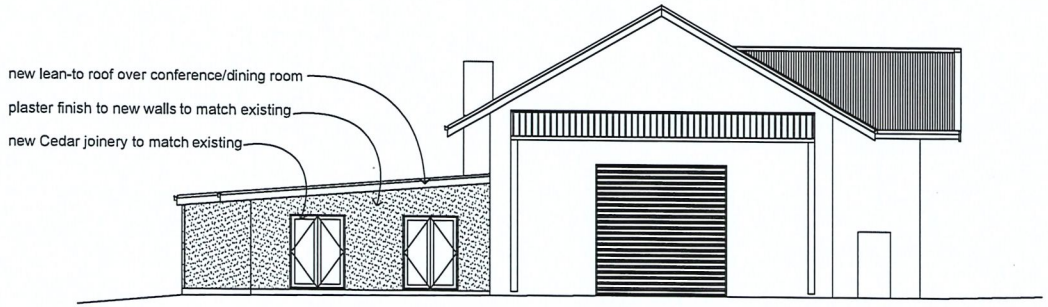
E-mail. brian@totaldesign.co.nz



E-07 South Elevation 1:150



E-08 West Elevation 1:150

LICENSED BUILDING PRACTITIONER
www.dbh.govt.nz
BUILDING CONFIDENCE

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No.	Date	Revision Detail

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Use figured dimensions in preference to scaling.
All construction to comply with NZS 3604: 2011 and/or NZBC

PROJECT:
Proposed New Building
M & S Endean Marsden Charitable Trust

PROJECT ADDRESS:
56 Wiroa Road Kerikeri

DRAWING:
Stage 2 - Restaurant - Elevations

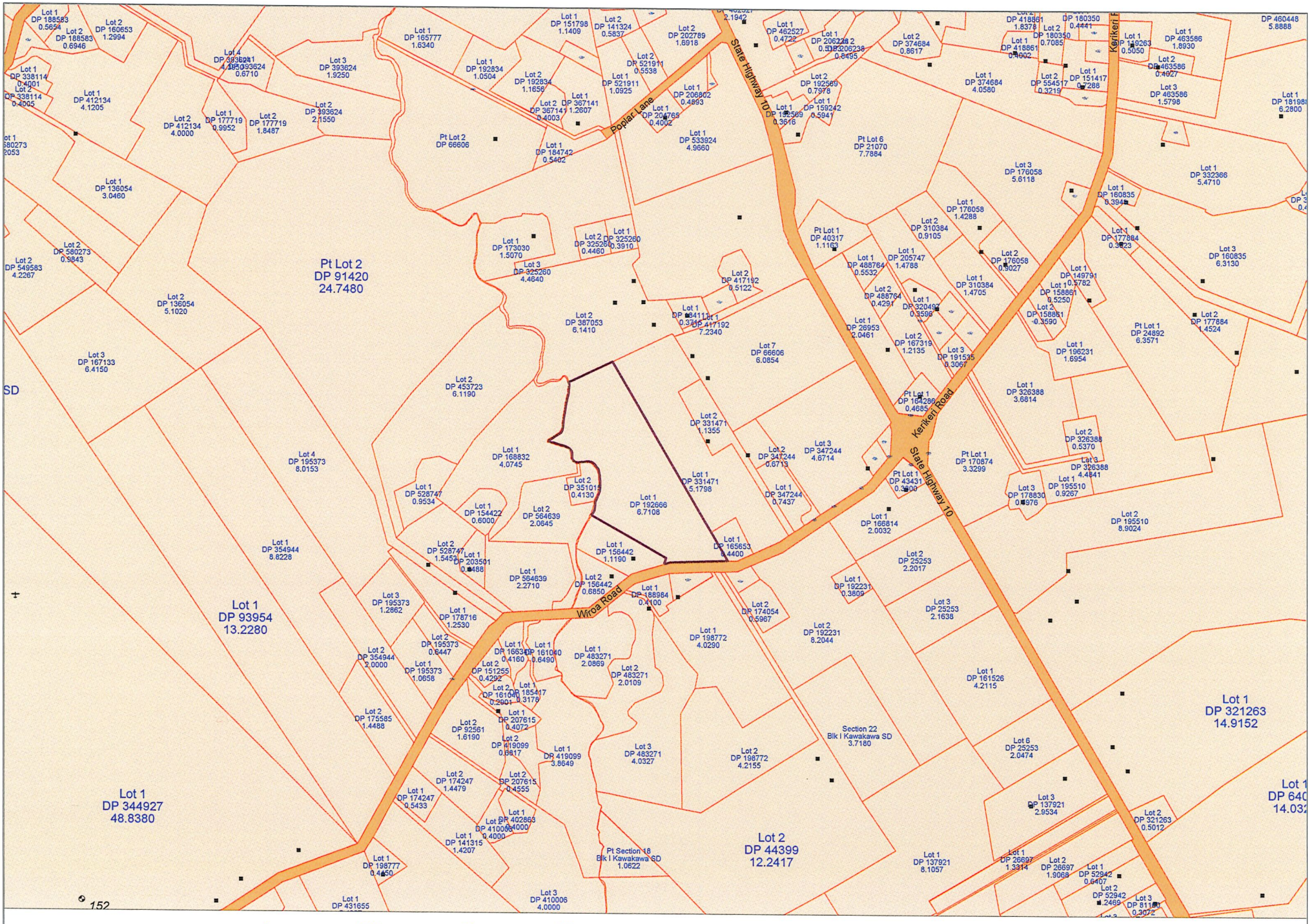
Drawn:	Date:
BH	7/10/2025
SCALE: 1:150	DRAWING No: 14 of 14
PROJECT No: 1800	

Total Design
BUILDING & LANDSCAPE DESIGN

National Bank Building
90 Kerikeri road,
P.O.Box 575
KERIKERI 0245

Tel. (09) 407 7049
Mobile. (021) 241 8679
E-mail. brian@totaldesign.co.nz

Appendix 2
Location Map



0 200 400 600 800 1000 1200m

QuickMap
Custom Software Ltd

Any person wishing to rely on the information shown on this map must independently verify the information

Scale 1:10000 Topographical and Cadastral map derived from LINZ data. Printed: 02-Dec-2025 01:38.

Appendix 3

Record of Title and Relevant Instruments

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Search Copy

R.W. Muir
Registrar-General
of Land

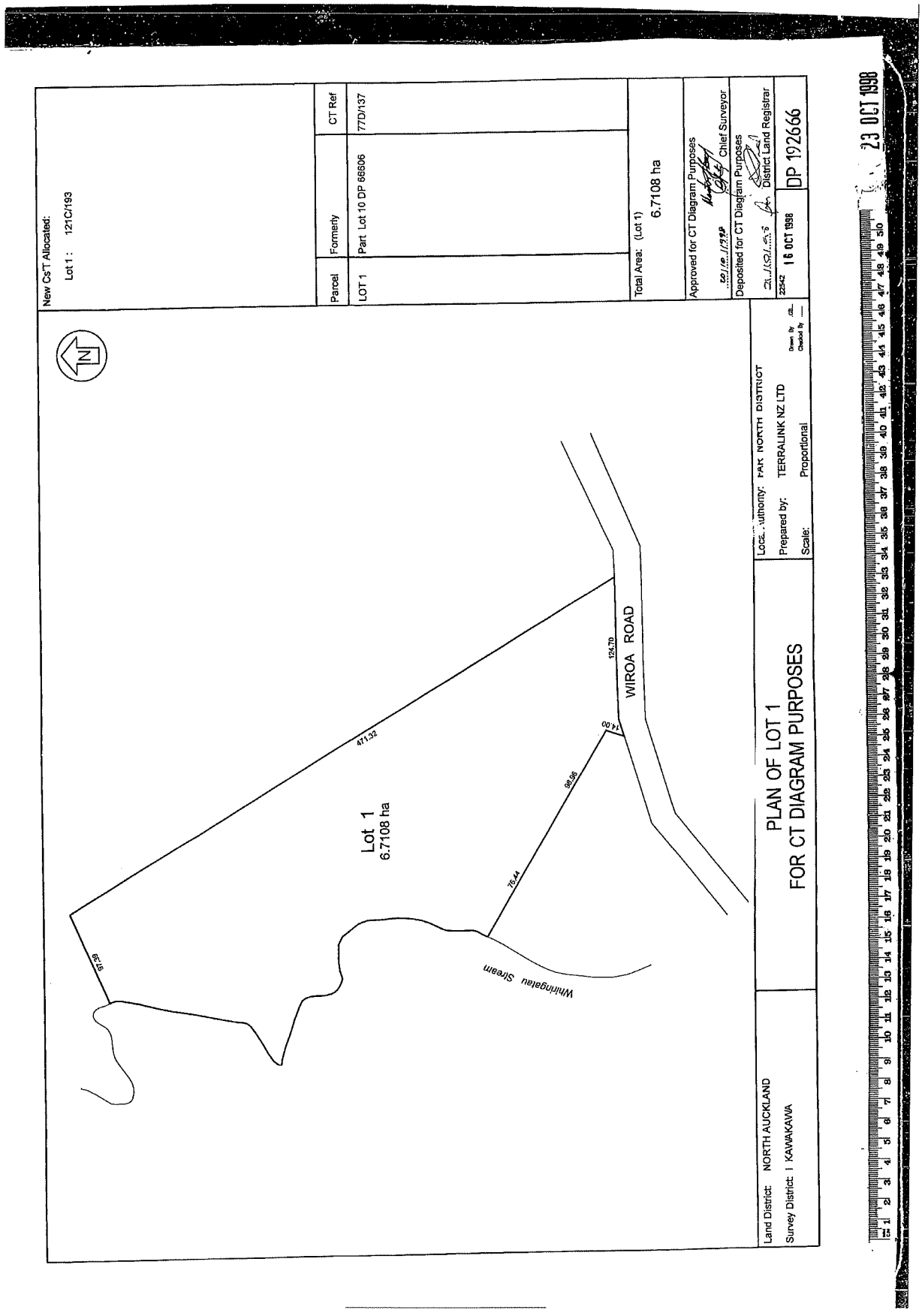
Identifier	**NA121C/193**
Land Registration District	**North Auckland**
Date Issued	01 October 1998

Prior References
NA77D/137

Estate	Fee Simple
Area	6.7108 hectares more or less
Legal Description	Lot 1 Deposited Plan 192666

Registered Owners
Mike and Shirley Endean Marsden Charitable Trust

Interests
Land Covenant in Easement Instrument 11217192.1 - 13.12.2018 at 11:56 am


New CsT Allocated:
Lot 1 : 121C/193
Parcel
Formerly
CT Ref
LOT 1
Part Lot 10 DP 66506
77D/137
Total Area: (Lot 1)
6.7108 ha
Approved for CT Diagram Purposes
Chief Surveyor
Deposited for CT Diagram Purposes
District Land Registrar
22542
16 OCT 1998
DP 192666
Land District: NORTH AUCKLAND
Survey District: I KAWAKAWA
PLAN OF LOT 1
FOR CT DIAGRAM PURPOSES
Prepared by: TERRALINK NZ LTD
Scale: Proportional
Lot 1
6.7108 ha
WIROA ROAD
471.32
124.70
14.00
98.96
75.44
91.39
Whitingatau Stream
23 OCT 1998

Appendix 4

Historic Resource Consents

FAR NORTH DISTRICT COUNCIL

IN THE MATTER of the Resource Management Act 1991:

AND

IN THE MATTER of an application under the aforesaid Act, 1991 by MARSDEN ESTATE LTD

APPLICATION NUMBER RC 2030473

HEARINGS APPLICATION FOR INDOOR/OUTDOOR RESTAURANT ACCOMMODATING UP TO 80 SEATED GUESTS AND TOTAL LIMIT 145 GUESTS, DWELLING ON THE FIRST FLOOR, PRODUCTION, STORAGE, TASTING AND SALE OF WINE PRODUCE ON THE SITE, STORAGE TASTING AND SALE OF CHAMPAGNE/SPARKLING WINE WITHIN THE RESTAURANT AND RESTAURANT FUNCTIONS.
The property in respect of which the application is made, is situated at WIROA ROAD, KERIKERI PT LOT 10 DP 66606, BLK I, KAWAKAWA SD.

HEARING

Before the Hearings Committee of the Far North District Council, on the 25 August 2003.

DECISION

THAT PURSUANT TO SECTIONS 105 (1)(B) AND 108 OF THE RESOURCE MANAGEMENT ACT 1991, THE COUNCIL GRANTS CONSENT TO RC 2030473, BEING AN APPLICATION BY MARSDEN ESTATE LIMITED TO USE THE SUBJECT SITE, BEING PT LOT 10 DP 66606, BLK I, KAWAKAWA SD, LOCATED ON WIROA ROAD, KERIKERI, FOR A RESTAURANT / WINERY CONTAINING THE FOLLOWING COMPONENTS:

- INDOOR / OUTDOOR RESTAURANT ACCOMMODATING UP TO 80 SEATED GUESTS, WITH A TOTAL LIMIT OF 145 GUESTS FOR RESTAURANT FUNCTIONS.
- DWELLING IN THE FIRST FLOOR.
- PRODUCTION AND STORAGE OF WINE WITHIN THE WINERY.
- TASTING & SALE OF WINE PRODUCED ON THE SITE.

THIS DECISION IS SUBJECT TO THE FOLLOWING CONDITIONS:

1. THE DEVELOPMENT SHALL PROCEED IN ACCORDANCE WITH THE PLANS AND INFORMATION PROVIDED WITH THE APPLICATION INCLUDING:
   - THE PLAN ENTITLED *"MARSDEN ESTATE WINERY RESTAURANT – EXISTING FACILITIES"*.
   - THE PLAN ENTITLED *"LOCATION PLAN OF EXISTING RESTAURANT / WINERY MARSDEN ESTATE"*, DRAWN BY TOTAL DESIGN.
   - THE PLAN ENTITLED MARSDEN ESTATE WINERY CAR PARK LAYOUT

- THE PLAN ENTITLED *"EXISTING SIDE ELEVATION"* DRAWN BY TOTAL DESIGN.
- THE PLAN ENTITLED *"GROUND FLOOR PLAN, AS PROPOSED IN ORIGINAL APPLICATION"*

EXCEPT AS REQUIRED BY THE FOLLOWING CONDITIONS OF CONSENT.

2. THAT THE OPERATING HOURS OF THE RESTAURANT / WINERY BE LIMITED TO BETWEEN 7.00AM AND 1.00AM THE FOLLOWING DAY, SEVEN DAYS PER WEEK.
3. THAT NO AMPLIFIED LIVE MUSIC BE PERMITTED ON THE PREMISES AFTER THE HOURS OF 7.00PM.
4. THAT THE ACTIVITIES ON THE SITE SHALL BE CARRIED OUT SO AS TO ENSURE THE FOLLOWING NOISE LIMITS ARE NOT EXCEEDED WITHIN THE TIME-FRAMES STATED:

   0700 to 2200 50 dBA L_{10}

   2200 to 0700 45 dBA L_{10} and 65 dBA L_{max}, AND

THE NOISE LIMITS SPECIFIED IN AN OPERATIVE DISTRICT PLAN AS A PERMITTED ACTIVITY FOR THE SUBJECT SITE.

ALL ACTIVITIES SHALL BE SO CONDUCTED AS TO ENSURE THAT NOISE FROM THE SITE SHALL NOT EXCEED THE ABOVE NOISE LIMITS AS MEASURED AT OR WITHIN THE BOUNDARY OF ANY OTHER SITE WITHIN THE ZONE.

THE SOUND SHALL BE MEASURED IN ACCORDANCE WITH THE PROVISIONS OF NZS 6801:1999 *ACOUSTICS- MEASUREMENT OF ENVIRONMENTAL SOUND* AND ASSESSED IN ACCORDANCE WITH THE PROVISIONS OF NZS 6802:1991 *ASSESSMENT OF ENVIRONMENTAL SOUND.*

5. THAT THE PLANS FOR THE DEVELOPMENT BE AMENDED TO THE SATISFACTION OF THE COUNCIL'S DEVELOPMENT ENGINEER TO SHOW 43 CAR PARKS AND LOADING BAY COMPLYING WITH THE STANDARDS SPECIFIED WITHIN THE PROPOSED DISTRICT PLAN.
6. THAT 43 CAR PARKS AND LOADING BAY BE MARKED ON THE SITE TO THE SATISFACTION OF THE COUNCIL'S DEVELOPMENT ENGINEER. THE CAR PARKS ARE TO COMPLY WITH THE MINIMUM DIMENSIONS FOR PARKING AND MANOEUVRING SPECIFIED IN THE PROPOSED DISTRICT PLAN.
7. THAT SIGNAGE SHALL BE ERECTED ADVISING USERS OF THE FACILITY THAT THE PARKING OF VEHICLES ON THE ROADSIDE VERGES OF WIROA ROAD (INCLUDING BOTH SIDES OF THE ROAD) ADJACENT TO MARSDEN ESTATE RESTAURANT AND WINERY IS NOT PERMITTED. SUCH SIGNAGE AND ITS LOCATION SHALL TO THE SATISFACTION OF COUNCILS ROADING MANAGER. SUCH APPROVAL SHALL BE OBTAINED PRIOR TO THE ERECTION OF THE SIGNAGE.
8. THAT ANY ALCOHOL RETAILED FOR OFF-STE CONSUMPTION BE RESTRICTED TO WINE PRODUCED ON THE SITE.
9. IN ACCORDANCE WITH SECTION 128 OF THE RESOURCE MANAGEMENT ACT 1991, THE COUNCIL MAY SERVE NOTICE ON THE CONSENT HOLDER OF ITS INTENTION TO REVIEW THE ABOVE CONDITIONS OF CONSENT SIX MONTHS FOLLOWING THE COMMENCEMENT OF THE ACTIVITY, AND IN

SIX MONTHLY INTERVALS THEREAFTER IN RELATION TO THE SCALE OF THE ACTIVITY, THE NUMBER OF ON-SITE CAR PARKING SPACES PROVIDED AND ASSOCIATED NOISE LEVELS. THE REVIEW WILL BE FOR THE PURPOSE OF DEALING WITH ANY ADVERSE EFFECT ON THE ENVIRONMENT THAT MAY ARISE FROM THE EXERCISE OF THE CONSENT AND WHICH IS APPROPRIATELY DEALT WITH AT A LATER STAGE OR TO REQUIRE THE CONSENT HOLDERS TO ADOPT THE BEST PRACTICABLE OPTION TO REMOVE OR REDUCE ANY ADVERSE EFFECTS ON THE ENVIRONMENT.

10. THE COSTS OF ANY MONITORING OR REVIEWING OF THE CONDITIONS OF THIS CONSENT SHALL BE BORNE BY THE CONSENT HOLDER.

Reasons For The Decision

In consideration of the application under Section 104 of the Act, the Council has made its decision for the following reasons:

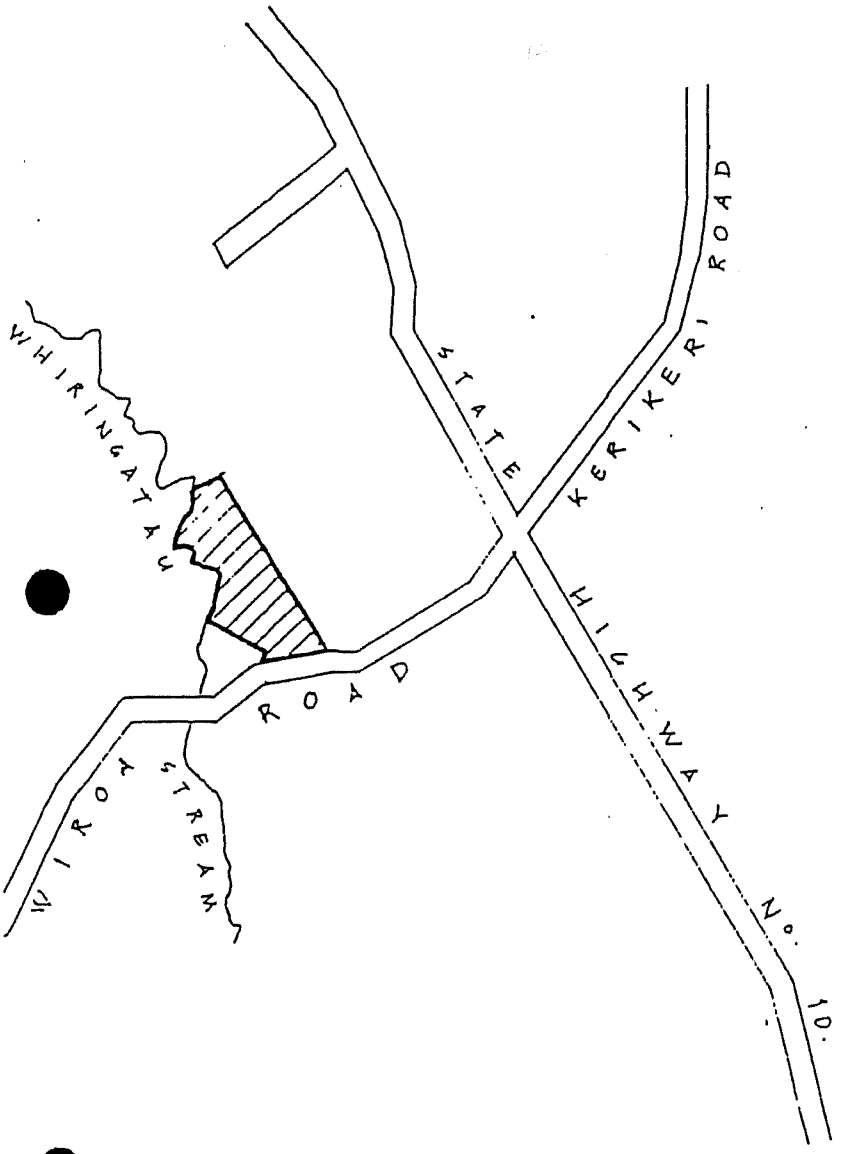
1. Council is of the opinion that the application will not conflict with the objectives and policies of either the Transitional or Proposed District Plans, and that the potential adverse effects resulting from granting consent to the application will not be more than minor.
2. The conditions of consent will avoid, remedy, or mitigate any adverse effects on the environment that may arise from this proposal.

Right To Appeal

Please note that pursuant to section 120 of the Resource Management Act 1991, you may, within 15 working days of receiving notification of Council's decision, appeal to the Environment Court against the whole or any part of the Council's decision.

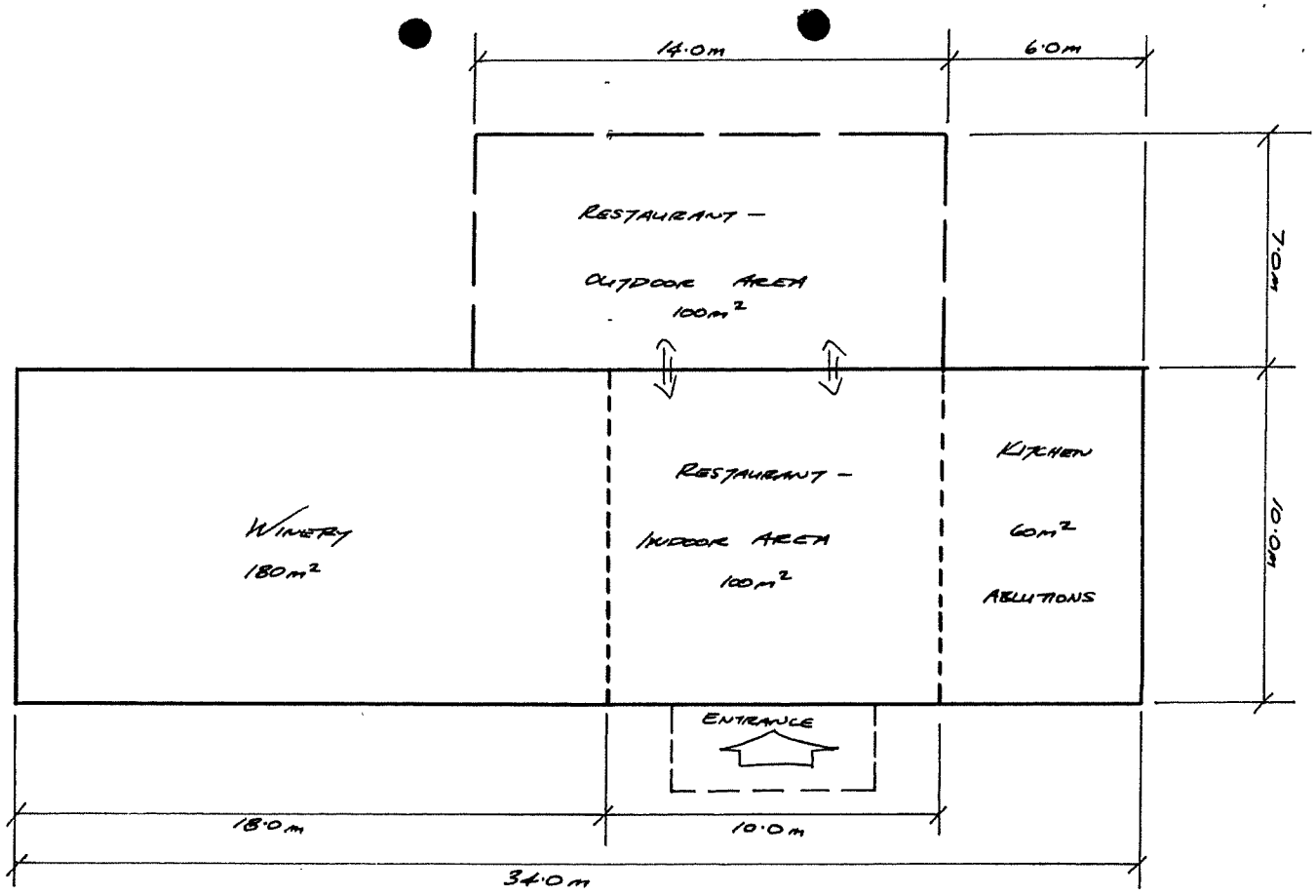
Advice Notes:

1. As indicated within the plans and application submitted with the proposal the granting of this consent is intended to provide clarity as to what is permitted on the site. This a stand alone consent and is independent of, and is in no way reliant on any previous landuse consents granted by Council since November 1995.
2. There are no limitations on the type of alcohol sold within the restaurant. This consent only limits the type of alcohol to be sold for off-site consumption, to wine produced on the site.
3. If problems are identified where noise generated from the restaurant/winery activities exceeds the standards specified within the resource consent, appropriate enforcement action shall be carried out which may require regular noise monitoring of the activity over a period of time and/or require the activities to cease until compliance is demonstrated.
4. On the 15th July 2003 the Far North District Council notified its decisions on the submissions to the Proposed Plan. In terms of the matters to be considered in making its decision on the 25th August, the Council is required to have regard to any relevant objectives, policies, rules or other provisions of a plan or proposed plan applying at that point in time. The Council is therefore required to consider the revised document.
5. Pursuant to section 36(3) of the Resource Management Act 1991, an invoice for the additional costs of processing and considering this application will be forwarded to the applicant following notification of the decision.



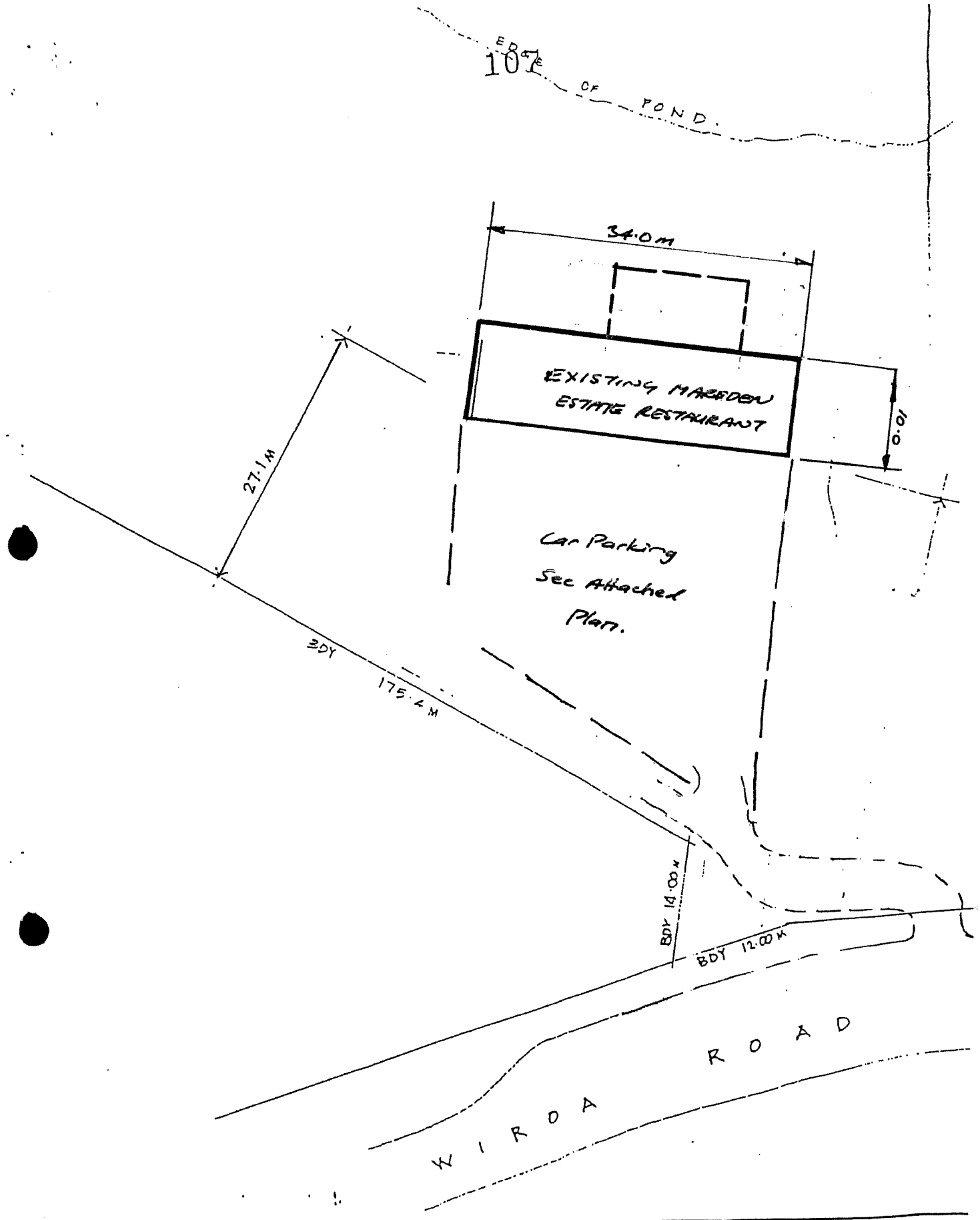
LOCATION PLAN N.T.S.

SCALE 1:500	DRAWN: B HUTCHING	SHEET
DATE: NOV.' 1994	JOB N°. 176	1.



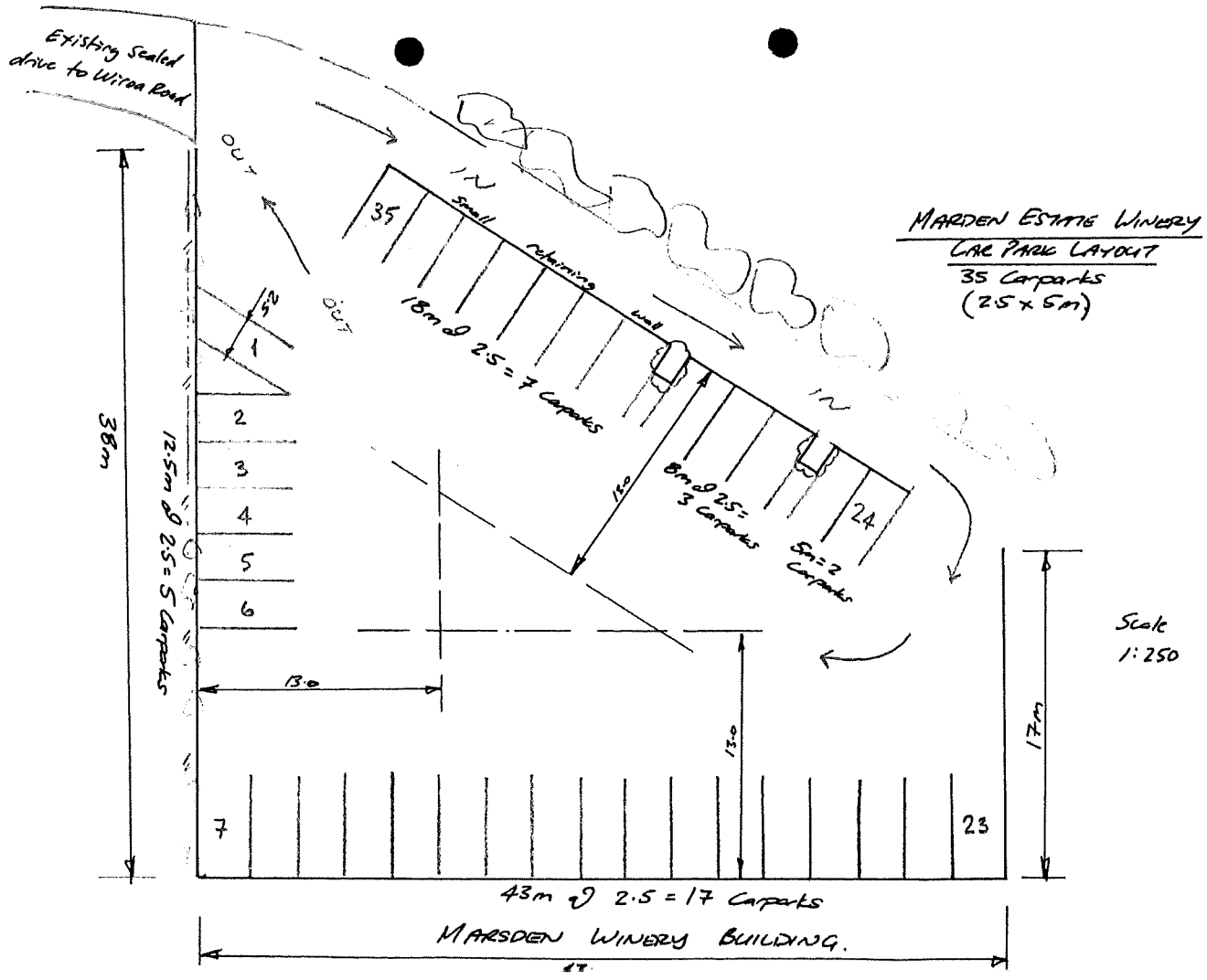
MARSDEN ESTATE WINERY / RESTAURANT
- Existing Facilities -

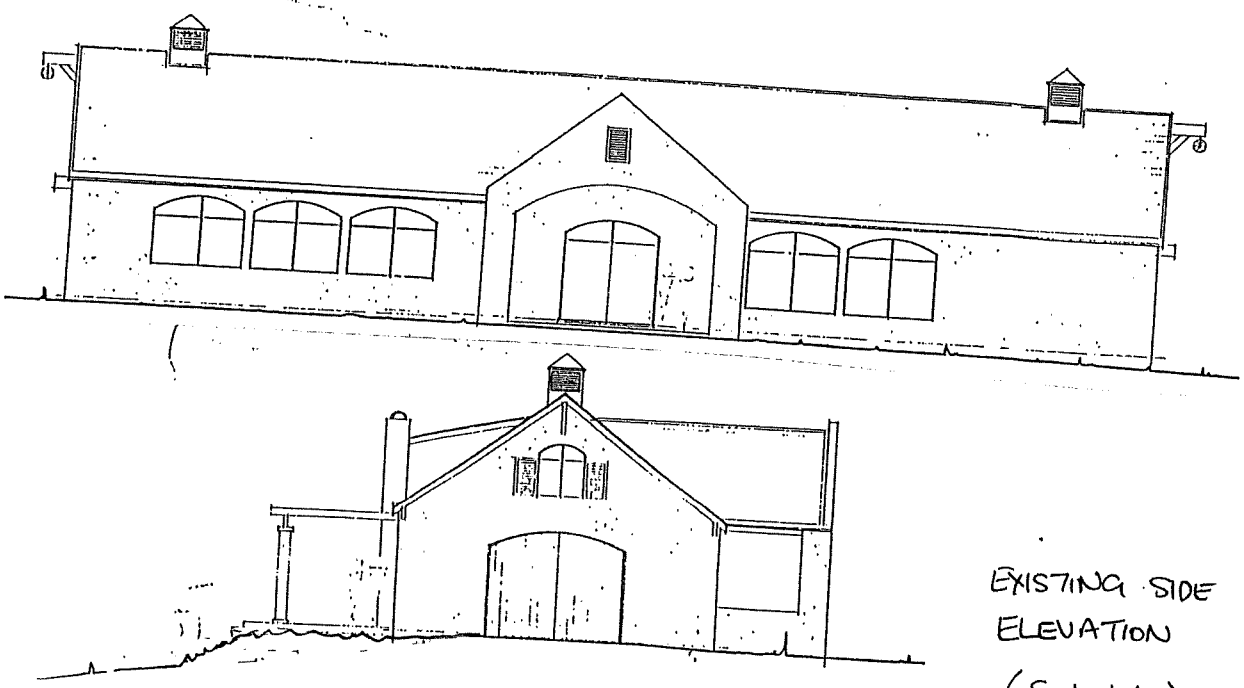
Scale 1:150



TOTAL DESIGN

LOCATION PLAN OF EXISTING RESTAURANT/ WINERY - Marsden Estate


Existing Sealed drive to Wirra Road
OUT
IN
35
Small
retaining
wall
18m @ 2.5 = 7 Carparks
OUT
IN
1
2
3
4
5
6
38m
12.5m @ 2.5 = 5 Carparks
8m @ 2.5 = 3 Carparks
5m = 2 Carparks
24
13.0
13.0
17m
7
23
43m @ 2.5 = 17 Carparks
MARSDEN WINERY BUILDING.
17.
MARDEN ESTATE WINERY
CAR PARK LAYOUT
35 Carparks
(2.5 x 5m)
Scale
1:250



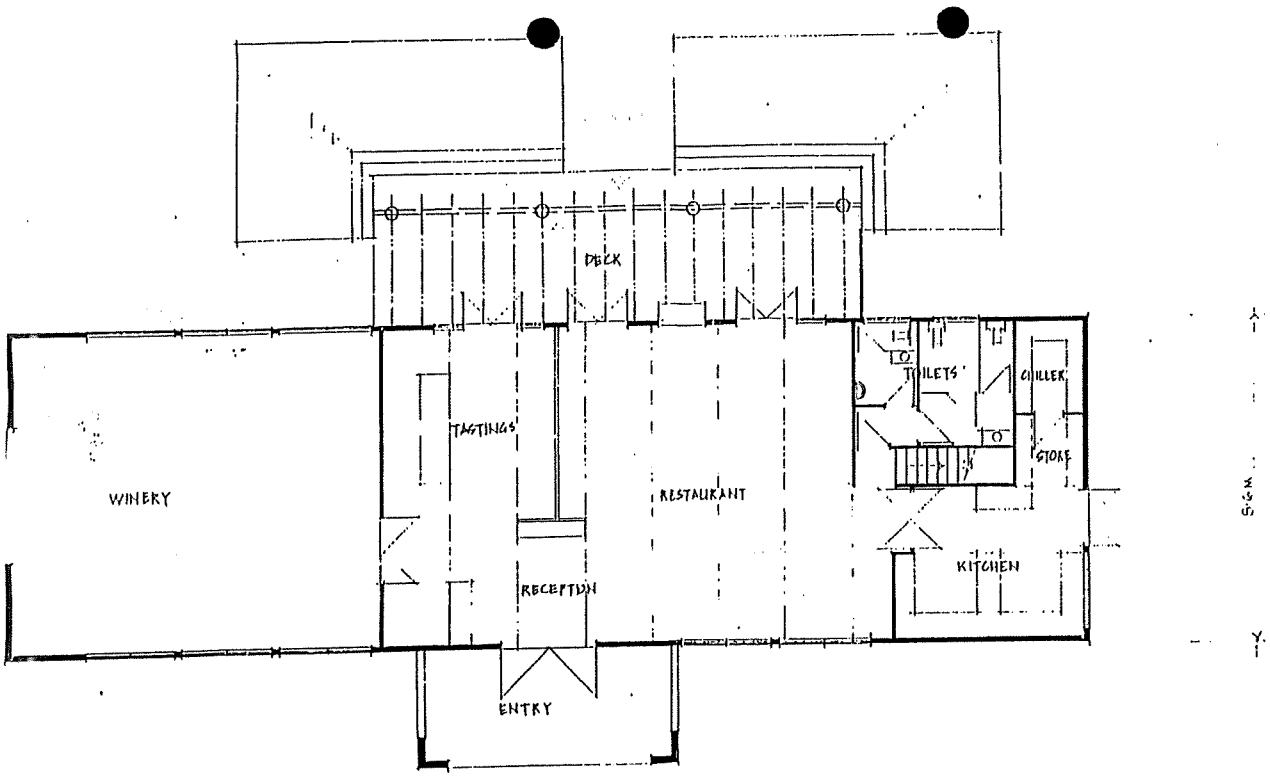
EXISTING SIDE
ELEVATION
(Scale 1:100)

TOTAL
DESIGN

BUILDING & LANDSCAPE DESIGN

P. O. BOX 575 KERIKERI. PH: (09) 4077049. FAX (09) 4077049

EXISTING WINERY / RESTAU
FOR R. & C. MACIVOR, AT WIROA R



GROUND FLOOR PLAN 1:100 AS PRESENTED IN ORIGINAL APPLICATION

Appendix 5
Discharge Consent

FILE: 46711
(01 and 02)
New

Resource Consent

Document Date: 31.07.2025

Pursuant to the Resource Management Act 1991, the Northland Regional Council (hereinafter called "the council") does hereby grant a Resource Consent to:

MIKE AND SHIRLEY ENDEAN MARSDEN CHARITABLE TRUST

To undertake the following activities on Lot 1 DP 192666 (56 Wiroa Road, Kerikeri), at or about location co-ordinates 1684117E 6098505N:

Note: All location co-ordinates in this document refer to Geodetic Datum 2000, New Zealand Transverse Mercator Projection.

AUT.046711.01.01 **Discharge secondary treated wastewater to land.**

AUT.046711.02.01 **Discharge contaminants (odour) to air.**

Subject to the following conditions:

AUT.046711.01.01 – Discharge to Land:

1 This consent only authorises the discharge to land from wastewater treatment and disposal systems servicing a winery, and a restaurant and living quarters.

2 The volume of wastewater discharged per day must not exceed 9,200 litres.

3 The wastewater disposal systems must be constructed generally in accordance with the **attached** drawings referenced as Northland Regional Council Plan Number **5580/1**, **5580/2** and **5580/3**. However, if there are any differences or apparent conflict between these drawings and any conditions of this consent, then the conditions of consent must prevail.

4 The treated wastewater must be discharged to land via a minimum of 2,050 lineal metres of irrigation line that has pressure compensating drip emitters installed at no less than 600 millimetres intervals and no greater than 1 metre intervals along the irrigation line and no greater than 1 metre horizontal separation distance between any lateral irrigation lines.

5 The irrigation lines must be firmly fixed to the surface of the disposal area and covered with a minimum depth of 100 millimetres of mulch.

6 The treated wastewater must not be applied to land at an areal loading rate greater than 4.5 litres per square metre per day.

7 An audible and visual high wastewater level alarm system must be installed and maintained within all wastewater pump chambers. In addition, there must be at least 24 hours emergency wastewater storage capacity within the treatment system above the level at which the high wastewater level alarm is activated.

Northland REGIONAL COUNCIL
Te Kaunihera ā rohe o Te Taitokerau

8 A meter that has a measurement error of ±5% or less must be installed and maintained on the outlet from the wastewater treatment system to the disposal area. This meter must be used to measure the quantity of treated wastewater discharged to land.

9 The Consent Holder must provide to the council's assigned monitoring officer prior to the discharge of treated wastewater to a disposal area for the first time:

(a) A certificate of compliance or a written statement from the suitably qualified and experienced person that installed the system. The certificate or statement must provide sufficient details and information to enable the council's assigned monitoring officer to verify compliance with Conditions 3 to 8; and

(b) Final "as built" plans that show the siting of all components of the wastewater treatment and disposal system. For the purpose of this Condition, the Consent Holder must ensure that the "as built" plans are drawn to scale and provide sufficient detail for a council monitoring officer to locate all features identified on the plans.

10 The Consent Holder shall keep a record of the volume of treated wastewater discharged to land weekly during the months of December, January and February and monthly for the remainder of the year. A copy of this record shall be forwarded immediately to the council's assigned monitoring officer on written request. The record must be in an electronic format that has been agreed to by the council.

11 Stormwater from all roofed and paved areas must be diverted away from the wastewater treatment and disposal areas. In addition, stormwater from surrounding areas and groundwater must be prevented from entering the treatment system, and stormwater from surrounding areas must, as far as is practicable, be prevented from entering the disposal area.

12 The wastewater disposal area must, at all times, be planted with appropriate plant species and must be adequately maintained so that plant coverage of the area is maximised.

13 A reserve disposal area that is equal to at least 100 percent of the design disposal area must remain undeveloped for future use if required. For this condition, "undeveloped" is defined as not being covered by an impermeable surface or permanent structure.

14 There must be no ponding of wastewater within, or surface runoff of any contaminants from, the wastewater treatment and disposal area as a result of the exercise of this consent.

15 The Consent Holder must have a contract with a suitably qualified and experienced person to maintain the wastewater treatment and disposal system so that it works effectively at all times. A written record of all maintenance undertaken on the wastewater treatment and disposal system must be kept. A copy of this record must be forwarded immediately to the council's assigned monitoring officer on written request.

Advice Note: *For compliance purposes, a "suitably qualified and experienced person" is a person employed or trained by the manufacturer of the wastewater treatment system, or someone who can provide evidence of satisfactory qualifications and/or experience in maintaining the type of wastewater treatment and disposal system installed.*

AUT.046711.02.01 – Discharge to Air:

16 The operation of the wastewater treatment and disposal system must not give rise to any discharge of odour, or any other contaminants, to air that are deemed by a council monitoring officer to be noxious, dangerous, offensive, or objectionable at or beyond the legal boundary of Lot 1 DP 192666.

General Conditions:

17 In the event of any discharge of wastewater or odour that is not otherwise in accordance with the conditions of these consents (e.g. from a treatment system or disposal area failure) the Consent Holder must:

(a) Immediately take such action, or execute such work as may be necessary, to stop and/or contain the discharge; and

(b) Immediately notify the council by telephone of the discharge; and

(c) Take all reasonable steps to remedy or mitigate any adverse effects on the environment resulting from the discharge; and

(d) Report to the council's assigned monitoring officer in writing within one week on the cause of the discharge and the steps taken, or being taken, to effectively control or prevent the discharge.

For telephone notification during the council's opening hours, the council's assigned monitoring officer for these consents must be contacted. If that person cannot be spoken to directly, or it is outside of the council's opening hours, then the Environmental Hotline must be contacted.

Advice Note: *The Environmental Hotline is a 24-hour, seven day a week, service that is free to call on 0800 504 639.*

18 The Consent Holder must notify the council in writing if the property is to be sold, at least two weeks beforehand. This is to allow the council, if required, to initiate the transfer of these consents to the new owners.

Advice Note: *The transfer of these consents should ideally be undertaken as part of the sale and purchase process for the property.*

19 The Consent Holder must provide written details to the council's assigned monitoring officer of any proposed significant change to the size of the Marsden Estate or any new wastewater connection to the treatment and disposal system at least one month prior to any proposed change being made.

Advice Note: *If the proposed alteration may result in non-compliance with the conditions of this consent or adverse effects that are greater than those authorised by this consent, then either a change to the conditions under Section 127 of the Resource Management Act or a new consent would need to be obtained.*

20 These consents will lapse on the 30 June 2030, unless before this date the consents have been given effect to.

Advice Note: *An application can be made to the council in accordance with Section 125 of the Resource Management Act 1991 to extend the date after which the consents lapse. Such an application must be made before the consents lapse.*

21 The council may, in accordance with Section 128 of the Resource Management Act 1991 serve notice on the Consent Holder of its intention to review the conditions of these consents during the month of June. The review may be initiated for any one or more of the following purposes:

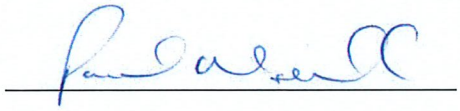
(a) To deal with any adverse effects on the environment that may arise from the exercise of these consents and which it is appropriate to deal with at a later stage; or

(b) To require the adoption of the best practicable option to remove or reduce any adverse effect on the environment.

The Consent Holder must meet all reasonable costs of any such review.

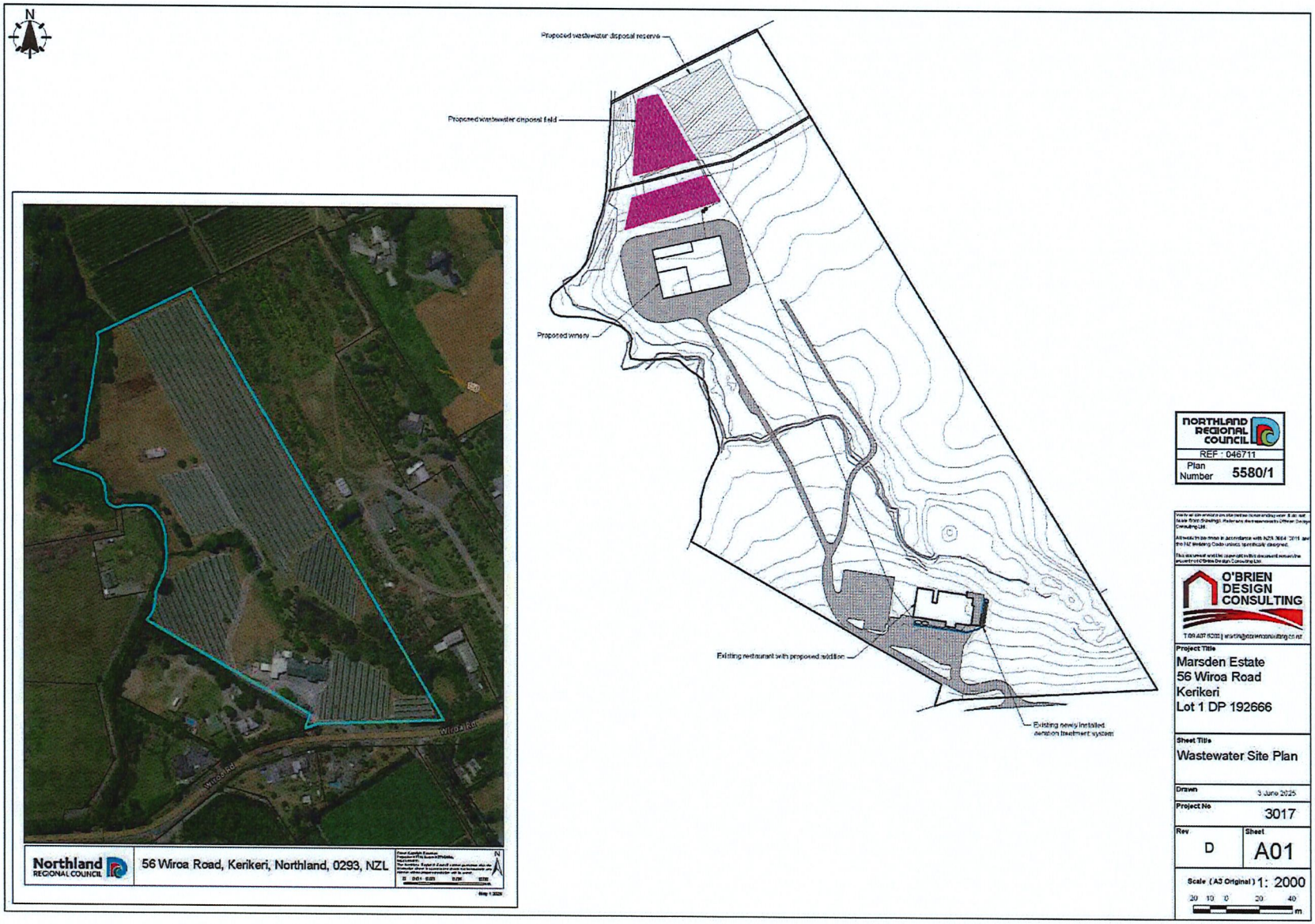
EXPIRY DATE: **30 JUNE 2060**

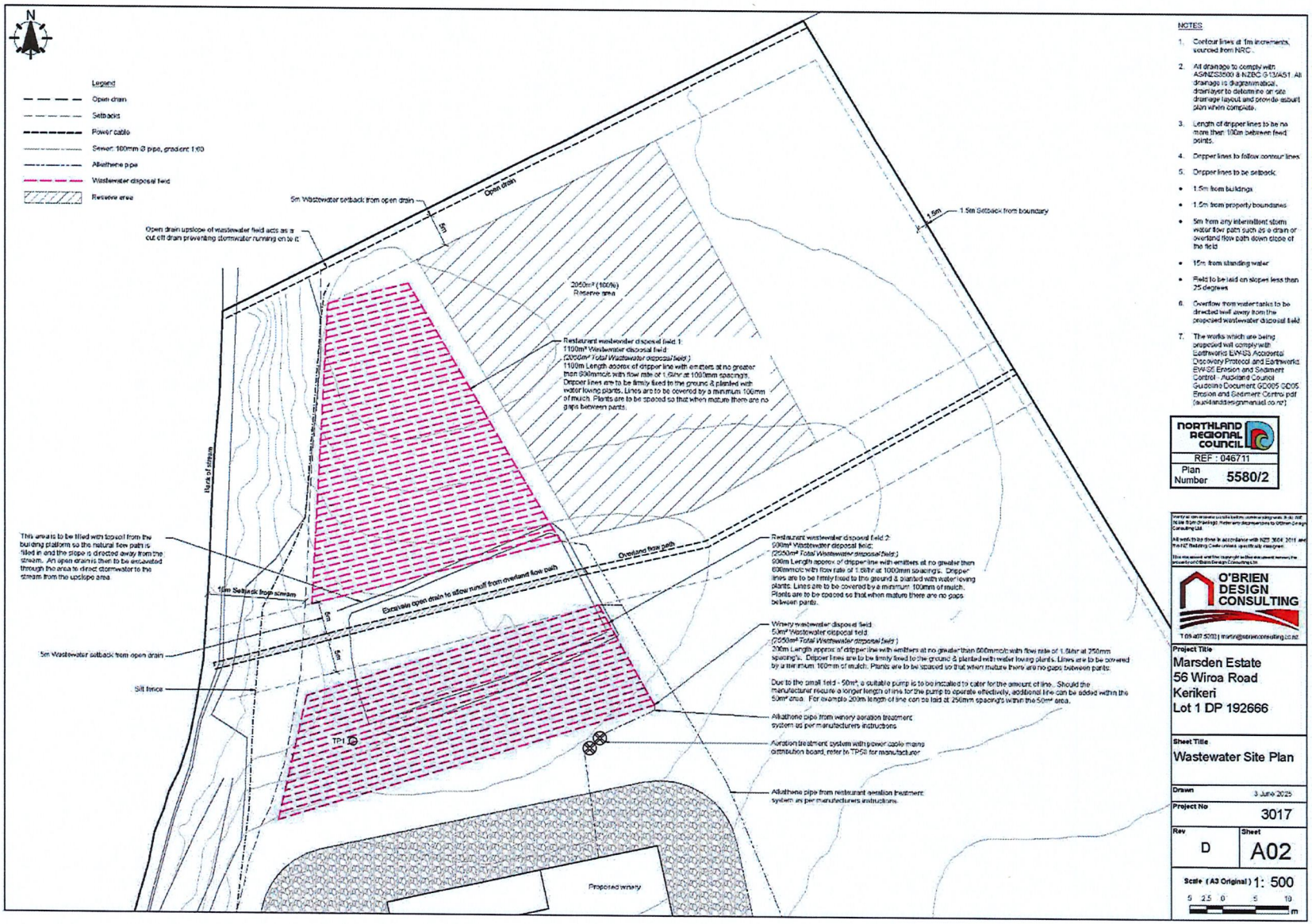
These consents are granted this Thirty First day of July 2025 under delegated authority from the council by:



Paul Maxwell
Coastal and Works Consents Manager

Note: *The plans attached to this consent are reduced copies and therefore may not be to scale and may be difficult to read. In the event that compliance and/or enforcement action is to be based on compliance with the attached plans, it is important that the original plans, are sighted and used. Originals of the plans referred to are available for viewing at the council's Whangārei office.*


N
Proposed wastewater disposal reserve
Proposed wastewater disposal field
Proposed winery
Existing restaurant with proposed addition
Existing newly installed aeration treatment system
Wiroa Rd
Wiroa Rd
Northland Regional Council
56 Wiroa Road, Kerikeri, Northland, 0293, NZL
NORTHLAND REGIONAL COUNCIL
REF : 046711
Plan Number 5580/1
O'BRIEN DESIGN CONSULTING
Project Title
Marsden Estate
56 Wiroa Road
Kerikeri
Lot 1 DP 192666
Sheet Title
Wastewater Site Plan
Drawn 3 June 2025
Project No 3017
Rev D
Sheet A01
Scale (A3 Original) 1: 2000
20 10 0 20 40
m



NOTES

1. Contour lines at 1m increments, sourced from NRC.
2. All drainage to comply with AS/NZS3500 & NZBC G13/AS1. All drainage is diagrammatical, drainlayer to determine on site drainage layout and provide asbuilt plan when complete.
3. Length of dripper lines to be no more than 100m between feed points.
4. Dripper lines to follow contour lines.
5. Dripper lines to be setback;
   - 1.5m from buildings
   - 1.5m from property boundaries
   - 5m from any intermittent storm water flow path such as a drain or overland flow path down slope of the field
   - 15m from standing water
   - Field to be laid on slopes less than 25 degrees
6. Overflow from water tanks to be directed well away from the proposed wastewater disposal field
7. The works which are being proposed will comply with Earthworks EW-S3 Accidental Discovery Protocol and Earthworks EW-S5 Erosion and Sediment Control - Auckland Council Guideline Document GD05 GD05 Erosion and Sediment Control.pdf (aucklanddesignmanual.co.nz)

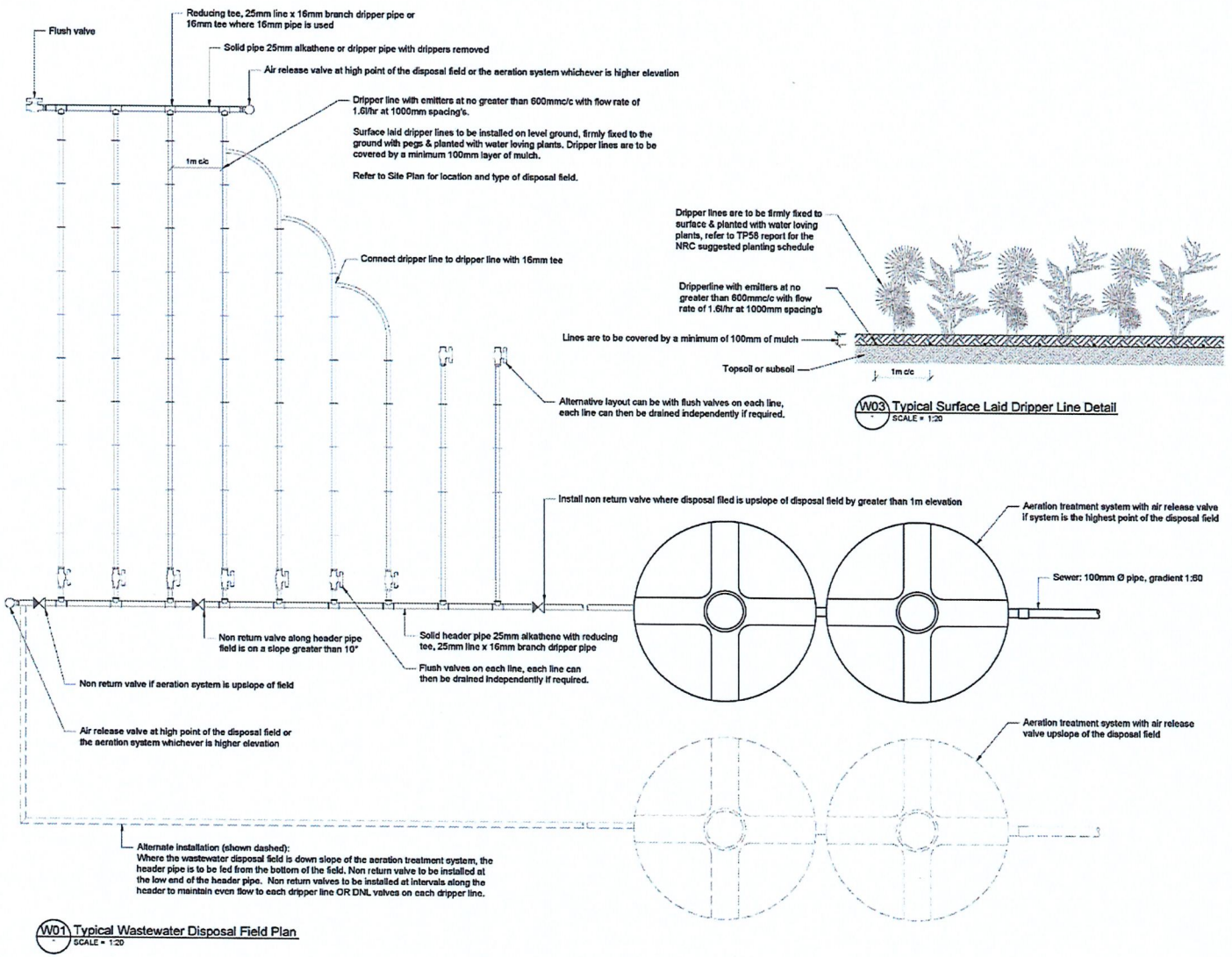
NORTHLAND REGIONAL COUNCIL
REF : 046711
Plan Number 5580/2

O'BRIEN DESIGN CONSULTING
T 09 407 5003 | mark@obrienconsulting.co.nz

Project Title
Marsden Estate
56 Wiroa Road
Kerikeri
Lot 1 DP 192666

Sheet Title
Wastewater Site Plan

Drawn 3 June 2025
Project No 3017
Rev D
Sheet A02
Scale (A3 Original) 1: 500
5 2.5 0 5 10 m



NOTES

1. All drainage is diagrammatical, do not scale from drawing.
2. Length of dripper lines to be no more than 100m between feed points.
3. Dripper lines to follow contour lines.
4. Dripper lines to laid on even ground, laying dripper lines on gully's or humps in the ground can cause ponding.
5. Air release valve to be at the high point in the disposal field or at the system if that is a higher elevation, locations shown on detail are indicative.
6. The works which are being proposed will comply with Earthworks EW-S3 Accidental Discovery Protocol and Earthworks EW-S5 Erosion and Sediment Control - Auckland Council Guideline Document GD005 GD05 Erosion and Sedimen Control.pdf (aucklanddesignmanual.co.nz)

NORTHLAND REGIONAL COUNCIL
REF : 046711
Plan Number 5580/3

O'BRIEN DESIGN CONSULTING
T 09-407 5205 | martin@obrienconsulting.co.nz

Project Title
Marsden Estate
56 Wiroa Road
Kerikeri
Lot 1 DP 192666

Sheet Title
Wastewater Site Plan

Drawn 3 June 2025
Project No 3017
Rev D
Sheet A03
Scale (A3 Original) 1: 20
0.2 0.1 0 0.2 0.4 m

Appendix 6

Acoustic Assessment Report

MARSHALL DAY Acoustics

MARSDEN ESTATE FUNCTIONS RESOURCE CONSENT ASSESSMENT

Rp 001 20250655 | 14 October 2025

MARSHALL DAY Acoustics

Level 2a, 3 Fairway Drive
Kerikeri 0230
T: +64 9 379 7822
www.marshallday.com

Project: **MARSDEN ESTATE FUNCTIONS VENUE**

RESOURCE CONSENT

Prepared for: **Marsden Estate**
Wiroa Road
Kerikeri
c/- Thompson Survey

Attention: **Lynley Newport**

Report No.: **Rp 001 20250655**

Document Control

Status:	Rev:	Comments	Date:	Author:	Reviewer:
Approved	-	-	14 Aug 2025	Peter Ibbotson	George Edgar
Approved	-	Review of consent conditions	9 Sept 2025	Peter Ibbotson	External
Approved	-	Minor improvements	14 Oct 2025	Peter Ibbotson	External

TABLE OF CONTENTS

1.0 INTRODUCTION

Marshall Day Acoustics has been engaged to assess noise emissions from function event activity at Marsden Estate as part of the proposed site development.

The purpose of this report is to form part of an application for Resource Consent.

2.0 PROPOSED OPERATION

Marsden Estate has been in operation at 56 Wiroa Road for around 30 years. The site has been used for viticulture, wine processing and a restaurant over this time.

Due to a recent change in ownership, it is now proposed to renovate and add new buildings and extensions to the site. The material works involve:

- The addition of a *conference-dining* room on the north-west side of the existing building
- The conversion of the wine making area within the existing building to a *tasting-conference* room. This room will be the primary area where function activity will typically occur.
- The establishment of a new building to the north of the property where wine making will predominantly occur. This building does not form part of the acoustic assessment.

As part of the improvements, it is proposed for up to 12 private function events to occur over the year.

These function events would likely include weddings, celebrations, workshops, and similar gatherings. The function events are expected to occur primarily in the proposed *tasting-conference* room. During fine days and evenings, function-goers will also use the existing outdoor areas, largely to the north of the existing building in the existing courtyard.

It is expected that these functions will predominantly not occur during the busiest season of dining (i.e. outside the summer season, typically over the spring and autumn months)[1]. However we understand that the consent does not propose to formally restrict the periods when functions will occur. Rather, the consent would restrict the number of functions to only 12 per year, and further restrict any amplified music to cease by 10pm. This is an important noise mitigation measure that will avoid loud operation occurring into the night period.

During functions, the number of guests may be greater the 145 guests currently allowed by the existing consent. A new consent is proposed.

3.0 SITE AND SURROUNDINGS

3.1 Site description

Marsden Estate is located at 56 Wiroa Road, Kerikeri. The site is used for viticulture, wine processing and for hospitality (restaurant, wine tasting). The site is zoned *Rural Production* under the operative District Plan.

The site surroundings are a mixture of rural paddocks, plant nurseries, and rural-residential type sites. The closest dwellings are around 70 metres south of the Marsden Winery building across Wiroa Road. A rural dwelling is approximately 80 metres southwest of the site at 66 Wiroa Road. Other dwellings are also located to the south of Wiroa Road.

State Highway 10 passes approximately 500 metres from the site. All land nearby is located *Rural Production.*

[1] This is understood to be for restaurant operational reasons over summer.

3.2 Buildings on site

The existing Marsden Estate building houses the existing winery production, as well as the restaurant. There is an upstairs area above the restaurant that is used for residential purposes.

There is an existing tractor shed to the north of the property. It is proposed to construct a new winery building at the location of the tractor shed.

Once the winery production is relocated to the new premises, the Marsden Estate building will be extended and developed to provide for the proposed activities as discussed in Section 2.0

It is proposed to host functions mainly within the proposed *tasting-conference* area. If music is required during functions, this would normally be the location where this would occur. It is expected that there would typically be patron access to the outdoor dining area via the bar and dining area, and also via the new *conference-dining* facility.

On warm evenings, it is expected that the northern and eastern doors of the dining and conference rooms (the larger doors) would remain open for access.

It is expected that the main door to the function would normally be closed (recognising that patrons may occasionally open them to access the carparking area)

Figure 1: Proposed Floor Plan

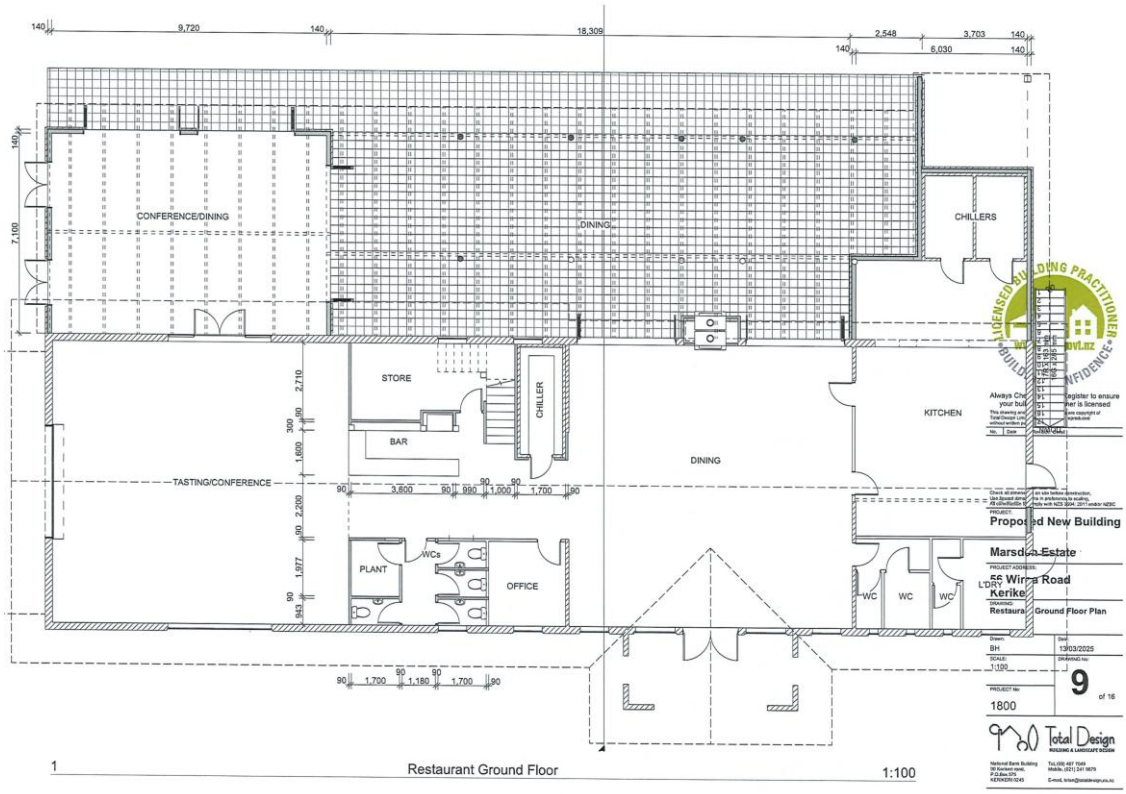


Figure 2: Marsden Estate - Site and Surrounds

4.0 AMBIENT ENVIRONMENTAL NOISE LEVELS

We measured ambient noise levels on the night of the 12 August 2025. The weather conditions were cold with broken/scattered cloud and calm wind conditions (estimated to be less than 0.5m/s).

We carried out measurements at locations representing the closest dwellings to the south of the building (53 Wiroa Rd and 66 Wiroa Road Refer to Figure 2 or the measurement location). Noise measurements were conducted in general accordance with New Zealand Standard NZS 6802:2008 *"Acoustics – Environmental Noise"*

Ambient noise measurements are summarised in the following table:

Table 1: Summary of Environmental Noise Level Measurements

Measurement Position and Location		Measured Noise Levels (dB)				Noise Sources and Comments
		L_{Aeq}	L_{A10}	L_{A90}	L_{AFmax}	Underlined values are considered to dominate
MP1	**Night-time** 20:21 hrs 12 Aug 2025 15:10 mm:ss 18m from road carriageway	51	53	34	71	**Local traffic on Wiroa Road dominated L_{Aeq} noise level. Car pass-by generates L_{AFmax} noise level** Distant traffic on SH10 present throughout measurement, typically around 33 to 36 dB L_{AF} Aircraft landing and manoeuvring at around 20:26pm with noise levels varying from around 44 to 50 dB L_{AF} for brief period post landing. Occasional night birds (spur winged plover). Occasional noise from residents outdoors on site at 53 Wiroa Road dwelling.

Noise levels on the site will vary from day-to-day and season to season. However, the measurements show that the area is generally subject to moderate noise levels in the evening due to the presence of the local Wiroa Road, the more distant SH10 and the nearby airport. The area has ambient noise levels that are generally more elevated than what might otherwise be expected in rural-type environments.

5.0 EXISTING CONSENT

The site is subject to a consent that was heard on the 25 August 2003[2]. The consent application was for a restaurant accommodating up to 80 seated guests, and a total limit of 145 guests as well as other activities such as production, storage, tasting and sale of wine and the first-floor dwelling. The consent is subject to the following conditions:

2. *That the opening hours of the restaurant / winery be limited to between 7.00am and 1.00am the following day, seven days per week.*

3. *That no amplified live music be permitted in the premises after the hours of 7.00pm*

4. *That the activities on the site shall be carried out so as to ensure the following noise limits are not exceeded within the timeframes stated:*

   0700 to 2200 — *50 dB L_{A10}*

   2200 to 0700 — *45 dB L_{A10} and 65 dB L_{AFmax}*

[2] The consent reference application number is RC 2030473.

The noise limits specified in an Operative District Plan as a permitted activity for the subject site

All activities shall be so conducted as to ensure that noise from the site shall not exceed the above noise limits as measured at or within the boundary of any other site within the zone

The sound shall be measured in accordance with the provisions of NZS6801:1991 Acoustics – Measurement of Environmental Sound and assessed in accordance with the provisions of NZS6802:1991 Assessment of Environmental Sound.

The existing consent allows for restaurant operation until 1am. We understand that such a late closure is seldom necessary as most diners have left the site well before this time. Nevertheless, it is proposed to retain this provision.

The existing consent would broadly allow for **function activity** to occur on the site on the following assumptions:

a) If no live amplified music occurred past 7pm

It is assumed that "live music" refers to the use of a band or performer who is playing the music in real time. It is unclear whether it could refer to a DJ. The intention of the condition may have been to include any such potentially loud performers, but this has not been explicitly specified.

b) And if the activity did not exceed 50 dB L_{A10} at the boundary of any other site within the zone to 10pm, or 45 dB L_{A10} up until 1am.

The key assessment locations would be to the south of Marsden Estate, at 53 Wiroa Road and to the north-east of the site at 32 Wiroa Road.

While the above could cover the required use of the site for the proposed 12 events per year, assuming prerecorded music is played for dancing, it is nonetheless proposed to establish specific consent conditions relevant to noise levels for the functions to ensure that there is no issue with DJs or bands playing (until 10pm) in the function room.

6.0 DISTRICT PLAN NOISE STANDARDS

The following sections review the District Plan noise rules:

6.1 Operative District Plan

The application site and all adjacent sites are zoned *Rural Production* in the operative District Plan.

Rule 8.6.5.1.7 is the applicable noise rule for the *Rural Production* zone.

All activities except Temporary Military Training Activities shall be so conducted as to ensure that noise from the site shall not exceed the following noise limits as measured at or within the boundary of any other site in this zone, or at any site in the Residential, Coastal Residential or Russell Township Zones, or at or within the notional boundary of any dwelling in any other rural or coastal zone:

0700 to 2200 hours	*65 dBA L_{10}*
2200 to 0700 hours	*45 dBA L_{10} and 70 dBA L_{max}*

Exemptions: …The noise limits shall also not apply to activities periodically required by normal farming and plantation forestry activities and the use of aircraft, provided that the activity shall comply with the requirements of s.16 of the Act.

Noise Measurement and Assessment:

Sound levels shall be measured in accordance with NZS 6801:1991 "Measurement of *Sound" and assessed in accordance with NZS 6802:1991 "Assessment of Environmental Sound". The notional boundary is defined in NZS 6802:1991 "Assessment of Environmental Sound" as a line 20m from any part of any dwelling, or the legal boundary where this is closer to the dwelling.*

6.2 Proposed District Plan

The application site would be zoned *Horticulture* under the proposed District Plan.

The Proposed District Plan is currently going through the hearings stage and does not yet have legal effect. However, a consideration of the proposed noise limits is useful as an indication of the type of amenity that could be expected in this zone in the future.

Noise rules as recommended post-hearing for the *Horticulture* zone in the Proposed District Plan are set out in NOISE-S1. These limits are:

NOISE S1 d) Noise generated in all zones, other than the zones and sites in e), f) and g) below:

1. *Noise shall not exceed the following rating noise levels within the notional boundary of any noise sensitive activity within the receiving property:*

   7.00 am to 10.00 pm - 55 dB L_{Aeq}

   10.00 pm to 7.00 am - 40 dB L_{Aeq}

   10.00 pm to 7.00 am - 70 dB L_{AFmax}

The proposed plan states that:

Noise shall be measured in accordance with NZS 6801:2008: - Acoustics Measurement of Environmental Sound, and assessed in accordance with NZS 6802:2008: Acoustics - Environmental Noise, unless otherwise specified elsewhere in the District Plan.

6.3 Special Audible Character and Averaging

NZS6802 makes provision for "special audible characteristics". The 1991 standard states that where special audible characteristics are present, the performance standard (i.e. the District Plan limit) should be reduced by 5 decibels. The 2008 version of the standard applies an upward adjustment to the assessed noise level which has been used in this assessment. Both standards achieve the same outcome (making compliance 5 dBA more stringent) but achieve this in different ways.

Noise from most activities on site would not require a special audible characteristics correction. However amplified music occurring with a significant bass component would require a special audible characteristics correction.

The standard also makes provision for "averaging" or "duration corrections" over the day period. The standard allows for noise measurements performed during the daytime to be "averaged" by up to 5 decibels. No such provision is to be applied at night (noting that the Marsden Estate functions are not proposed to occur in the night period)

6.4 Resource Management Act

Regardless of the zone noise limits, under the provisions of the RMA there is a duty to adopt the best practicable option to ensure that noise (including vibration) from any development does not exceed a reasonable level. Specifically, Sections 16 and 17 reference noise effects.

Section 16 states that *"every occupier of land (including any premises and any coastal marine area), and every person carrying out an activity in, on, or under a water body or the coastal marine area, shall adopt the best practicable option to ensure that the emission of noise from that land or water does not exceed a reasonable level".*

6.5 Use of Noise Assessment Parameters

The Proposed District Plan uses L_{Aeq} as a basis for assessment. The Operative District Plan uses L_{A10}. This report will address both parameters. However, primary reliance has been given to L_{Aeq} as this is the modern metric that is referenced by current standards and is the parameter that any noise limits in the proposed consent should include.

The relationship between L_{Aeq} and L_{A10} for noise emissions from most functions is typically L_{A10} = L_{Aeq} + 2 dBA. The L_{AFmax} noise limits are not a constraining limit for the proposed activity.

7.0 DISCUSSION OF DISTRICT PLAN NOISE STANDARDS

The Operative Far North District Plan noise standards are different from noise limits that apply in most *Rural* zones throughout New Zealand. The daytime noise limit of **65 dB L_{A10}** applies at the site boundary, which is unusual. As the District Plan daytime noise limit allows a high level of noise at site boundaries, if ongoing operation of Marsden Estate hypothetically *just complied* with the daytime noise limit of 65 dB L_{A10} it would not necessarily ensure that noise levels will be acceptable or reasonable in terms of the RMA.

The Proposed District Plan would reduce the daytime noise limit to **55 dB L_{Aeq}** and apply it at the notional boundary of any noise sensitive activity. This is more in line with typical approaches to rural noise throughout other districts in New Zealand.

The night-time Operative District Plan noise limit of **45 dB L_{A10}** in the *Rural Production* zone is in line with typically adopted national and international guidelines for environmental noise (noting that modern noise limits are typically expressed in terms of L_{Aeq} rather than $L_{A10,}$ and are typically applied at the notional boundary). The Proposed District Plan would reduce the noise limit to **40 dB L_{Aeq}** and apply it at the notional boundary of any noise sensitive activity. Based on the location of the site and notional boundaries of the surrounding area, the operative and proposed night-time noise limits may provide for a somewhat similar level of amenity.

The existing consent contains a night-time noise limit of **45 dB L_{A10}** at the site boundary of adjacent lots in the zone, which is similar to the Operative District Plan noise rule.

Note that the Marsden Estate functions would cease by 10pm, and noise after this time would only consist of patrons departing the site and the associated vehicle noise. These matters are largely already covered by the existing consent.

8.0 NOISE LEVEL PREDICTIONS

8.1 Event noise

To determine compliance with recommended noise limits, we modelled noise from a band or DJ inside the proposed event building based on the following scenario

- Main glazed doors open on *Conference-Dining* and *Dining* areas (primarily north and east doors)
- Southern entry doors opened at times for occasional access to carpark, but generally closed

We used noise spectrum data in the model that we have directly measured from a DJ performance for a similar project. This spectrum is shown in Table 1 below.

Table 1: Noise source spectrum (DJ)

Frequency Hz	Octave Band Sound Pressure Level dB $L_{Zeq(15\ min)}$ Octave Band Sound Power Level dB L_{WZ}							Total (dBA)
	63	125	250	500	1000	2000	4000	
Average music sound pressure level dB L_{Aeq}	99	92	88	89	89	84	78	**92 dB L_{Aeq} (reverberant)**
People (large group up to 140) outside with one in four conversing with "raised" voice effort dB L_{WA}	86	88	89	96	94	90	83	**98 dB L_{WA}**

The noise levels in Table 2 below have been calculated at property boundaries using SoundPLAN and International Standard ISO 9613-2:1996 *Acoustics - Attenuation of sound during propagation outdoors – Part 2: General method of calculation.*

Table 2: Noise levels at receivers from event noise (Band or DJ) with event building windows open and people outside

Receiver	Predicted daytime noise rating level[1] at boundary (dB L_{Aeq})
	Notional boundary
30A Wiroa Road, Kerikeri	43
32 Wiroa Road, Kerikeri	52
45 Wiroa Road, Kerikeri	36
46 Wiroa Road, Kerikeri	52
53 Wiroa Road, Kerikeri	45
61 Wiroa Road, Kerikeri	45
66 Wiroa Road, Kerikeri	43
68 Wiroa Road, Kerikeri	31
90B Wiroa Road, Kerikeri	44
	Site boundary
East Site Boundary	56
West Site Boundary	44
South Site Boundary	46
North Site Boundary	37

1. Includes SAC and duration correction where appropriate.
2. L_{A10} noise levels would be 2 decibels higher than the L_{Aeq} noise levels stated.

The above noise levels are summarised in Figure 3 overleaf.

Figure 3: Grid Noise Map – Daytime Rating Noise Level – Function Room Doors Open, entry doors open at times

8.1.1 Event Noise Operational Noise Summary

The noise levels in Table 2 and Figure 3 show the following would occur during music performances during functions:

- Noise levels could be somewhat above the **existing consented** daytime noise limit of 50 dB L_{A10} at the eastern site boundary. Compliance with this noise limit is possible, however it would require the closure of certain doors and the control of DJ noise levels.
- Noise levels would readily comply with the **Operative District Plan** daytime-time noise limit (65 dB L_{A10}) at all surrounding site boundaries. Compliance will be achieved with a margin of around seven decibels, even with all doors and windows open.
- Noise levels would comply with the **Proposed District Plan** daytime-time noise limit (55 dB L_{Aeq}) at all surrounding dwelling notional boundaries. Compliance will be achieved with a margin of around three decibels, even with all doors and windows open.
- The Operative and Proposed District Plan noise limits can be achieved provided music noise levels do not exceed 95 dB $L_{Aeq(15min)}$. This is an acceptable music level for dancing for most audiences, and DJs can typically be expected to play at noise levels below this level. Based on the existing noise limits, there would be no requirement to close the main northern or eastern doors or windows to limit noise emissions before 10pm[3].
- We would expect that Marsden Estate can comply with the recommended noise limits by working with DJs to ensure they are aware that noise levels can be appropriate for dancing, but should not be "unreasonably loud". For the expected "daytime functions", control of DJ music noise levels is not expected to be a critical issue for compliance.

8.1.2 Consent Noise Management Measures

We suggest the following consent approach is provided for

- Functions involving amplified music for the purposes of dancing are limited to **12 times per year**
- On these occasions, **the dancing music component of the functions shall cease before 10pm**
- Function rating noise levels must be no greater than **55 dB L_{Aeq}** at the notional boundary of any dwelling existing at the time consent is granted (when assessed in accordance with NZS6802:2008).
- The original consented night-time noise limit of **45 dB L_{A10}** should be replaced with a limit of **45 dB L_{Aeq}** applying at the notional boundary**.** This is a broadly similar noise limit though may be slightly more liberal for some dwellings[4]. Note that function music would not occur after 10pm, so this noise limit would only apply to activity generated by patrons departing the site after the close of a function, or to other activity that could occur after 10pm during normal consented operation.
- A noise management plan is implemented.

The above framework would result in compliance with the Operative and Proposed District Plan zone daytime noise rules which is when most activity is expected to occur. While amplified music would be audible at surrounding dwellings during the 12 functions per year, noise effects are expected to

[3] To comply with the consented noise limit of 50 dB L_{A10} at the nearest site boundary would require DJs to play at a dance floor level of around 87 dB L_{Aeq}. This may be acceptable to many patrons, but would require active supervision or noise management.

[4] For a source of noise such as people, traffic or mechanical plant, the majority of people would not be able to determine any difference in loudness between a limit of 45 dB L_{A10} or 45 dB $L_{Aeq.}$ 45 dB L_{Aeq} aligns with the modern approach to the assessment of environmental noise.

be limited due to the limited duration of each function, and the limited number of functions per year that could occur.

Suitable consent conditions are recommended in Section 9.0 of this report.

8.2 Vehicle movements

It is expected that for a larger wedding function of 150 people, around 80 patrons would be expected to leave after 10pm[5]. There would be no more than 20 passenger vehicles departing the site in the hour after the function ceases (an additional three staff vehicles could depart the site once clean-up is completed). In addition, there may be four movements of a shuttle bus. Vehicles will depart from the carparking area to Wiroa Road.

Calculations of noise from the carparking area. have been modelled with an emitted sound power of 86 dBA L_W at 20 kph.

The noise levels from cars arriving on site at receivers are shown in Table 4 below.

Table 4: Car parking noise levels at receivers

Receiver	Predicted night-time noise rating level at boundary (dB L_{Aeq})
	Notional boundary
30A Wiroa Road, Kerikeri	11
32 Wiroa Road, Kerikeri	19
45 Wiroa Road, Kerikeri	16
46 Wiroa Road, Kerikeri	23
53 Wiroa Road, Kerikeri	32
61 Wiroa Road, Kerikeri	27
66 Wiroa Road, Kerikeri	26
68 Wiroa Road, Kerikeri	8
90B Wiroa Road, Kerikeri	15
	Site boundary
East Site Boundary	23
West Site Boundary	5
South Site Boundary	31
North Site Boundary	23

The results show that:

- Traffic noise levels would readily comply with the **existing consented** night-time noise limit of 45 dB L_{A10} at the nearest zone boundary. Noise levels would comply with the recommended consented noise limit of 45 dB L_{Aeq}.
- Traffic noise levels would readily comply with the **Operative District Plan** nighttime-time noise limit (45 dB L_{A10}) at all surrounding site boundaries. Compliance will be achieved with a margin of around twelve decibels.

[5] Marsden Estate have reviewed traffic and expect this to be the case based on their proposed function end times and patron management measures before and after 10pm.

- Noise levels would comply with the **Proposed District Plan** night time-time noise limit (40 dB L_{Aeq}) at all surrounding dwelling notional boundaries. Compliance will be achieved with a margin of around eight decibels.
- Noise levels will be well below the existing level of traffic noise from vehicles using Wiroa Road.

8.3 Restaurant Noise

Restaurant dining is covered under an existing consent. We have not measured noise from the restaurant during however we have calculated typical restaurant dining noise levels on the basis of:

- A group of up to 40 patrons dining in the outside area with "normal raised voices"
- Restaurant dining reverberant internal noise levels of 78 dB L_{Aeq} in both the *Conference-Dining* and existing *Dining* area

The noise levels under this scenario are summarised in the following table:

Table 3: Noise levels at receivers from restaurant activity within the building during normal dining

Receiver	Predicted daytime noise rating level[1] at boundary (dB L_{Aeq})
	Notional boundary
30A Wiroa Road, Kerikeri	25
32 Wiroa Road, Kerikeri	34
45 Wiroa Road, Kerikeri	17
46 Wiroa Road, Kerikeri	35
53 Wiroa Road, Kerikeri	27
61 Wiroa Road, Kerikeri	26
66 Wiroa Road, Kerikeri	23
68 Wiroa Road, Kerikeri	10
90B Wiroa Road, Kerikeri	25
	Site boundary
East Site Boundary	38
West Site Boundary	18
South Site Boundary	28
North Site Boundary	24

1. Does not include SAC, but does include duration correction.
2. L_{A10} noise levels would be 2 decibels higher than the L_{Aeq} noise levels stated.

The table shows that even if the restaurant is full there is no risk that any daytime noise limits could be exceeded.

We understand that although the restaurant is consented to operate until 1am, dining does not currently extend into the night-time hours specified in the Operative District Plan noise rules. It is expected that a limited numbers of patrons on site after 10pm (e.g. at the conclusion of a long dinner) would not risk exceeding the night-time noise limits.

9.0 RECOMMENDED CONDITIONS FOR CONSENT

The following Consent Conditions are recommended for the site:

Functions

1. Functions involving amplified music for dancing purposes may occur up to 12 times per year.
2. Amplified music for dancing purposes must cease at or before 10:00pm.
3. The first function authorised under this consent must be monitored by a recognised acoustician to ensure that the noise limits in Condition [7] are complied with.
4. A report shall be provided to Council within 15 working days of the first function occurring. The report shall set out:
   i. Details of the function
   ii. The external rating noise levels measured/assessed
   iii. Internal dancefloor noise levels, if measured,
   iv. Whether compliance was achieved
   v. Any details of management measures that were necessary to ensure compliance occurred throughout the monitoring period
   vi. Review of the implementation of any calibrated noise monitor
   vii. Any further specific recommendations and requirements that the applicant must adopt into the noise management plan to ensure ongoing compliance during future events.
5. An operational noise management plan shall be implemented by the consent holder that includes the following measures:
   - Details of any noise monitor that will be held on site, or details of any passive noise limiting device that will be utilised (this is at the discretion of the consent holder)
   - Noise monitor calibration and checking methods, if required
   - Management procedures that will be taken to ensure that DJs and bands play within the noise limits for the site, and how management will enforce these noise limits
   - Communication procedures with owners and residents of dwellings within 500 metres of the venue, including:
     - Methods for communicating details (dates and time) of upcoming functions or any other relevant information
     - Contact details of the on-site manager for complaints regarding noise
   - Specific measures that will be implemented on site for reducing noise as far as practicable
   - Guest behaviour management measures
   - Complaints management and response methods, including register of any complaints

Restaurant and Winery Operation

6. The opening hours of the restaurant / winery be limited to between 7.00am and 1.00am the following day, seven days per week.
7. Noise from all operation (including functions) shall not exceed the following rating noise levels within the notional boundary of any noise sensitive activity within the receiving property.

   7.00 am to 10.00 pm - 55 dB L_{Aeq}

   10:00 pm to 7.00 am - 45 dB L_{Aeq} and 70 dB L_{AFmax}
8. Noise shall be measured in accordance with *NZS 6801:2008: - Acoustics Measurement of Environmental Sound,* and assessed in accordance with *NZS 6802:2008: Acoustics - Environmental Noise.*

APPENDIX A GLOSSARY OF TERMINOLOGY

Frequency	Sound occurs over a range of frequencies, extending from the very low (e.g. thunder) to the very high (e.g. mosquito buzz). Measured in units of Hertz (Hz). Humans typically hear sounds between 20 Hz and 20 kHz. High frequency acuity naturally reduces with age most adults can hear up to 15 kHz.
Hertz (Hz)	The unit of frequency, named after Gustav Hertz (1887-1975). One hertz is one pressure cycle of sound per second. One thousand hertz – 1000 cycles per second – is a kilohertz (kHz).
Noise	A subjective term used to describe sound that is unwanted by, or distracting to, the receiver.
L_{A90}	The A-weighted sound level exceeded for 90 % of the measurement period, measured in dB. Commonly referred to as the background noise level.
L_{Aeq}	The equivalent continuous A-weighted sound level. Commonly referred to as the average sound level and is measured in dB.
L_{Amax}	The A-weighted maximum sound level. The highest sound level which occurs during the measurement period. Usually measured with a fast time–weighting i.e. L_{AFmax}
L_w	Sound Power Level. The calculated level of total sound power radiated by a sound source. Usually A-weighted i.e. L_{WA}.

Appendix 7
Stormwater Management Report

Wilton Joubert Limited
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SITE	Marsden Winery, 56 Wiroa Road, Kerikeri
LEGAL DESCRIPTION	Lot 1 DP 192666
PROJECT	Proposed Winery Building & Additions
CLIENT	Marsden Charitable Trust
REFERENCE NO.	140794
DOCUMENT	Stormwater Management Report
STATUS/REVISION No.	00
DATE OF ISSUE	13 June 2025

Report Prepared For	Email
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1. EXECUTIVE SUMMARY

The following table is intended to be a concise summary which must be read in conjunction with the relevant report sections as referenced herein.

Legal Description:	Lot 1 DP 192666
Site Area:	67,108 m²
Development Proposals Supplied:	• Proposed Site Plan by Total Design, Proj No. 1800, dated 16.05.2025. • Topographical Survey by Thomson Survey, Job Ref. 10714, dated 19.02.2025.
Associated Documents:	WJL Geotechnical Investigation Report Ref. 140407
Development Type:	Proposed Winery Building & Additions
District Plan Zone:	Rural Production
Permitted Activity Coverage:	15%
Impermeable Coverage:	**Post-Development** Total Roof Area 2,213.4 m² Total Hardstand Area 6,436.4 m² Post-Development Total = 8,649.8 m² or 12.9% of the site area
Activity Status:	Permitted
Roof Drainage:	• Runoff from roof of proposed additions to existing building to be directed to existing stormwater management system. Existing outlet to be confirmed on-site as being in working order. • Winery roof runoff directed to rainwater tanks for reuse and optional detention via proprietary gutter system.
Optional Water Quality Volume Detention:	• Assumed 3 x 25,000L rainwater tanks – 3.5mØ x 2.6m high • 150mmØ overflow outlet to be fitted at top of tanks • 15mmØ orifice outlet to be installed >930mm below overflow outlet • All tanks linked via balancing pipes at top and base. • Runoff from overflow outlet directed to discharge point via minimum 150mmØ drainage line at minimum 1% grade. Stormwater detention configuration to be reviewed and amended if different tank setup is used to that assumed.
Hardstand Drainage:	• Proposed carpark adjacent to southern existing building to be shaped to shed runoff to catchpits. Runoff directed from catchpits to outlet in existing pond/stream north of the building via minimum 150mmØ drainage line @ >1% grade. • Minimum 750mmW x 250mmD v-channel grassed perimeter swale drain installed around proposed winery access/parking area. Draining to low-point on western side of paved area at minimum 1% grade. • Runoff from perimeter drain directed to discharge point via continuation of drain down slope (underlying geotextile/impermeable liner required in swale) or 675Ø inlet chamber with scruffy dome cover directing runoff to discharge point via minimum 150mmØ drainage line @ >3% grade .
Discharge Point:	• Runoff generated over the proposed winery impermeable areas to be directed to a 10m long level spreader trench located downslope to the southwest of the proposed development area. See attached Level Spreader Detail C211. • Alternatively, discharge may be directed to a new 150mmØ outlet in the Whiringatau Stream on the western property boundary. A minimum 1m long apron of 6-inch riprap should be placed downstream of the outlet.

			Road Overspill Hazard Classification	
Existing Accessway Culvert Options:	Option	Culvert Type	20% AEP Storm	1% AEP Storm
	1	2 x 900Ø Double Barrel	N/A	H2
	2	2 x 1050Ø Double Barrel	N/A	H1
	3	1.2mW x 0.9mD Box	N/A	N/A

			Road Overspill Hazard Classification	
Proposed Accessway Culvert Options:	Option	Culvert Type	20% AEP Storm	1% AEP Storm
	4	2 x 600Ø Double Barrel	H2	H5
	5	2 x 900Ø Double Barrel	N/A	H2
	6	1.2mW x 0.9mD Box	N/A	N/A

2. SCOPE OF WORK

Wilton Joubert Ltd. (WJL) was engaged by the client, Marsden Charitable Trust, to produce a stormwater mitigation assessment and culvert designs for the proposed development at the above site.

At the time of report writing, the following documents were referred to for background data and details of the proposed development:

- Proposed Site Plan by Total Design, Proj No. 1800, dated 16.05.2025.
- Topographical Survey by Thomson Survey, Job Ref. 10714, dated 19.02.2025.

Any revision of these drawings and/or development proposals with stormwater management implications should be referred back to us for review.

3. SITE DESCRIPTION

The subject 6.7108ha block is currently occupied by the Marsden Winery and is located off the northern side of Wiroa Road, accessed 550m west of the State Highway 10 roundabout, in the southwestern area of the Kerikeri district. The property is legally titled Lot 1 DP 192666 and is situated within a Rural Production Zone. The block is accessed at the southern boundary via a bitumen-type driveway that traverses approximately 80m northwest towards an existing winery and restaurant building and bounding car park environment.

Topographically speaking, most of the property is positioned on gently sloping, broad terrain that descends towards the Whiringatau Stream along the western boundary. The stream dissects the block at the southern end, traversing from the western boundary towards the southeastern corner, where a small pond is present. The land at the southern end of the property descends gently north towards the pond. Existing ground levels across the block essentially range between RL129m and RL123m New Zealand Vertical Datum (NZVD).

The property is largely covered in vineyards with areas of pasture covering the northwestern end and around the existing winery and restaurant building. Small bush generally flanks the stream. An existing farm shed is also present across the northwestern pastured land.

Figure 1: Screenshot from the FNDC on-line GIS Property and Land Map. 10m LiDAR contours are overlaid. Property boundary is highlighted in cyan. Yellow and red rings depict new winery building and building extension development areas, respectively.

Figure 2: Site photograph looking southeast towards the new winery building location. Orange cones depict the development extents.

Figure 3: Site photograph from the downslope pond looking southwest towards the existing winery and restaurant building.

An unnamed stream meanders from the south-eastern corner of the site in a general north-western direction across to the approximate midpoint of the site's western boundary where this joins to the Whiringatau Stream. The western property boundary roughly follows the eastern bank of the Whiringatau Stream. An existing unsealed accessway runs from the existing southern structures to the north and across the aforementioned unnamed stream over an existing 600Ø culvert structure, downstream of the pond located on the north side of the existing building.

Based on site observations and the provided topographical plans, the channel dimensions of the unnamed stream range between 2.0m wide x 1.0m deep to 3.0m wide x 2.0m deep. The client has advised that overtopping of the culvert occurs relatively frequently (more than once per year) in rainfall events. Refer to Figure 7 for an indication of the existing and proposed culvert locations.

At the time of preparing this report, we note that the Far North District Council (FNDC) on-line GIS Water Services Map indicates that reticulated wastewater, and stormwater service connections are not available to the property.

Figure 4: 12.06.2025 Site Photo – View of proposed accessway culvert crossing location from south side of stream, facing northeast.

Figure 5: 12.06.2025 Site Photo – View of existing accessway over stream from south-western side of culvert crossing, facing northeast.

Figure 6: 12.06.2025 Site Photo – View of existing 600Ø culvert in stream under existing accessway.

4. DEVELOPMENT PROPOSALS

In reviewing the supplied architectural drawings, we note that the client proposes to construct a new winery building with a footprint of ~1,216m² at the northwestern end of the property, and extensions off the first floor of the existing winery and restaurant building. The new winery building is to be surrounded by a new paved access/parking area (~2,240m²), accessed via a new driveway from the existing southern structure. A new paved carpark (~850m²) is also proposed on the western side of the existing southern structure. As part of the development works, the existing farm shed will require demolition.

The principal objectives of this report are to:

- Provide a conceptual stormwater management design for the proposed structures and paving
- Provide sizing for culverts under the new and existing driveways (marked in Figure 7 below) based on a high-level catchment assessment and resulting headwater levels.

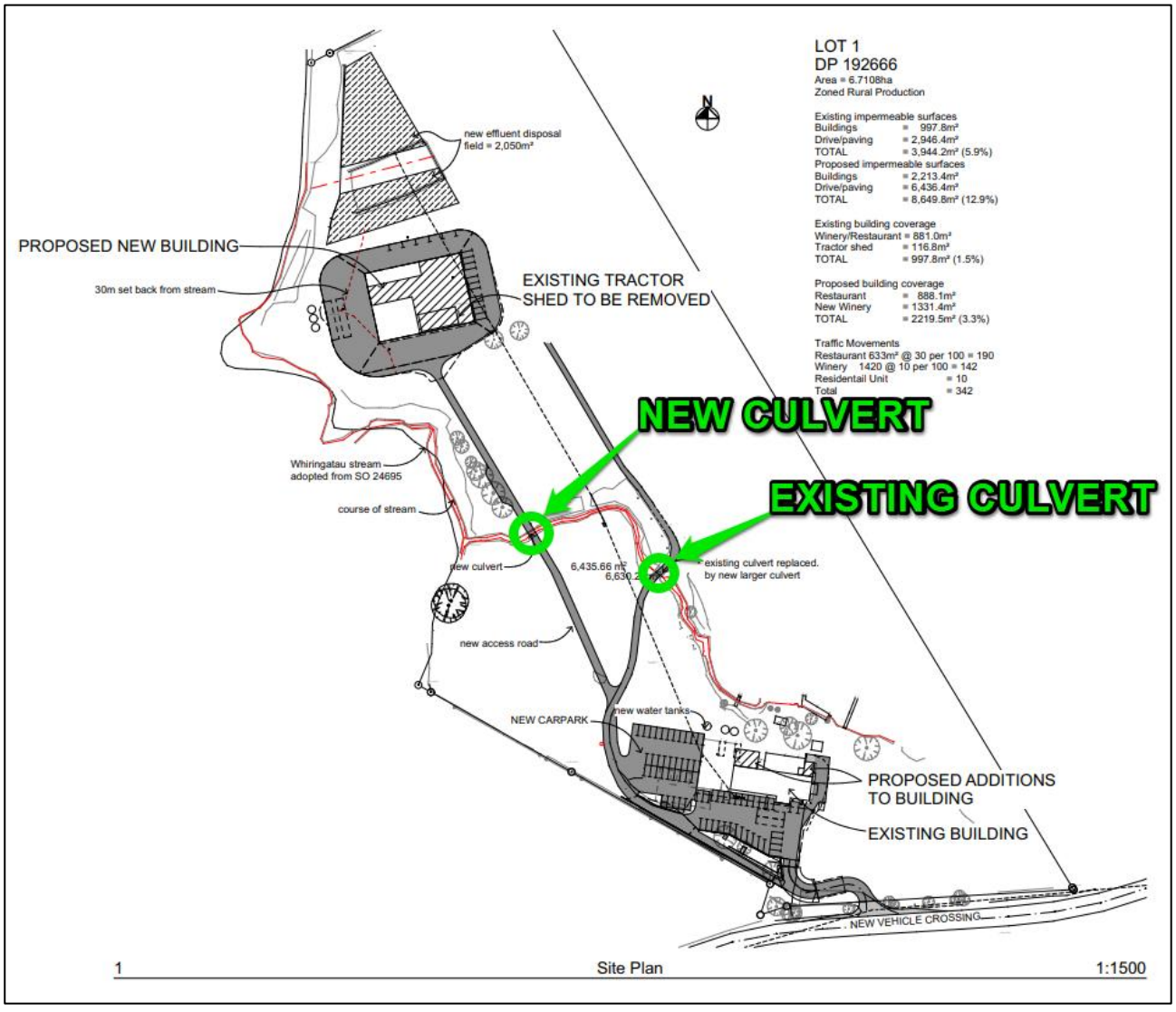

Figure 7: Screenshot of the Site Plan from the supplied architectural drawings.

5. ASSESSMENT CRITERIA

Impermeable Areas

The calculation for the stormwater system for the development is based on a gross site area of 67,108m² and the below areas *extracted from the supplied plans*:

	Pre-Development	Post-Development	Total Change
Roof Area	997.8 m²	**2,213.4 m²**	1,215.6 m²
Hardstand Area	2,976.4 m²	**6,436.4 m²**	3,460 m²
Pervious	63,133.8 m²	58,458.2 m²	**-4,675.6 m²**

The development proposals will result in an additional impermeable surface area of 4,675.6m² at the site. The total amount of impermeable area on site, post-development, will be 8,649.8m² or 12.9% of the site area. Should any changes be made to the current proposal, the on-site stormwater mitigation design must be reviewed.

District Plan Rules

The site is zoned Rural Production. The following rules apply under the FNDC District Plan:

8.6.5.1.3 – **Permitted Activities – Stormwater Management** - The maximum proportion or amount of the gross site area covered by buildings and other impermeable surfaces shall be 15%.

8.6.5.2.1 – **Controlled Activities – Stormwater Management** - The maximum proportion or amount of the gross site area covered by buildings and other impermeable surfaces shall be 20%.

The total proposed impermeable development area does not exceed 15% of the site area and is therefore compliant with Permitted Activity rules under the FNDC District Plan Cl 8.6.5.1.3.

Design Requirements

The site is under the jurisdiction of the Far North District Council. This design has been completed in general accordance with the recommendations and requirements contained within the Far North District Engineering Standards and the Far North District Council District Plan as well as Clause E1 of the New Zealand Building Code.

In accordance with the standards, stormwater management devices have been sized to accommodate for flows from the 20% AEP storm event, adjusted for climate change. The SCS TR-20 runoff method was utilised with a Type 1A storm curve.

Stormwater runoff attenuation measures are not strictly required under the District Plan, as the development proposals fall under Permitted Activity status with regards to impermeable coverage. However, if the client wishes to implement at-source runoff attenuation for the development proposals, we recommend that Water Quality Volume (WQV) control be provided for the 90th percentile storm event across the proposed impermeable roof areas (1,216m²). TP108 methodology has been utilised in WQV Control calculations with a predevelopment 90th percentile rainfall value of 25mm being adopted in accordance with Table 4-1 of the FNDC Engineering standards 2023. See the appended calculations for clarification.

Provided that the recommendations within this report are adhered to, the effects of stormwater runoff resulting from the unattenuated proposed impermeable surfaces are considered to have less than minor effects on the receiving environment, less than conditions that would result from development proposals with unattenuated impermeable coverage at the Permitted Activity coverage threshold.

6. STORMWATER MITIGATION ASSESSMENT

6.1 Extensions to Existing Building

Roof Area Drainage

A proprietary guttering system is required to collect roof runoff from the roof areas of the additions to the existing structure at the southern end of the property, directing runoff to the existing stormwater management system serving the structure.

An additional water tank may be plumbed into the existing stormwater management system for additional water storage capacity. If the existing tanks' discharge point is verified on-site as being in working order, then this can remain unchanged.

Hardstand Drainage

The new carpark area should be formed to shed runoff to catchpits, which are to direct runoff to an outlet in the existing pond/waterway via a minimum 150mmØ drainage line at a minimum grade of 1%. We recommend the use of litter filters within hardstand catchpits as a pre-treatment device to aid in the longevity of the stormwater mitigation system. See the appended Site Plan 02 for clarification.

6.2 New Winery Building

Potable Water Supply

It is recommended that rainwater tanks are utilised to provide the proposed structures with a potable water supply. The tank type is at the discretion of the client.

A proprietary guttering system is required to collect roof runoff from the proposed restaurant and shed. It is recommended to install litter filters in-line between the roof and the inlet of the tanks. The tank inlet level should be at least 600mm below the gutter inlet and any in-line litter filters. The filters will require regular inspection and cleaning to ensure the effective operation of the system. The frequency of cleaning will depend on current and future plantings around the proposed structure. Provision should be made by the homeowner for top-up of the tanks via water tankers in periods of low rainfall. The tanks must be installed as per the manufacturer's specifications.

All potable tanks must be constructed level and fitted with balancing pipes at the top and near the base of each tank to connect all potable water tanks to each other. Partial burial of the tanks is at the discretion of the client.

Due to inadequate water quality concerns, runoff from hardstand areas should not be allowed to drain to the potable water tanks.

If the client wishes to implement at-source runoff attenuation, the upper section of the potable water tanks is to act as a detention volume for storage of the Water Quality Volume generated over the new roof areas. One of the tanks is to be fitted with a 150mmØ overflow outlet with a flow attenuation outlet as specified below.

Water Quality Volume Attenuation (Optional)

The upper sections of the potable water tanks are to act as a detention volume for stormwater runoff collected from the proposed roof area. As per the attached design calculations, the design elements of the detention volume are as follows:

Assumed Tank Setup*	3 x 25,000 litre Rainwater Tanks
Assumed Tank dimensions	3500mmØ (or greater) x 2600mm high (or greater)
Outlet orifice (WQV)	**15mm diameter orifice**; located >930mm below the overflow outlet - 26.6m³ Total Detention Volume
Overflow Outlet	**150mm diameter**; located at the top of the tank

* The detention configuration should be reviewed and amended if a different tank setup is to be installed.

Tank detail, 140794-C210, is appended to this report. Refer to the appended calculation set for clarification. Discharge from potable water / detention tanks must be transported via a minimum 150mmØ drainage line at a minimum grade of 1% from the tanks' overflow to the discharge point specified below.

Hardstand Drainage

To direct runoff generated over the parking area surrounding the proposed winery building to an appropriate discharge point, the paved area should be formed to shed runoff to a perimeter swale drain with the following specifications:

- Grass-lined v-channel
- Minimum 750mm wide x 250mm deep
- Minimum 1% grade to low-point

Flows from the swale drain may be directed to the discharge point via either of the following options:

1. Perimeter drain joining at low-point on the western side of the development area and continuing downslope to the dispersal trench specified below. Anchored geotextile or an impermeable liner should be installed inside the channel with 6-inch riprap where the alignment passes over any formed batter slopes or slopes steeper than 14°.
2. Perimeter drain discharging to a minimum 675mmØ inlet chamber with a scruffy dome cover, from which flows are to be piped to the dispersal trench via a minimum 150mmØ drainage line at >3% grade.

Refer to the appended Site Plan 01 for clarification.

The new accessway from the existing southern structures to the proposed winery building may be formed to crossfall to the western side of the accessway to shed runoff to lower-lying grassed areas for passive mitigation.

Discharge Point

The rainwater tank overflow and hardstand drainage outlet are to be directed to a 10m long dispersal trench installed level with the topography, southwest of the development area, releasing runoff via even sheet flow across the lower-lying grassed areas out to the stream on the western side of the property.

The dispersal trench is to consist of a 750mmW x 250mmD v-channel with the low side cut down by 100mm and a level treated timber beam installed on the edge, pinned by waratahs. A level concrete edge is also acceptable. See the appended Level Spreader Detail for clarification.

The outfall is to be inspected and maintained regularly to ensure the efficacy of the system. Any future plantings in the downslope grassed area will aid in the treatment of runoff via filtration and evapotranspiration.

Alternatively, drainage from the rainwater tanks and hardstand areas may be directed to a 150mmØ outlet @ >3% grade in the stream on the western side of the property. A minimum 1.0m long apron of 6-inch riprap should be installed downstream of the outlet prior to runoff being released into the stream.

7. CULVERT SIZING ASSESSMENT

7.1 Catchment Assessment

Hydrologic analysis was conducted in the HEC-HMS and HydroCAD software packages to determine runoff flows through the unnamed stream tributary to the Whiringatau Stream. Hydraulic design of culverts was also completed in HydroCAD.

Catchment & Model Terrain

Topographical data for the surrounding area was extracted from LINZ data service (2018-2020 LiDAR 1.0m DEM data – NZVD2016 datum).

For the purposes of catchment delineation and hydraulic modelling, embankments in waterways in the terrain were manually "burned" through. This equates to "free-flow" through any culvert structures that exist in the catchment area, which is a conservative approach for the purpose of determining peak flow rate at the location of the proposed culverts.

Hydrologic Analysis

The following assumptions were made in the delineation of the catchment and subsequent calculations for determining peak flow through the stream:

Runoff Method	SCS TR-20
Storm Type	Type 1A 24-hr
20% AEP + CC Rainfall Value	195mm [HIRDS NIWA v4 Historic + 20%]
1% AEP + CC Rainfall Value	350mm [HIRDS NIWA v4 Historic + 20%]
CN Pervious	74
CN Impervious	98

The runoff catchment for the stream was delineated in HEC-HMS from the extracted LiDAR DEM – see Figure 8 below. The catchment area amounts to 608,700m², with zoning of Rural Production.

The catchment weighted CN value was calculated assuming maximum probable development per the FNDC District Plan maximum impervious area rules, with a resulting weighted CN value of 78.

The catchment time of concentration to the subject site was calculated as 116 minutes, determined from the hydraulic length and average land slope of the longest flowpath in the catchment.

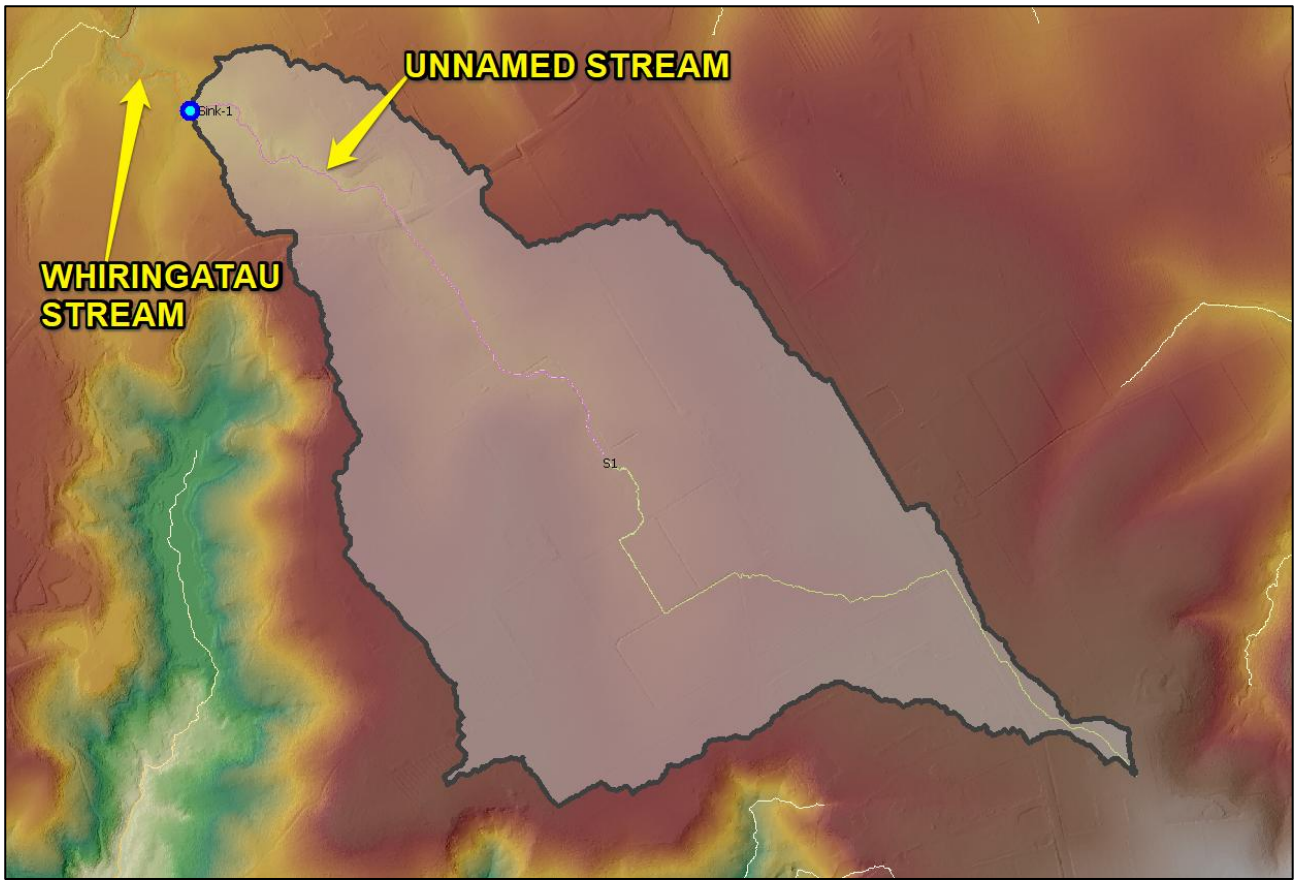

Figure 8: Screenshot from HEC-HMS basin model of delineated catchment.

The catchment peak flow rate was calculated in HydroCAD with the above inputs. The resulting peak flow rates for the 20% AEP + CC and 1% AEP + CC storm events amount to **2.85m³/s** and **6.31m³/s** respectively.

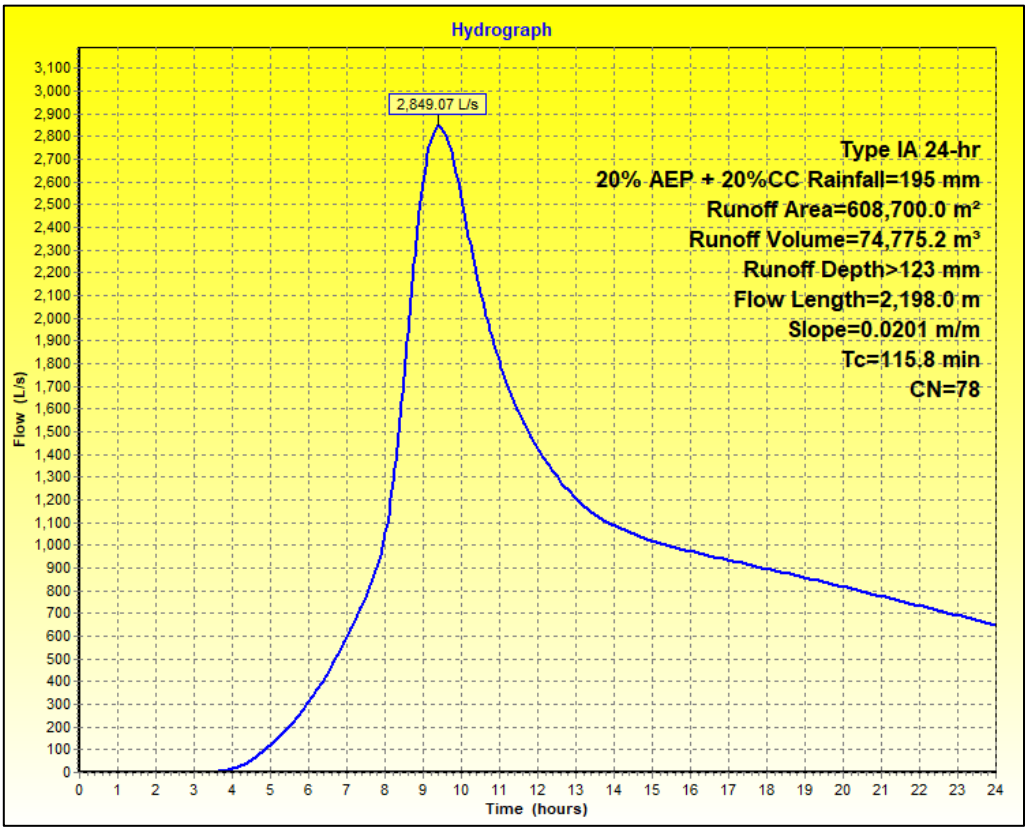

Figure 9: Screenshot of catchment hydrograph for 20% AEP + CC storm event from HydroCAD.

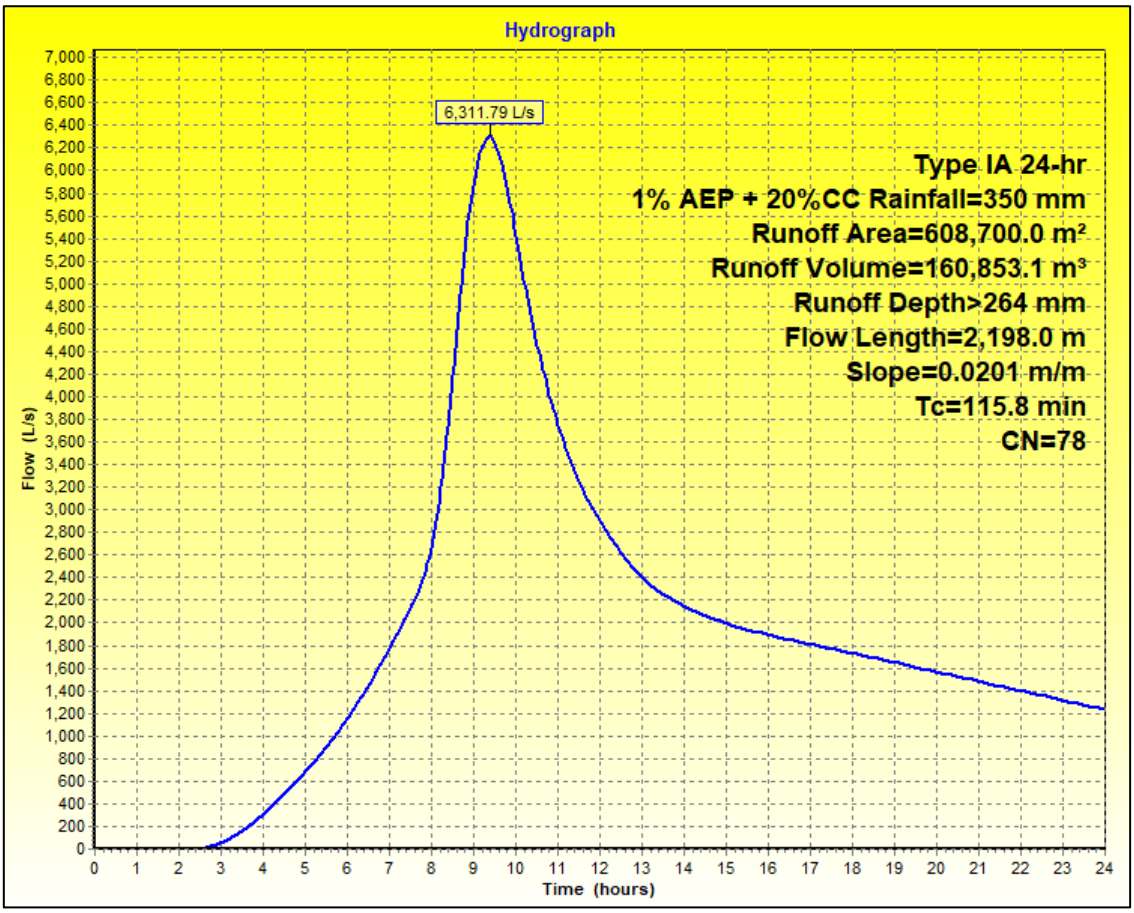

Figure 10: Screenshot of catchment hydrograph for 20% AEP + CC storm event from HydroCAD.

7.2 Culvert Sizing

Design Flow Rate

The flow rates given from the catchment assessment above are considered to be conservative. Based on our review of aerial and street view images, there appear to be several upstream drainage structures that are likely undersized and will inhibit flows upstream of the site, reducing the peak flow through the subject site. However, for the purposes of design, it is appropriate to assume that upstream infrastructure may be upgraded in the future to accommodate the full volume of incoming flows. Therefore, the design of the proposed culvert structures will be based on the peak flow rates provided by the above catchment assessment to ensure resilience to future catchment-wide drainage upgrades.

Recommendations Format

As the incoming peak flows are high relative to the flow capacity of the existing stream channel size, it may not be feasible to entirely prevent overtopping of the culvert and flow across the accessway(s) (depending on the vertical/horizontal alignment of the accessway(s)).

Several options for progressively upsized culvert structures and the corresponding headwater level (upstream water height build-up) for each option will be given to enable the client to undertake a cost-benefit analysis. The existing culvert setup will also be assessed to provide a baseline headwater level for comparison. The options have been given to provide a range of setups with differing hazard classifications, with guidance from the AIDR Flood Hazard handbook Figure 6 as depicted below.

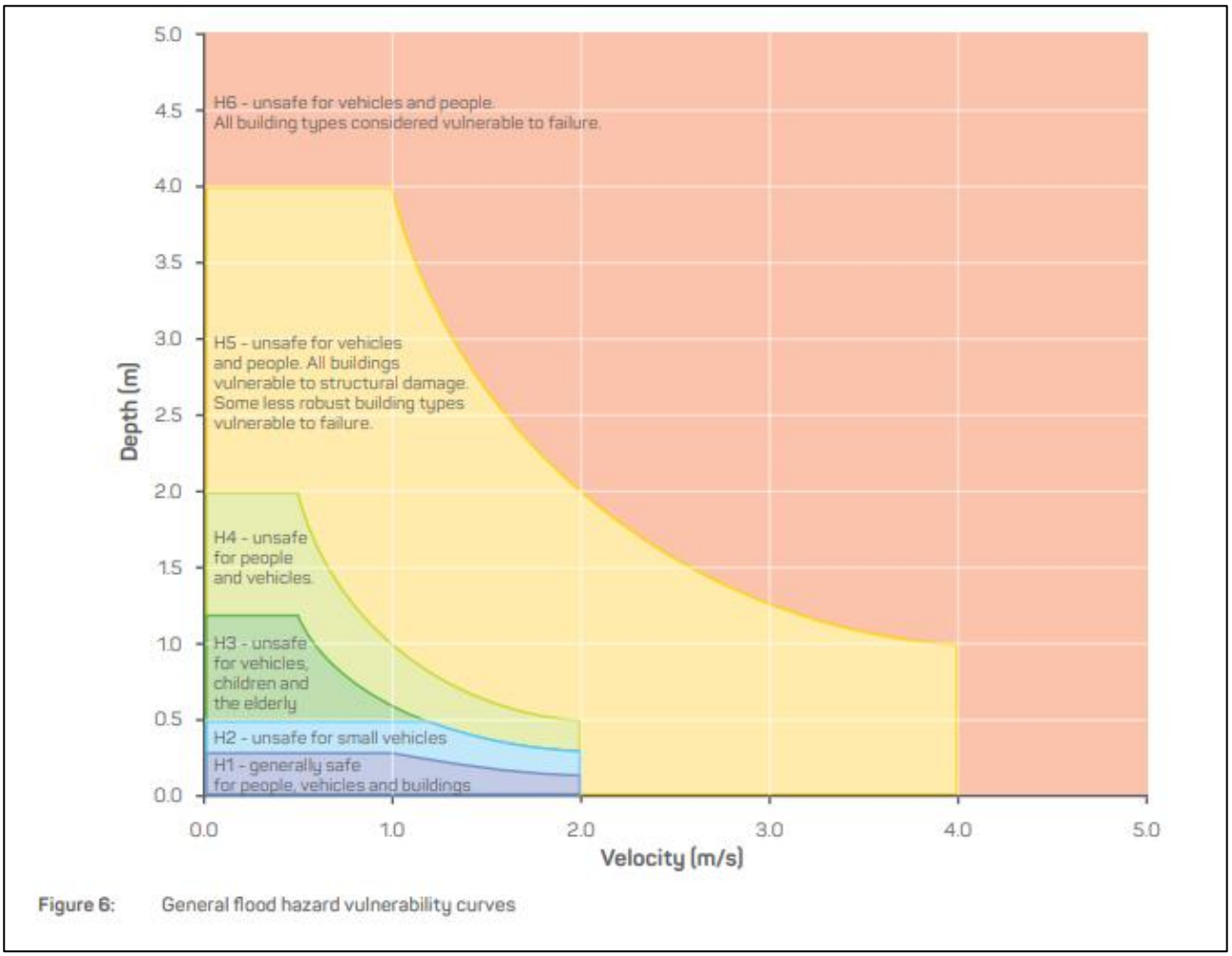

Figure 11: Extract from AIDR Flood Hazard Figure 6.

Culvert Sizing Options

The following assumptions were adopted for all calculations:

*Height from Culvert Invert to Road Low-point**	1.5m
Culvert Length	6.0m
Culvert Slope	3.5%
Culvert Manning's N	0.012
Accessway Manning's N	0.020

Notes:

- *Road low-point is not directly over culvert for existing accessway, is rather situated south of culvert structure. Road low-point is assumed to be directly over proposed accessway culvert.
- Culverts should be constructed with groove/chamfer/headwall inlets to improve inlet capacity where possible.
- The specifications given do not account for the effects of any blockages that may occur in the stream.
- The effects of debris flow was not considered in this assessment.

Existing Accessway Culvert

The existing culvert structure under the accessway located north of the existing southern building was measured on-site as consisting of a concrete 600mmØ single-barrel culvert. The depth of the culvert invert to the top of the accessway on the upstream side is approximately 1500mm.

The existing accessway's vertical alignment over the culvert was measured from a longsection taken from the provided topographical plan dwg file and imported into the HydroCAD software as an asymmetrical weir, discharging to a channel with the same dimensions having an assumed 2% crossfall to the opposite side of the crossing.

Utilising these parameters in HydroCAD, the expected headwater levels for the 20% AEP + CC and 1% AEP + CC design storms are 1750mm and 1920mm respectively, resulting in overtopping of the accessway at peak water depth of 250mm and 420mm respectively.

The upgrade specifications and resulting water levels are summarised in the table below, with Figure 12 providing an example visual representation of the results (not to scale). The results are based on the existing accessway vertical alignment as shown in the supplied topographical plan – any variations made to the existing accessway alignment from these assumptions will result in variations in the expected headwater level. The culvert designs may be reviewed once the final accessway alignment has been confirmed.

Table 1 : Existing Accessway Culvert Options Specifications (in stream)

Option	Culvert Type	Dimensions	20% AEP* Water Level	1% AEP* Water Level
Exist	Single-Barrel	1 x 600mmØ	1.749m	1.915m
1	Double-Barrel	2 x 900mmØ	1.317m	1.814m
2	Double-Barrel	2 x 1050mmØ	0.862m	1.619m
3	Box	1.2mW x 0.9mH	0.664m	1.257m

* Above culvert invert

Table 2: Existing Accessway Culvert Options Results (on accessway)

Option	20% AEP Depth Over Road	20% AEP Velocity Over Road	20% AEP Hazard Classification	1% AEP Depth Over Road	1% AEP Velocity Over Road	1% AEP Hazard Classification
Exist	249mm	1.76m/s	H1	418mm	2.41m/s	H5
1	-183mm**	N/A	N/A	314mm	1.73m/s	H2
2	-638mm**	N/A	N/A	119mm	0.97m/s	H1
3	-836mm**	N/A	N/A	-243mm**	N/A	N/A

** Negative indicates below road

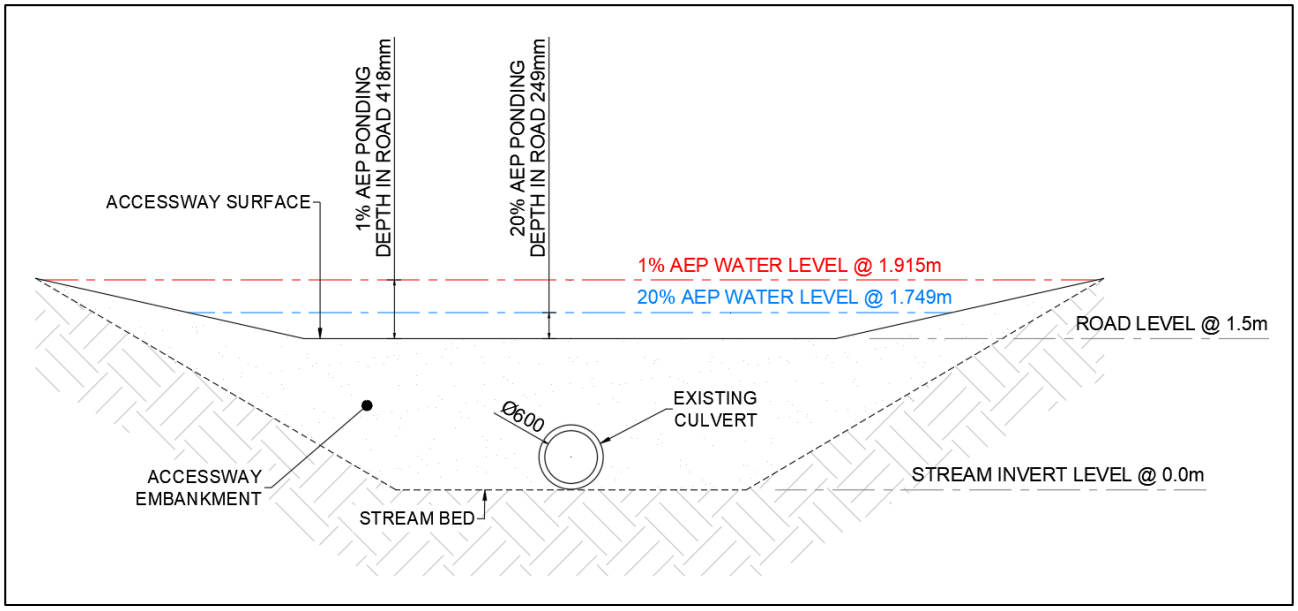

Figure 12: Diagram of EXISTING CULVERT calculations results, indicating 20% AEP and 1% AEP water levels and overspill depths above road level.

New Accessway Culvert Options

The depth of the stream bed to bank level at the proposed accessway location was measured on-site as approximately 1500mm.

The calculations for the proposed culvert are based on a new accessway vertical alignment with a low-point road level of 121.582m (datum per supplied topographical plan) with a road crossfall from the inlet to outlet side of 2%. Any variations made to the proposed accessway alignment from these assumptions will result in variations in the expected headwater level. The culvert designs may be reviewed once the final accessway alignment has been confirmed.

Table 3: Proposed Accessway Culvert Options Specifications (in stream)

Option	Culvert Type	Dimensions	20% AEP* Water Level	1% AEP* Water Level
4	Double-Barrel	2 x 600mmØ	1.789m	2.110m
5	Double-Barrel	2 x 900mmØ	0.960m	1.890m
6	Box	1.2mW x 0.9mH	0.664m	1.257m

* Above culvert invert

Table 4: Proposed Accessway Culvert Options Results (on accessway)

Option	20% AEP Depth Over Road	20% AEP Velocity Over Road	20% AEP Hazard Classification	1% AEP Depth Over Road	1% AEP Velocity Over Road	1% AEP Hazard Classification
4	289mm	1.50m/s	H2	610mm	2.49m/s	H5
5	-540mm**	N/A	N/A	390mm	1.90m/s	H2
6	-836mm**	N/A	N/A	-243mm**	N/A	N/A

** Negative indicates below road

8. NOTES

If any of the design specifications mentioned in the previous sections are altered or found to be different than what is described in this report, Wilton Joubert Ltd will be required to review this report. Indicative system details have been provided in the appendices of this report (140794-C200, 140794-C201, 140794-C210 & 140794-C211). Care should be taken when constructing the discharge point to avoid any siphon or backflow effect within the stormwater system.

Subsequent to construction, a programme of regular inspection / maintenance of the system should be initiated by the Owner to ensure the continuance of effective function, and if necessary, the instigation of any maintenance required.

Wilton Joubert Ltd recommends that all contractors keep a photographic record of their work.

9. LIMITATIONS

The recommendations and opinions contained in this report are based on information received and available from the client at the time of report writing.

All drainage design is up to the connection point for each building face of any new structures/slabs; no internal building plumbing or layouts have been undertaken.

During construction, an engineer competent to judge whether the conditions are compatible with the assumptions made in this report should examine the site. In all circumstances, if variations occur which differ from that described or that are assumed to exist, then the matter should be referred to a suitably qualified and experienced engineer.

The performance behaviour outlined by this report is dependent on the construction activity and actions of the builder/contractor. Inappropriate actions during the construction phase may cause behaviour outside the limits given in this report.

This report has been prepared for the particular project described to us and no responsibility is accepted for the use of any part of this report in any other context or for any other purpose.

Wilton Joubert Ltd.

Patrick McSweeney
BE(Hons)

NOTES:

1. BACKGROUND INFORMATION, CONTOURS & LOCAL SERVICES PROVIDED BY THE CLIENT & EXTRACTED FROM COUNCIL GIS. EXISTING SERVICES LOCATIONS AND CONDITIONS ON-SITE MAY VARY - THIS PLAN IS NOT TO BE USED FOR SERVICE LOCATION IN CONSTRUCTION.
2. ALL DIMENSION AND LEVELS TO BE CHECKED ON SITE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER.
3. ALL WORK TO BE DONE IN ACCORDANCE WITH THE RELEVANT STANDARDS AND MUST BE UNDERTAKEN IN ACCORDANCE WITH THE HEALTH AND SAFETY AT WORK ACT 2015.

INDICATIVE EFFLUENT DISPOSAL FIELD (BY OTHERS)

MINIMUM 750mmW x 250mmD GRASSED V-CHANNEL SWALE DRAIN INSTALLED AROUND PAVED AREA PERIMETER, DRAINING AT MINIMUM 1% GRADE TO LOW-POINT ON WESTERN SIDE.

INDICATIVE DOWNPIPES DIRECTING RUNOFF TO RAINWATER TANKS

3 x 25,000L RAINWATER TANKS WITH WQV DETENTION IN UPPER SECTION.
150mmØ OVERFLOW INSTALLED AT TOP OF TANKS
15mmØ OUTLET ORIFICE INSTALLED @ 930mm BELOW OVERFLOW INVERT

MINIMUM 150mmØ DRAINAGE LINE @ >1% FROM RAINWATER TANKS' OVERFLOW TO OUTLET IN DISPERSAL TRENCH

10m LONG DISPERSAL TRENCH INSTALLED LEVEL WITH TOPOGRAPHY TO DISPERSE RUNOFF ON SLOPE VIA SHEET FLOW.

DP — DP — DP

DP

DP

DP

DP

PROPOSED WINERY BUILDING

SWALE DRAIN LOW-POINT

SW

PAVED AREA FORMED TO SHED RUNOFF TO PERIMETER CHANNEL

ALTERNATIVE DISCHARGE POINT
DRAINAGE DIRECTED TO 150mmØ OUTLET IN STREAM. 1.0mL APRON OF 6-INCH RIPRAP LAID DOWNSTREAM OF OUTLET PRIOR TO RUNOFF ENTERING STREAM

OPTION 1:
SWALE DRAIN JOINING AT LOW-POINT AND CONTINUING DOWNSLOPE TO DISPERSAL TRENCH. ANCHORED GEOTEXTILE OR IMPERMEABLE LINER PLACED IN CHANNEL WHERE PASSING OVER FORMED BATTER SLOPES

OPTION 2:
SWALE DRAIN DIRECTING RUNOFF TO MINIMUM 675mmØ INLET CHAMBER, WITH 150mmØ OUTLET @ >3% DIRECTING FLOWS TO DISPERSAL TRENCH

ACCESSWAY SHEDDING RUNOFF TO LOWER-LYING GRASSED AREAS FOR PASSIVE MITIGATION

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Wanaka: 03 443 6209
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ISSUE / REVISION

No.	DATE	BY	DESCRIPTION
00	JUN '25	PM	STORMWATER REPORT

DESIGNED BY: PM
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FOR INFORMATION
DESIGN / DRAWING SUBJECT TO ENGINEER'S APPROVAL

DRAWING TITLE: **SITE PLAN**

PROJECT DESCRIPTION: **STORMWATER MITIGATION REPORT**

PROJECT TITLE: **MARSDEN WINERY
LOT 1 DP 192666
56 WIROA ROAD
KERIKERI**

ORIGINAL DRAWING SIZE: A3
OFFICE: **OREWA**
DRAWING SCALE: **N.T.S**
CO-ORDINATE SYSTEM: NOT COORDINATED
DRAWING NUMBER: **140794-C200**
ISSUE: **00**

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EXISTING CULVERT LOCATION
SEE SECTION 7 FOR CULVERT UPGRADE OPTIONS

PROPOSED ACCESSWAY CULVERT LOCATION
SEE SECTION 7 FOR CULVERT OPTIONS

PROPOSED NEW ACCESSWAY TO NEW WINERY BUILDING SHEDDING RUNOFF TO LOWER-LYING GRASSED AREAS FOR PASSIVE MITIGATION

PROPERTY BOUNDARY

CATCHPITS IN NEW CARPARK AREA DRAINING TO OUTLET IN STREAM VIA MINIMUM 150mmØ DRAINAGE LINE @ >1%

SW

PROPOSED CARPARK

PROPOSED ADDITIONS TO EXISTING BUILDING
ROOF DRAINAGE TO BE ROUTED TO EXISTING STORMWATER MANAGEMENT SYSTEM PROVIDED THAT EXISTING DISCHARGE POINT IS CONFIRMED ON-SITE AS BEING IN WORKING ORDER.

WIROA ROAD

Proposed Accessway Culvert

		Road Overspill Hazard Classification	
Option	**Culvert Type**	**20% AEP Storm**	**1% AEP Storm**
4	2 x 600Ø Double Barrel	H2	H5
5	2 x 900Ø Double Barrel	N/A	H2
6	1.2mW x 0.9mD Box	N/A	N/A

Existing Accessway Culvert

		Road Overspill Hazard Classification	
Option	**Culvert Type**	**20% AEP Storm**	**1% AEP Storm**
1	2 x 900Ø Double Barrel	N/A	H2
2	2 x 1050Ø Double Barrel	N/A	H1
3	1.2mW x 0.9mD Box	N/A	N/A

WILTON JOUBERT
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Christchurch: 021 824 063 Wanaka: 03 443 6209
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PROJECT DESCRIPTION: **STORMWATER MITIGATION REPORT**

PROJECT TITLE: **MARSDEN WINERY LOT 1 DP 192666 56 WIROA ROAD KERIKERI**

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OFFICE: OREWA
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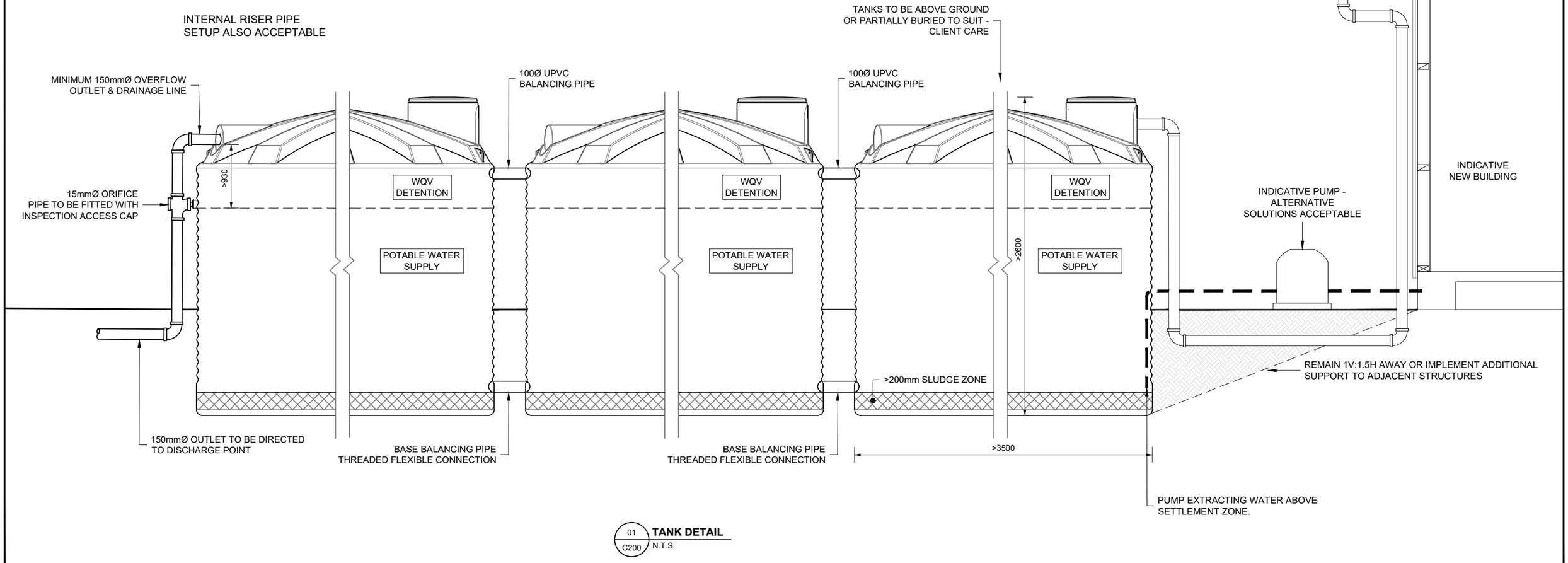
2. ALL LEVELS & DIMENSIONS TO BE CONFIRMED ON SITE & ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
3. TANK TO BE INSTALLED AS PER MANUFACTURERS SPECIFICATIONS & RELEVANT COUNCIL STANDARDS.
4. REGULAR INSPECTION & CLEANING IS REQUIRED TO ENSURE THE EFFECTIVE OPERATION OF THE SYSTEM.
5. MINIMUM SLUDGE ZONE OF 200mm TO BE KEPT.
6. ALL ORIFICE OUTLETS TO BE COVERED WITH STAINLESS STEEL OR NYLON MESH.
7. ASSUMED USE OF A 3 x 25,000 LITRE RAINWATER TANKS OR SIMILARLY APPROVED.



01 / C200 **TANK DETAIL**
N.T.S

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DRAWING TITLE: **TANK DETAIL**

PROJECT DESCRIPTION: **STORMWATER MITIGATION REPORT**

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LOT 1 DP 192666
56 WIROA ROAD
KERIKERI**

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A3	OREWA
DRAWING SCALE:	CO-ORDINATE SYSTEM:
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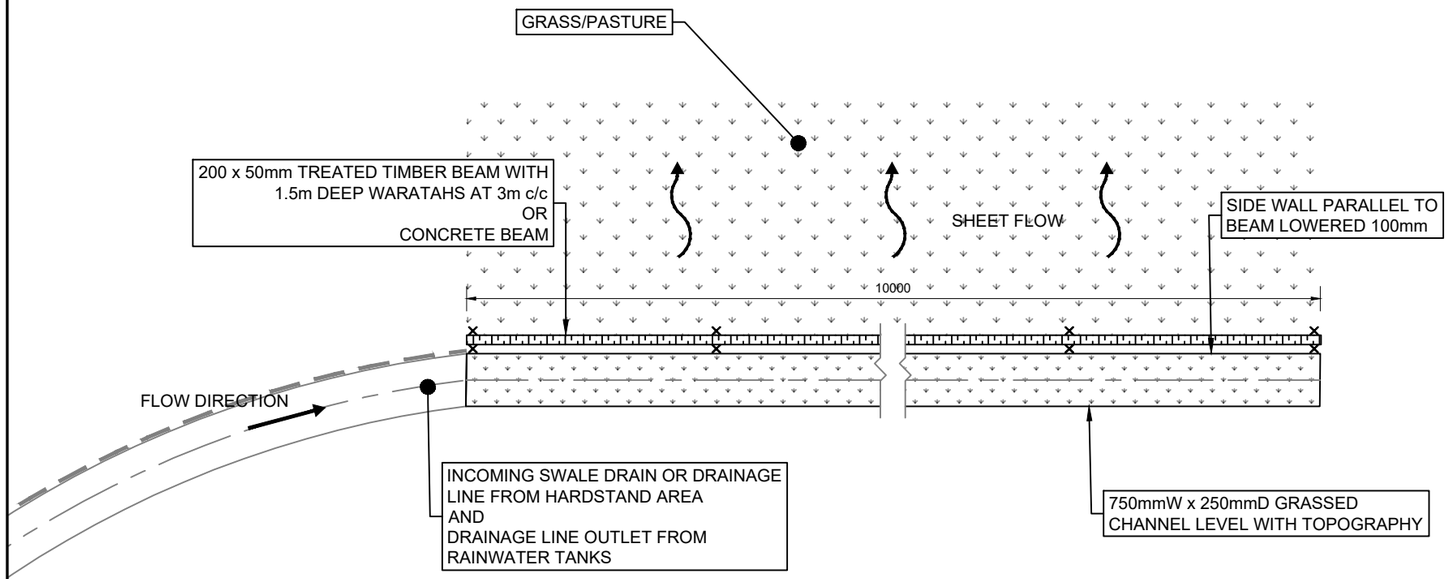
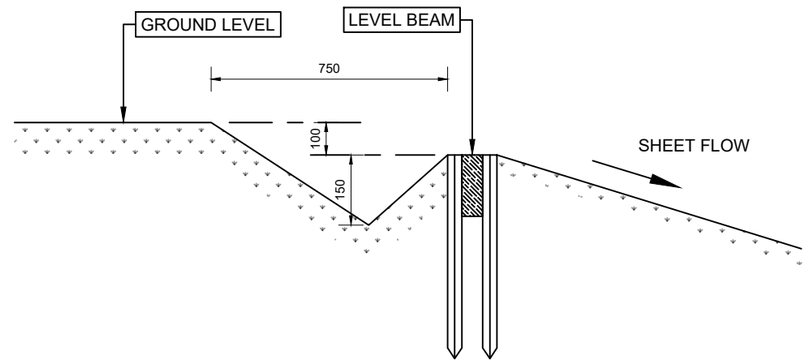
DRAWING NUMBER: 140794-C210
ISSUE: 00

PLAN VIEW



SIDE ELEVATION



02 / C200 **LEVEL SPREADER DETAIL**
N.T.S

NOTES:

1. NOT TO SCALE. LABELLED DIMENSIONS IN MM.
2. ALL LEVELS & DIMENSIONS TO BE CONFIRMED ON SITE & ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
3. REFER TO OPERATION & MAINTENANCE MANUAL APPENDED TO MEMORANDUM.

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DRAWING TITLE: **LEVEL SPREADER DETAIL**

PROJECT DESCRIPTION: **STORMWATER MITIGATION REPORT**

PROJECT TITLE: **MARSDEN WINERY
LOT 1 DP 192666
56 WIROA ROAD
KERIKERI**

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A3	OREWA
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N.T.S	NOT COORDINATED
DRAWING NUMBER:	ISSUE:
140794-C211	00

Subcat Reach Pond Link

Routing Diagram for 56WiroaRoad Culverts

Prepared by {enter your company name here}, Printed 13/06/2025

Summary for Subcatchment 43S: Stream Catchment

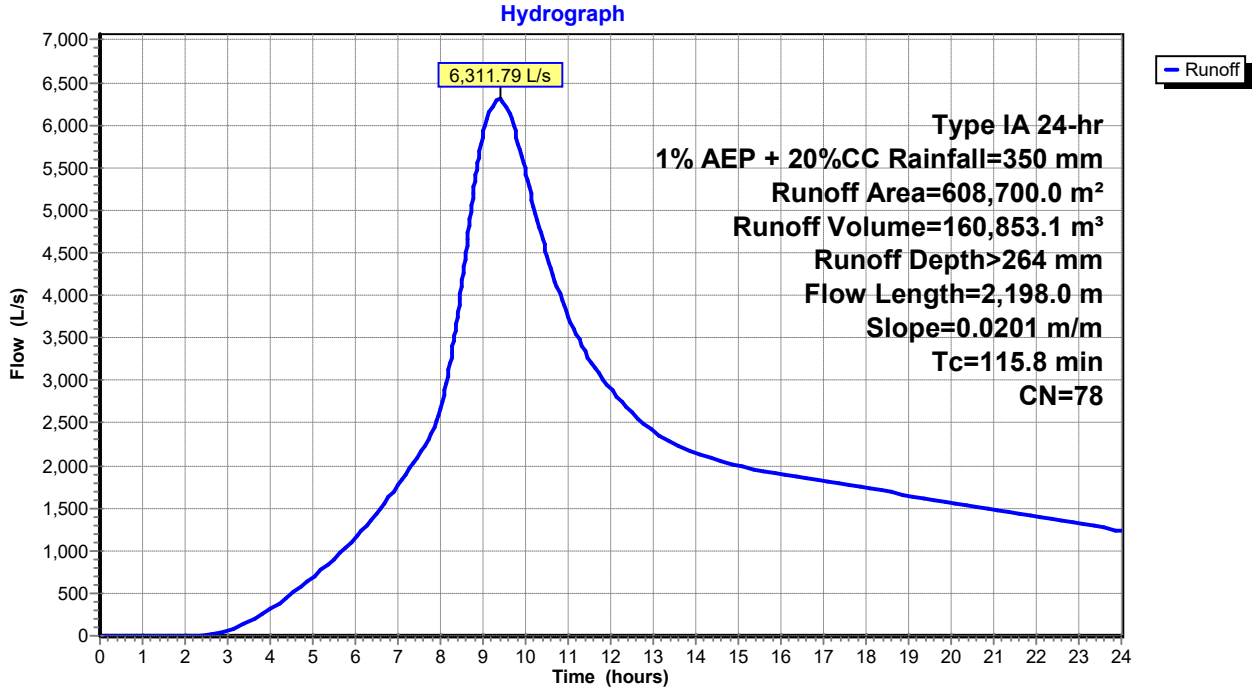
Runoff = 6,311.79 L/s @ 9.39 hrs, Volume= 160,853.1 m³, Depth> 264 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type IA 24-hr 1% AEP + 20%CC Rainfall=350 mm

	Area (m²)	CN	Description
*	608,700.0	78	Rural Production
	608,700.0		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
115.8	2,198.0	0.0201	0.32		**Lag/CN Method,**

Subcatchment 43S: Stream Catchment



Summary for Subcatchment 43S: Stream Catchment

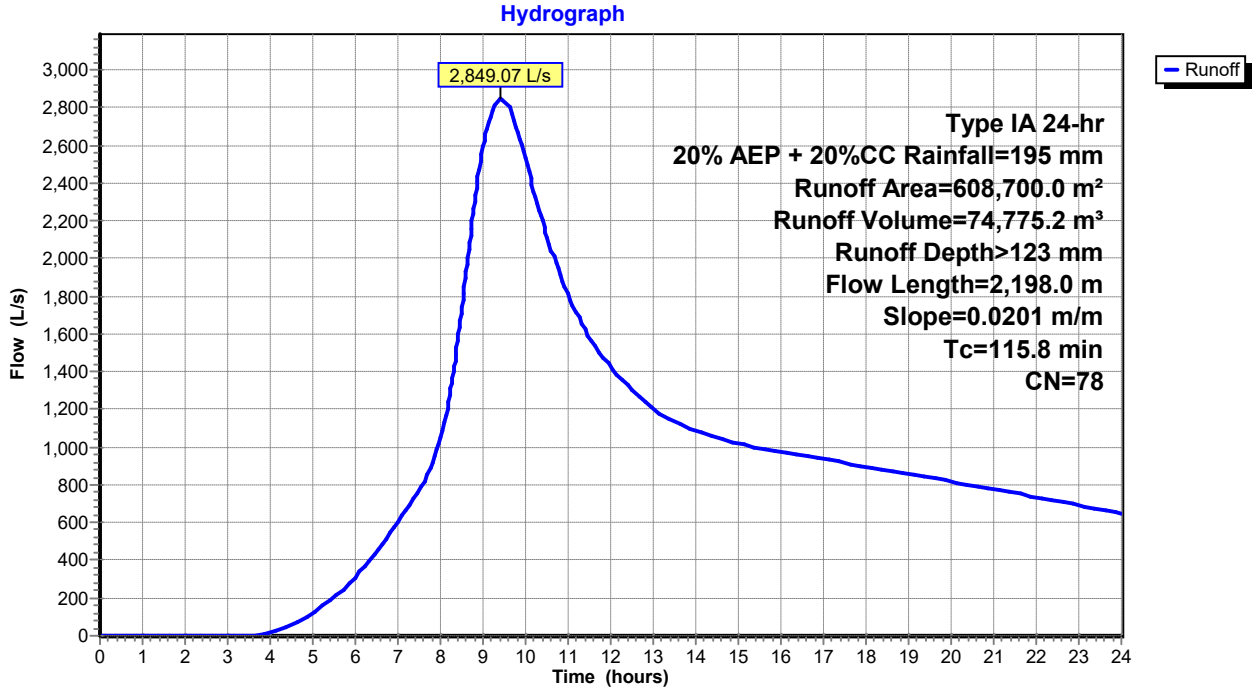
Runoff = 2,849.07 L/s @ 9.40 hrs, Volume= 74,775.2 m³, Depth> 123 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type IA 24-hr 20% AEP + 20%CC Rainfall=195 mm

	Area (m²)	CN	Description
*	608,700.0	78	Rural Production
	608,700.0		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
115.8	2,198.0	0.0201	0.32		**Lag/CN Method,**

Subcatchment 43S: Stream Catchment



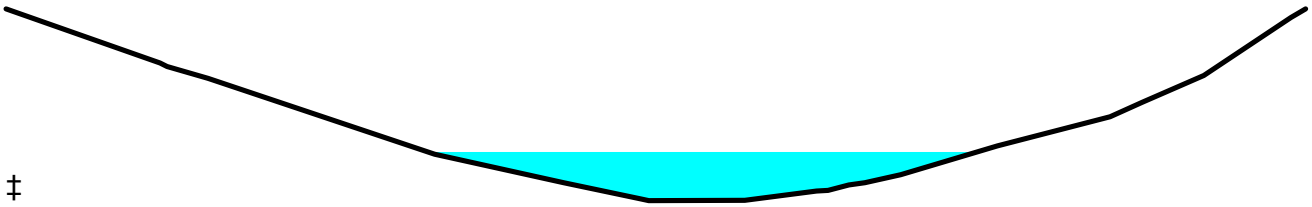
Summary for Reach 75R: Flow Over Existing Accessway

Inflow = 5,116.95 L/s @ 9.39 hrs, Volume= 83,298.0 m³
Outflow = 5,116.79 L/s @ 9.39 hrs, Volume= 83,296.6 m³, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.05 m/s, Min. Travel Time= 0.0 min
Avg. Velocity = 1.26 m/s, Avg. Travel Time= 0.1 min

Peak Storage= 15.0 m³ @ 9.39 hrs
Average Depth at Peak Storage= 0.25 m
Bank-Full Depth= 0.98 m Flow Area= 22.87 m², Capacity= 115,728.42 L/s

Custom cross-section, Length= 6.00 m Slope= 0.0200 m/m (113 Elevation Intervals)
Constant n= 0.020
Inlet Invert= 123.454 m, Outlet Invert= 123.334 m

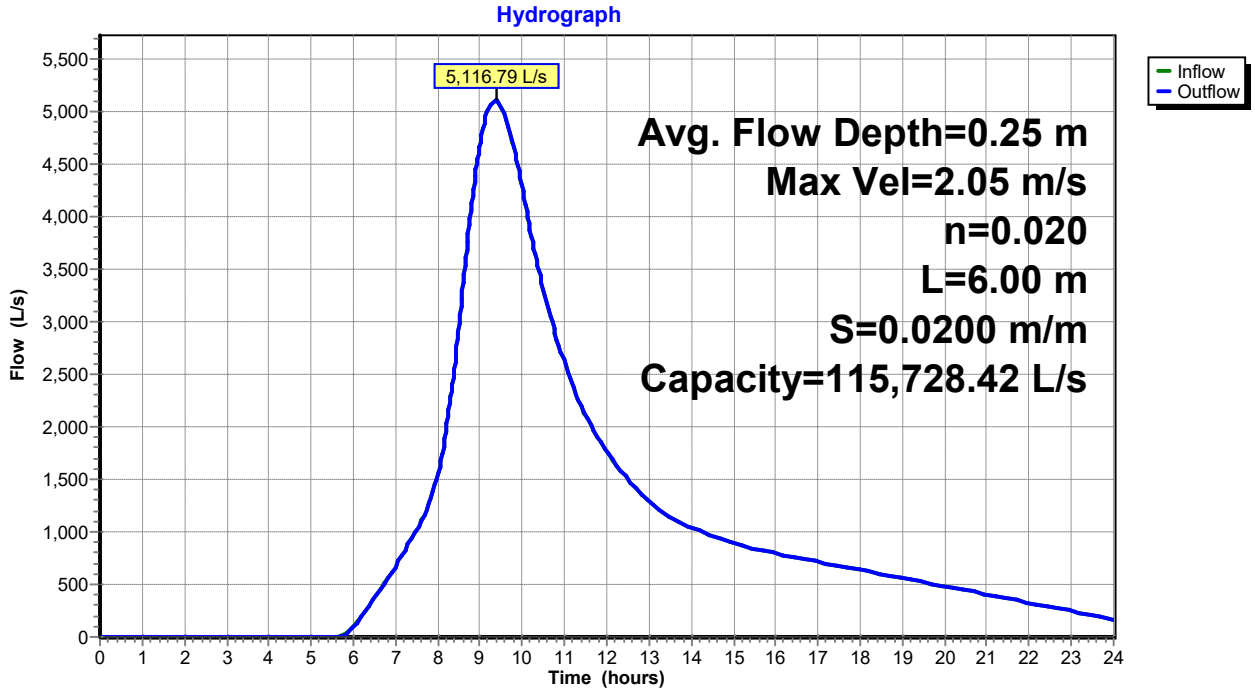


‡

Offset (meters)	Elevation (meters)	Chan.Depth (meters)
0.000	124.435	0.00
4.466	124.158	0.28
4.672	124.141	0.29
5.858	124.080	0.36
12.432	123.691	0.74
16.178	123.546	0.89
18.383	123.464	0.97
18.645	123.454	0.98
21.428	123.456	0.98
23.509	123.503	0.93
23.846	123.507	0.93
24.451	123.535	0.90
24.914	123.546	0.89
25.958	123.587	0.85
28.756	123.734	0.70
32.028	123.883	0.55
32.952	123.956	0.48
34.744	124.094	0.34
37.274	124.391	0.04
37.701	124.435	0.00

Depth (meters)	End Area (sq-meters)	Perim. (meters)	Storage (cubic-meters)	Discharge (L/s)
0.00	0.00	0.00	0.0	0.00
0.00	0.00	2.84	0.0	0.20
0.01	0.03	3.40	0.2	8.08
0.05	0.21	6.18	1.3	161.41
0.05	0.24	6.62	1.4	185.95
0.08	0.44	7.98	2.7	458.26
0.09	0.54	8.74	3.2	590.05
0.13	0.94	10.84	5.6	1,296.40
0.24	2.31	15.51	13.8	4,580.39
0.28	3.01	17.06	18.0	6,685.50
0.43	5.98	22.86	35.9	17,292.64
0.50	7.73	25.02	46.4	24,954.00
0.63	11.06	28.74	66.3	41,348.52
0.64	11.46	29.19	68.8	43,446.82
0.69	12.86	30.51	77.2	51,132.31
0.70	13.38	30.86	80.3	54,211.21
0.94	21.23	36.63	127.4	104,389.56
0.98	22.87	37.77	137.2	115,728.42

Reach 75R: Flow Over Existing Accessway



Summary for Pond 72P: Existing 600Ø

Inflow Area = 608,700.0 m², 0.00% Impervious, Inflow Depth > 264 mm for 1% AEP + 20%CC event
Inflow = 6,311.79 L/s @ 9.39 hrs, Volume= 160,853.1 m³
Outflow = 6,311.79 L/s @ 9.39 hrs, Volume= 160,853.1 m³, Atten= 0%, Lag= 0.0 min
Primary = 1,194.84 L/s @ 9.39 hrs, Volume= 77,555.1 m³
Secondary = 5,116.95 L/s @ 9.39 hrs, Volume= 83,298.0 m³

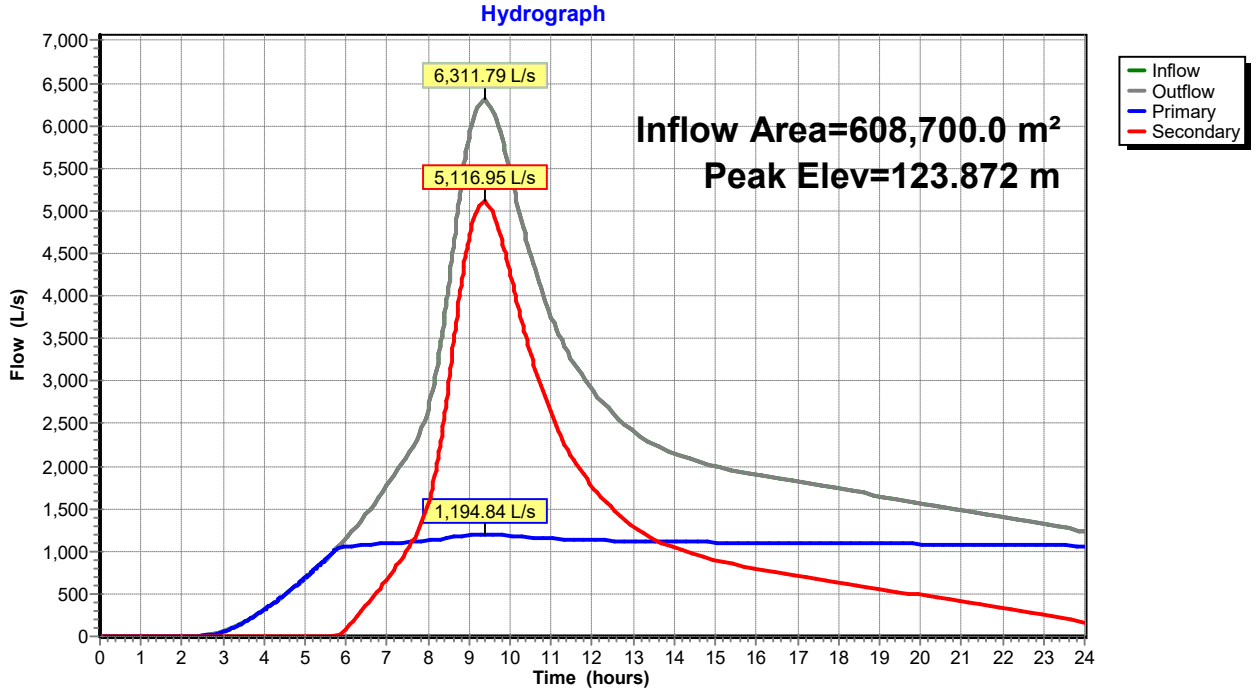
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 123.872 m @ 9.39 hrs
Flood Elev= 123.454 m

Device	Routing	Invert	Outlet Devices
#1	Primary	121.954 m	**600 mm Round Culvert** L= 6.00 m RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 121.954 m / 121.744 m S= 0.0350 m/m Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.283 m²
#2	Secondary	123.454 m	**Asymmetrical Weir, C= 1.81** Offset (meters) 0.000 4.466 4.672 5.858 12.432 16.178 18.383 18.645 21.428 23.509 23.846 24.451 24.914 25.958 28.756 32.028 32.952 34.744 37.274 37.701 Elev. (meters) 124.44 124.16 124.14 124.08 123.69 123.55 123.46 123.45 123.46 123.50 123.51 123.53 123.55 123.59 123.73 123.88 123.96 124.09 124.39 124.44

Primary OutFlow Max=1,194.83 L/s @ 9.39 hrs HW=123.872 m (Free Discharge)
└**1=Culvert** (Inlet Controls 1,194.83 L/s @ 4.23 m/s)

Secondary OutFlow Max=5,116.35 L/s @ 9.39 hrs HW=123.872 m TW=123.703 m (Dynamic Tailwater)
└**2=Asymmetrical Weir** (Weir Controls 5,116.35 L/s @ 0.74 m/s)

Pond 72P: Existing 600Ø



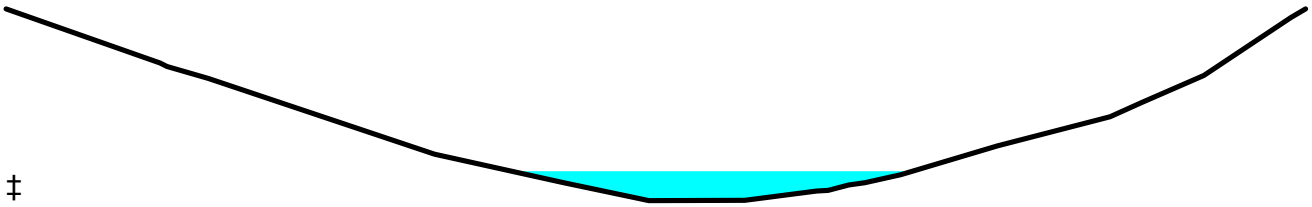
Summary for Reach 75R: Flow Over Existing Accessway

Inflow = 1,718.27 L/s @ 9.40 hrs, Volume= 15,017.3 m³
Outflow = 1,718.35 L/s @ 9.40 hrs, Volume= 15,017.3 m³, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.50 m/s, Min. Travel Time= 0.1 min
Avg. Velocity = 0.96 m/s, Avg. Travel Time= 0.1 min

Peak Storage= 6.9 m³ @ 9.40 hrs
Average Depth at Peak Storage= 0.15 m
Bank-Full Depth= 0.98 m Flow Area= 22.87 m², Capacity= 115,728.42 L/s

Custom cross-section, Length= 6.00 m Slope= 0.0200 m/m (113 Elevation Intervals)
Constant n= 0.020
Inlet Invert= 123.454 m, Outlet Invert= 123.334 m

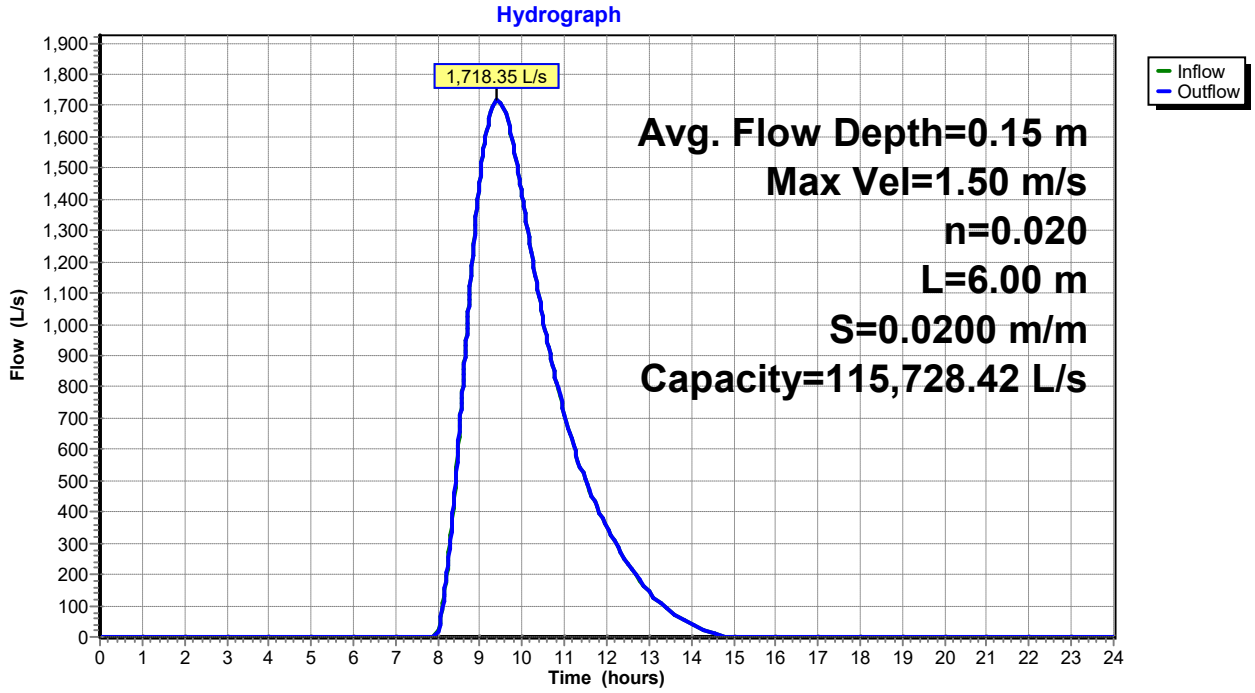


‡

Offset (meters)	Elevation (meters)	Chan.Depth (meters)
0.000	124.435	0.00
4.466	124.158	0.28
4.672	124.141	0.29
5.858	124.080	0.36
12.432	123.691	0.74
16.178	123.546	0.89
18.383	123.464	0.97
18.645	123.454	0.98
21.428	123.456	0.98
23.509	123.503	0.93
23.846	123.507	0.93
24.451	123.535	0.90
24.914	123.546	0.89
25.958	123.587	0.85
28.756	123.734	0.70
32.028	123.883	0.55
32.952	123.956	0.48
34.744	124.094	0.34
37.274	124.391	0.04
37.701	124.435	0.00

Depth (meters)	End Area (sq-meters)	Perim. (meters)	Storage (cubic-meters)	Discharge (L/s)
0.00	0.00	0.00	0.0	0.00
0.00	0.00	2.84	0.0	0.20
0.01	0.03	3.40	0.2	8.08
0.05	0.21	6.18	1.3	161.41
0.05	0.24	6.62	1.4	185.95
0.08	0.44	7.98	2.7	458.26
0.09	0.54	8.74	3.2	590.05
0.13	0.94	10.84	5.6	1,296.40
0.24	2.31	15.51	13.8	4,580.39
0.28	3.01	17.06	18.0	6,685.50
0.43	5.98	22.86	35.9	17,292.64
0.50	7.73	25.02	46.4	24,954.00
0.63	11.06	28.74	66.3	41,348.52
0.64	11.46	29.19	68.8	43,446.82
0.69	12.86	30.51	77.2	51,132.31
0.70	13.38	30.86	80.3	54,211.21
0.94	21.23	36.63	127.4	104,389.56
0.98	22.87	37.77	137.2	115,728.42

Reach 75R: Flow Over Existing Accessway



Summary for Pond 72P: Existing 600Ø

Inflow Area = 608,700.0 m², 0.00% Impervious, Inflow Depth > 123 mm for 20% AEP + 20%CC event
Inflow = 2,849.07 L/s @ 9.40 hrs, Volume= 74,775.2 m³
Outflow = 2,849.07 L/s @ 9.40 hrs, Volume= 74,775.2 m³, Atten= 0%, Lag= 0.0 min
Primary = 1,130.80 L/s @ 9.40 hrs, Volume= 59,757.9 m³
Secondary = 1,718.27 L/s @ 9.40 hrs, Volume= 15,017.3 m³

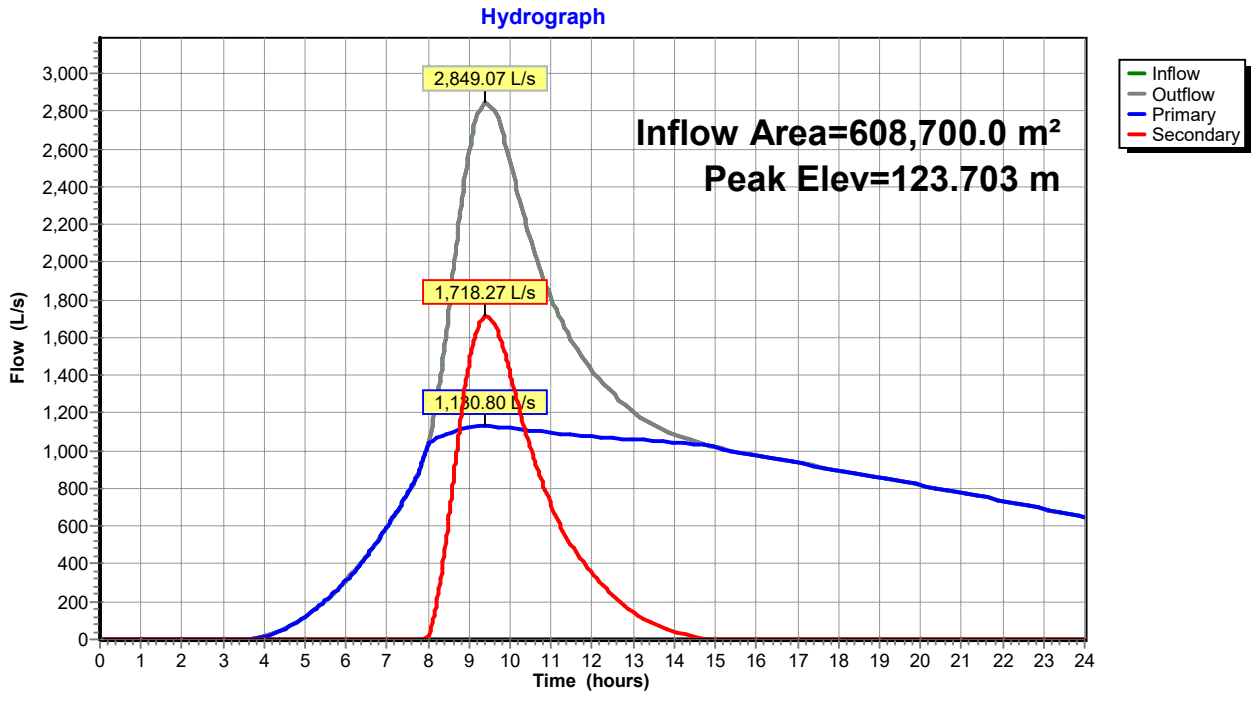
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 123.703 m @ 9.40 hrs
Flood Elev= 123.454 m

Device	Routing	Invert	Outlet Devices
#1	Primary	121.954 m	**600 mm Round Culvert** L= 6.00 m RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 121.954 m / 121.744 m S= 0.0350 m/m Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.283 m²
#2	Secondary	123.454 m	**Asymmetrical Weir, C= 1.81** Offset (meters) 0.000 4.466 4.672 5.858 12.432 16.178 18.383 18.645 21.428 23.509 23.846 24.451 24.914 25.958 28.756 32.028 32.952 34.744 37.274 37.701 Elev. (meters) 124.44 124.16 124.14 124.08 123.69 123.55 123.46 123.45 123.46 123.50 123.51 123.53 123.55 123.59 123.73 123.88 123.96 124.09 124.39 124.44

Primary OutFlow Max=1,130.80 L/s @ 9.40 hrs HW=123.703 m (Free Discharge)
└**1=Culvert** (Inlet Controls 1,130.80 L/s @ 4.00 m/s)

Secondary OutFlow Max=1,717.78 L/s @ 9.40 hrs HW=123.703 m TW=123.605 m (Dynamic Tailwater)
└**2=Asymmetrical Weir** (Weir Controls 1,717.78 L/s @ 0.56 m/s)

Pond 72P: Existing 600Ø



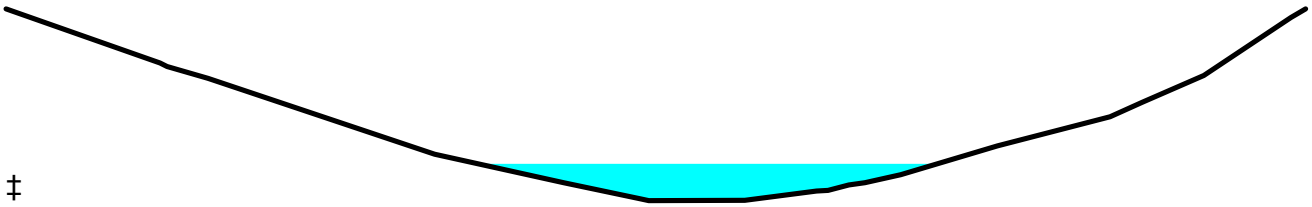
Summary for Reach 74R: Flow Over Existing Accessway

Inflow = 2,790.55 L/s @ 9.39 hrs, Volume= 17,080.2 m³
Outflow = 2,790.36 L/s @ 9.39 hrs, Volume= 17,080.2 m³, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.73 m/s, Min. Travel Time= 0.1 min
Avg. Velocity = 1.26 m/s, Avg. Travel Time= 0.1 min

Peak Storage= 9.7 m³ @ 9.39 hrs
Average Depth at Peak Storage= 0.19 m
Bank-Full Depth= 0.98 m Flow Area= 22.87 m², Capacity= 115,728.42 L/s

Custom cross-section, Length= 6.00 m Slope= 0.0200 m/m (113 Elevation Intervals)
Constant n= 0.020
Inlet Invert= 123.454 m, Outlet Invert= 123.334 m

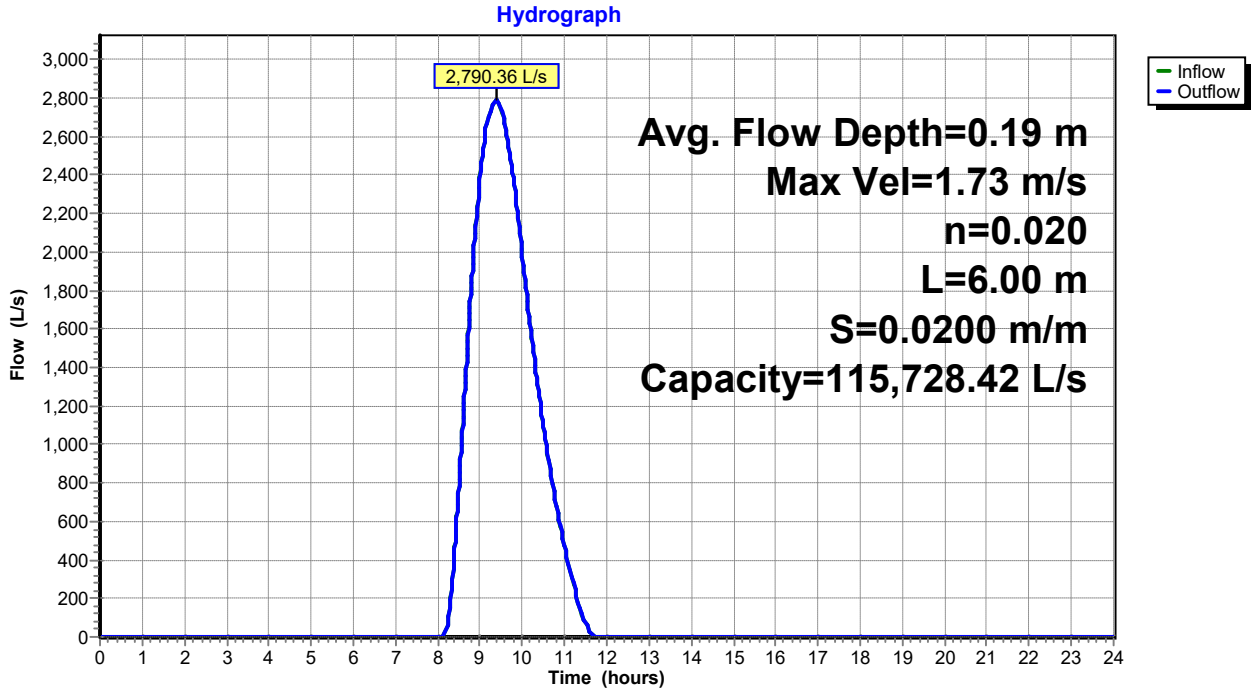


‡

Offset (meters)	Elevation (meters)	Chan.Depth (meters)
0.000	124.435	0.00
4.466	124.158	0.28
4.672	124.141	0.29
5.858	124.080	0.36
12.432	123.691	0.74
16.178	123.546	0.89
18.383	123.464	0.97
18.645	123.454	0.98
21.428	123.456	0.98
23.509	123.503	0.93
23.846	123.507	0.93
24.451	123.535	0.90
24.914	123.546	0.89
25.958	123.587	0.85
28.756	123.734	0.70
32.028	123.883	0.55
32.952	123.956	0.48
34.744	124.094	0.34
37.274	124.391	0.04
37.701	124.435	0.00

Depth (meters)	End Area (sq-meters)	Perim. (meters)	Storage (cubic-meters)	Discharge (L/s)
0.00	0.00	0.00	0.0	0.00
0.00	0.00	2.84	0.0	0.20
0.01	0.03	3.40	0.2	8.08
0.05	0.21	6.18	1.3	161.41
0.05	0.24	6.62	1.4	185.95
0.08	0.44	7.98	2.7	458.26
0.09	0.54	8.74	3.2	590.05
0.13	0.94	10.84	5.6	1,296.40
0.24	2.31	15.51	13.8	4,580.39
0.28	3.01	17.06	18.0	6,685.50
0.43	5.98	22.86	35.9	17,292.64
0.50	7.73	25.02	46.4	24,954.00
0.63	11.06	28.74	66.3	41,348.52
0.64	11.46	29.19	68.8	43,446.82
0.69	12.86	30.51	77.2	51,132.31
0.70	13.38	30.86	80.3	54,211.21
0.94	21.23	36.63	127.4	104,389.56
0.98	22.87	37.77	137.2	115,728.42

Reach 74R: Flow Over Existing Accessway



Summary for Pond 77P: 2 x 750Ø

Inflow Area = 608,700.0 m², 0.00% Impervious, Inflow Depth > 264 mm for 1% AEP + 20%CC event
Inflow = 6,311.79 L/s @ 9.39 hrs, Volume= 160,853.1 m³
Outflow = 6,311.79 L/s @ 9.39 hrs, Volume= 160,853.1 m³, Atten= 0%, Lag= 0.0 min
Primary = 3,521.24 L/s @ 9.39 hrs, Volume= 143,772.9 m³
Secondary = 2,790.55 L/s @ 9.39 hrs, Volume= 17,080.2 m³

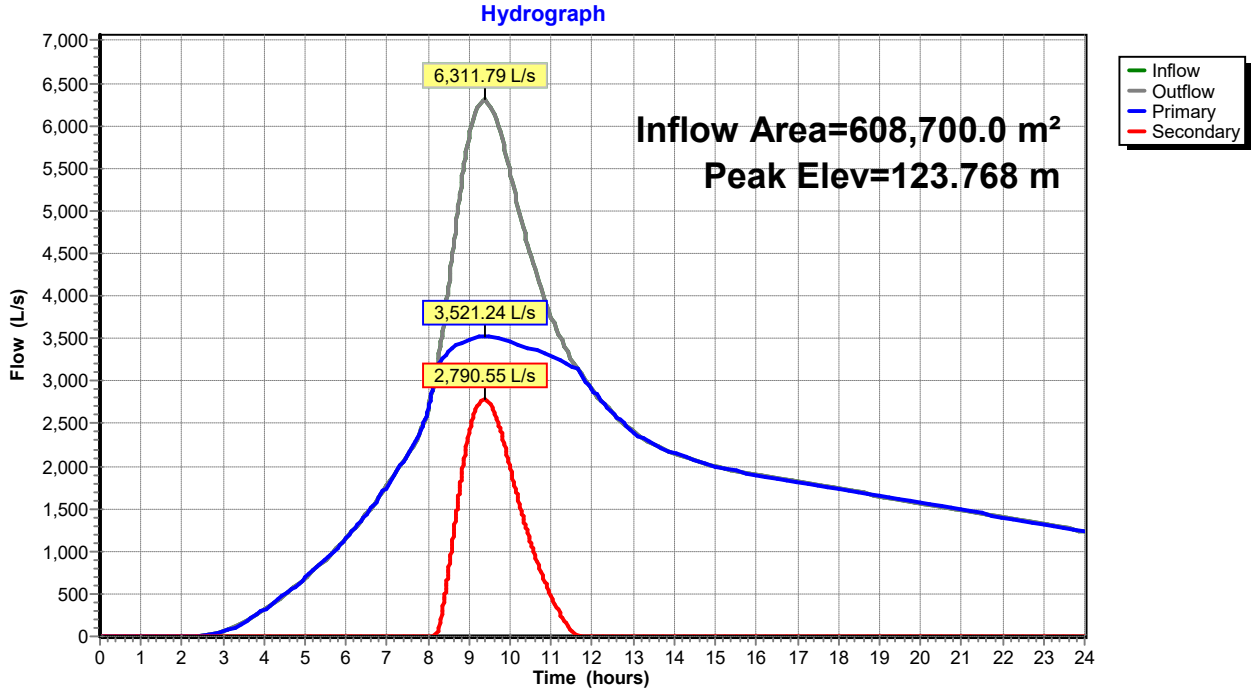
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 123.768 m @ 9.39 hrs
Flood Elev= 123.454 m

Device	Routing	Invert	Outlet Devices
#1	Primary	121.954 m	**750 mm Round Culvert X 2.00** L= 6.00 m RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 121.954 m / 121.744 m S= 0.0350 m/m Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.442 m²
#2	Secondary	123.454 m	**Asymmetrical Weir, C= 1.81** Offset (meters) 0.000 4.466 4.672 5.858 12.432 16.178 18.383 18.645 21.428 23.509 23.846 24.451 24.914 25.958 28.756 32.028 32.952 34.744 37.274 37.701 Elev. (meters) 124.44 124.16 124.14 124.08 123.69 123.55 123.46 123.45 123.46 123.50 123.51 123.53 123.55 123.59 123.73 123.88 123.96 124.09 124.39 124.44

Primary OutFlow Max=3,521.23 L/s @ 9.39 hrs HW=123.768 m (Free Discharge)
└**1=Culvert** (Inlet Controls 3,521.23 L/s @ 3.99 m/s)

Secondary OutFlow Max=2,789.94 L/s @ 9.39 hrs HW=123.768 m TW=123.643 m (Dynamic Tailwater)
└**2=Asymmetrical Weir** (Weir Controls 2,789.94 L/s @ 0.64 m/s)

Pond 77P: 2 x 750Ø



Summary for Reach 74R: Flow Over Existing Accessway

Inflow = 0.00 L/s @ 0.00 hrs, Volume= 0.0 m³
Outflow = 0.00 L/s @ 0.00 hrs, Volume= 0.0 m³, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.00 m/s, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 m/s, Avg. Travel Time= 0.0 min

Peak Storage= 0.0 m³ @ 0.00 hrs
Average Depth at Peak Storage= 0.00 m
Bank-Full Depth= 0.98 m Flow Area= 22.87 m², Capacity= 115,728.42 L/s

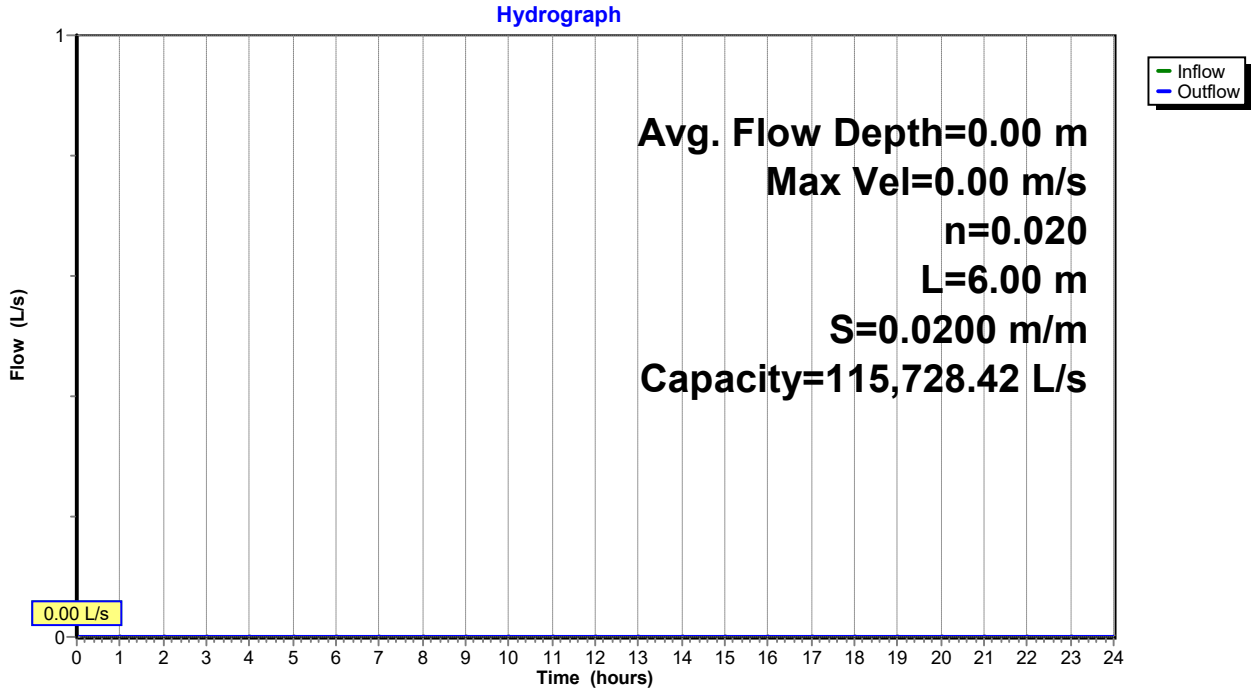
Custom cross-section, Length= 6.00 m Slope= 0.0200 m/m (113 Elevation Intervals)
Constant n= 0.020
Inlet Invert= 123.454 m, Outlet Invert= 123.334 m

‡

Offset (meters)	Elevation (meters)	Chan.Depth (meters)
0.000	124.435	0.00
4.466	124.158	0.28
4.672	124.141	0.29
5.858	124.080	0.36
12.432	123.691	0.74
16.178	123.546	0.89
18.383	123.464	0.97
18.645	123.454	0.98
21.428	123.456	0.98
23.509	123.503	0.93
23.846	123.507	0.93
24.451	123.535	0.90
24.914	123.546	0.89
25.958	123.587	0.85
28.756	123.734	0.70
32.028	123.883	0.55
32.952	123.956	0.48
34.744	124.094	0.34
37.274	124.391	0.04
37.701	124.435	0.00

Depth (meters)	End Area (sq-meters)	Perim. (meters)	Storage (cubic-meters)	Discharge (L/s)
0.00	0.00	0.00	0.0	0.00
0.00	0.00	2.84	0.0	0.20
0.01	0.03	3.40	0.2	8.08
0.05	0.21	6.18	1.3	161.41
0.05	0.24	6.62	1.4	185.95
0.08	0.44	7.98	2.7	458.26
0.09	0.54	8.74	3.2	590.05
0.13	0.94	10.84	5.6	1,296.40
0.24	2.31	15.51	13.8	4,580.39
0.28	3.01	17.06	18.0	6,685.50
0.43	5.98	22.86	35.9	17,292.64
0.50	7.73	25.02	46.4	24,954.00
0.63	11.06	28.74	66.3	41,348.52
0.64	11.46	29.19	68.8	43,446.82
0.69	12.86	30.51	77.2	51,132.31
0.70	13.38	30.86	80.3	54,211.21
0.94	21.23	36.63	127.4	104,389.56
0.98	22.87	37.77	137.2	115,728.42

Reach 74R: Flow Over Existing Accessway



Summary for Pond 77P: 2 x 750Ø

Inflow Area = 608,700.0 m², 0.00% Impervious, Inflow Depth > 123 mm for 20% AEP + 20%CC event
Inflow = 2,849.07 L/s @ 9.40 hrs, Volume= 74,775.2 m³
Outflow = 2,849.07 L/s @ 9.40 hrs, Volume= 74,775.2 m³, Atten= 0%, Lag= 0.0 min
Primary = 2,849.07 L/s @ 9.40 hrs, Volume= 74,775.2 m³
Secondary = 0.00 L/s @ 0.00 hrs, Volume= 0.0 m³

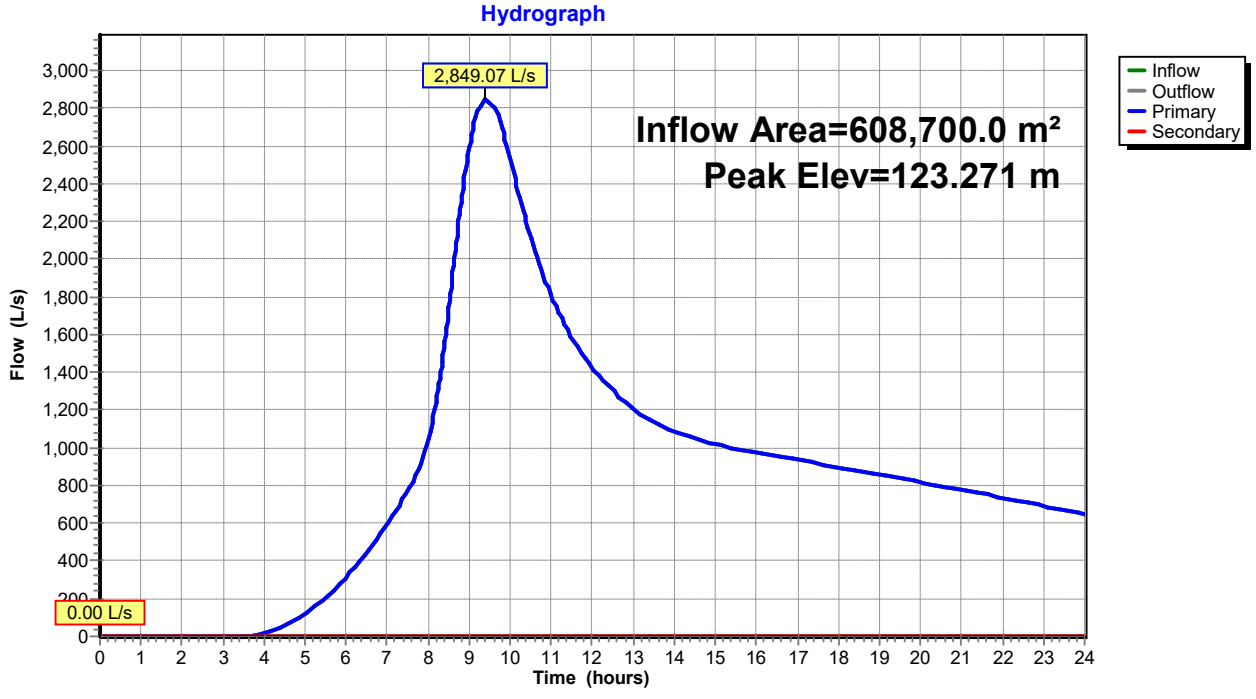
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 123.271 m @ 9.40 hrs
Flood Elev= 123.454 m

Device	Routing	Invert	Outlet Devices
#1	Primary	121.954 m	**750 mm Round Culvert X 2.00** L= 6.00 m RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 121.954 m / 121.744 m S= 0.0350 m/m Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.442 m²
#2	Secondary	123.454 m	**Asymmetrical Weir, C= 1.81** Offset (meters) 0.000 4.466 4.672 5.858 12.432 16.178 18.383 18.645 21.428 23.509 23.846 24.451 24.914 25.958 28.756 32.028 32.952 34.744 37.274 37.701 Elev. (meters) 124.44 124.16 124.14 124.08 123.69 123.55 123.46 123.45 123.46 123.50 123.51 123.53 123.55 123.59 123.73 123.88 123.96 124.09 124.39 124.44

Primary OutFlow Max=2,848.91 L/s @ 9.40 hrs HW=123.271 m (Free Discharge)
└**1=Culvert** (Inlet Controls 2,848.91 L/s @ 3.22 m/s)

Secondary OutFlow Max=0.00 L/s @ 0.00 hrs HW=121.954 m TW=123.454 m (Dynamic Tailwater)
└**2=Asymmetrical Weir** (Controls 0.00 L/s)

Pond 77P: 2 x 750Ø



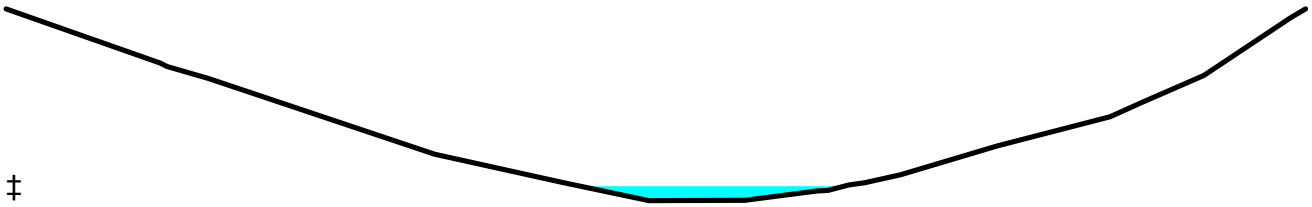
Summary for Reach 76R: Flow Over Existing Accessway

Inflow = 375.69 L/s @ 9.39 hrs, Volume= 874.4 m³
Outflow = 375.46 L/s @ 9.39 hrs, Volume= 874.4 m³, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.97 m/s, Min. Travel Time= 0.1 min
Avg. Velocity = 0.72 m/s, Avg. Travel Time= 0.1 min

Peak Storage= 2.3 m³ @ 9.39 hrs
Average Depth at Peak Storage= 0.07 m
Bank-Full Depth= 0.98 m Flow Area= 22.87 m², Capacity= 115,728.42 L/s

Custom cross-section, Length= 6.00 m Slope= 0.0200 m/m (113 Elevation Intervals)
Constant n= 0.020
Inlet Invert= 123.454 m, Outlet Invert= 123.334 m

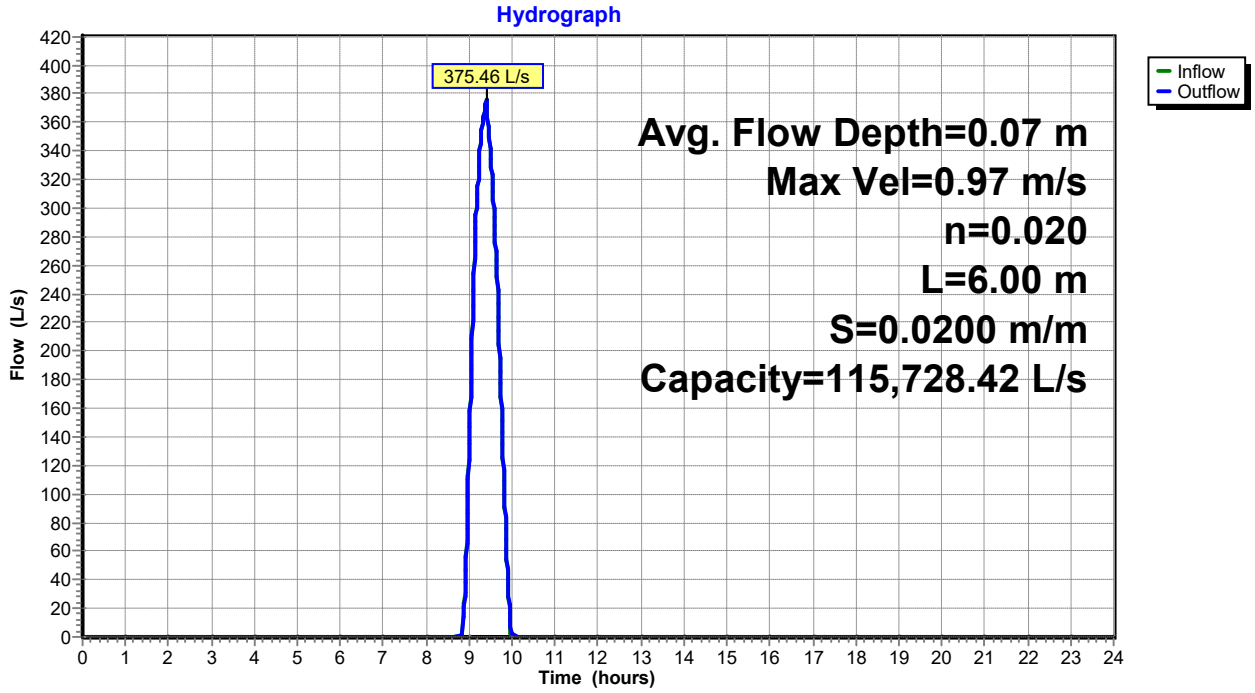


‡

Offset (meters)	Elevation (meters)	Chan.Depth (meters)
0.000	124.435	0.00
4.466	124.158	0.28
4.672	124.141	0.29
5.858	124.080	0.36
12.432	123.691	0.74
16.178	123.546	0.89
18.383	123.464	0.97
18.645	123.454	0.98
21.428	123.456	0.98
23.509	123.503	0.93
23.846	123.507	0.93
24.451	123.535	0.90
24.914	123.546	0.89
25.958	123.587	0.85
28.756	123.734	0.70
32.028	123.883	0.55
32.952	123.956	0.48
34.744	124.094	0.34
37.274	124.391	0.04
37.701	124.435	0.00

Depth (meters)	End Area (sq-meters)	Perim. (meters)	Storage (cubic-meters)	Discharge (L/s)
0.00	0.00	0.00	0.0	0.00
0.00	0.00	2.84	0.0	0.20
0.01	0.03	3.40	0.2	8.08
0.05	0.21	6.18	1.3	161.41
0.05	0.24	6.62	1.4	185.95
0.08	0.44	7.98	2.7	458.26
0.09	0.54	8.74	3.2	590.05
0.13	0.94	10.84	5.6	1,296.40
0.24	2.31	15.51	13.8	4,580.39
0.28	3.01	17.06	18.0	6,685.50
0.43	5.98	22.86	35.9	17,292.64
0.50	7.73	25.02	46.4	24,954.00
0.63	11.06	28.74	66.3	41,348.52
0.64	11.46	29.19	68.8	43,446.82
0.69	12.86	30.51	77.2	51,132.31
0.70	13.38	30.86	80.3	54,211.21
0.94	21.23	36.63	127.4	104,389.56
0.98	22.87	37.77	137.2	115,728.42

Reach 76R: Flow Over Existing Accessway



Summary for Pond 79P: 2 x 1050Ø

Inflow Area = 608,700.0 m², 0.00% Impervious, Inflow Depth > 264 mm for 1% AEP + 20%CC event
Inflow = 6,311.79 L/s @ 9.39 hrs, Volume= 160,853.1 m³
Outflow = 6,311.79 L/s @ 9.39 hrs, Volume= 160,853.1 m³, Atten= 0%, Lag= 0.0 min
Primary = 5,936.11 L/s @ 9.39 hrs, Volume= 159,978.7 m³
Secondary = 375.69 L/s @ 9.39 hrs, Volume= 874.4 m³

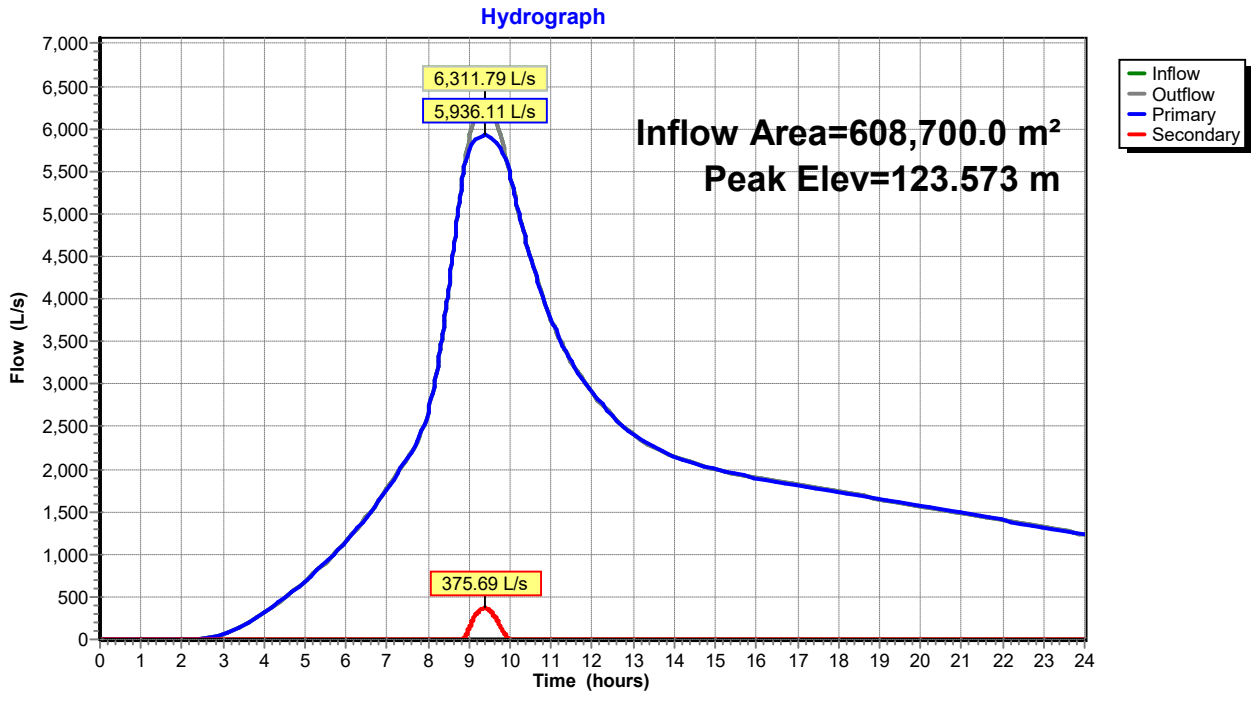
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 123.573 m @ 9.39 hrs
Flood Elev= 123.454 m

Device	Routing	Invert	Outlet Devices
#1	Primary	121.954 m	**1,050 mm Round Culvert X 2.00** L= 6.00 m RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 121.954 m / 121.744 m S= 0.0350 m/m Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.866 m²
#2	Secondary	123.454 m	**Asymmetrical Weir, C= 1.81** Offset (meters) 0.000 4.466 4.672 5.858 12.432 16.178 18.383 18.645 21.428 23.509 23.846 24.451 24.914 25.958 28.756 32.028 32.952 34.744 37.274 37.701 Elev. (meters) 124.44 124.16 124.14 124.08 123.69 123.55 123.46 123.45 123.46 123.50 123.51 123.53 123.55 123.59 123.73 123.88 123.96 124.09 124.39 124.44

Primary OutFlow Max=5,936.03 L/s @ 9.39 hrs HW=123.573 m (Free Discharge)
└**1=Culvert** (Barrel Controls 5,936.03 L/s @ 3.43 m/s)

Secondary OutFlow Max=375.14 L/s @ 9.39 hrs HW=123.573 m TW=123.527 m (Dynamic Tailwater)
└**2=Asymmetrical Weir** (Weir Controls 375.14 L/s @ 0.39 m/s)

Pond 79P: 2 x 1050Ø



Summary for Reach 76R: Flow Over Existing Accessway

Inflow = 0.00 L/s @ 0.00 hrs, Volume= 0.0 m³
Outflow = 0.00 L/s @ 0.00 hrs, Volume= 0.0 m³, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.00 m/s, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 m/s, Avg. Travel Time= 0.0 min

Peak Storage= 0.0 m³ @ 0.00 hrs
Average Depth at Peak Storage= 0.00 m
Bank-Full Depth= 0.98 m Flow Area= 22.87 m², Capacity= 115,728.42 L/s

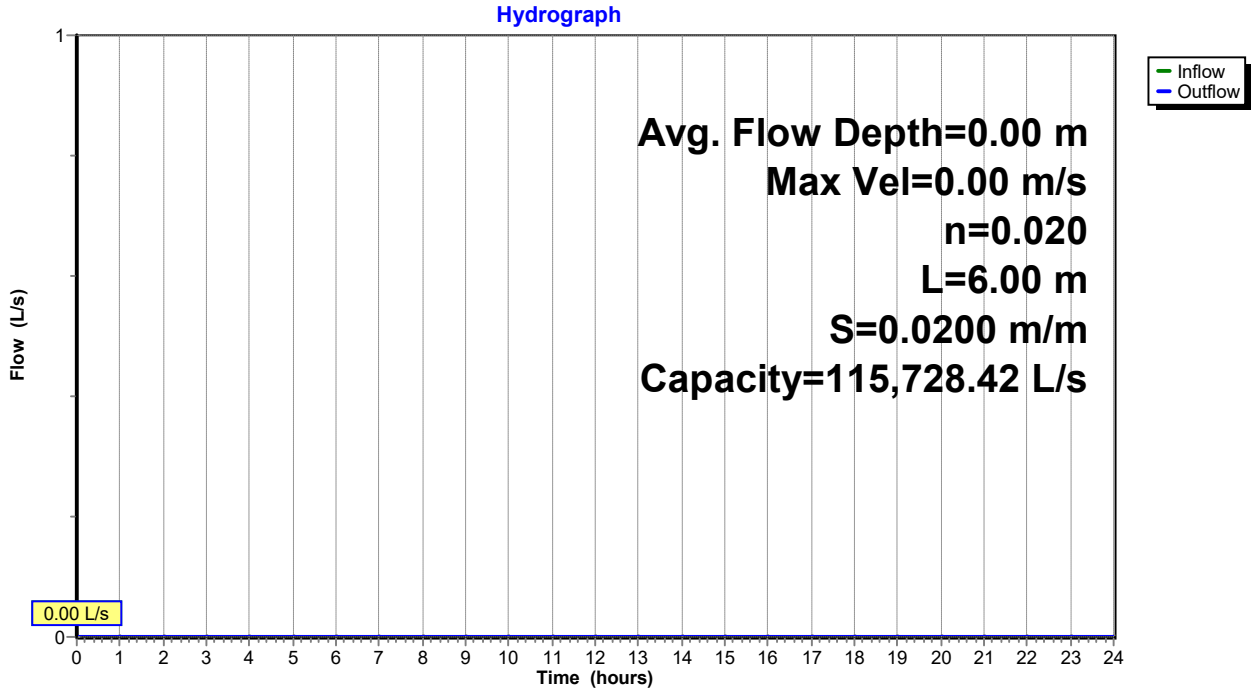
Custom cross-section, Length= 6.00 m Slope= 0.0200 m/m (113 Elevation Intervals)
Constant n= 0.020
Inlet Invert= 123.454 m, Outlet Invert= 123.334 m

‡

Offset (meters)	Elevation (meters)	Chan.Depth (meters)
0.000	124.435	0.00
4.466	124.158	0.28
4.672	124.141	0.29
5.858	124.080	0.36
12.432	123.691	0.74
16.178	123.546	0.89
18.383	123.464	0.97
18.645	123.454	0.98
21.428	123.456	0.98
23.509	123.503	0.93
23.846	123.507	0.93
24.451	123.535	0.90
24.914	123.546	0.89
25.958	123.587	0.85
28.756	123.734	0.70
32.028	123.883	0.55
32.952	123.956	0.48
34.744	124.094	0.34
37.274	124.391	0.04
37.701	124.435	0.00

Depth (meters)	End Area (sq-meters)	Perim. (meters)	Storage (cubic-meters)	Discharge (L/s)
0.00	0.00	0.00	0.0	0.00
0.00	0.00	2.84	0.0	0.20
0.01	0.03	3.40	0.2	8.08
0.05	0.21	6.18	1.3	161.41
0.05	0.24	6.62	1.4	185.95
0.08	0.44	7.98	2.7	458.26
0.09	0.54	8.74	3.2	590.05
0.13	0.94	10.84	5.6	1,296.40
0.24	2.31	15.51	13.8	4,580.39
0.28	3.01	17.06	18.0	6,685.50
0.43	5.98	22.86	35.9	17,292.64
0.50	7.73	25.02	46.4	24,954.00
0.63	11.06	28.74	66.3	41,348.52
0.64	11.46	29.19	68.8	43,446.82
0.69	12.86	30.51	77.2	51,132.31
0.70	13.38	30.86	80.3	54,211.21
0.94	21.23	36.63	127.4	104,389.56
0.98	22.87	37.77	137.2	115,728.42

Reach 76R: Flow Over Existing Accessway



Summary for Pond 79P: 2 x 1050Ø

Inflow Area = 608,700.0 m², 0.00% Impervious, Inflow Depth > 123 mm for 20% AEP + 20%CC event
Inflow = 2,849.07 L/s @ 9.40 hrs, Volume= 74,775.2 m³
Outflow = 2,849.07 L/s @ 9.40 hrs, Volume= 74,775.2 m³, Atten= 0%, Lag= 0.0 min
Primary = 2,849.07 L/s @ 9.40 hrs, Volume= 74,775.2 m³
Secondary = 0.00 L/s @ 0.00 hrs, Volume= 0.0 m³

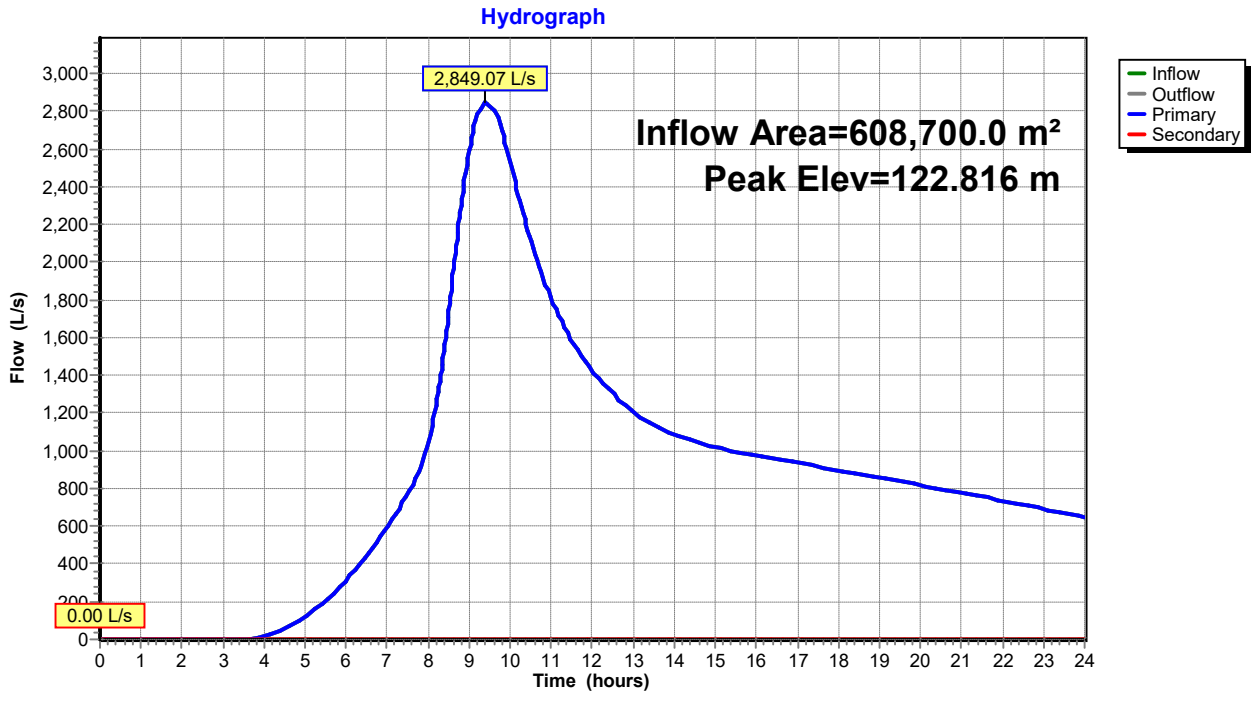
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 122.816 m @ 9.40 hrs
Flood Elev= 123.454 m

Device	Routing	Invert	Outlet Devices
#1	Primary	121.954 m	**1,050 mm Round Culvert X 2.00** L= 6.00 m RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 121.954 m / 121.744 m S= 0.0350 m/m Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.866 m²
#2	Secondary	123.454 m	**Asymmetrical Weir, C= 1.81** Offset (meters) 0.000 4.466 4.672 5.858 12.432 16.178 18.383 18.645 21.428 23.509 23.846 24.451 24.914 25.958 28.756 32.028 32.952 34.744 37.274 37.701 Elev. (meters) 124.44 124.16 124.14 124.08 123.69 123.55 123.46 123.45 123.46 123.50 123.51 123.53 123.55 123.59 123.73 123.88 123.96 124.09 124.39 124.44

Primary OutFlow Max=2,848.91 L/s @ 9.40 hrs HW=122.816 m (Free Discharge)
└**1=Culvert** (Barrel Controls 2,848.91 L/s @ 2.55 m/s)

Secondary OutFlow Max=0.00 L/s @ 0.00 hrs HW=121.954 m TW=123.454 m (Dynamic Tailwater)
└**2=Asymmetrical Weir** (Controls 0.00 L/s)

Pond 79P: 2 x 1050Ø



Summary for Reach 77R: Flow Over Existing Accessway

Inflow = 0.00 L/s @ 0.00 hrs, Volume= 0.0 m³
Outflow = 0.00 L/s @ 0.00 hrs, Volume= 0.0 m³, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.00 m/s, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 m/s, Avg. Travel Time= 0.0 min

Peak Storage= 0.0 m³ @ 0.00 hrs
Average Depth at Peak Storage= 0.00 m
Bank-Full Depth= 0.98 m Flow Area= 22.87 m², Capacity= 115,728.42 L/s

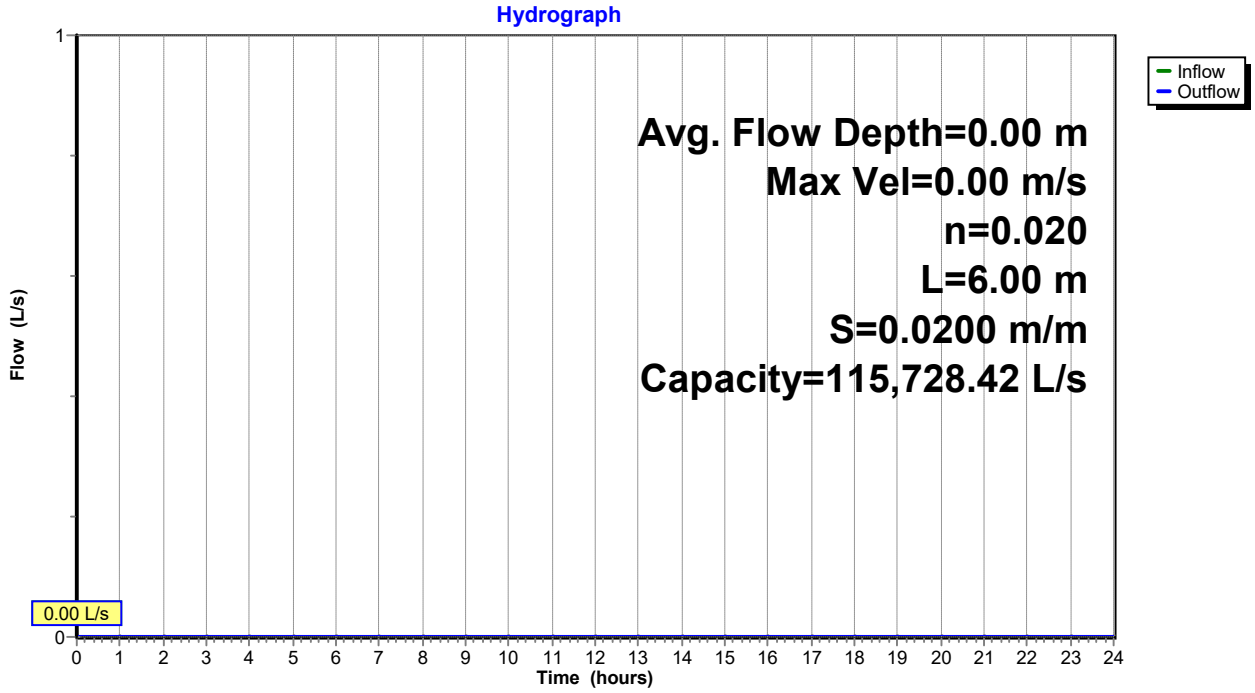
Custom cross-section, Length= 6.00 m Slope= 0.0200 m/m (113 Elevation Intervals)
Constant n= 0.020
Inlet Invert= 123.454 m, Outlet Invert= 123.334 m

‡

Offset (meters)	Elevation (meters)	Chan.Depth (meters)
0.000	124.435	0.00
4.466	124.158	0.28
4.672	124.141	0.29
5.858	124.080	0.36
12.432	123.691	0.74
16.178	123.546	0.89
18.383	123.464	0.97
18.645	123.454	0.98
21.428	123.456	0.98
23.509	123.503	0.93
23.846	123.507	0.93
24.451	123.535	0.90
24.914	123.546	0.89
25.958	123.587	0.85
28.756	123.734	0.70
32.028	123.883	0.55
32.952	123.956	0.48
34.744	124.094	0.34
37.274	124.391	0.04
37.701	124.435	0.00

Depth (meters)	End Area (sq-meters)	Perim. (meters)	Storage (cubic-meters)	Discharge (L/s)
0.00	0.00	0.00	0.0	0.00
0.00	0.00	2.84	0.0	0.20
0.01	0.03	3.40	0.2	8.08
0.05	0.21	6.18	1.3	161.41
0.05	0.24	6.62	1.4	185.95
0.08	0.44	7.98	2.7	458.26
0.09	0.54	8.74	3.2	590.05
0.13	0.94	10.84	5.6	1,296.40
0.24	2.31	15.51	13.8	4,580.39
0.28	3.01	17.06	18.0	6,685.50
0.43	5.98	22.86	35.9	17,292.64
0.50	7.73	25.02	46.4	24,954.00
0.63	11.06	28.74	66.3	41,348.52
0.64	11.46	29.19	68.8	43,446.82
0.69	12.86	30.51	77.2	51,132.31
0.70	13.38	30.86	80.3	54,211.21
0.94	21.23	36.63	127.4	104,389.56
0.98	22.87	37.77	137.2	115,728.42

Reach 77R: Flow Over Existing Accessway



Summary for Pond 78P: 1.2mW x 0.9mD Box

Inflow Area = 608,700.0 m², 0.00% Impervious, Inflow Depth > 264 mm for 1% AEP + 20%CC event
Inflow = 6,311.79 L/s @ 9.39 hrs, Volume= 160,853.1 m³
Outflow = 6,311.79 L/s @ 9.39 hrs, Volume= 160,853.1 m³, Atten= 0%, Lag= 0.0 min
Primary = 6,311.79 L/s @ 9.39 hrs, Volume= 160,853.1 m³
Secondary = 0.00 L/s @ 0.00 hrs, Volume= 0.0 m³

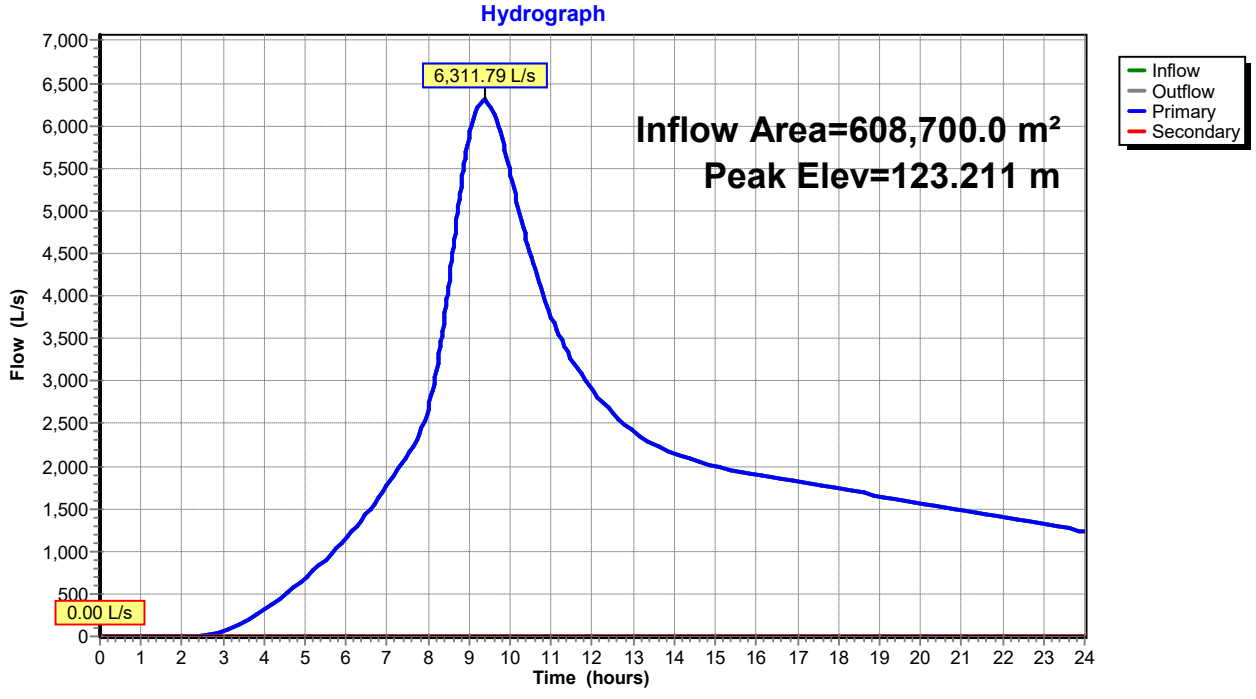
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 123.211 m @ 9.39 hrs
Flood Elev= 123.454 m

Device	Routing	Invert	Outlet Devices
#1	Primary	121.954 m	**1,200 mm W x 900 mm H Box Culvert X 2.00** L= 6.00 m RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 121.954 m / 121.744 m S= 0.0350 m/m Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.080 m²
#2	Secondary	123.454 m	**Asymmetrical Weir, C= 1.81** Offset (meters) 0.000 4.466 4.672 5.858 12.432 16.178 18.383 18.645 21.428 23.509 23.846 24.451 24.914 25.958 28.756 32.028 32.952 34.744 37.274 37.701 Elev. (meters) 124.44 124.16 124.14 124.08 123.69 123.55 123.46 123.45 123.46 123.50 123.51 123.53 123.55 123.59 123.73 123.88 123.96 124.09 124.39 124.44

Primary OutFlow Max=6,311.75 L/s @ 9.39 hrs HW=123.211 m (Free Discharge)
└**1=Culvert** (Barrel Controls 6,311.75 L/s @ 2.92 m/s)

Secondary OutFlow Max=0.00 L/s @ 0.00 hrs HW=121.954 m TW=123.454 m (Dynamic Tailwater)
└**2=Asymmetrical Weir** (Controls 0.00 L/s)

Pond 78P: 1.2mW x 0.9mD Box



Summary for Reach 77R: Flow Over Existing Accessway

Inflow = 0.00 L/s @ 0.00 hrs, Volume= 0.0 m³
Outflow = 0.00 L/s @ 0.00 hrs, Volume= 0.0 m³, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.00 m/s, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 m/s, Avg. Travel Time= 0.0 min

Peak Storage= 0.0 m³ @ 0.00 hrs
Average Depth at Peak Storage= 0.00 m
Bank-Full Depth= 0.98 m Flow Area= 22.87 m², Capacity= 115,728.42 L/s

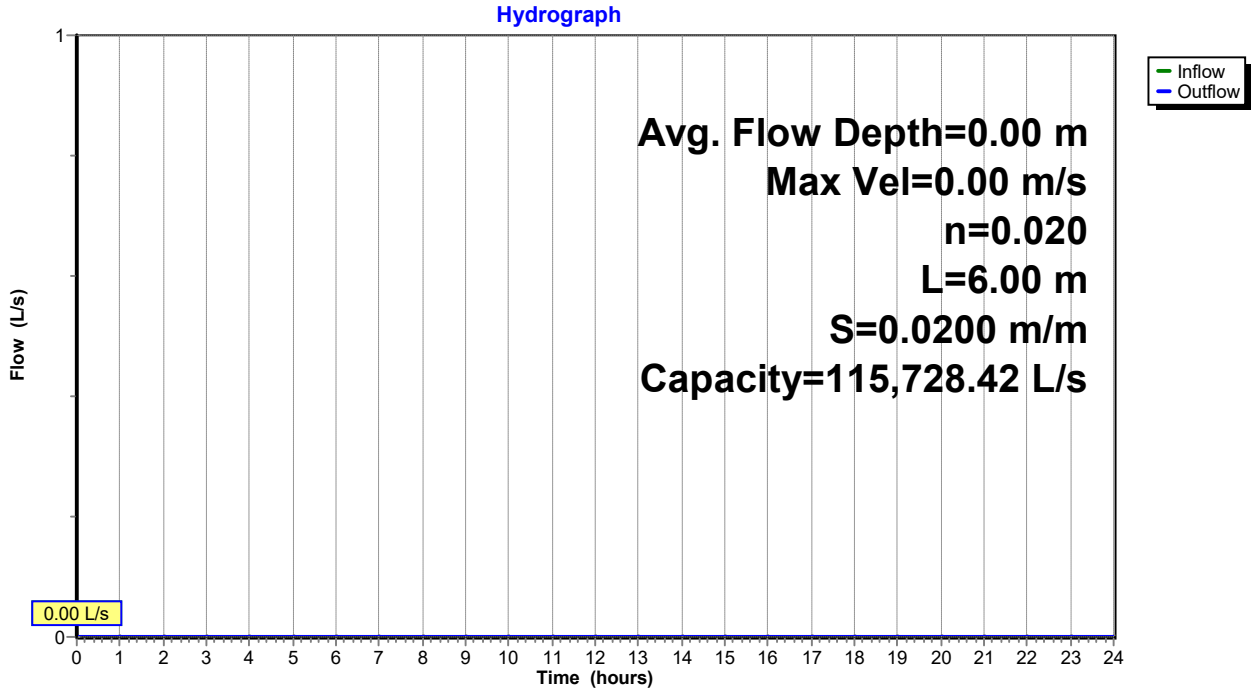
Custom cross-section, Length= 6.00 m Slope= 0.0200 m/m (113 Elevation Intervals)
Constant n= 0.020
Inlet Invert= 123.454 m, Outlet Invert= 123.334 m

‡

Offset (meters)	Elevation (meters)	Chan.Depth (meters)
0.000	124.435	0.00
4.466	124.158	0.28
4.672	124.141	0.29
5.858	124.080	0.36
12.432	123.691	0.74
16.178	123.546	0.89
18.383	123.464	0.97
18.645	123.454	0.98
21.428	123.456	0.98
23.509	123.503	0.93
23.846	123.507	0.93
24.451	123.535	0.90
24.914	123.546	0.89
25.958	123.587	0.85
28.756	123.734	0.70
32.028	123.883	0.55
32.952	123.956	0.48
34.744	124.094	0.34
37.274	124.391	0.04
37.701	124.435	0.00

Depth (meters)	End Area (sq-meters)	Perim. (meters)	Storage (cubic-meters)	Discharge (L/s)
0.00	0.00	0.00	0.0	0.00
0.00	0.00	2.84	0.0	0.20
0.01	0.03	3.40	0.2	8.08
0.05	0.21	6.18	1.3	161.41
0.05	0.24	6.62	1.4	185.95
0.08	0.44	7.98	2.7	458.26
0.09	0.54	8.74	3.2	590.05
0.13	0.94	10.84	5.6	1,296.40
0.24	2.31	15.51	13.8	4,580.39
0.28	3.01	17.06	18.0	6,685.50
0.43	5.98	22.86	35.9	17,292.64
0.50	7.73	25.02	46.4	24,954.00
0.63	11.06	28.74	66.3	41,348.52
0.64	11.46	29.19	68.8	43,446.82
0.69	12.86	30.51	77.2	51,132.31
0.70	13.38	30.86	80.3	54,211.21
0.94	21.23	36.63	127.4	104,389.56
0.98	22.87	37.77	137.2	115,728.42

Reach 77R: Flow Over Existing Accessway



Summary for Pond 78P: 1.2mW x 0.9mD Box

Inflow Area = 608,700.0 m², 0.00% Impervious, Inflow Depth > 123 mm for 20% AEP + 20%CC event
Inflow = 2,849.07 L/s @ 9.40 hrs, Volume= 74,775.2 m³
Outflow = 2,849.07 L/s @ 9.40 hrs, Volume= 74,775.2 m³, Atten= 0%, Lag= 0.0 min
Primary = 2,849.07 L/s @ 9.40 hrs, Volume= 74,775.2 m³
Secondary = 0.00 L/s @ 0.00 hrs, Volume= 0.0 m³

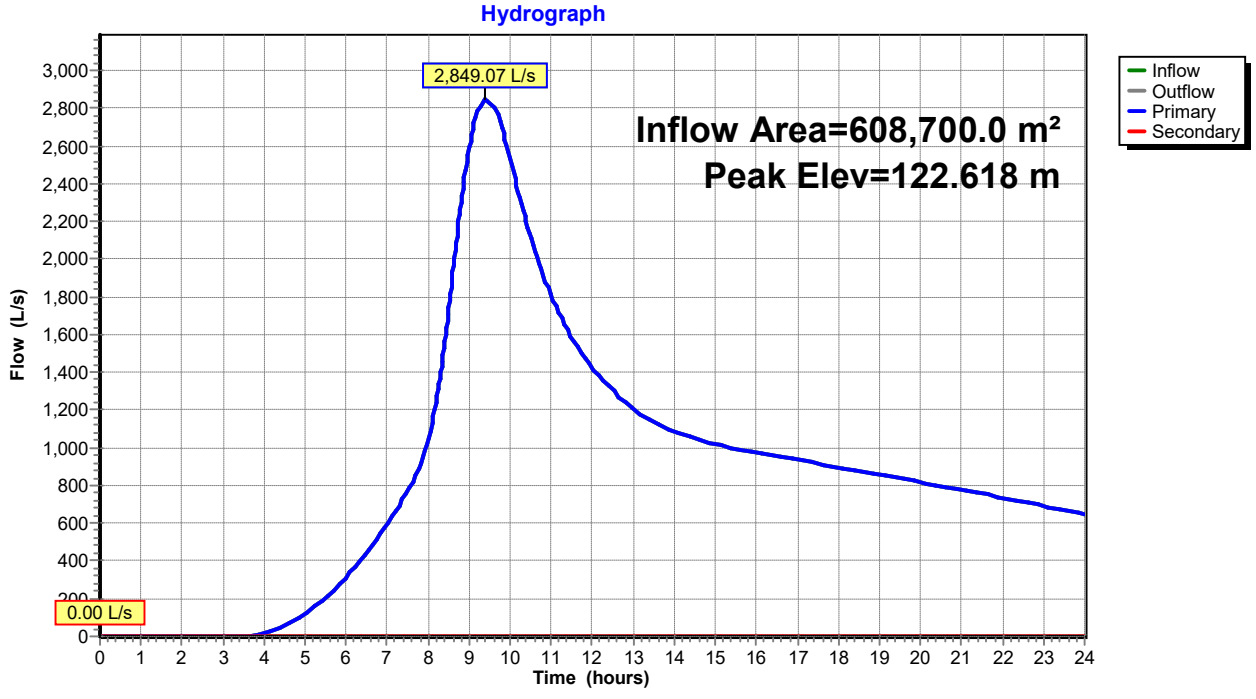
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 122.618 m @ 9.40 hrs
Flood Elev= 123.454 m

Device	Routing	Invert	Outlet Devices
#1	Primary	121.954 m	**1,200 mm W x 900 mm H Box Culvert X 2.00** L= 6.00 m RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 121.954 m / 121.744 m S= 0.0350 m/m Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.080 m²
#2	Secondary	123.454 m	**Asymmetrical Weir, C= 1.81** Offset (meters) 0.000 4.466 4.672 5.858 12.432 16.178 18.383 18.645 21.428 23.509 23.846 24.451 24.914 25.958 28.756 32.028 32.952 34.744 37.274 37.701 Elev. (meters) 124.44 124.16 124.14 124.08 123.69 123.55 123.46 123.45 123.46 123.50 123.51 123.53 123.55 123.59 123.73 123.88 123.96 124.09 124.39 124.44

Primary OutFlow Max=2,848.91 L/s @ 9.40 hrs HW=122.618 m (Free Discharge)
└**1=Culvert** (Barrel Controls 2,848.91 L/s @ 2.39 m/s)

Secondary OutFlow Max=0.00 L/s @ 0.00 hrs HW=121.954 m TW=123.454 m (Dynamic Tailwater)
└**2=Asymmetrical Weir** (Controls 0.00 L/s)

Pond 78P: 1.2mW x 0.9mD Box



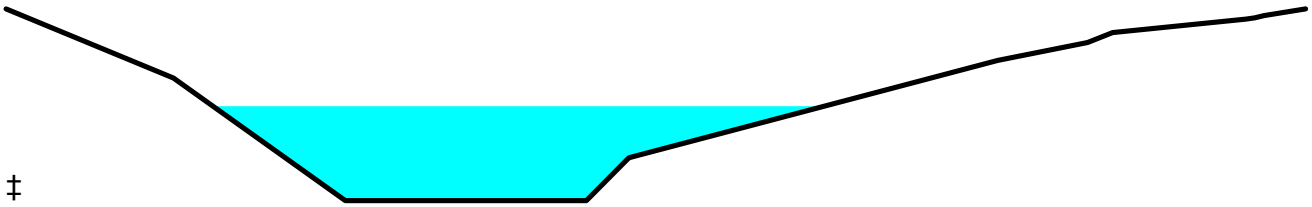
Summary for Reach 69R: Flow Over New Accessway

Inflow = 3,784.60 L/s @ 9.39 hrs, Volume= 31,888.5 m³
Outflow = 3,784.46 L/s @ 9.39 hrs, Volume= 31,888.5 m³, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.49 m/s, Min. Travel Time= 0.0 min
Avg. Velocity = 1.68 m/s, Avg. Travel Time= 0.1 min

Peak Storage= 9.1 m³ @ 9.39 hrs
Average Depth at Peak Storage= 0.33 m
Bank-Full Depth= 0.66 m Flow Area= 5.14 m², Capacity= 17,450.57 L/s

Custom cross-section, Length= 6.00 m Slope= 0.0200 m/m (106 Elevation Intervals)
Constant n= 0.020
Inlet Invert= 121.730 m, Outlet Invert= 121.610 m

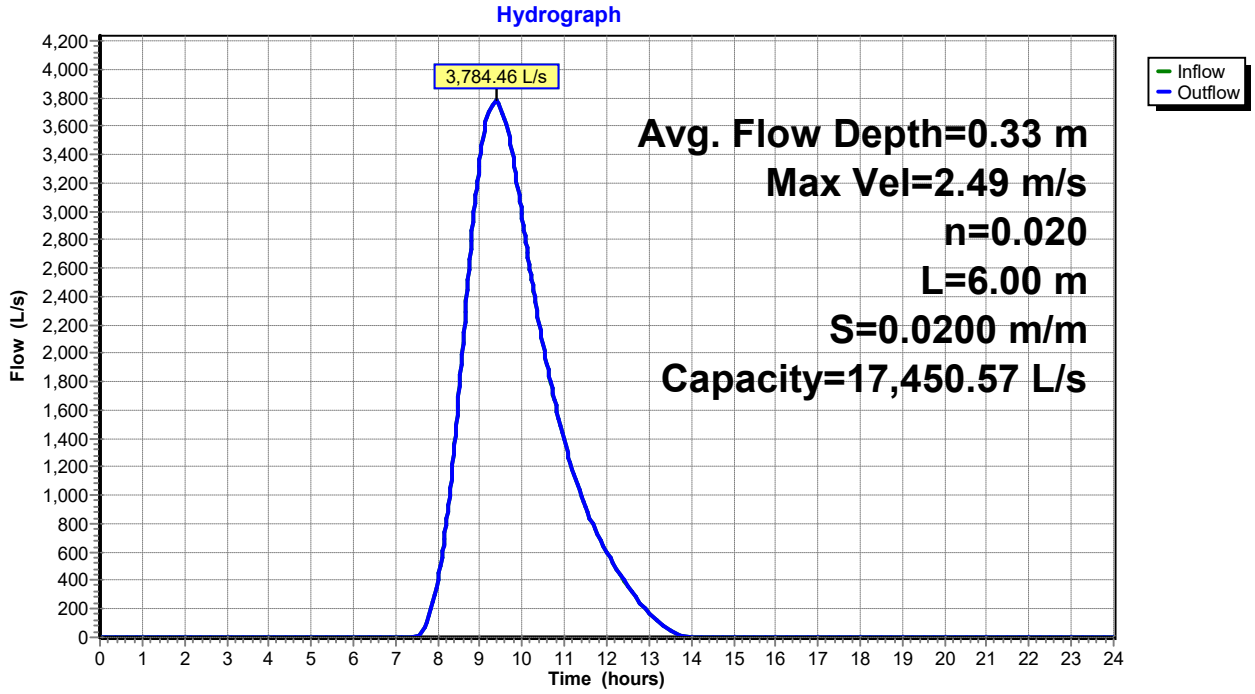


‡

Offset (meters)	Elevation (meters)	Chan.Depth (meters)
0.000	122.246	0.00
1.977	122.007	0.24
4.010	121.582	0.66
6.856	121.582	0.66
7.360	121.731	0.52
11.718	122.068	0.18
12.779	122.130	0.12
13.076	122.164	0.08
14.647	122.211	0.04
14.754	122.215	0.03
14.864	122.223	0.02
15.355	122.246	0.00

Depth (meters)	End Area (sq-meters)	Perim. (meters)	Storage (cubic-meters)	Discharge (L/s)
0.00	0.00	2.85	0.0	0.00
0.15	0.51	4.10	3.1	912.52
0.42	2.31	9.03	13.9	6,586.70
0.49	2.90	10.33	17.4	8,772.42
0.55	3.58	11.91	21.5	11,362.64
0.58	3.99	12.49	24.0	13,195.95
0.63	4.62	14.45	27.7	15,277.00
0.63	4.68	14.59	28.1	15,496.13
0.64	4.80	14.77	28.8	16,016.41
0.66	5.14	15.45	30.8	17,450.57

Reach 69R: Flow Over New Accessway



Summary for Pond 68P: 2 x 600Ø

Inflow Area = 608,700.0 m², 0.00% Impervious, Inflow Depth > 264 mm for 1% AEP + 20%CC event
Inflow = 6,311.79 L/s @ 9.39 hrs, Volume= 160,853.1 m³
Outflow = 6,311.79 L/s @ 9.39 hrs, Volume= 160,853.1 m³, Atten= 0%, Lag= 0.0 min
Primary = 2,527.19 L/s @ 9.39 hrs, Volume= 128,964.6 m³
Secondary = 3,784.60 L/s @ 9.39 hrs, Volume= 31,888.5 m³

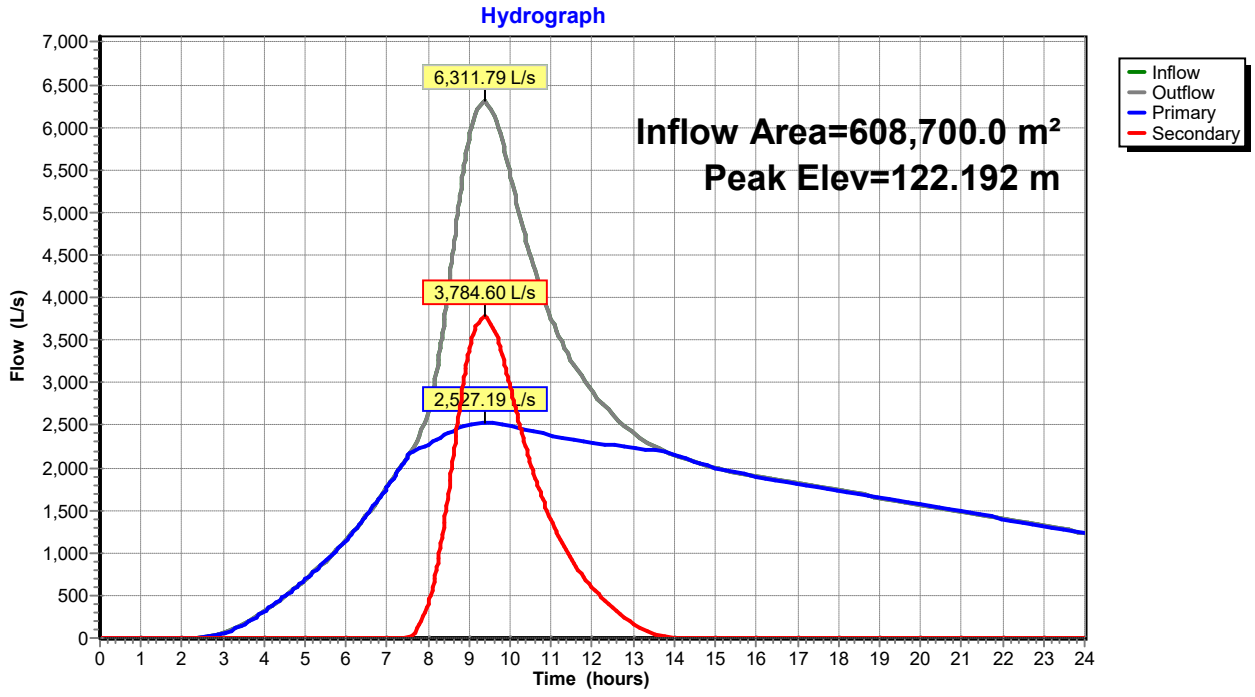
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 122.192 m @ 9.39 hrs
Flood Elev= 120.082 m

Device	Routing	Invert	Outlet Devices
#1	Primary	120.082 m	**600 mm Round Culvert X 2.00** L= 6.00 m RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 120.082 m / 119.872 m S= 0.0350 m/m Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.283 m²
#2	Secondary	121.582 m	**Asymmetrical Weir, C= 1.81** Offset (meters) 0.000 1.977 4.010 6.856 7.360 11.718 12.779 13.076 14.647 14.754 14.864 15.355 Elev. (meters) 122.25 122.01 121.58 121.58 121.73 122.07 122.13 122.16 122.21 122.22 122.22 122.25

Primary OutFlow Max=2,527.18 L/s @ 9.39 hrs HW=122.192 m (Free Discharge)
└**1=Culvert** (Inlet Controls 2,527.18 L/s @ 4.47 m/s)

Secondary OutFlow Max=3,783.20 L/s @ 9.39 hrs HW=122.192 m TW=122.057 m (Dynamic Tailwater)
└**2=Asymmetrical Weir** (Weir Controls 3,783.20 L/s @ 0.66 m/s)

Pond 68P: 2 x 600Ø



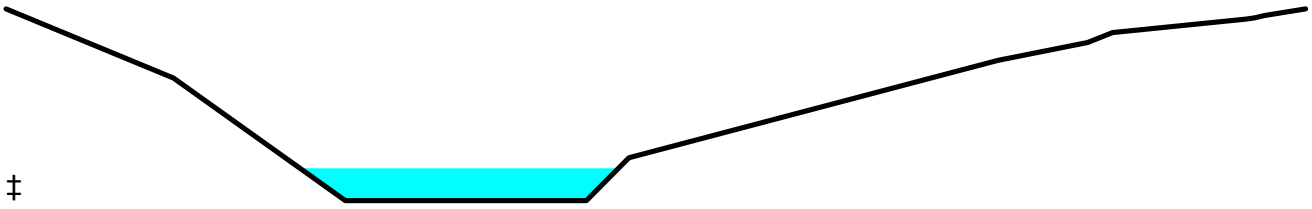
Summary for Reach 69R: Flow Over New Accessway

Inflow = 556.68 L/s @ 9.39 hrs, Volume= 2,030.3 m³
Outflow = 556.51 L/s @ 9.40 hrs, Volume= 2,030.3 m³, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.50 m/s, Min. Travel Time= 0.1 min
Avg. Velocity = 1.18 m/s, Avg. Travel Time= 0.1 min

Peak Storage= 2.2 m³ @ 9.40 hrs
Average Depth at Peak Storage= 0.11 m
Bank-Full Depth= 0.66 m Flow Area= 5.14 m², Capacity= 17,450.57 L/s

Custom cross-section, Length= 6.00 m Slope= 0.0200 m/m (106 Elevation Intervals)
Constant n= 0.020
Inlet Invert= 121.730 m, Outlet Invert= 121.610 m

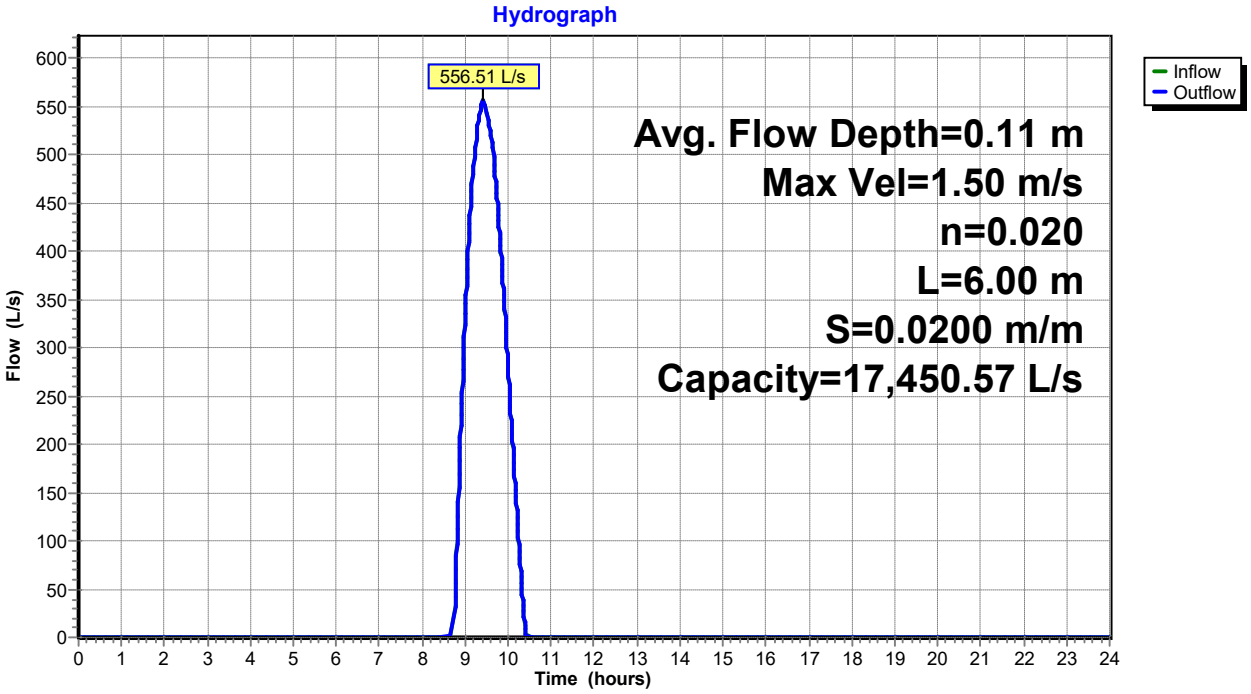


‡

Offset (meters)	Elevation (meters)	Chan.Depth (meters)
0.000	122.246	0.00
1.977	122.007	0.24
4.010	121.582	0.66
6.856	121.582	0.66
7.360	121.731	0.52
11.718	122.068	0.18
12.779	122.130	0.12
13.076	122.164	0.08
14.647	122.211	0.04
14.754	122.215	0.03
14.864	122.223	0.02
15.355	122.246	0.00

Depth (meters)	End Area (sq-meters)	Perim. (meters)	Storage (cubic-meters)	Discharge (L/s)
0.00	0.00	2.85	0.0	0.00
0.15	0.51	4.10	3.1	912.52
0.42	2.31	9.03	13.9	6,586.70
0.49	2.90	10.33	17.4	8,772.42
0.55	3.58	11.91	21.5	11,362.64
0.58	3.99	12.49	24.0	13,195.95
0.63	4.62	14.45	27.7	15,277.00
0.63	4.68	14.59	28.1	15,496.13
0.64	4.80	14.77	28.8	16,016.41
0.66	5.14	15.45	30.8	17,450.57

Reach 69R: Flow Over New Accessway



Summary for Pond 68P: 2 x 600Ø

Inflow Area = 608,700.0 m², 0.00% Impervious, Inflow Depth > 123 mm for 20% AEP + 20%CC event
Inflow = 2,849.07 L/s @ 9.40 hrs, Volume= 74,775.2 m³
Outflow = 2,849.07 L/s @ 9.40 hrs, Volume= 74,775.2 m³, Atten= 0%, Lag= 0.0 min
Primary = 2,292.68 L/s @ 9.40 hrs, Volume= 72,744.9 m³
Secondary = 556.68 L/s @ 9.39 hrs, Volume= 2,030.3 m³

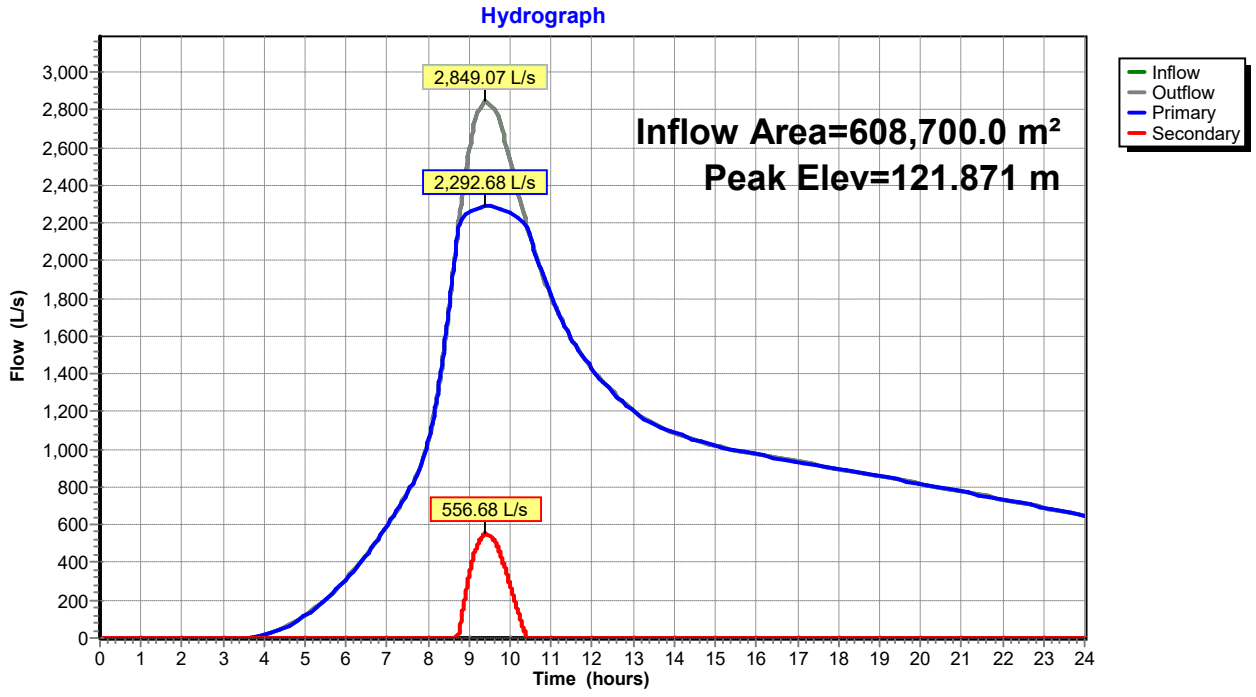
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 121.871 m @ 9.40 hrs
Flood Elev= 120.082 m

Device	Routing	Invert	Outlet Devices
#1	Primary	120.082 m	**600 mm Round Culvert X 2.00** L= 6.00 m RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 120.082 m / 119.872 m S= 0.0350 m/m Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.283 m²
#2	Secondary	121.582 m	**Asymmetrical Weir, C= 1.81** Offset (meters) 0.000 1.977 4.010 6.856 7.360 11.718 12.779 13.076 14.647 14.754 14.864 15.355 Elev. (meters) 122.25 122.01 121.58 121.58 121.73 122.07 122.13 122.16 122.21 122.22 122.22 122.25

Primary OutFlow Max=2,292.66 L/s @ 9.40 hrs HW=121.871 m (Free Discharge)
└**1=Culvert** (Inlet Controls 2,292.66 L/s @ 4.05 m/s)

Secondary OutFlow Max=554.72 L/s @ 9.39 hrs HW=121.871 m TW=121.842 m (Dynamic Tailwater)
└**2=Asymmetrical Weir** (Weir Controls 554.72 L/s @ 0.34 m/s)

Pond 68P: 2 x 600Ø



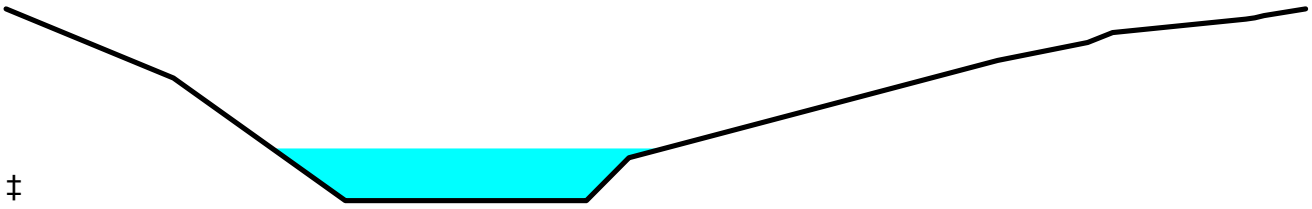
Summary for Reach 78R: Flow Over New Accessway

Inflow = 1,240.11 L/s @ 9.39 hrs, Volume= 4,711.5 m³
Outflow = 1,239.94 L/s @ 9.39 hrs, Volume= 4,711.5 m³, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.90 m/s, Min. Travel Time= 0.1 min
Avg. Velocity = 1.51 m/s, Avg. Travel Time= 0.1 min

Peak Storage= 3.9 m³ @ 9.39 hrs
Average Depth at Peak Storage= 0.18 m
Bank-Full Depth= 0.66 m Flow Area= 5.14 m², Capacity= 17,450.57 L/s

Custom cross-section, Length= 6.00 m Slope= 0.0200 m/m (106 Elevation Intervals)
Constant n= 0.020
Inlet Invert= 121.730 m, Outlet Invert= 121.610 m

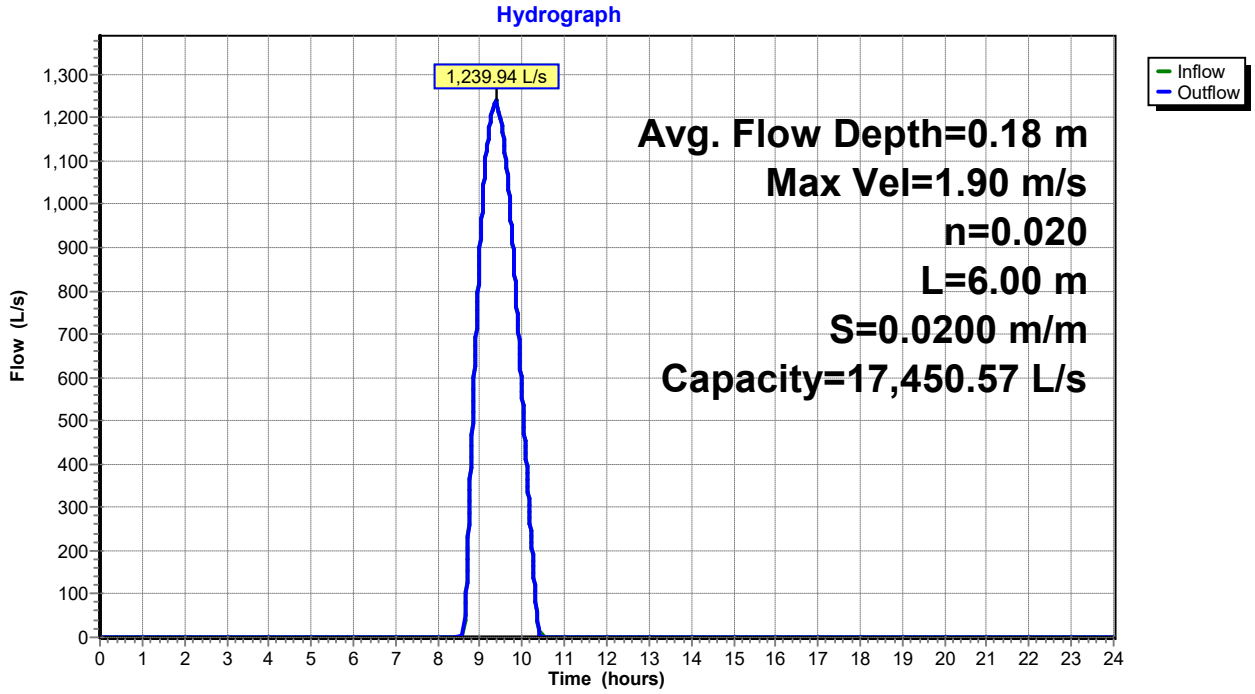


‡

Offset (meters)	Elevation (meters)	Chan.Depth (meters)
0.000	122.246	0.00
1.977	122.007	0.24
4.010	121.582	0.66
6.856	121.582	0.66
7.360	121.731	0.52
11.718	122.068	0.18
12.779	122.130	0.12
13.076	122.164	0.08
14.647	122.211	0.03
14.754	122.215	0.03
14.864	122.223	0.02
15.355	122.246	0.00

Depth (meters)	End Area (sq-meters)	Perim. (meters)	Storage (cubic-meters)	Discharge (L/s)
0.00	0.00	2.85	0.0	0.00
0.15	0.51	4.10	3.1	912.52
0.43	2.31	9.03	13.9	6,586.70
0.49	2.90	10.33	17.4	8,772.42
0.55	3.58	11.91	21.5	11,362.64
0.58	3.99	12.49	24.0	13,195.95
0.63	4.62	14.45	27.7	15,277.00
0.63	4.68	14.59	28.1	15,496.13
0.64	4.80	14.77	28.8	16,016.41
0.66	5.14	15.45	30.8	17,450.57

Reach 78R: Flow Over New Accessway



Summary for Pond 71P: 2 x 900Ø

Inflow Area = 608,700.0 m², 0.00% Impervious, Inflow Depth > 264 mm for 1% AEP + 20%CC event
Inflow = 6,311.79 L/s @ 9.39 hrs, Volume= 160,853.1 m³
Outflow = 6,311.79 L/s @ 9.39 hrs, Volume= 160,853.1 m³, Atten= 0%, Lag= 0.0 min
Primary = 5,071.72 L/s @ 9.39 hrs, Volume= 156,141.6 m³
Secondary = 1,240.11 L/s @ 9.39 hrs, Volume= 4,711.5 m³

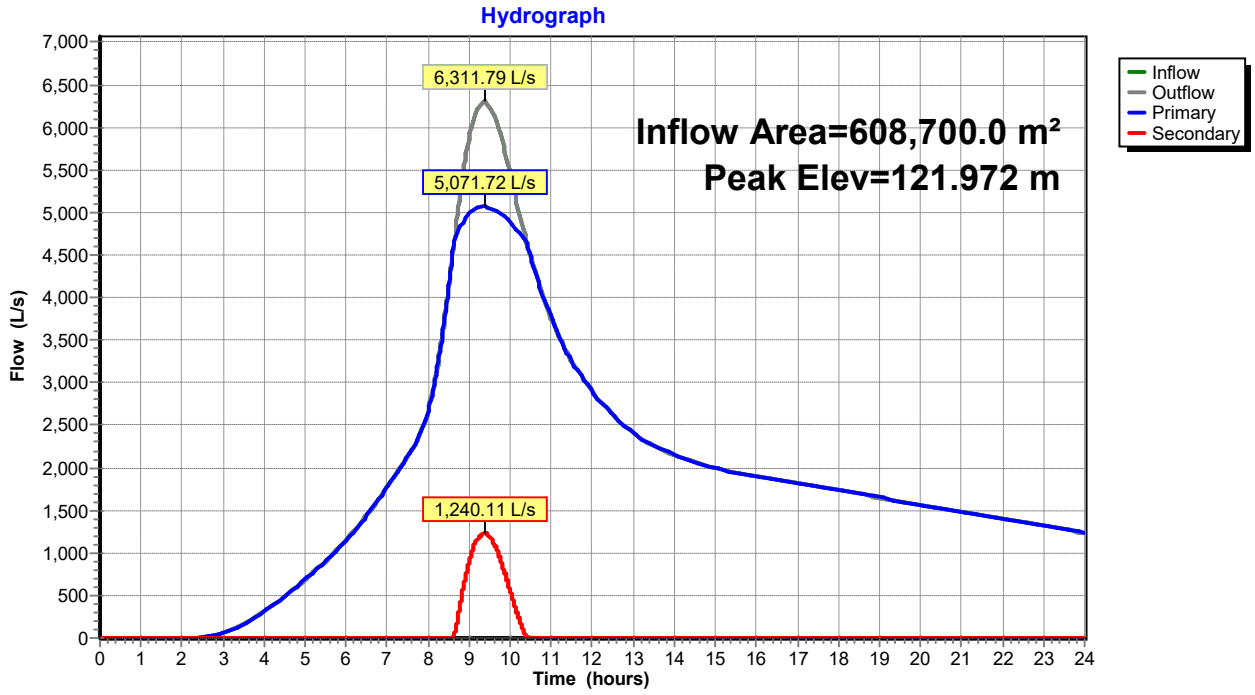
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 121.972 m @ 9.39 hrs
Flood Elev= 120.082 m

Device	Routing	Invert	Outlet Devices
#1	Primary	120.082 m	**900 mm Round Culvert X 2.00** L= 6.00 m RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 120.082 m / 119.872 m S= 0.0350 m/m Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.636 m²
#2	Secondary	121.582 m	**Asymmetrical Weir, C= 1.81** Offset (meters) 0.000 1.977 4.010 6.856 7.360 11.718 12.779 13.076 14.647 14.754 14.864 15.355 Elev. (meters) 122.25 122.01 121.58 121.58 121.73 122.07 122.13 122.16 122.21 122.22 122.22 122.25

Primary OutFlow Max=5,071.64 L/s @ 9.39 hrs HW=121.972 m (Free Discharge)
└**1=Culvert** (Inlet Controls 5,071.64 L/s @ 3.99 m/s)

Secondary OutFlow Max=1,238.04 L/s @ 9.39 hrs HW=121.972 m TW=121.910 m (Dynamic Tailwater)
└**2=Asymmetrical Weir** (Weir Controls 1,238.04 L/s @ 0.45 m/s)

Pond 71P: 2 x 900Ø



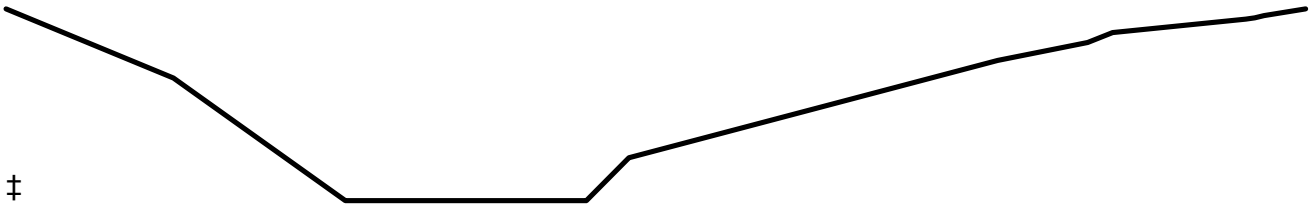
Summary for Reach 78R: Flow Over New Accessway

Inflow = 0.00 L/s @ 0.00 hrs, Volume= 0.0 m³
Outflow = 0.00 L/s @ 0.00 hrs, Volume= 0.0 m³, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.00 m/s, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 m/s, Avg. Travel Time= 0.0 min

Peak Storage= 0.0 m³ @ 0.00 hrs
Average Depth at Peak Storage= 0.00 m
Bank-Full Depth= 0.66 m Flow Area= 5.14 m², Capacity= 17,450.57 L/s

Custom cross-section, Length= 6.00 m Slope= 0.0200 m/m (106 Elevation Intervals)
Constant n= 0.020
Inlet Invert= 121.730 m, Outlet Invert= 121.610 m



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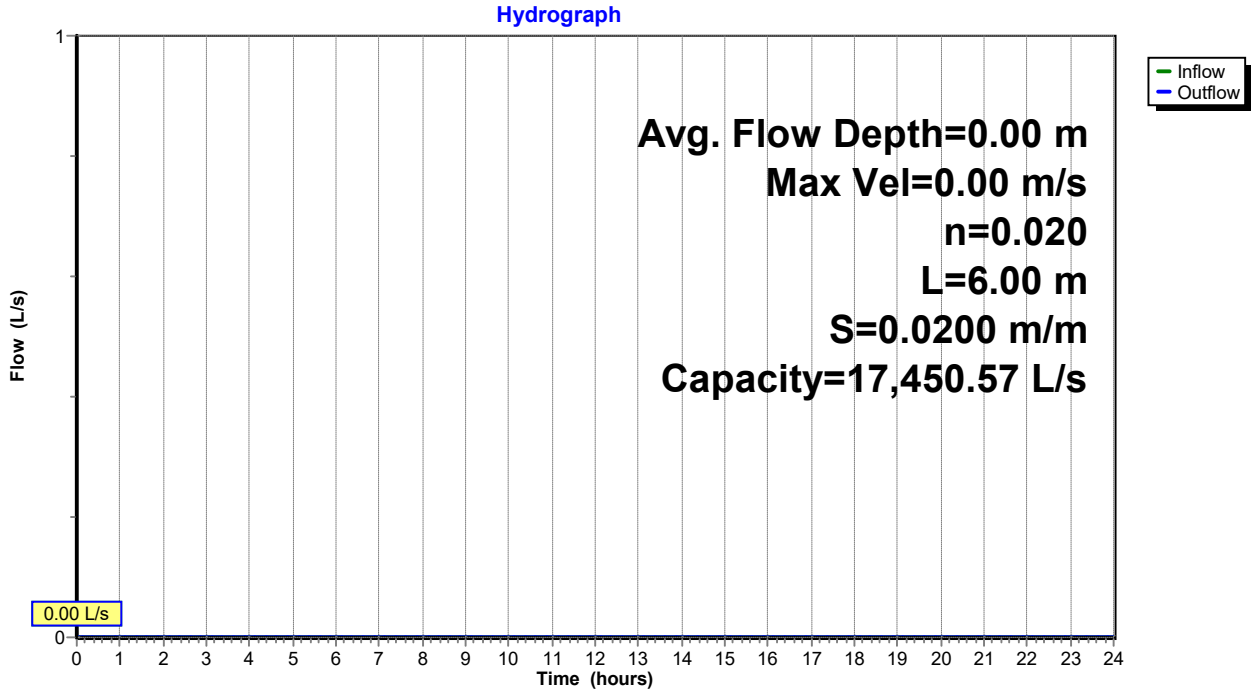
Offset (meters)	Elevation (meters)	Chan.Depth (meters)
0.000	122.246	0.00
1.977	122.007	0.24
4.010	121.582	0.66
6.856	121.582	0.66
7.360	121.731	0.52
11.718	122.068	0.18
12.779	122.130	0.12
13.076	122.164	0.08
14.647	122.211	0.03
14.754	122.215	0.03
14.864	122.223	0.02
15.355	122.246	0.00

Depth (meters)	End Area (sq-meters)	Perim. (meters)	Storage (cubic-meters)	Discharge (L/s)
0.00	0.00	2.85	0.0	0.00
0.15	0.51	4.10	3.1	912.52
0.43	2.31	9.03	13.9	6,586.70
0.49	2.90	10.33	17.4	8,772.42
0.55	3.58	11.91	21.5	11,362.64
0.58	3.99	12.49	24.0	13,195.95
0.63	4.62	14.45	27.7	15,277.00
0.63	4.68	14.59	28.1	15,496.13
0.64	4.80	14.77	28.8	16,016.41
0.66	5.14	15.45	30.8	17,450.57

Reach 78R: Flow Over New Accessway



Summary for Pond 71P: 2 x 900Ø

Inflow Area = 608,700.0 m², 0.00% Impervious, Inflow Depth > 123 mm for 20% AEP + 20%CC event
Inflow = 2,849.07 L/s @ 9.40 hrs, Volume= 74,775.2 m³
Outflow = 2,849.07 L/s @ 9.40 hrs, Volume= 74,775.2 m³, Atten= 0%, Lag= 0.0 min
Primary = 2,849.07 L/s @ 9.40 hrs, Volume= 74,775.2 m³
Secondary = 0.00 L/s @ 0.00 hrs, Volume= 0.0 m³

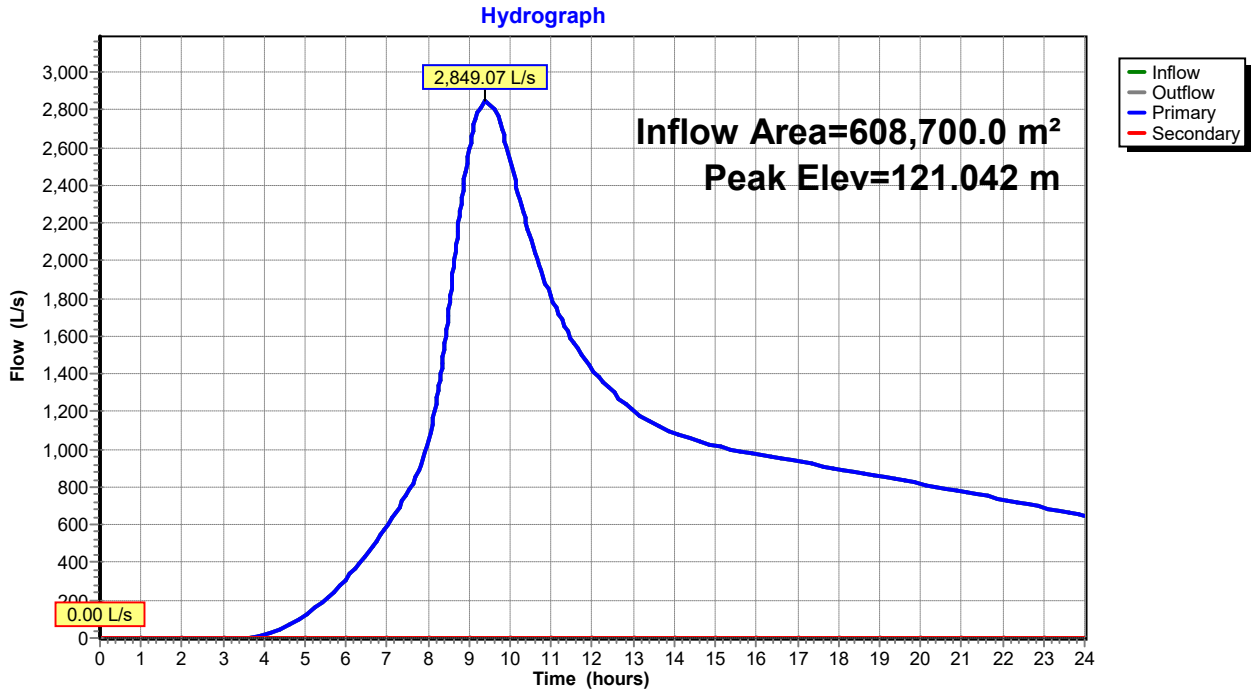
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 121.042 m @ 9.40 hrs
Flood Elev= 120.082 m

Device	Routing	Invert	Outlet Devices
#1	Primary	120.082 m	**900 mm Round Culvert X 2.00** L= 6.00 m RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 120.082 m / 119.872 m S= 0.0350 m/m Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.636 m²
#2	Secondary	121.582 m	**Asymmetrical Weir, C= 1.81** Offset (meters) 0.000 1.977 4.010 6.856 7.360 11.718 12.779 13.076 14.647 14.754 14.864 15.355 Elev. (meters) 122.25 122.01 121.58 121.58 121.73 122.07 122.13 122.16 122.21 122.22 122.22 122.25

Primary OutFlow Max=2,848.91 L/s @ 9.40 hrs HW=121.042 m (Free Discharge)
└**1=Culvert** (Barrel Controls 2,848.91 L/s @ 2.61 m/s)

Secondary OutFlow Max=0.00 L/s @ 0.00 hrs HW=120.082 m TW=121.730 m (Dynamic Tailwater)
└**2=Asymmetrical Weir** (Controls 0.00 L/s)

Pond 71P: 2 x 900Ø



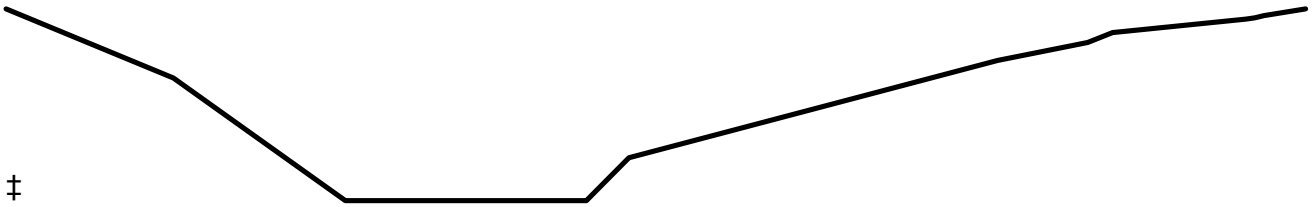
Summary for Reach 79R: Flow Over New Accessway

Inflow = 0.00 L/s @ 0.00 hrs, Volume= 0.0 m³
Outflow = 0.00 L/s @ 0.00 hrs, Volume= 0.0 m³, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.00 m/s, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 m/s, Avg. Travel Time= 0.0 min

Peak Storage= 0.0 m³ @ 0.00 hrs
Average Depth at Peak Storage= 0.00 m
Bank-Full Depth= 0.66 m Flow Area= 5.14 m², Capacity= 17,450.57 L/s

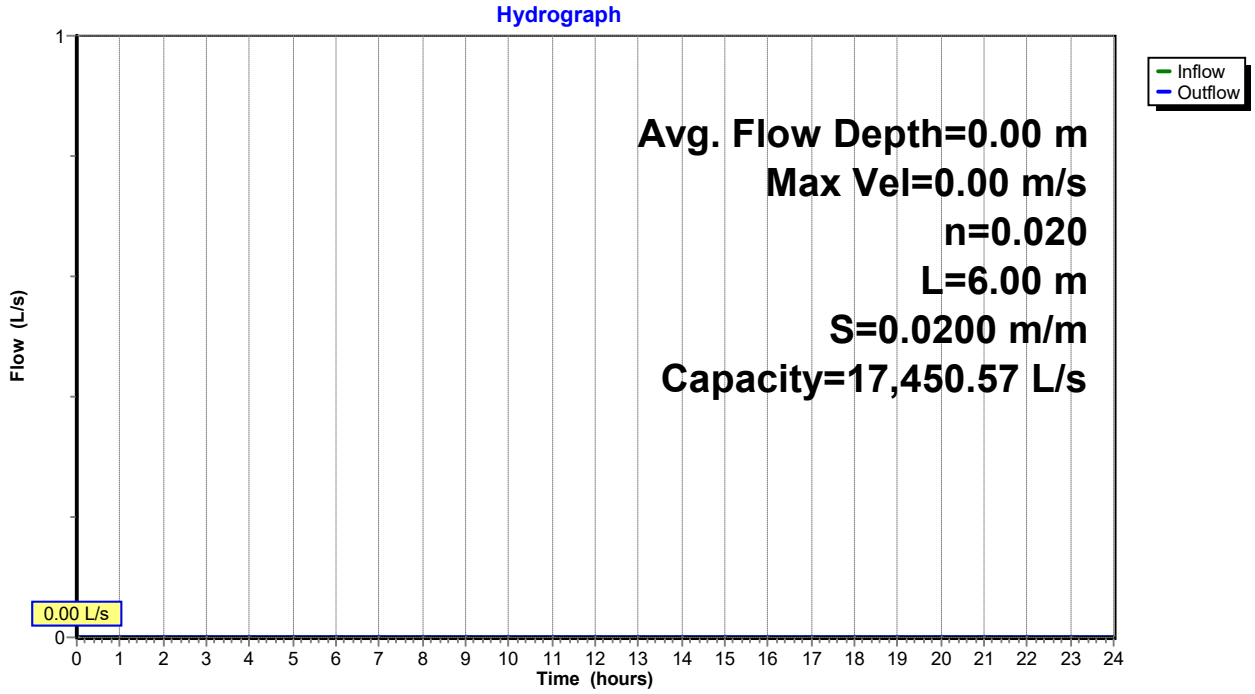
Custom cross-section, Length= 6.00 m Slope= 0.0200 m/m (106 Elevation Intervals)
Constant n= 0.020
Inlet Invert= 121.730 m, Outlet Invert= 121.610 m



Offset (meters)	Elevation (meters)	Chan.Depth (meters)
0.000	122.246	0.00
1.977	122.007	0.24
4.010	121.582	0.66
6.856	121.582	0.66
7.360	121.731	0.52
11.718	122.068	0.18
12.779	122.130	0.12
13.076	122.164	0.08
14.647	122.211	0.03
14.754	122.215	0.03
14.864	122.223	0.02
15.355	122.246	0.00

Depth (meters)	End Area (sq-meters)	Perim. (meters)	Storage (cubic-meters)	Discharge (L/s)
0.00	0.00	2.85	0.0	0.00
0.15	0.51	4.10	3.1	912.52
0.43	2.31	9.03	13.9	6,586.70
0.49	2.90	10.33	17.4	8,772.42
0.55	3.58	11.91	21.5	11,362.64
0.58	3.99	12.49	24.0	13,195.95
0.63	4.62	14.45	27.7	15,277.00
0.63	4.68	14.59	28.1	15,496.13
0.64	4.80	14.77	28.8	16,016.41
0.66	5.14	15.45	30.8	17,450.57

Reach 79R: Flow Over New Accessway



Summary for Pond 73P: 1.2mW x 0.9mD Box

Inflow Area = 608,700.0 m², 0.00% Impervious, Inflow Depth > 264 mm for 1% AEP + 20%CC event
Inflow = 6,311.79 L/s @ 9.39 hrs, Volume= 160,853.1 m³
Outflow = 6,311.79 L/s @ 9.39 hrs, Volume= 160,853.1 m³, Atten= 0%, Lag= 0.0 min
Primary = 6,311.79 L/s @ 9.39 hrs, Volume= 160,853.1 m³
Secondary = 0.00 L/s @ 0.00 hrs, Volume= 0.0 m³

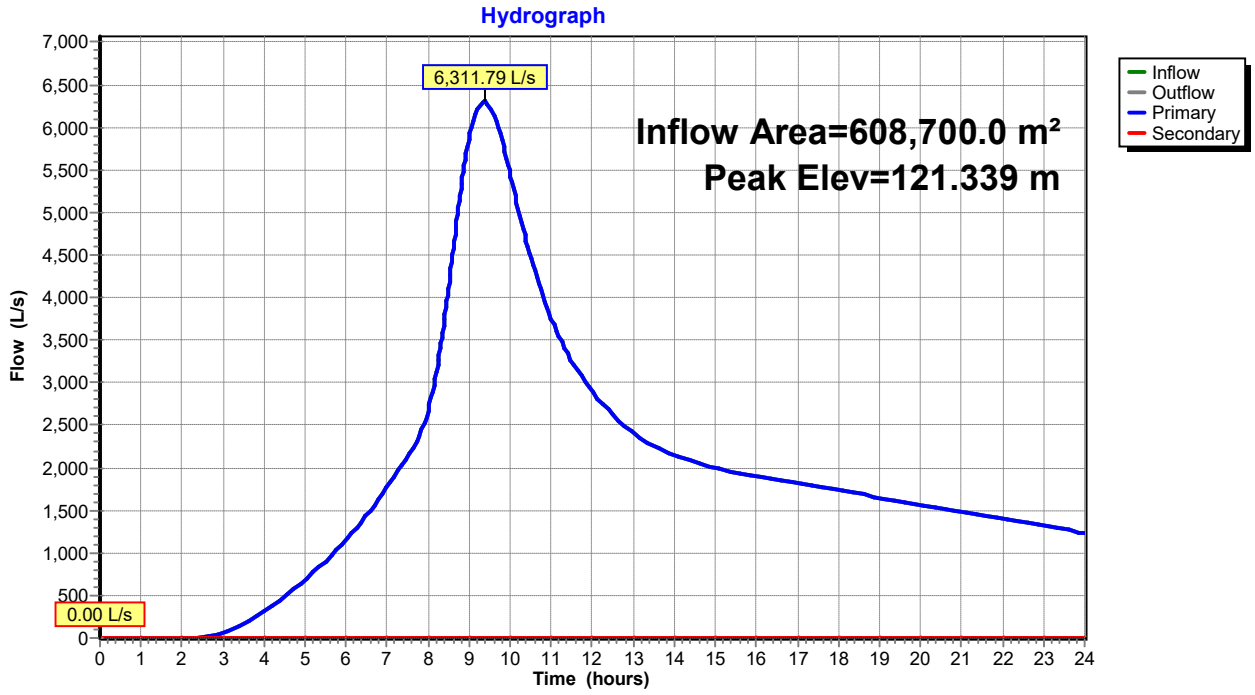
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 121.339 m @ 9.39 hrs
Flood Elev= 120.082 m

Device	Routing	Invert	Outlet Devices
#1	Primary	120.082 m	**1,200 mm W x 900 mm H Box Culvert X 2.00** L= 6.00 m RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 120.082 m / 119.872 m S= 0.0350 m/m Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.080 m²
#2	Secondary	121.582 m	**Asymmetrical Weir, C= 1.81** Offset (meters) 0.000 1.977 4.010 6.856 7.360 11.718 12.779 13.076 14.647 14.754 14.864 15.355 Elev. (meters) 122.25 122.01 121.58 121.58 121.73 122.07 122.13 122.16 122.21 122.22 122.22 122.25

Primary OutFlow Max=6,311.75 L/s @ 9.39 hrs HW=121.339 m (Free Discharge)
└**1=Culvert** (Barrel Controls 6,311.75 L/s @ 2.92 m/s)

Secondary OutFlow Max=0.00 L/s @ 0.00 hrs HW=120.082 m TW=121.730 m (Dynamic Tailwater)
└**2=Asymmetrical Weir** (Controls 0.00 L/s)

Pond 73P: 1.2mW x 0.9mD Box



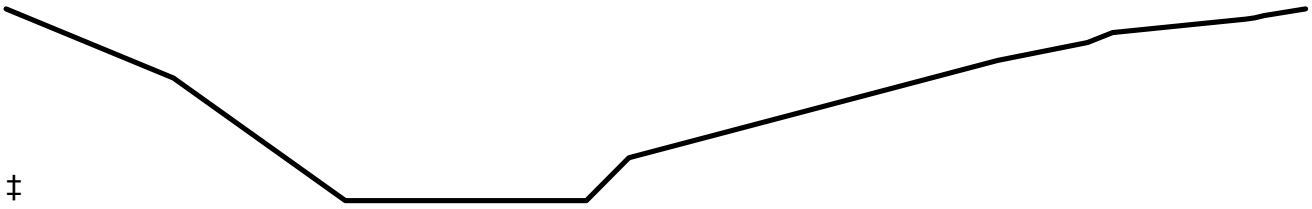
Summary for Reach 79R: Flow Over New Accessway

Inflow = 0.00 L/s @ 0.00 hrs, Volume= 0.0 m³
Outflow = 0.00 L/s @ 0.00 hrs, Volume= 0.0 m³, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.00 m/s, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 m/s, Avg. Travel Time= 0.0 min

Peak Storage= 0.0 m³ @ 0.00 hrs
Average Depth at Peak Storage= 0.00 m
Bank-Full Depth= 0.66 m Flow Area= 5.14 m², Capacity= 17,450.57 L/s

Custom cross-section, Length= 6.00 m Slope= 0.0200 m/m (106 Elevation Intervals)
Constant n= 0.020
Inlet Invert= 121.730 m, Outlet Invert= 121.610 m

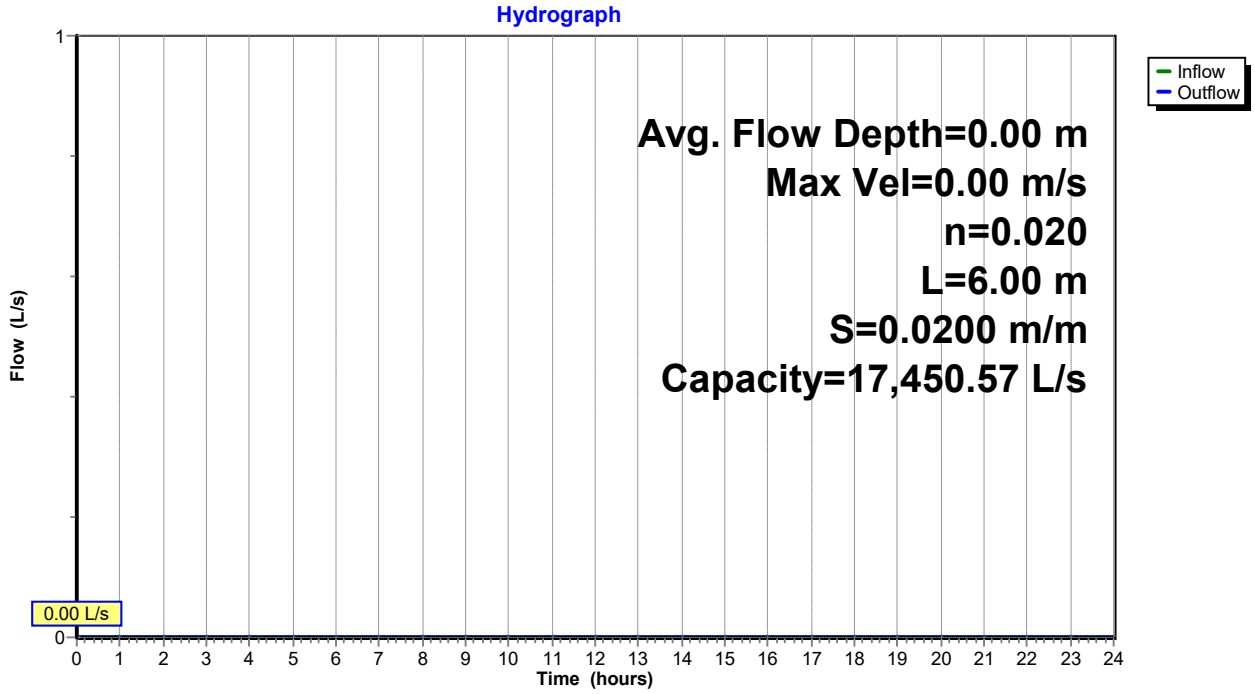


‡

Offset (meters)	Elevation (meters)	Chan.Depth (meters)
0.000	122.246	0.00
1.977	122.007	0.24
4.010	121.582	0.66
6.856	121.582	0.66
7.360	121.731	0.52
11.718	122.068	0.18
12.779	122.130	0.12
13.076	122.164	0.08
14.647	122.211	0.03
14.754	122.215	0.03
14.864	122.223	0.02
15.355	122.246	0.00

Depth (meters)	End Area (sq-meters)	Perim. (meters)	Storage (cubic-meters)	Discharge (L/s)
0.00	0.00	2.85	0.0	0.00
0.15	0.51	4.10	3.1	912.52
0.43	2.31	9.03	13.9	6,586.70
0.49	2.90	10.33	17.4	8,772.42
0.55	3.58	11.91	21.5	11,362.64
0.58	3.99	12.49	24.0	13,195.95
0.63	4.62	14.45	27.7	15,277.00
0.63	4.68	14.59	28.1	15,496.13
0.64	4.80	14.77	28.8	16,016.41
0.66	5.14	15.45	30.8	17,450.57

Reach 79R: Flow Over New Accessway



Summary for Pond 73P: 1.2mW x 0.9mD Box

Inflow Area = 608,700.0 m², 0.00% Impervious, Inflow Depth > 123 mm for 20% AEP + 20%CC event
Inflow = 2,849.07 L/s @ 9.40 hrs, Volume= 74,775.2 m³
Outflow = 2,849.07 L/s @ 9.40 hrs, Volume= 74,775.2 m³, Atten= 0%, Lag= 0.0 min
Primary = 2,849.07 L/s @ 9.40 hrs, Volume= 74,775.2 m³
Secondary = 0.00 L/s @ 0.00 hrs, Volume= 0.0 m³

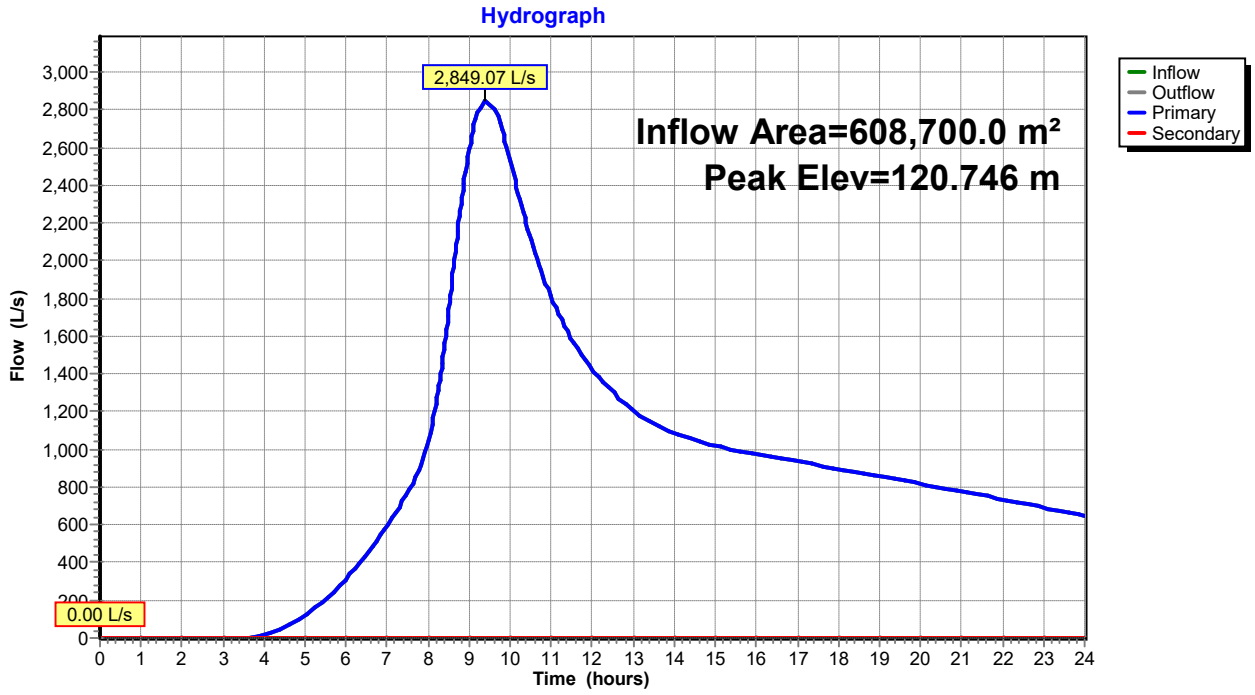
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 120.746 m @ 9.40 hrs
Flood Elev= 120.082 m

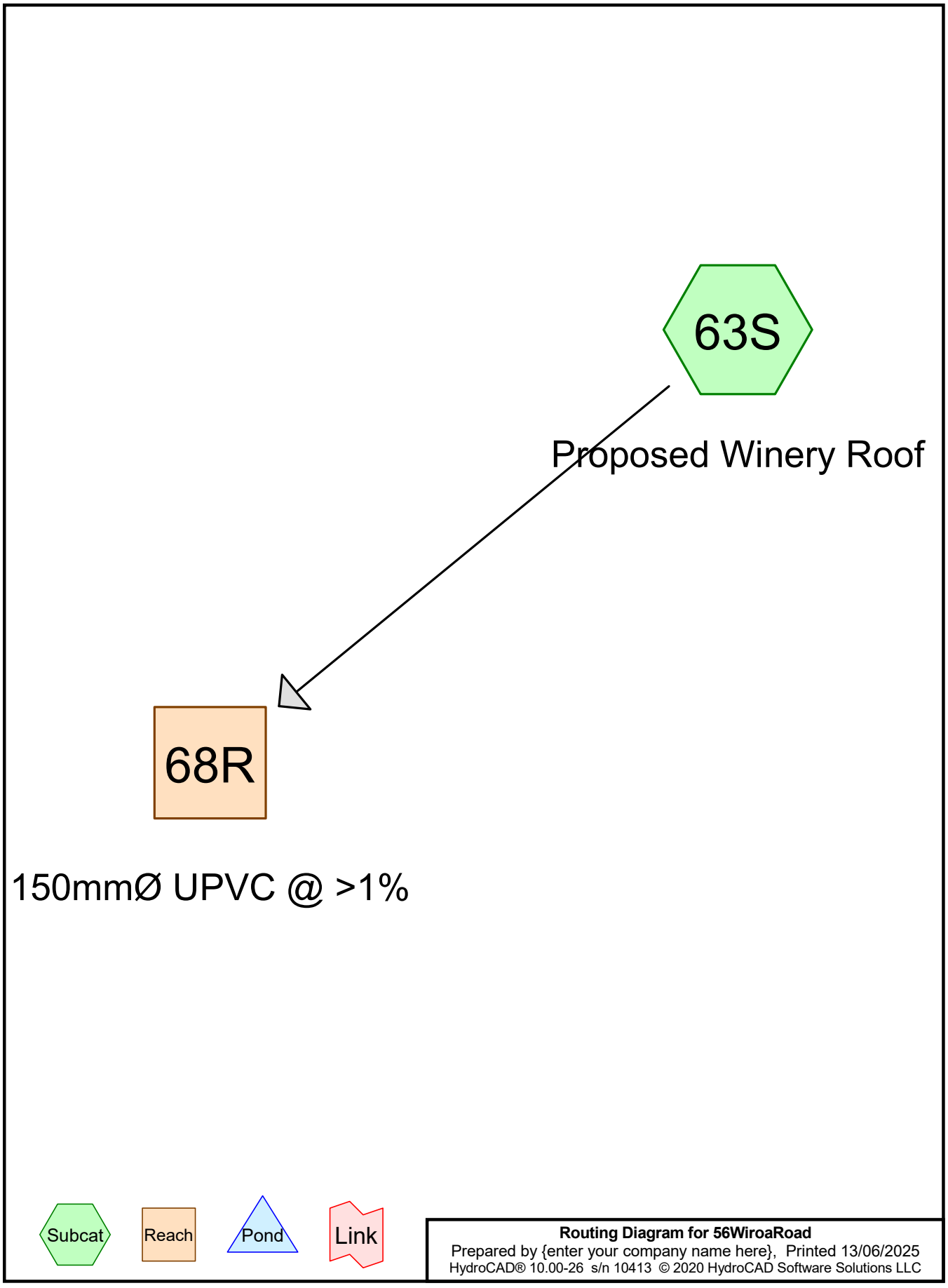
Device	Routing	Invert	Outlet Devices
#1	Primary	120.082 m	**1,200 mm W x 900 mm H Box Culvert X 2.00** L= 6.00 m RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 120.082 m / 119.872 m S= 0.0350 m/m Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.080 m²
#2	Secondary	121.582 m	**Asymmetrical Weir, C= 1.81** Offset (meters) 0.000 1.977 4.010 6.856 7.360 11.718 12.779 13.076 14.647 14.754 14.864 15.355 Elev. (meters) 122.25 122.01 121.58 121.58 121.73 122.07 122.13 122.16 122.21 122.22 122.22 122.25

Primary OutFlow Max=2,848.91 L/s @ 9.40 hrs HW=120.746 m (Free Discharge)
└**1=Culvert** (Barrel Controls 2,848.91 L/s @ 2.39 m/s)

Secondary OutFlow Max=0.00 L/s @ 0.00 hrs HW=120.082 m TW=121.730 m (Dynamic Tailwater)
└**2=Asymmetrical Weir** (Controls 0.00 L/s)

Pond 73P: 1.2mW x 0.9mD Box




63S
Proposed Winery Roof
68R
150mmØ UPVC @ >1%
Subcat
Reach
Pond
Link
Routing Diagram for 56WiroaRoad
Prepared by {enter your company name here}, Printed 13/06/2025
HydroCAD® 10.00-26 s/n 10413 © 2020 HydroCAD Software Solutions LLC

Summary for Subcatchment 63S: Proposed Winery Roof

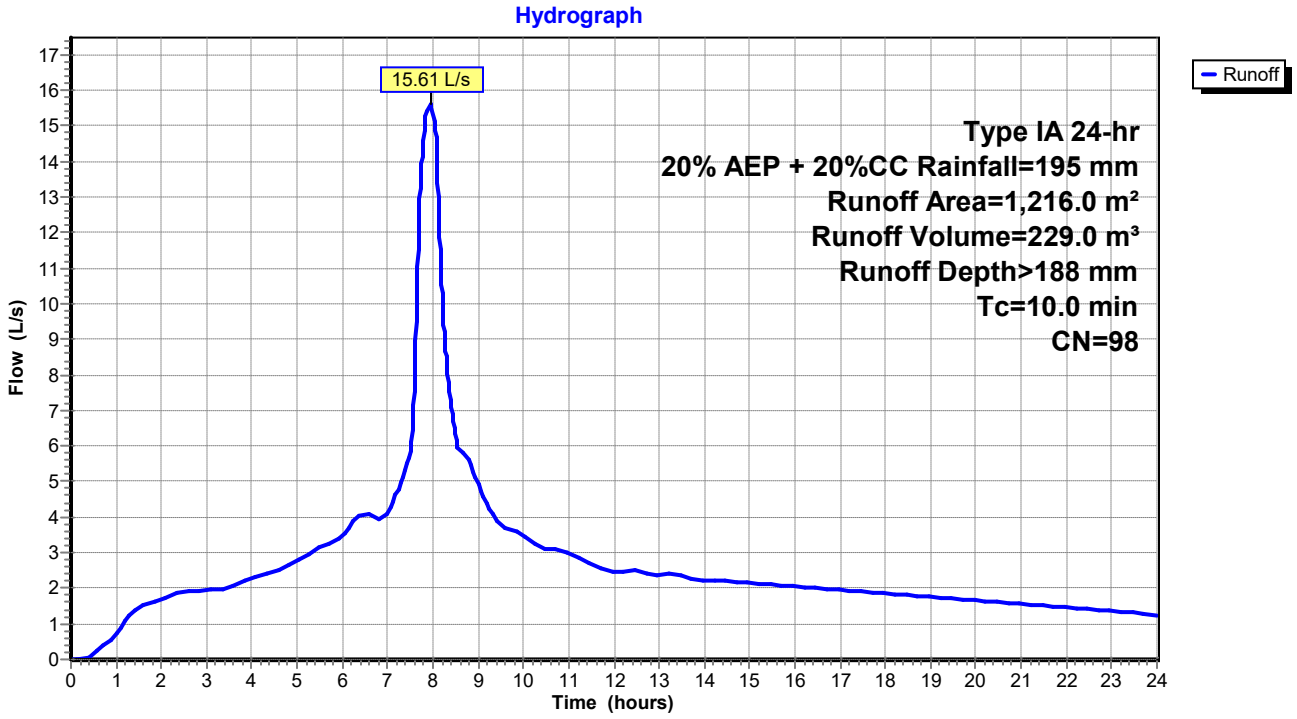
Runoff = 15.61 L/s @ 7.94 hrs, Volume= 229.0 m³, Depth> 188 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type IA 24-hr 20% AEP + 20%CC Rainfall=195 mm

	Area (m²)	CN	Description
*	1,216.0	98	
	1,216.0		100.00% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 63S: Proposed Winery Roof



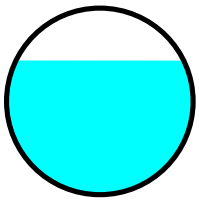
Summary for Reach 68R: 150mmØ UPVC @ >1%

Inflow Area = 1,216.0 m²,100.00% Impervious, Inflow Depth > 188 mm for 20% AEP + 20%CC event
Inflow = 15.61 L/s @ 7.94 hrs, Volume= 229.0 m³
Outflow = 15.60 L/s @ 7.95 hrs, Volume= 229.0 m³, Atten= 0%, Lag= 0.6 min

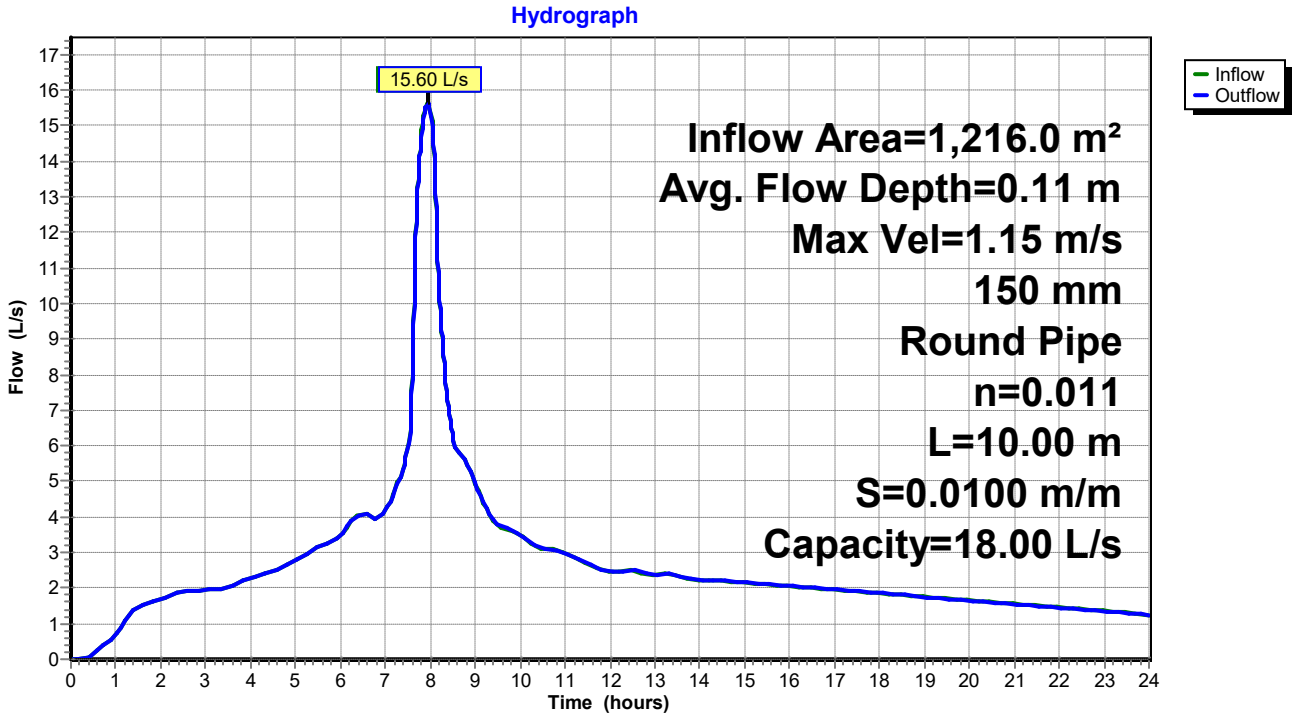
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.15 m/s, Min. Travel Time= 0.1 min
Avg. Velocity = 0.70 m/s, Avg. Travel Time= 0.2 min

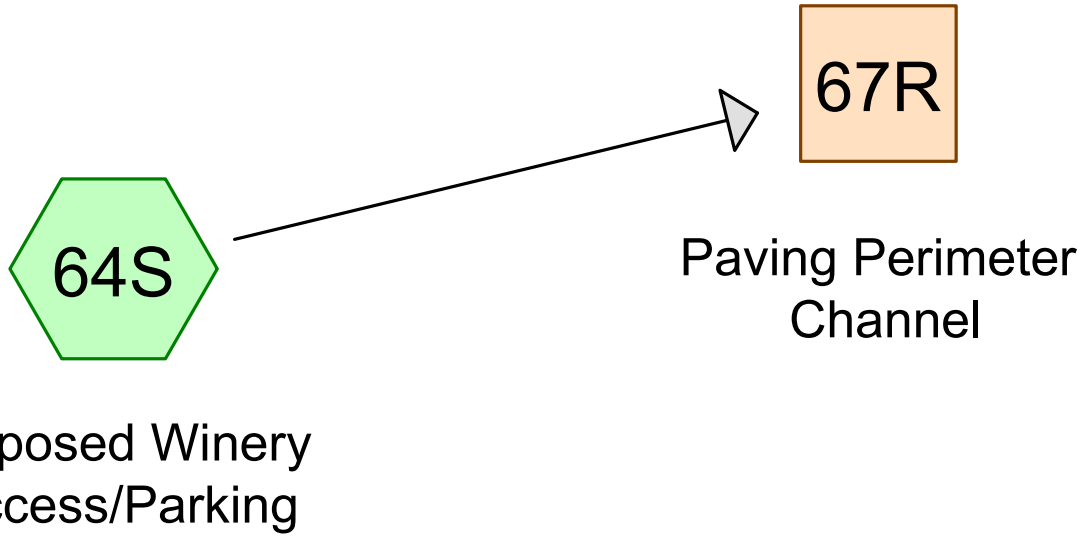
Peak Storage= 0.1 m³ @ 7.95 hrs
Average Depth at Peak Storage= 0.11 m
Bank-Full Depth= 0.15 m Flow Area= 0.02 m², Capacity= 18.00 L/s

150 mm Round Pipe
n= 0.011
Length= 10.00 m Slope= 0.0100 m/m
Inlet Invert= 1.000 m, Outlet Invert= 0.900 m



Reach 68R: 150mmØ UPVC @ >1%





Subcat Reach Pond Link

Routing Diagram for 56WiroaRoad
Prepared by {enter your company name here}, Printed 13/06/2025
HydroCAD® 10.00-26 s/n 10413 © 2020 HydroCAD Software Solutions LLC

Summary for Subcatchment 64S: Proposed Winery Access/Parking

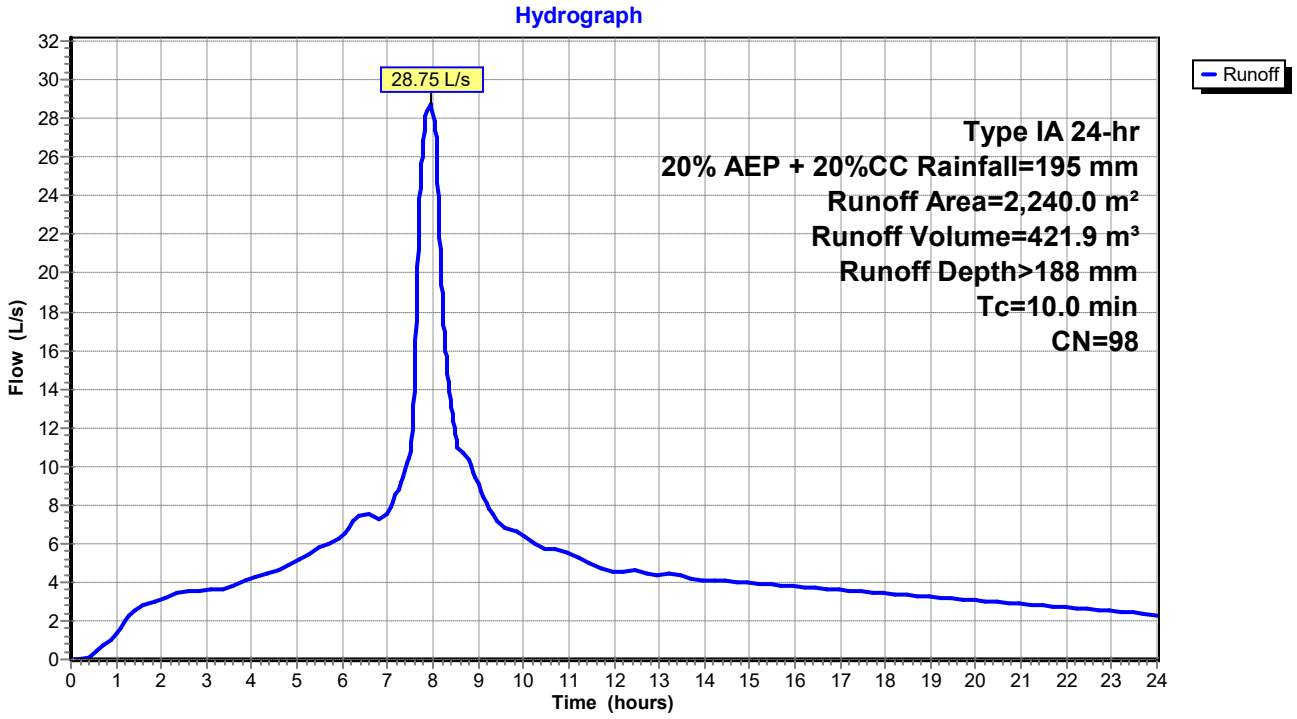
Runoff = 28.75 L/s @ 7.94 hrs, Volume= 421.9 m³, Depth> 188 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type IA 24-hr 20% AEP + 20%CC Rainfall=195 mm

	Area (m²)	CN	Description
*	2,240.0	98	
	2,240.0		100.00% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 64S: Proposed Winery Access/Parking



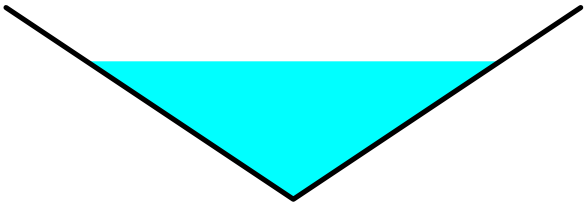
Summary for Reach 67R: Paving Perimeter Channel

Inflow Area = 2,240.0 m²,100.00% Impervious, Inflow Depth > 188 mm for 20% AEP + 20%CC event
Inflow = 28.75 L/s @ 7.94 hrs, Volume= 421.9 m³
Outflow = 28.74 L/s @ 7.95 hrs, Volume= 421.9 m³, Atten= 0%, Lag= 0.3 min

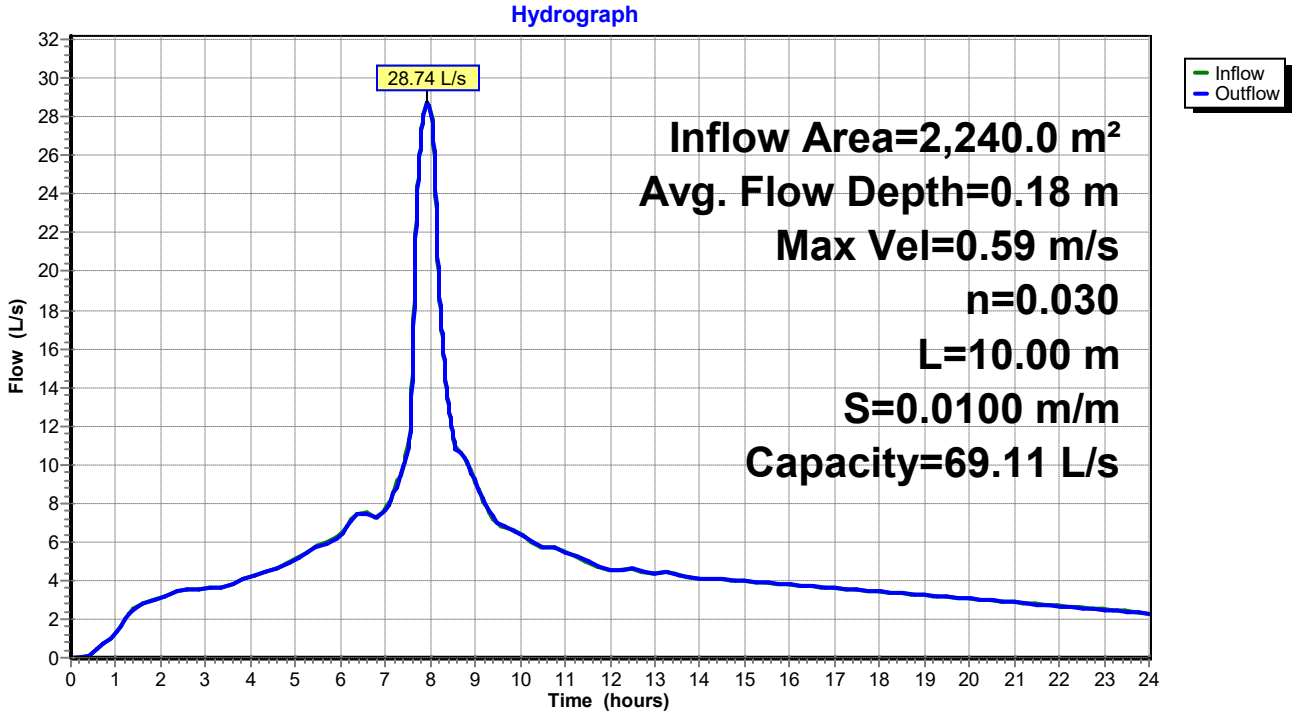
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.59 m/s, Min. Travel Time= 0.3 min
Avg. Velocity = 0.37 m/s, Avg. Travel Time= 0.5 min

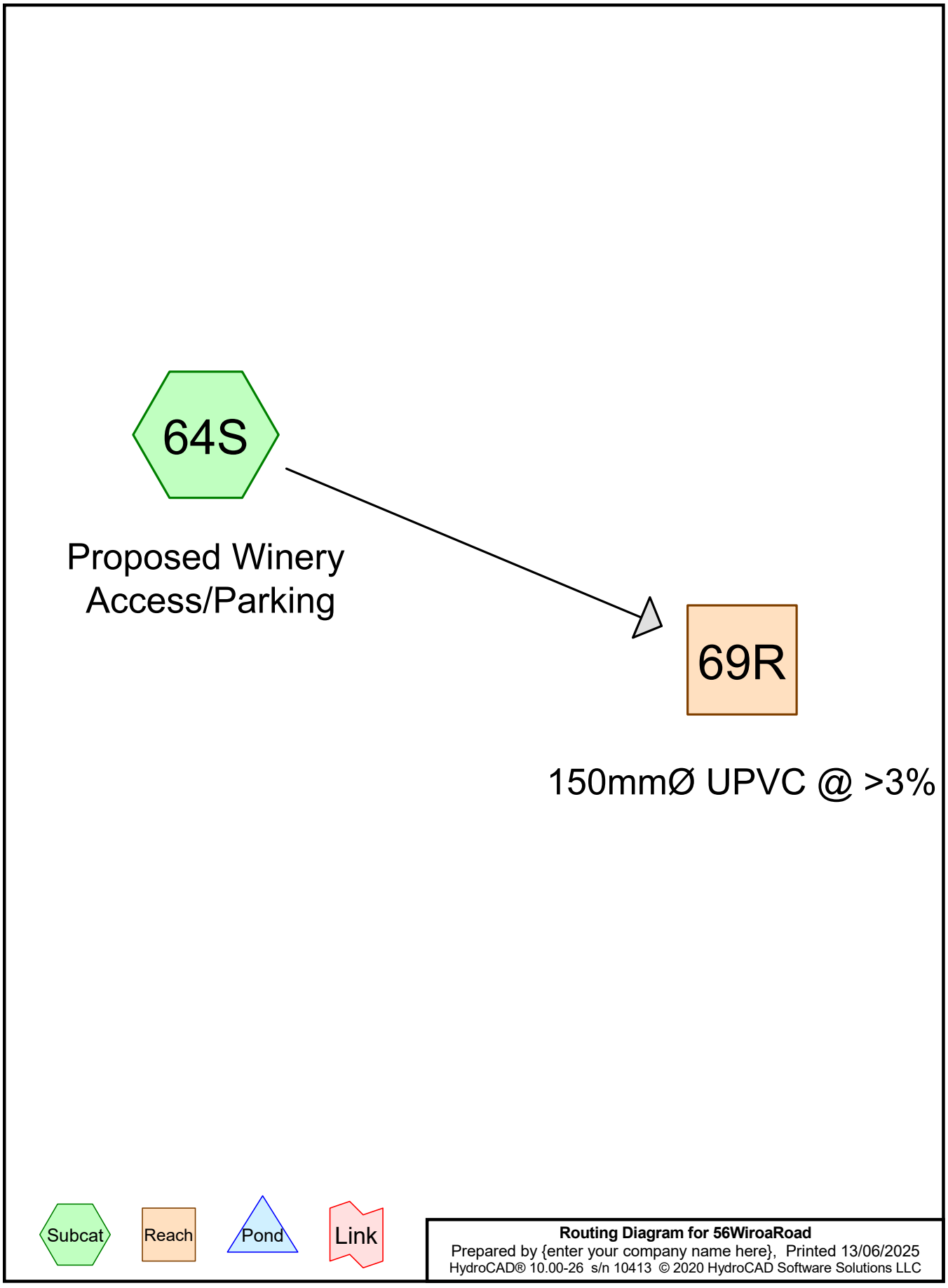
Peak Storage= 0.5 m³ @ 7.95 hrs
Average Depth at Peak Storage= 0.18 m
Bank-Full Depth= 0.25 m Flow Area= 0.09 m², Capacity= 69.11 L/s

0.00 m x 0.25 m deep channel, n= 0.030
Side Slope Z-value= 1.5 m/m Top Width= 0.75 m
Length= 10.00 m Slope= 0.0100 m/m
Inlet Invert= 0.000 m, Outlet Invert= -0.100 m



Reach 67R: Paving Perimeter Channel





Routing Diagram for 56WiroaRoad
Prepared by {enter your company name here}, Printed 13/06/2025
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Summary for Subcatchment 64S: Proposed Winery Access/Parking

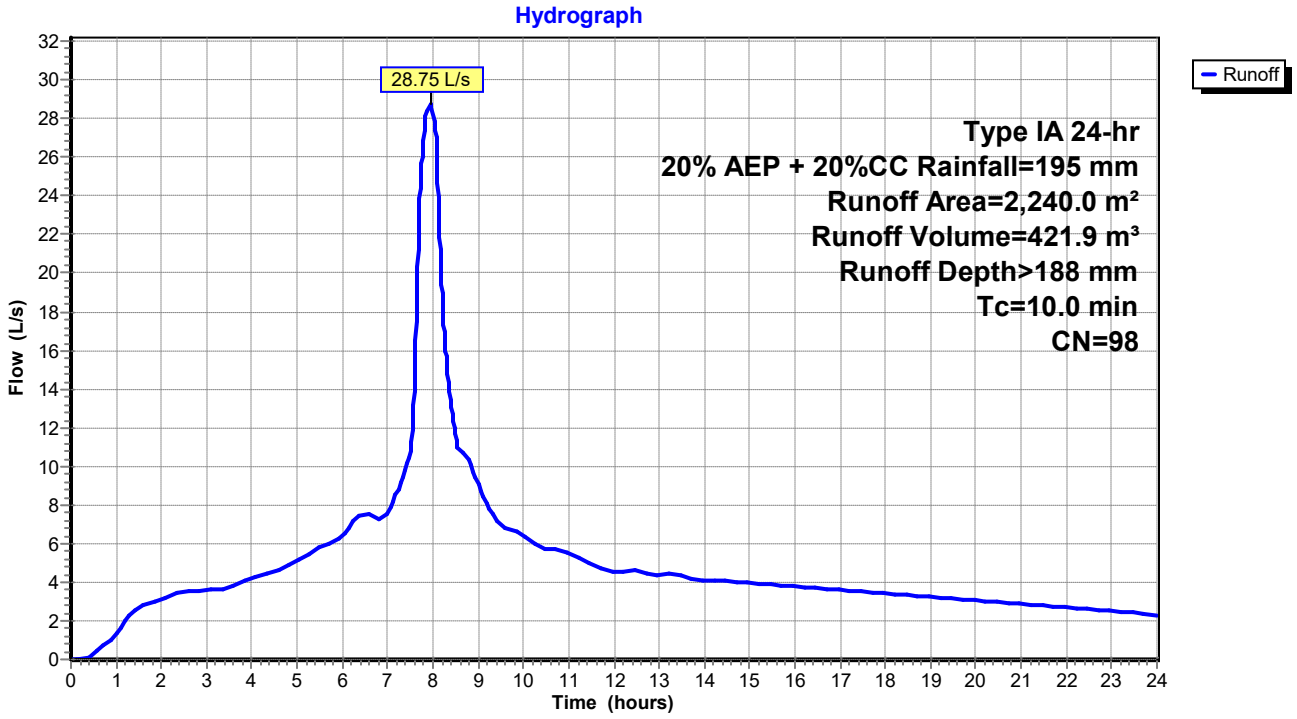
Runoff = 28.75 L/s @ 7.94 hrs, Volume= 421.9 m³, Depth> 188 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type IA 24-hr 20% AEP + 20%CC Rainfall=195 mm

	Area (m²)	CN	Description
*	2,240.0	98	
	2,240.0		100.00% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 64S: Proposed Winery Access/Parking



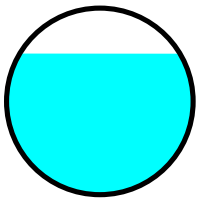
Summary for Reach 69R: 150mmØ UPVC @ >3%

Inflow Area = 2,240.0 m²,100.00% Impervious, Inflow Depth > 188 mm for 20% AEP + 20%CC event
Inflow = 28.75 L/s @ 7.94 hrs, Volume= 421.9 m³
Outflow = 28.74 L/s @ 7.95 hrs, Volume= 421.9 m³, Atten= 0%, Lag= 0.6 min

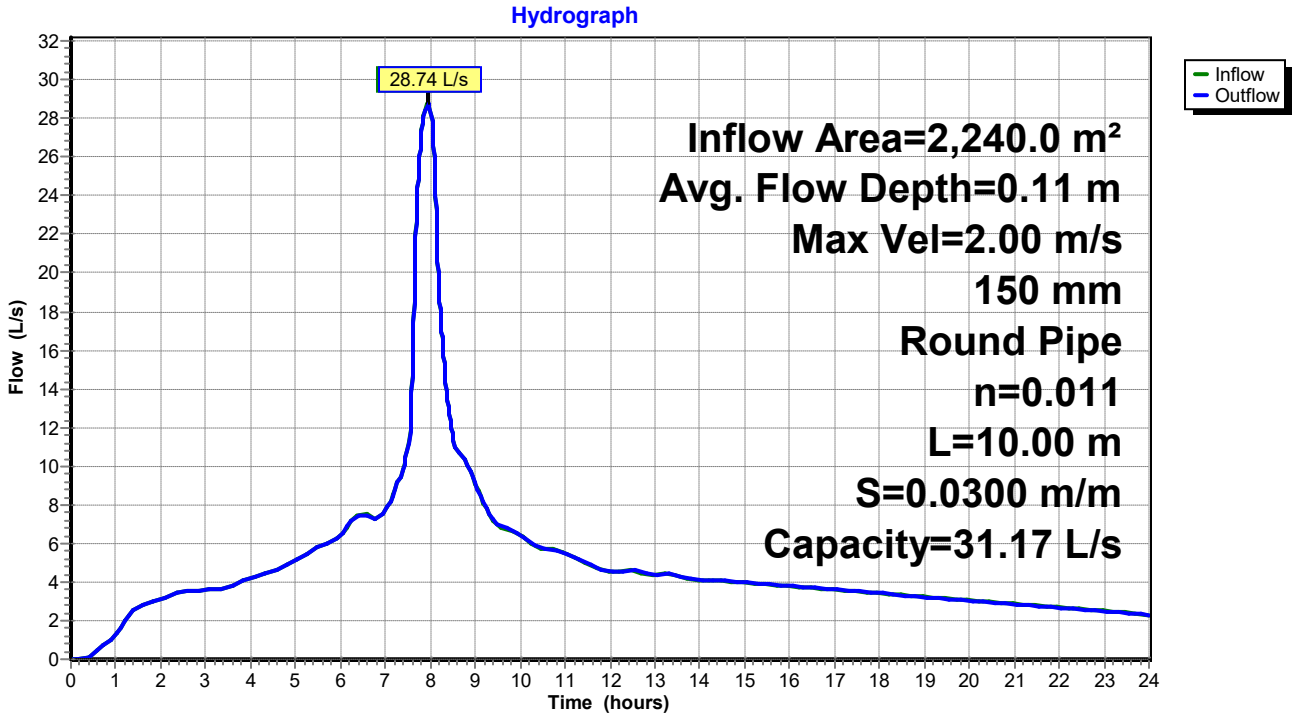
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.00 m/s, Min. Travel Time= 0.1 min
Avg. Velocity = 1.24 m/s, Avg. Travel Time= 0.1 min

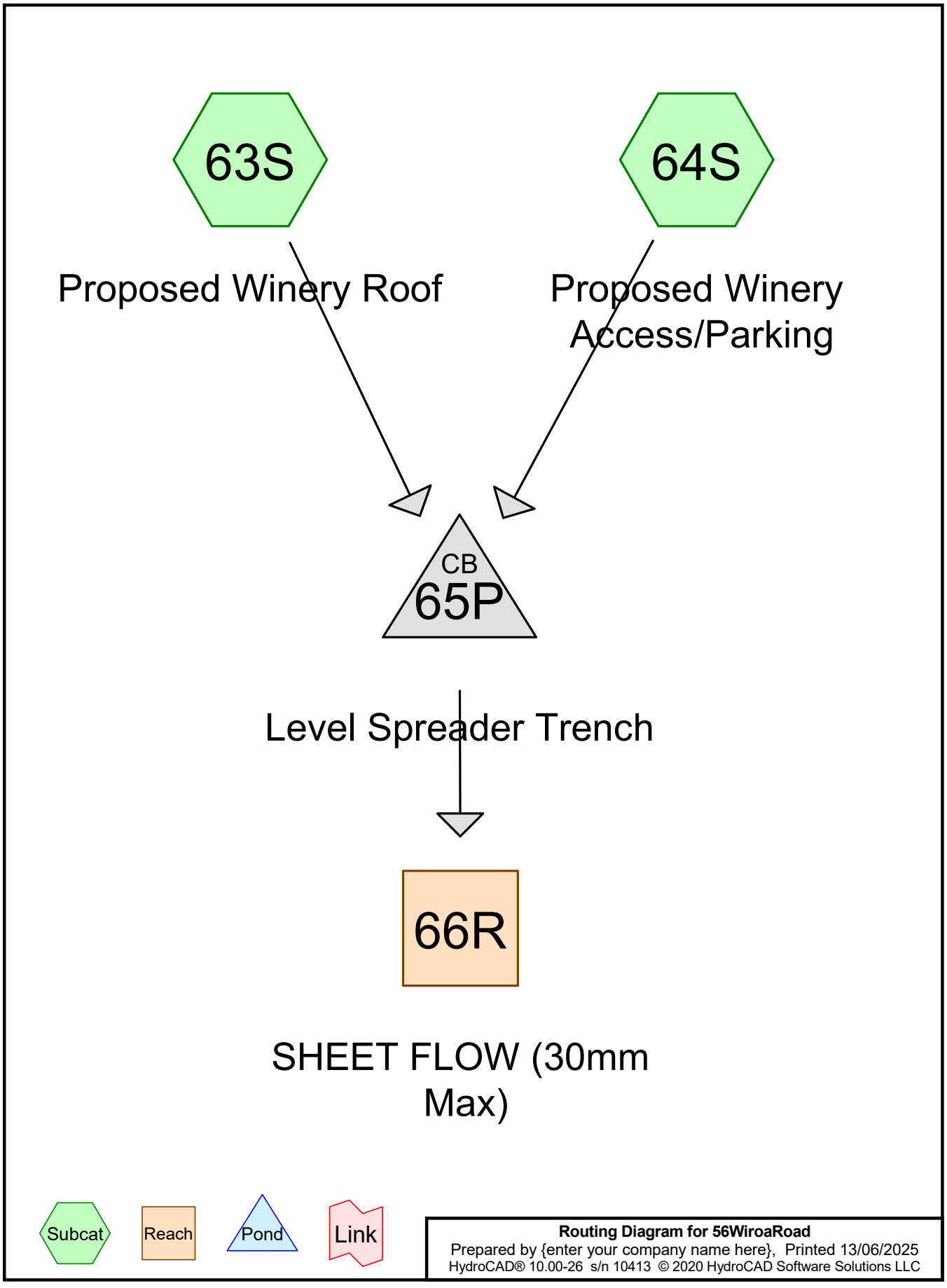
Peak Storage= 0.1 m³ @ 7.95 hrs
Average Depth at Peak Storage= 0.11 m
Bank-Full Depth= 0.15 m Flow Area= 0.02 m², Capacity= 31.17 L/s

150 mm Round Pipe
n= 0.011
Length= 10.00 m Slope= 0.0300 m/m
Inlet Invert= 1.000 m, Outlet Invert= 0.700 m



Reach 69R: 150mmØ UPVC @ >3%





Routing Diagram for 56WiroaRoad

Prepared by {enter your company name here}, Printed 13/06/2025

Summary for Subcatchment 63S: Proposed Winery Roof

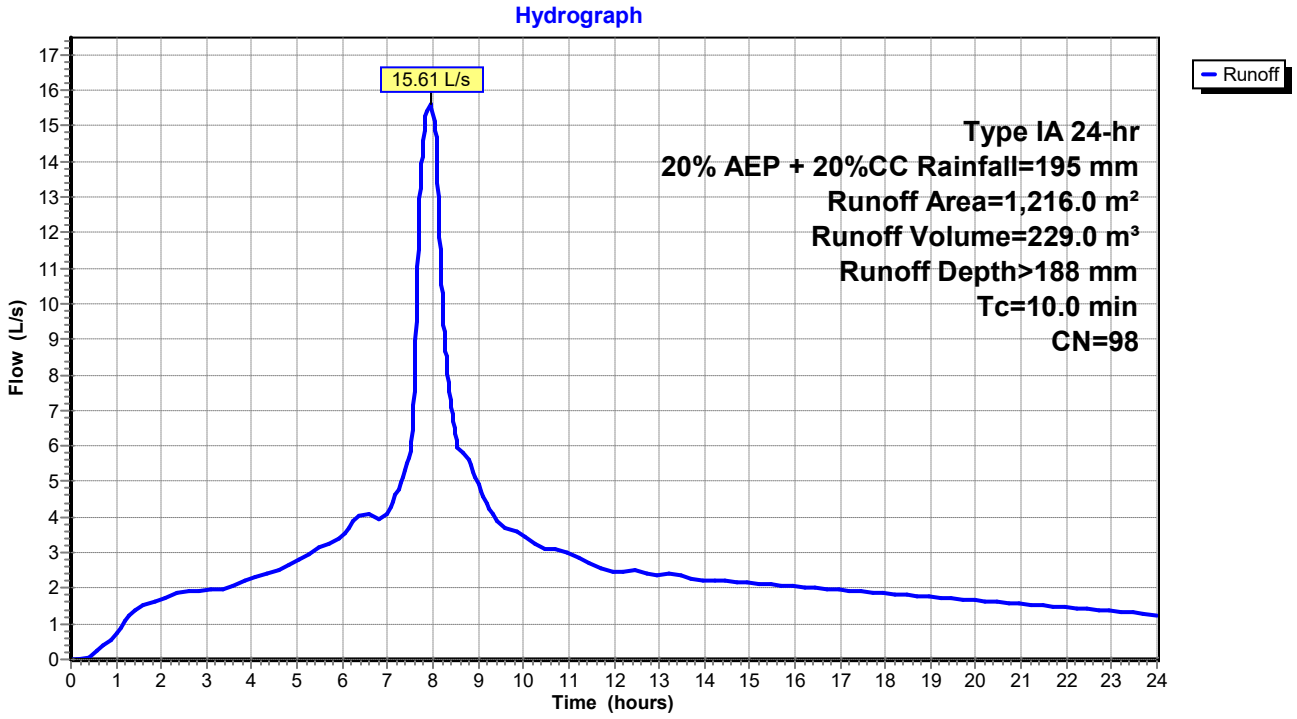
Runoff = 15.61 L/s @ 7.94 hrs, Volume= 229.0 m³, Depth> 188 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type IA 24-hr 20% AEP + 20%CC Rainfall=195 mm

	Area (m²)	CN	Description
*	1,216.0	98	
	1,216.0		100.00% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 63S: Proposed Winery Roof



Summary for Subcatchment 64S: Proposed Winery Access/Parking

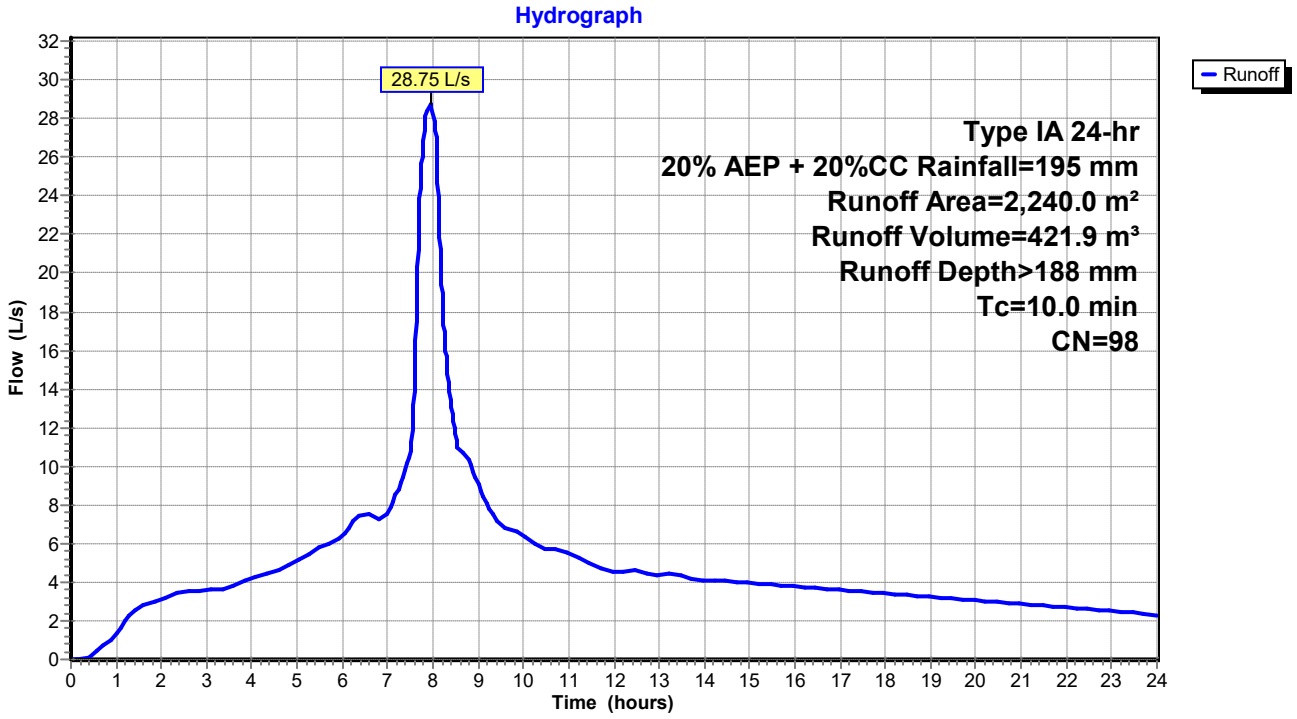
Runoff = 28.75 L/s @ 7.94 hrs, Volume= 421.9 m³, Depth> 188 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type IA 24-hr 20% AEP + 20%CC Rainfall=195 mm

	Area (m²)	CN	Description
*	2,240.0	98	
	2,240.0		100.00% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 64S: Proposed Winery Access/Parking



Summary for Reach 66R: SHEET FLOW (30mm Max)

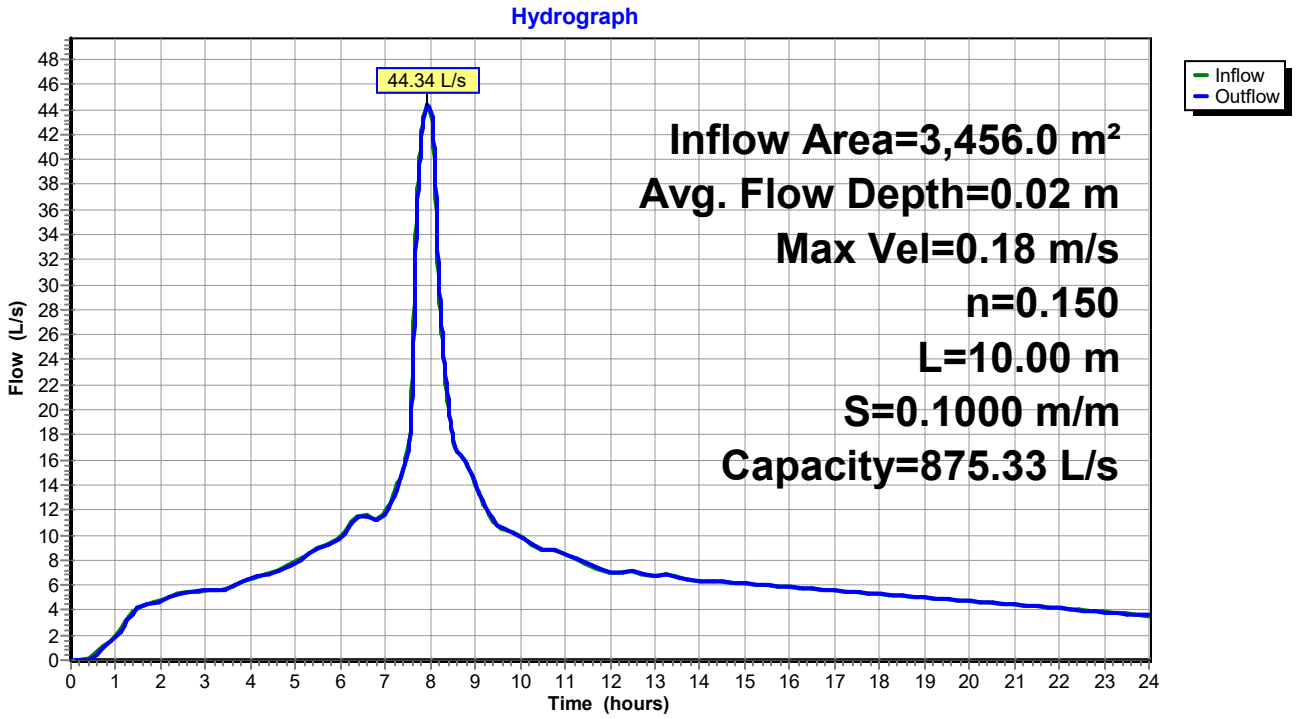
Inflow Area = 3,456.0 m²,100.00% Impervious, Inflow Depth > 188 mm for 20% AEP + 20%CC event
Inflow = 44.35 L/s @ 7.94 hrs, Volume= 651.0 m³
Outflow = 44.34 L/s @ 7.95 hrs, Volume= 650.4 m³, Atten= 0%, Lag= 0.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.18 m/s, Min. Travel Time= 0.9 min
Avg. Velocity = 0.08 m/s, Avg. Travel Time= 2.0 min

Peak Storage= 2.5 m³ @ 7.95 hrs
Average Depth at Peak Storage= 0.02 m
Bank-Full Depth= 0.15 m Flow Area= 1.50 m², Capacity= 875.33 L/s

10.00 m x 0.15 m deep channel, n= 0.150 Sheet flow over Short Grass
Length= 10.00 m Slope= 0.1000 m/m
Inlet Invert= 0.000 m, Outlet Invert= -1.000 m

Reach 66R: SHEET FLOW (30mm Max)



Summary for Pond 65P: Level Spreader Trench

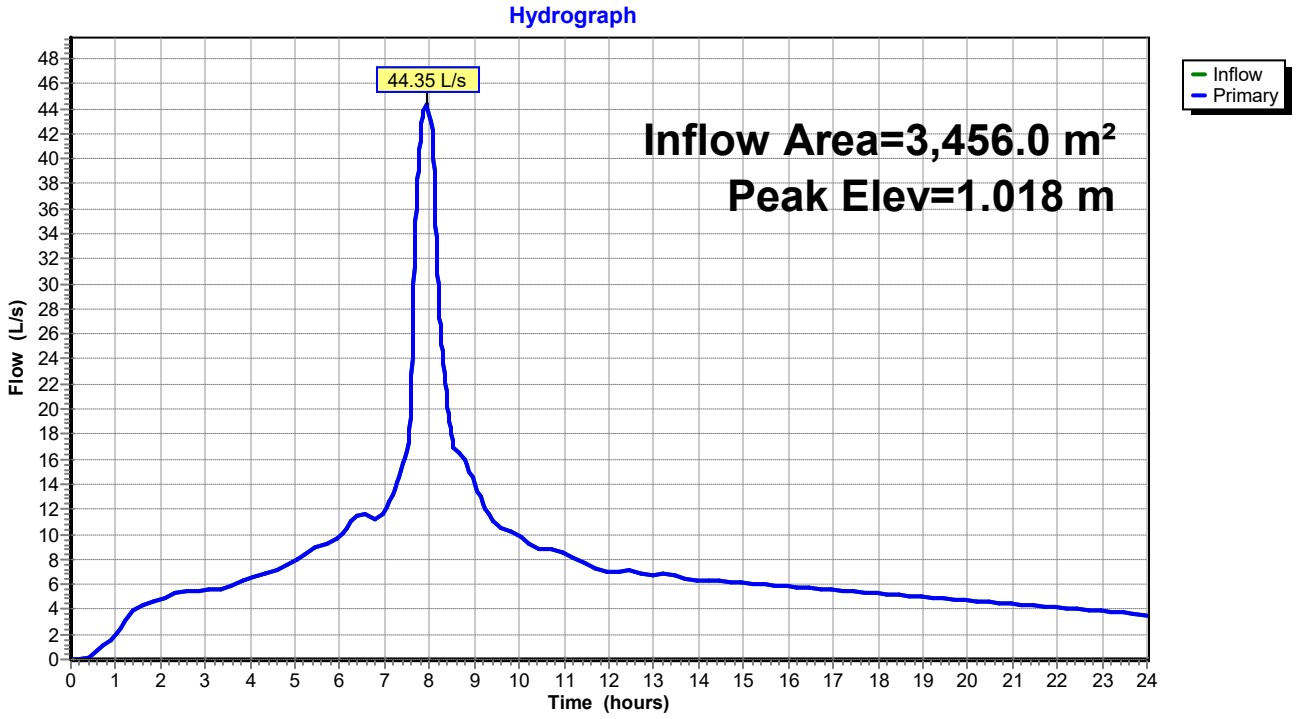
Inflow Area = 3,456.0 m²,100.00% Impervious, Inflow Depth > 188 mm for 20% AEP + 20%CC event
Inflow = 44.35 L/s @ 7.94 hrs, Volume= 651.0 m³
Outflow = 44.35 L/s @ 7.94 hrs, Volume= 651.0 m³, Atten= 0%, Lag= 0.0 min
Primary = 44.35 L/s @ 7.94 hrs, Volume= 651.0 m³

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 1.018 m @ 7.94 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1.000 m	**10.00 m long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=44.35 L/s @ 7.94 hrs HW=1.018 m TW=0.025 m (Dynamic Tailwater)
└**1=Sharp-Crested Rectangular Weir** (Weir Controls 44.35 L/s @ 0.24 m/s)

Pond 65P: Level Spreader Trench



WILTON JOUBERT
Consulting Engineers

Volume Control Calculations

Job Number	140794	Date:	12.06.2025
Address	56 Wiroa Road	Initials:	PM
	Kerikeri	Revision	0

Catchment Information For Pre-Development Conditions

1216	m²	0.001216	km^2	
Group C	soil type		see TP108 page 8 section 3.2 for soil designations	
25.00	P_{24}		90th Percentile Rainfall - Table 4-1 FNDC ES	
		CN		
1216	m²	74	Pervious	
0	m²	98	Sealed roof(s)	
0	m²	98	Sealed conrete	
0	m²	0		
1216	m² tot	74.00	CN -mean	TP108 Eq3.4

5.00	Ia (mm)	Weighted initial abstraction - Ia (mm)
0.03	Tc (hrs)	TP108 Eq 4.3 - pg 12
0.02	Tp (hrs)	Time to peak
89.24	S (mm)	Soil Storage parameter see TP108 eq 3.2 pg 6
3.662	Q_{24} (mm)	Run-Off Depth
4.45	m^3	Volume

Catchment Information For Post-Development Conditions

1216	m²	0.001216	km^2	
Group C	soil type		see page 8 section 3.2 for soil designations	
30.00	P_{24}		90th Percentile + 20% CCF - Table 4-1 FNDC ES	
		CN		
0	m²	74	Pervious	
1216	m²	98	Sealed roof(s)	
0	m²	98	Sealed conrete	
0	m²	89	Metal/Gravel	
1216	m² tot	98.00	CN -mean	TP108 Eq3.4

0.00	Ia (mm)	Weighted initial abstraction - Ia (mm)
0.02	Tc (hrs)	TP108 Eq 4.3 - pg 12
0.01	Tp (hrs)	Time to peak
5.18	S (mm)	Soil Storage parameter see TP108 eq 3.2 pg 6
25.580	Q_{24} (mm)	Run-Off Depth
31.11	m^3	Volume

Total Detention Volume Required: **26.65** m^3

ADDRESS	Marsden Winery 56 Wiroa Road, Kerikeri	**JOB NO**	140794
		DATE	12.06.2025
REFERENCE	WQV Control	**DESIGNER**	PM
		CHECKER	BGS

Outlet Orifice: 24-hour release

Q=(C)(A)(2gh)^0.5	Q = orifice discharge capacity (m3/s)
	C = orifice constant (0.9), value considered conservative
	A = orifice area (m2)
	g = acceleration due to gravity9.8m/s2
	h = head on orifice (m)

Select orifice size (D)	0.011000			
Orifice Area (A)	0.000095			
Select hydraulic height	0.930000			
Flow from tank	0.365	*l/s*	1.31	m^3/h

Flow Required

Tank Size	26.65	m^3		
24-hr release	0.308	*l/s*	1.11	m^3/h

Appendix 8

Geotechnical Assessment Report

Wilton Joubert Limited
09 945 4188
185 Waipapa Road,
Kerikeri

SITE	**56 Wiroa Road, Kerikeri**
LEGAL DESCRIPTION	**Lot 1 DP 192666**
PROJECT	**New Winery Building & Extensions to an Existing Building**
CLIENT	**Marsden Charitable Trust**
REFERENCE NO.	**140407**
DOCUMENT	**Geotechnical Assessment Report**
STATUS/REVISION NO.	**FINAL – Issued for Building Consent**
DATE OF ISSUE	**4 June 2025**

Report Prepared For	Email
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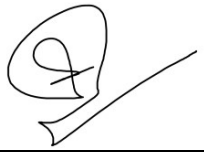
Approved by	**A. Asadi** *PhD (Geotech), CPEng, CMEngNZ*	Senior Geotechnical Engineer	afshin@wjl.co.nz	

1. EXECUTIVE SUMMARY

The following table is intended to be a concise summary which must be read in conjunction with the relevant report sections as referenced herein.

Development Type:	New winery building and extensions to an existing building.
Development Proposals Supplied:	Yes – Preliminary architectural drawings (12 sheets).
NZS3604 Type Structure/s:	**Winery Building:** No. **Extensions:** Yes.
Geology Encountered:	**Winery Building:** Kerikeri Volcanic Group deposits. **Extensions:** Generally, Waipapa Group with minor volcanic veneer across the eastern location.
Surficial Topsoil & Non-Engineered Fill Encountered:	**Winery Building:** Yes – Surficial layers of 0.20m to 0.30m thickness. **Extensions:** Yes - Surficial layers of 0.25m to 0.70m thickness.
Overall Site Gradient in Proximity to Development:	Broad, flat to gently sloping.
Site Stability Risk:	Low risk of deep-seated global instability.
Liquefaction Risk:	Negligible risk of liquefaction susceptibility.
Suitable Foundation Type(s):	**Winery Building:** Reinforced, stiffened raft slab foundation system, or Slab-on-Grade with deepened perimeter strip footings. **Extensions:** Bored, concrete encased, tanalised timber pile or pole foundations.
Soil Bearing Capacity:	Yes – Competent Natural Ground and Engineered Hardfill Only **Shallow Foundations:** Geotechnical Ultimate Bearing Capacity= 300kPa. **Pole Foundations:** Geotechnical Ultimate Bearing Capacity= 900kPa.
NZBC B1 Expansive Soil Classification:	**Winery Building:** Class M – Moderately Expansive (y_s = 44mm). **Extensions:** Class H – Highly Expansive (y_s = 78mm). Refer report text for design guidance.
Minimum Footing Embedment Depths:	**Winery Building:** 0.60m below finished ground levels and 0.30m into competent natural ground, whichever is deeper. **Extensions:** 0.90m below finished ground levels and 0.30m into competent natural ground, whichever is deeper.
NZS1170.5:2004 Site Subsoil Classification:	Class C – Shallow soil stratigraphy.
Earthworks:	For the new winery building, an engineered cut-fill earthworks in the order of approximately 2.0m will be required to create a level building platform. As part of the development works, the existing farm shed will require demolition. For the new extensions, it is generally assumed earthworks will largely be confined to bored footing excavations. Refer report text for design guidance.
Consent Application Report Suitable for:	Once architectural drawings have been finalised, most notably foundation and earthwork plans, they should be referred to WJL for review and a supplementary memorandum will be provided to support a Building Consent application.

2. INTRODUCTION

2.1. SCOPE OF WORK

Wilton Joubert Limited (WJL) was engaged by **Marsden Charitable Trust** (the client), to undertake a geotechnical assessment of ground conditions at the above site, where we understand, it is proposed to construct a new winery building and extensions off the existing winery and restaurant building that is positioned at the southern end of the property.

For the purposes of this report, we have generally assumed that:

- The new winery building is likely to be a portal framed structure, and
- The new extensions will comprise of lightweight, timber framing, designed and constructed to apply loads generally in keeping with the requirements of NZS3604:2011.

2.2. SUPPLIED INFORMATION

At the time of preparing this report, we were supplied with a preliminary set of architectural drawings (12 sheets), prepared by Total Design Ltd, titled; '*Proposed New Building, Marsden Estate, 56 Wiroa Road, Kerikeri*', dated 13 March 2025 (Ref: 1800).

Once architectural drawings have been finalised, most notably foundation and earthwork plans, they should be referred to WJL for review and a supplementary memorandum will be provided to support a Building Consent application.

3. SITE DESCRIPTION

The subject 6.7108ha block is currently occupied by the Marsden Winery and is located off the northern side of Wiroa Road, accessed 550m west of the State Highway 10 roundabout, in the southwestern area of the Kerikeri district. The property is legally titled Lot 1 DP 192666 and is situated within a Rural Production Zone.

The block is accessed at the southern boundary via a bitumen-type driveway that traverses approximately 80m northwest towards an existing winery and restaurant building and bounding car park environment.

Topographically speaking, most of the property is positioned on gently sloping, broad terrain that descends towards the Whiringatau Stream along the western boundary. The stream dissects the block at the southern end, traversing from the western boundary towards the southeastern corner, where a small pond is present. The land at the southern end of the property descends gently north towards the pond. Existing ground levels across the block essentially range between RL129m and RL123m New Zealand Vertical Datum (NZVD).

The property is largely covered in vineyards with areas of pasture covering the northwestern end and around the existing winery and restaurant building. Small bush generally flanks the stream. An existing farm shed is also present across the northwestern pastured land.

At the time of preparing this report, we note that the Far North District Council (FNDC) on-line GIS Water Services Map indicates that reticulated wastewater, and stormwater service connections are not available to the property.

The property and proposed building sites are depicted on our appended Site Plan (Ref: 140407-G600) and in Figure 1 below.

Figure 1: Screenshot from the FNDC on-line GIS Property and Land Map. 10m LiDAR contours are overlaid. Property boundary is highlighted in cyan. Yellow and red rings depict new winery building and building extension development areas, respectively.

4. DEVELOPMENT PROPOSALS

In reviewing the supplied architectural drawings, we note that the client proposes to construct a new winery building at the northwestern end of the property and extensions off the first floor of the existing winery and restaurant building.

The new winery building is to encompass a total footprint area of approximately 1,300m² and will be founded on a slab-on-grade, likely supporting portal framing and lightweight steel cladding and roofing. The building will also contain a minor mezzanine floor. The proposed finished floor level (FFL) is currently unknown. An engineered cut-fill earthworks in the order of approximately 2.0m will be required to create a level building platform. As part of the development works, the existing farm shed will require demolition.

The new first floor extensions are to be constructed off the northwestern and northeastern ends of the existing winery and restaurant building. The northwestern extension will encompass an area of approximately 80m², whilst the northeastern extension is smaller in nature at approximately 30m². It is generally envisaged that both extensions will be found on timber subfloors, suspended on bored, concrete encased, tanalised timber pile or pole foundations. It is assumed the FFL's for both extensions will match the existing first floor FFL and earthworks will largely be confined to bored footing excavations.

As a result, the principal objectives were to investigate and assess the suitability of potential foundation options for the site subsoils, not only primarily in terms of bearing capacity, but also for differential foundation movement.

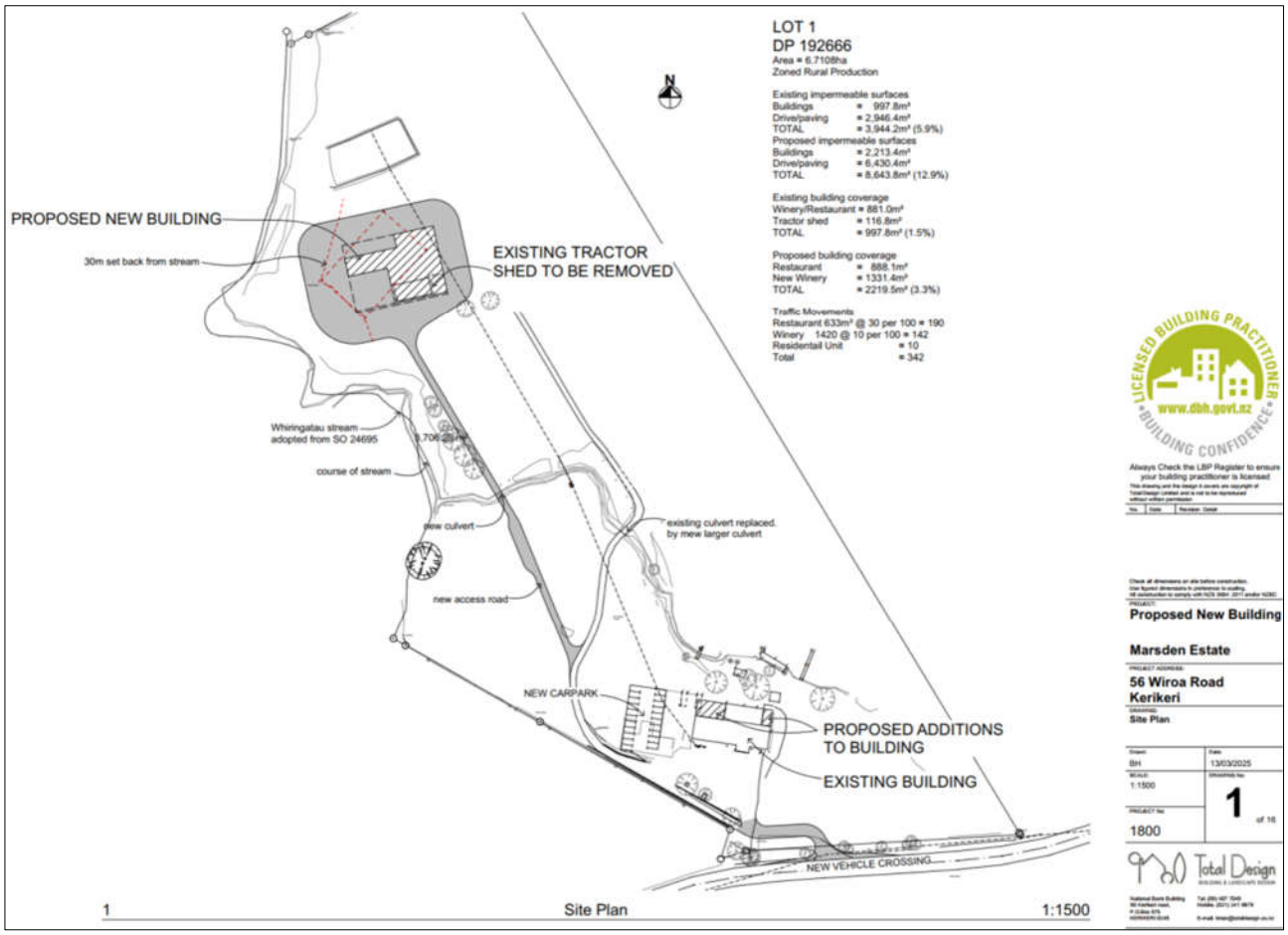


Figure 2: Screenshot of the Site Plan from the supplied architectural drawings.

Figure 3: Site photograph looking southeast towards the new winery building location. Orange cones depict the development extents.

Figure 4: Site photograph from the downslope pond looking southwest towards the existing winery and restaurant building.

5. GEOLOGY

Local geology across the property and wider surrounding land to the west, north and east is noted by the GNS Science New Zealand Geology Web Map, Scale 1:250,000, as; Kerikeri Volcanic Group Late Miocene Basalt of Kaikohe – Bay of Islands Volcanic Field. These deposits are up to approximately 1.8 to 9.7 million years in age and described as; "*Basalt lava, volcanic plugs, and minor tuff.*"

Referring to the above mapping source, a geological boundary is noted across the road from the property, on the southern side of Wiroa Road, with deposits to the south noted as; Waipapa Group Sandstone and Siltstone (Waipapa Composite Terrane). These deposits are up to approximately 154 to 270 million years in age and described as; "*Massive to thin bedded, lithic volcaniclastic metasandstone and argillite, with tectonically enclosed basalt, chert and siliceous argillite.*"

Our subsoil testing findings (see Section 7 below) encountered Kerikeri Volcanic deposits beneath the new winery building location that appear to be part of an air-fall ash and tuff shower, associated with an ancient volcanic event.

Across the new extension build sites, Waipapa Group deposits were encountered beneath the northwestern location, whilst the northeastern location was initially overlain by a Kerikeri Volcanic Group veneer, transitioning into Waipapa Group deposits from approximately 2.1m below existing ground level (BEGL). Due to the proximity of the geological boundary, it is likely that the existing development was previously overlain by a shallow volcanic veneer which has since largely been excavated during construction of the existing building and surrounding car park environment.

Figure 5: Screenshot from the New Zealand Geology Web Map. Blue marker depicts property location.

6. GEOTECHNICAL INVESTIGATION

We undertook a geotechnical investigation of the site on 22 May 2025, involving the following:

- A walkover inspection of both development locations and surrounding influential land,
- Drilling seven (no.) 50mm diameter hand auger boreholes (HA01 to HA07 inclusive) to depths ranging between 0.70m and 3.0m BEGL. HA's 01-05 were drilled at the new winery building location, whilst HA's 06-07 were were drilled at the new extension locations, and
- Dynamic cone – scala penetrometer tests (DCP's) were extended through the invert of HA's 01-05 to refusal depths ranging between 1.3m and 3.4m BGEL.

The soil sample arisings from the HA's were logged in accordance with the "Field Description of Soil and Rock", NZGS, December 2005.

In-situ undrained Vane Shear Strengths were measured at intervals of depth and then adjusted in accordance with the New Zealand Geotechnical Society (NZGS); Guidelines for Handheld Shear Vane Testing, August 2001, with strengths classified in accordance with the NZGS Field Classification Guidelines; Table 2.10, December 2005. The materials identified are described in detail on the appended records, together with the results of the various tests undertaken, plus the groundwater conditions as determined during time on site.

The HA locations are depicted on our appended Site Plan (Ref: 140407-G600) and the logged results are appended to this report.

Additionally, we have drawn two (no.) cross-sections (A-A' and B-B'), utilising 1.0m LiDAR contour data, to represent the topography across both proposed development locations and surrounding influential land. Both cross-sections are appended to this report (Ref: 140407-G610 and 140407-G611) and are depicted on our abovementioned Site Plan.

7. GEOTECHNICAL FINDINGS

The following is a summary of the ground conditions encountered in our investigation. Please refer to the appended logs for greater detail.

7.1. TOPSOIL

Surficial TOPSOIL layers of 0.20m to 0.30m thickness were overlying all seven HA's.

7.2. NON-ENGINEERED FILL

Below the surficial topsoil in HA06, at the northwestern extension location, a 0.50m thick crust of NON-ENGINEERED FILL, comprising of stiff silty clay, was encountered to a depth of 0.70m BEGL.

No fill was detected in the remaining six HA's.

7.3. NEW WINERY BUILDING

The natural ground deposits encountered beneath the building site comprised of very stiff, slightly clayey SILT and gravelly SILT, before terminating on harder basalt rock obstructions at depths ranging between 0.70m and 1.6m BEGL. Massive basalt boulders were also intermittently present at ground surface across the development location and surrounding land, including outcrops across the western boundary stream.

Measured in-situ, BS1377 adjusted peak Shear Vane Strengths generally exceeded 197kPa and/or 220kPa, the latter being where soil strength was in excess of the shear vane capacity, or the vane was not able to penetrate into the soil (UTP). An isolated Shear Vane strength of 155kPa was measured at a depth of 2.0m BEGL in HA05.

Subsequently, no peak to remould Vane Shear Strength ratios were able to be obtained however, based on our experience, we generally assess the underlying silty subgrade as 'Moderately Sensitive.'

DCP's at the invert of HA's 03-05 immediately terminated on a greater than 20 blow count. DCP's extended 1.4m and 1.8m below the invert of HA01 and HA02, respectively, with blow counts initially ranging between 5 and 18, before terminating on a greater than 20 blow count.

Figure 6: Site photograph of the typical HA soil arisings encountered (HA01: 0.0m to 1.6m).

7.4. NEW EXTENSIONS OFF THE EXISTING WINERY AND RESTAURANT BUILDING

At the northwestern location (HA06), the natural ground deposits encountered comprised of very stiff silty CLAY until termination at a depth of 3.0m BEGL.

At the northeastern location (HA07), the natural ground deposits encountered initially comprised of a veneer of very stiff, volcanic clayey SILT and gravelly SILT to a depth of 2.1m BEGL, overlying Waipapa derived, very stiff slightly silty CLAY until termination at a depth of 3.0m BEGL.

Measured in-situ, BS1377 adjusted peak Shear Vane Strengths generally ranged between 127kPa and greater than 197kPa and/or 220kPa, the latter being where soil strength was in excess of the shear vane capacity, or the vane was not able to penetrate into the soil (UTP). An isolated Shear Vane strength of 82kPa was measured at a depth of 2.0m BEGL in HA07, above the volcanic and Waipapa Group transition.

Where measured, peak to remould Vane Shear Strength ratios ranged between 1.8 and 4.5, indicating the underlying subgrade is 'Insensitive, Normal' to 'Moderately Sensitive.'

Figure 7: Site photograph of the HA06 soil arisings (0.0m to 3.0m).

Figure 8: Site photograph of the HA07 soil arisings (0.0m to 3.0m).

7.5. GROUNDWATER

Groundwater was not detected within any of our seven HA's.

Our fieldwork investigation was undertaken on a fine weather day and followed two days of similar good weather conditions.

Considering the above, together with the topography across both development areas and underlying subsoil deposits encountered, we generally envisage that transient and long-term groundwater levels will not be significantly elevated beneath both proposed development locations.

7.6. SUMMARY TABLE

The following table summarises our inferred stratigraphic profiling:

Investigation Hole ID	Termination Depth (m)	Depth to Base of Surficial Topsoil and/or Non-Engineered Fill (m)	Vane Shear Strength Range (kPa) within Natural Ground	DCP Blow Count Range Below HA Invert	DCP Refusal Blow Count (20+) Depth (m)	Standing Groundwater Depth (m)
HA01	1.6	0.20	220+ / UTP	6 - 20+	3.4	NE
HA02	0.70	0.20	197+ / UTP	5 – 20+	2.1	NE
HA03	1.6	0.25	220+ / UTP	20+	1.7	NE
HA04	1.2	0.20	220+ / UTP	20+	1.3	NE
HA05	2.5	0.30	155 - 197+ / UTP	20+	2.6	NE
HA06	3.0	0.70	127 - 186	N/A	N/A	NE
HA07	3.0	0.25	82 – 220+	N/A	N/A	NE

Note: UTP = Unable to Penetrate, NE = Not Encountered, N/A = Not Applicable

8. GEOTECHNICAL ASSESSMENTS

8.1. SITE STABILITY

On the basis of:

- No obvious evidence of deep-seated instability within the immediate vicinity of both proposed development locations and surrounding influential land,
- The broad, gently sloping nature of both proposed development locations, averaging less than 5°,
- The very stiff in-situ measured Shear Vane Strengths recorded during our investigation and high DCP blow counts at depth below the invert of each HA, and
- Lack of groundwater evidence within our HA's,

we perceive the risk of deep-seated global slope instability impacting both proposed development locations to be significantly low.

8.2. LIQUEFACTION ASSESSMENT

Liquefaction is a natural phenomenon whereby prolonged seismic shaking induces an increase in pore water pressure, which in turn decreases the effective stress of silt/fine sand-like soil deposits. Excess pore water pressure (EPWP) can build to such an extent that the effective stress of the underlying soil is reduced to near zero, whereby the soils no longer carry shear strength and behave as a semi solid/fluid. In such a scenario, excess pore water pressures will follow the path of least resistance to eventual dissipation, which can lead to the migration of liquefied soils towards the surface, or laterally towards a free-face (edge of slope, riverbank, etc.) or layers that have not yet undergone liquefaction. Examples of these phenomena were experienced in Christchurch and the greater Canterbury Region during the Earthquake Sequence between 2010-2011.

At the time of preparing this report, we note that the FNDC on-line GIS Liquefaction Vulnerability Map indicates that the property and wider surrounding land lies within an '*Unlikely*' zone.

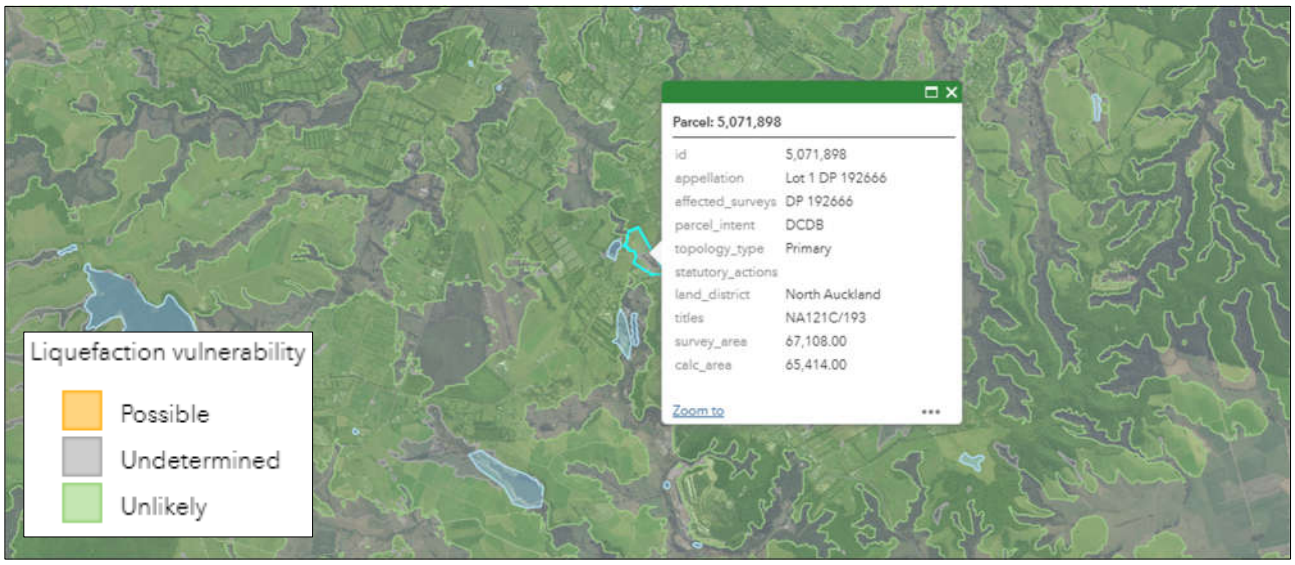


Figure 9: Screenshot from the FNDC on-line GIS Liquefaction Vulnerability Map. Property boundary is highlighted in cyan.

A screening procedure based on geological criteria was adopted to examine whether the proposed development might be susceptible to liquefaction, with observations as follows:

- There are no known active faults traversing through the property or wider surrounding land,
- There is no historical evidence of liquefaction at the property,
- The property is situated in an elevated location, set no less than approximately RL123m NZVD, with good water shedding characteristics,
- The very stiff in-situ measured Shear Vane Strengths recorded during our investigation and high DCP blow counts at depth below the invert of each HA,
- Lack of groundwater evidence within our HA's,
- The underlying natural soil deposits comprise of cohesive soils that are not generally considered susceptible to liquefaction, and
- The subsoils beneath the development area are underlain by Kerikeri Volcanic Group deposits, being 1.8 to 9.7 million years in age, allowing for adequate consolidation in comparison to younger, Holocene age material (10,000 years).

Based on the above, we conclude that the subsoils across both proposed building sites have a negligible risk of liquefaction susceptibility and liquefaction damage is therefore considered to be unlikely.

9. CONCLUSIONS AND RECOMMENDATIONS

On the basis of the above findings, we consider that the risk of moderate to deep-seated slope instability impacting both proposed development locations to be significantly low, provided all recommendations contained within our report are implemented in design and construction.

With regard to the Building Act 2004; Sections 71-72, we believe on reasonable grounds that:

i. The current proposed site development and associated building work within the relayed building platforms should not accelerate, worsen, or result in slippage or subsidence on the land on which the building work is to be carried out or any other property, and

ii. The land beneath the building footprints and surrounding immediate amenity areas of the relayed building platforms are neither subject nor likely to be subject to slippage or subsidence, provided the development is undertaken in accordance with the recommendations and guidance of this report.

9.1. FOUNDATIONS

The new winery building will be found on a slab-on-grade, likely supporting portal framing and lightweight steel cladding and roofing. In following Section 9, we will provide design recommendations pertaining to both reinforced, stiffened raft slab foundation system and slab-on-grade with deepened perimeter strip footing construction.

It is generally envisaged that both first floor extensions will be found on timber subfloors, suspended on bored, concrete encased, tanalised timber pile or pole foundations.

Due to the expansive nature of the subsoil deposits beneath the proposed development locations, thus not complying with the NZS3604 definition of "*Good Ground*", all foundations will need to be subject to specific engineering design (SED).

9.1.1. SHALLOW FOUNDATION BEARING CAPACITY

The following bearing capacity values are considered to be appropriate for the design of shallow foundations, subject to founding directly within or on competent natural ground or engineered hardfill, for which careful Geo-Professional inspections of the subgrade should be undertaken to check that underlying ground conditions are in keeping with our expectations:

Geotechnical Ultimate Bearing Capacity	300 kPa
ULS Dependable Bearing Capacity (Φ=0.5)	150 kPa

When finalising development proposals, it should be checked that all foundations lie outside 45° envelopes rising up from 0.50m below the invert of service trenches, unless such foundation details are found by SED to be satisfactory. Deeper foundation embedment with piles may be required for any surcharging foundations.

During inspections, it is important to exercise caution to verify that the natural ground meets the recommended bearing capacity mentioned in this report. This is crucial for preserving structural integrity.

9.1.2. POLE FOUNDATION BEARING CAPACITY

If the pole foundations are to be deeper than 4 times the diameter of the drilled concrete collar to ensure cantilever embedment action, then the following bearing capacity values are considered to be appropriate for the design of such foundations, subject to founding directly within or on competent natural ground, which competency should be confirmed by careful Geo-Professional inspections of the subgrade prior to material placement:

Geotechnical Ultimate Bearing Capacity	900 kPa
ULS Dependable Bearing Capacity (Φ=0.5)	450 kPa

9.1.3. SHALLOW FOUNDATIONS ON EXPANSIVE SOILS

There was a noticeable difference in subsoil founding materials at foundation levels across both proposed development locations. As such, different expansive soil classifications are recommended for each development location as follows:

NEW WINERY BUILDING

In this instance, considering the no to low plasticity of the of the slightly clayey silt and gravelly silt deposits, together with our extensive previous experience within similar volcanic settings across the Kerikeri Region which have yielded Class S and Class M results during laboratory testing, we recommend a primary conservative classification of Class M (Moderately) expansive soils, as defined in clause 7.5.13.1.2, and introduced to NZS3604 by Amendment 19 of NZBC Structure B1/AS1.

- NZBC B1 Expansive Soil Class M
- Upper Limit of Characteristic surface movement (ys) 44mm

Soil expansiveness can be aided in mitigation as follows:

- For Raft Slab Foundation System:
  - Reinforced, stiffened raft slab, designed for a Ys value of 44mm and founded on a minimum of 0.10m of engineered hardfill that extends a minimum of 1.0m beyond the building footprint.

- For Slab-on-Grade with Deepened Perimeter Strip Footings and Portal Footings:
  - Minimum embedment of 0.60m below finished ground levels and 0.30m into competent natural ground, whichever is deeper.

NEW EXTENSIONS OF THE EXISTING WINERY AND RESTAURANT BUILDING

In this instance, considering the general moderate to high plasticity of the Waipapa Group deposits, we recommend a primary conservative classification on Class H (Highly) expansive soils, as defined in clause 7.5.13.1.2, and introduced to NZS3604 by Amendment 19 of NZBC Structure B1/AS1.

- NZBC B1 Expansive Soil Class H
- Upper Limit of Characteristic surface movement (ys) 78mm

Soil expansiveness can be aided in mitigation as follows:

- For Bored, Concrete Encased, Tanalised Timber Pile or Pole Foundations:
  - Minimum embedment of 0.90m below finished ground levels and 0.30m into competent natural ground, whichever is deeper.

9.1.4. NZS1170.5:2004 SITE SUBSOIL CLASSIFICATION

We consider both proposed building sites to be underlain with a Class C – Shallow Soil stratigraphy.

9.2. SITE EARTHWORKS

For the new winery building, an engineered cut-fill earthworks in the order of approximately 2.0m will be required to create a level building platform. As part of the development works, the existing farm shed will require demolition.

For the new extensions, it is generally assumed earthworks will largely be confined to bored footing excavations.

Generally, and as directed by a suitably experienced engineer, all earthworks should be undertaken in accordance with the following standards:

- NZS4431:2022 "Code of Practice for Earth Fill Residential Development",
- Section 2 "Earthworks & Geotechnical Requirements" of NZS4404:2010 "Land Development and Subdivision Infrastructure", and
- Chapter 2 "Site Development Suitability (Geotechnical and Natural Hazards" of the Far North District Council Engineering Standards, (Version 0.6 issued May 2023).

9.3. SITE PREPARATION

The competency of the exposed subgrade at the invert of all footings and across the new winery building floor slab should be confirmed by a Geo-Professional. We recommend the stripping of all vegetation, topsoil, and any non-engineered fill deposits encountered across the new winery building footprint, prior to requesting Geo-Professional inspection(s) of the stripped ground to confirm that the underlying natural subgrade conditions are in keeping with the expectations of this report. Without such inspections being undertaken, a Chartered Professional Geotechnical Engineer is unable to issue a Producer Statement - PS4 – Design Review which could result in the failure to meet Building Consent requirements as set by Council as conditions of consent.

9.4. SUBGRADE PROTECTION

The subgrade beneath the new winery building floor slab should not be exposed for any prolonged period and should be covered with a 0.10m thick layer of granular fill such as GAP40 basecourse, as soon as possible.

If subgrade degradation occurs by:

- Excessive drying out resulting in desiccation shrinkage cracking, it will be necessary to either re-hydrate the subgrade or undercut the degraded material and replace with compacted hardfill, or
- Excessive subgrade softening after a period of wet weather resulting in weakened soils, it will be necessary to undercut the degraded material and replacement with compacted hardfill.

All footing inverts should be poured as soon as possible once inspected by a Geo-Professional or covered with a protective layer of site concrete.

9.5. HARDFILL COMPACTION

Engineered hardfill should be used for all fills beneath the new winery building. Bulk filling using AP sizes or brown rock may be applicable however, it is recommended the platform is capped with a minimum 0.20m thick layer of GAP40. The compaction of hardfill should be undertaken using either a heavy plate compactor or a steel wheeled roller with low frequency dynamic compaction. Hardfill layers should not exceed 0.15m at a time, and where the total depths exceed 0.60m, there is likely to be a Building Consent condition for observation/testing of the hardfill by a Geo-Professional. We recommend achieving the following compacted target values, with equivalence testing using either a Clegg Impact Hammer or DCP.

Foundation Support Type	CBR	Equivalent Clegg Impact Value (CIV)	Equivalent DCP-Scala Penetrometer Blows
Foundation Footings & Beams (Over a depth of no less than twice the foundation width)	≥ 10%	Minimum 20 Average 25	≥5 blows/100mm (NZS3604)
Floor Slabs	≥ 7%	Minimum 18 Average 20	≥3.5 blows/100mm (NZS3604)

9.6. TEMPORARY & LONG-TERM EARTHWORK BATTERS

We recommend that earthworks only be undertaken during prolonged periods of dry forecast conditions.

During times of inclement weather, earthwork sites should be shaped to assist in stormwater run-off. The toe of any batter excavations should be shaped to avoid ponding water, as saturating site soils could result in a reduction of bearing capacities.

All cuts up to a height of 1.5m should be battered no steeper than 1V:3H (18°). Any cuts outside these imposed limits should be referred to WJL for advice.

All cuts up to a height of 1.0m should be battered no steeper than 1V:4H (14°). Any fills outside these imposed limits should be referred to WJL for advice.

The structural designer and building contractor should ensure that a satisfactory Factory of Safety (FoS) against ground instability is available at all stages of the development.

9.7. GENERAL SITE WORKS

We stress that all works should be undertaken in a careful and safe manner so that Health & Safety is not compromised, and that suitable Erosion & Sediment control measures should be put in place. Any stockpiles placed should be done so in an appropriate manner so that land stability and/or adjacent structures are not compromised. Furthermore:

- All works must be undertaken in accordance with the Health and Safety at Work Act 2015,
- Any open excavations should be fenced off or covered, and/or access restricted as appropriate,
- The location of all services should be verified at the site prior to the commencement of construction,
- The Contractor is responsible at all times for ensuring that all necessary precautions are taken to protect all aspects of the works, as well as adjacent properties, buildings and services, and
- Should the contractor require any site-specific assistance with safe construction methodologies, please contact WJL for further assistance.

9.8. LONG-TERM FOUNDATION CARE & MAINTENANCE

The recommendations given above to mitigate the risk of expansive soils do not necessarily remove the risk of external influences affecting the moisture in the subgrade supporting the foundations.

All owners should also be aware of the detrimental effects that significant trees can have on building foundation soils, viz:

- Their presence can induce differential consolidation settlements beneath foundations through localised soil water deprivation, or conversely, and
- Foundation construction too soon after their removal can result in soil swelling and raising foundations as the soil rehydrates.

To this end, care should be taken to avoid:

- Having significant trees positioned where their roots could migrate beneath the house foundations, and
- Constructing foundations on soils that have been differentially excessively desiccated by nearby trees, whether still existing, or recently removed.

We recommend that homeowners make themselves familiar with the appended Homeowners' Guide published by CSIRO, with particular emphasis on maintenance of drains, water pipes, gutters, and downpipes.

10. STORMWATER CONTROL

Uncontrolled stormwater flows must not be allowed to run onto or over site slopes, or to saturate the ground, so as to adversely affect soil strength.

All stormwater runoff from new roof and paved areas should be collected in sealed pipes and be discharged to a stable disposal point that is well clear of both development locations.

Under no circumstances should concentrated overflows from any source be discharged into or onto the ground in an uncontrolled fashion.

11. UNDERGROUND SERVICES

Underground services, public or private, mapped, or unmapped, of any type may be present, hence we recommend staying on the side of caution during the commencement of any work within the proposed development area.

12. FUTURE CONSTRUCTION MONITORING

The foregoing statements are Professional Opinion, based on a limited collection of information, some of which is factual, and some of which is inferred. Because soils are not a homogeneous, manufactured building component, there always exists a level of risk that inferences about soil conditions across the greater site, which have been drawn from isolated "pin-prick" locations, may be subject to localized variations. Generally, any investigation is deemed less complete until the applicability of its inferences and the Professional Opinions arising out of those are checked and confirmed during the construction phase, to an appropriate level.

It is increasingly common for the Building Consent Authorities to require a Producer Statement – Construction (PS4) which is an important document. The purpose of the PS4 is to confirm the Engineers' Professional Opinion to the BCA that specific elements of construction, such as the verification of design assumptions and soil parameters (NZBC clause B1/VM4 2.0.8), are in accordance with the approved Building Consent and its related documents, which should include the subject Geotechnical Report. Where site works will involve the placement of fill, the PS4 should reference NZBC clause B1/VM1 10.1.

For WJL to issue a PS4 to meet the above clauses of the NZBC, we will need to carry out the site inspections as per the Building Consent and Council requirements.

We require at least 48 hours' notice for site inspections.

Site inspections should be undertaken by a Chartered Professional Geotechnical Engineer or their Agent, who is familiar with both this site and the contents of this Geotechnical Report.

Prior to works commencement, the above Engineer should be contacted to confirm the construction methodologies, inspection, and testing frequency.

The primary purpose of the site inspections is to check that the conditions encountered are consistent with those expected from the investigations and adopted for the design as discussed herein. If anomalies or uncertainties are identified, then further Professional advice should be sought from the Geo-Professional, which will allow the timely provision of solutions and recommendations should any engineering problems arise.

Upon satisfactory completion of the above work aspects, WJL would then be in a position to issue the PS4 as required by Council.

At this time, the following Geotechnical site inspections and testing should include, but are not limited to:

- Site cut,
- Hardfill compaction testing, and
- Pre-pour strip, pad, pile and post footing excavations.

13. LIMITATIONS

We anticipate that this report is to be submitted to Council in support of a Building Consent application.

This report has been commissioned solely for the benefit of our client, **Marsden Charitable Trust**, in relation to the project described herein, and to the limits of our engagement, with the exception that the local Territorial Authority may rely on it to the extent of its appropriateness, conditions and limitations, when issuing the subject consent. Any variations from the development proposals described herein as forming the basis of our appraisal should be referred to us for further evaluation. Copyright of Intellectual Property remains with WJL, and this report may NOT be used by any other entity, or for any other proposals, without our written consent. Therefore, no liability is accepted by this firm or any of its directors, servants, or agents, in respect of any other geotechnical aspects of this site, nor for its use by any other person or entity, and any other person or entity who relies upon any information contained herein does so entirely at their own risk. Where other parties may wish to rely on it, whether for the same or different proposals, this permission may be extended, subject to our satisfactory review of their interpretation of the report.

The recommendations provided in this geotechnical report are in accordance with the findings from our shallow investigation. However, it is important to acknowledge that additional refinement of the investigation and analysis may be necessary to meet the specific requirements set by the local council.

Although this report may be submitted to a local authority in connection with an application for a consent, permission, approval, or pursuant to any other requirement of law, this disclaimer shall still apply and require all other parties to use due diligence where necessary and does not remove the necessity for the normal inspection of site conditions and the design of foundations as would be made under all normal circumstances.

Thank you for the opportunity to provide our service on this project, and if we can be of further assistance, please do not hesitate to contact us.

Yours faithfully,

WILTON JOUBERT LIMITED

Enclosures:

Site Plan (1 sheet)
Cross-Section A-A' and B-B' (2 sheets)
Hand Auger Borehole Records (7 sheets)
'Foundation Maintenance & Footing Performance' sheet BTF18: A Homeowner's Guide, published by CSIRO (4 sheets)
Construction Monitoring (1 sheet)

SITE LOCATION

IMAGE SOURCE:
FAR NORTH DISTRICT COUNCIL LOCAL MAPS

SYMBOL KEY	
HA 01	HAND AUGER LOCATIONS
A G610 / A G610	CROSS SECTION LOCATION

GENERAL NOTES

1. SITE PLAN IS ONLY INDICATIVE FOR CONCEPT DESIGN. NO MEASUREMENTS MAY BE TAKEN FROM DRAWING.
2. BACKGROUND INFORMATION, CONTOURS & LOCAL SERVICES PROVIDED BY THE CLIENT & EXTRACTED FROM LOCAL COUNCIL GIS.
3. ALL DIMENSION AND LEVELS TO BE CHECKED ON SITE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER.
4. ALL WORK TO BE DONE IN ACCORDANCE WITH THE RELEVANT STANDARDS AND MUST BE UNDERTAKEN IN ACCORDANCE WITH THE HEALTH AND SAFETY AT WORK ACT 2015.

0m 5m 25m 50m

SCALE 1:500

WILTON JOUBERT
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Auckland: 09 527 0196
Christchurch: 021 824 063
Wanaka: 03 443 6209
www.wiltonjoubert.co.nz

ISSUE / REVISION

No.	DATE	BY	DESCRIPTION
A	MAY '25	SJP	ISSUED WITH GEOTECHNICAL REPORT

DESIGNED BY: SJP
DRAWN BY: GMB
CHECKED BY: SJP
SURVEYED BY: N/A

SERVICES NOTE

WHERE EXISTING SERVICES ARE SHOWN, THEY ARE INDICATIVE ONLY AND MAY NOT INCLUDE ALL SITE SERVICES. WILTON JOUBERT LTD DOES NOT WARRANT THAT ALL, OR INDEED ANY SERVICES ARE SHOWN. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE AND PROTECT ALL EXISTING SERVICES PRIOR TO AND FOR THE DURATION OF THE CONTRACT WORKS.

GEOTECHNICAL

DESIGN / DRAWING SUBJECT TO ENGINEER'S APPROVAL

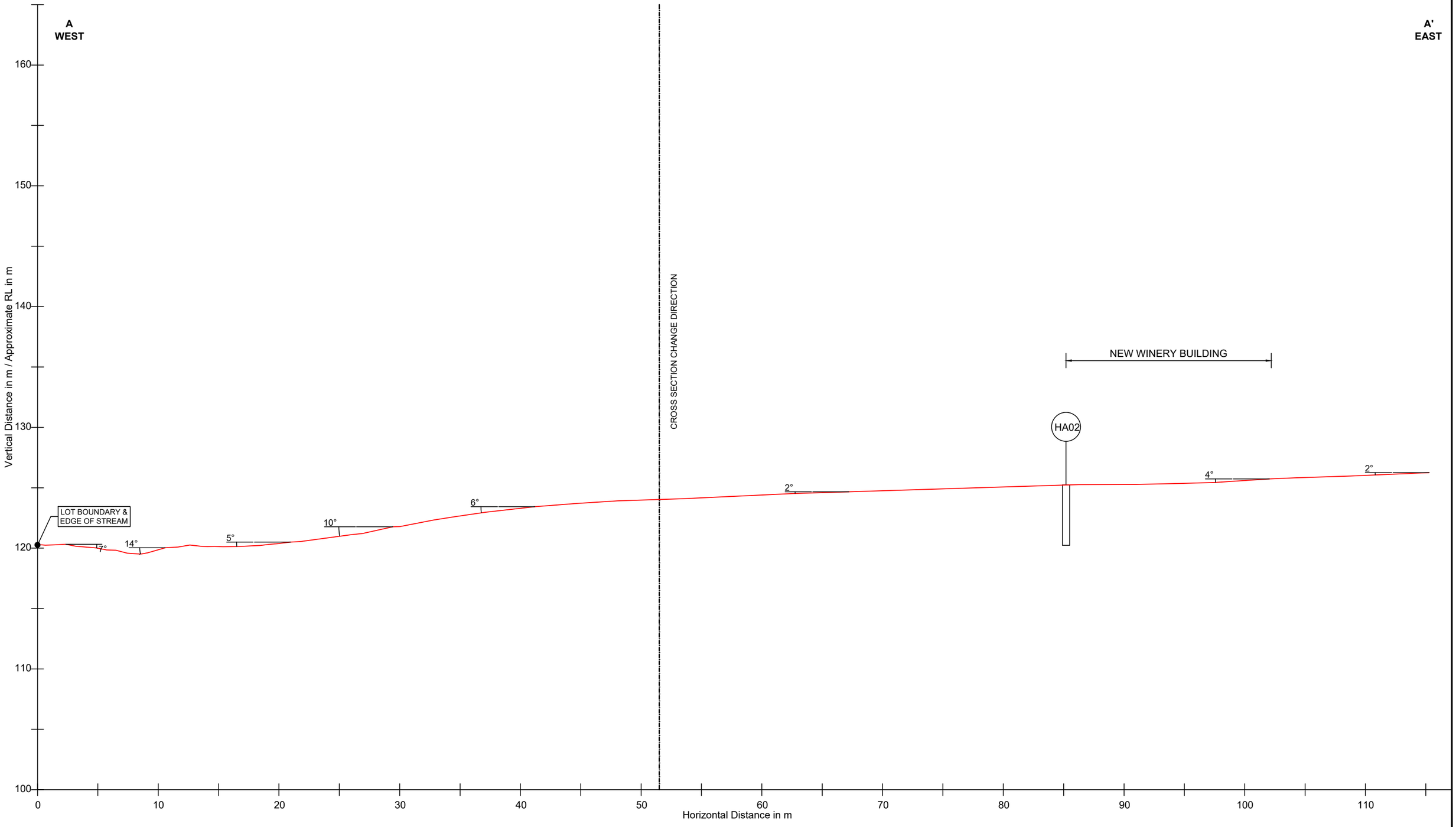
DRAWING TITLE:
SITE PLAN

PROJECT DESCRIPTION:
NEW WINERY BUILDING & EXTENSIONS TO AN EXISTING BUILDING

PROJECT TITLE:
LOT 1 DP 192666
56 WIROA ROAD
KERIKERI
NORTHLAND

ORIGINAL DRAWING SIZE:	OFFICE:
A3	OREWA
DRAWING SCALE:	CO-ORDINATE SYSTEM:
1:1000	NOT COORDINATED

DRAWING NUMBER: **140407-G600**
ISSUE: **A**



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ISSUE / REVISION			
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A	MAY '25	SJP	ISSUED WITH GEOTECHNICAL REPORT

DESIGNED BY: SJP
DRAWN BY: GMB
CHECKED BY: SJP
SURVEYED BY: N/A

SERVICES NOTE
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GEOTECHNICAL

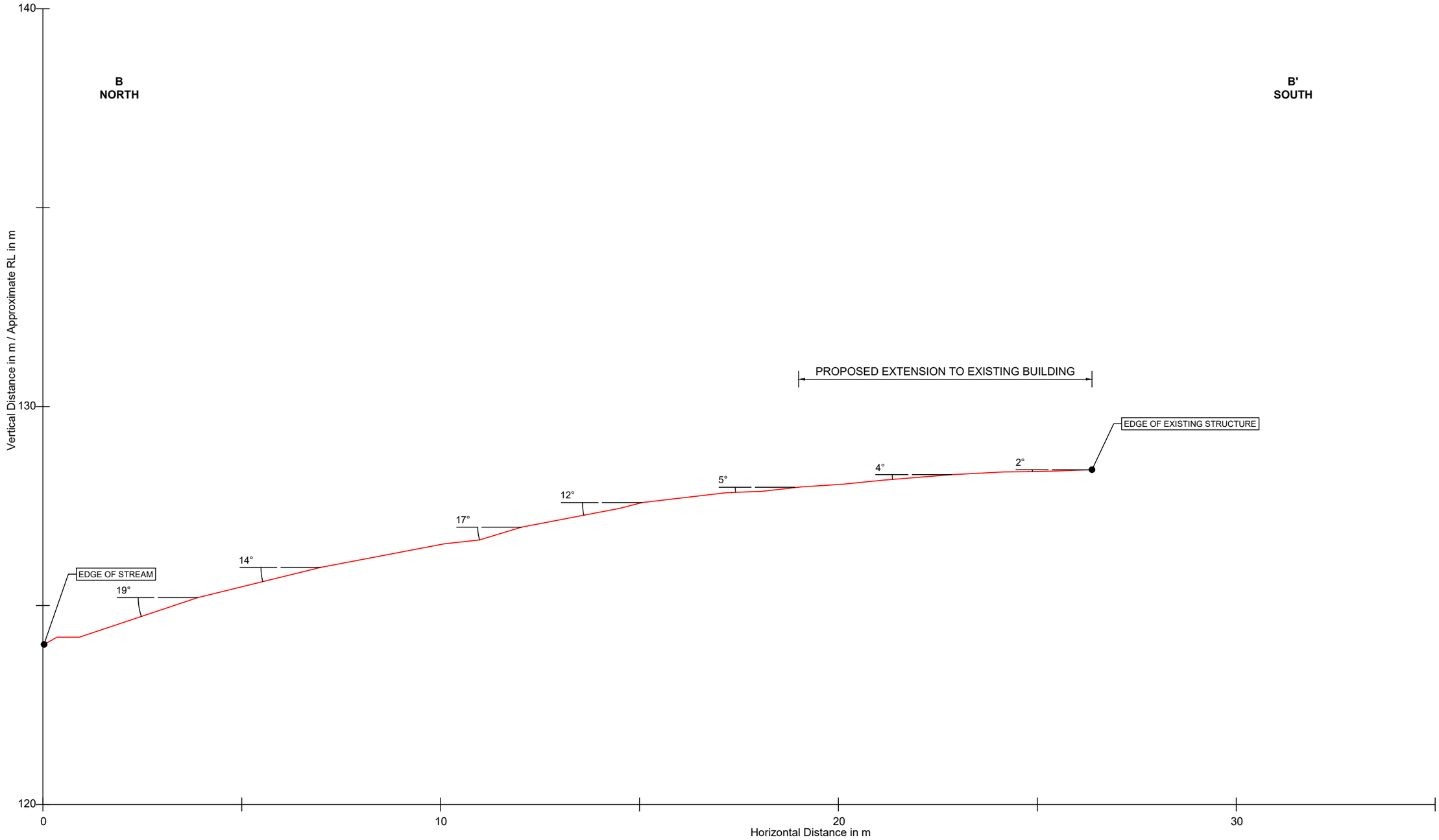
DESIGN / DRAWING SUBJECT TO ENGINEER'S APPROVAL

DRAWING TITLE:
CROSS SECTION A-A'

PROJECT DESCRIPTION:
NEW WINERY BUILDING & EXTENSIONS TO AN EXISTING BUILDING

PROJECT TITLE:
LOT 1 DP 192666
56 WIROA ROAD
KERIKERI
NORTHLAND

ORIGINAL DRAWING SIZE:	OFFICE:
A3	**OREWA**
DRAWING SCALE: **1:300**	CO-ORDINATE SYSTEM: NOT COORDINATED
DRAWING NUMBER: **140407-G610**	ISSUE: **A**



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ISSUE / REVISION

No.	DATE	BY	DESCRIPTION
A	MAY '25	SJP	ISSUED WITH GEOTECHNICAL REPORT

DESIGNED BY: SJP
DRAWN BY: GMB
CHECKED BY: SJP
SURVEYED BY: N/A

SERVICES NOTE
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GEOTECHNICAL
DESIGN / DRAWING SUBJECT TO ENGINEER'S APPROVAL

DRAWING TITLE:
CROSS SECTION A-A'

PROJECT DESCRIPTION:
NEW WINERY BUILDING & EXTENSIONS TO AN EXISTING BUILDING

PROJECT TITLE:
LOT 1 DP 192666
56 WIROA ROAD
KERIKERI
NORTHLAND

ORIGINAL DRAWING SIZE: A3
OFFICE: OREWA
DRAWING SCALE: 1:300
CO-ORDINATE SYSTEM: NOT COORDINATED
DRAWING NUMBER: 140407-G611
ISSUE: A

HAND AUGER : HA01

JOB NO.: 140407 **SHEET:** 1 OF 1

START DATE: 22/05/2025 **NORTHING:** **GRID:**

CLIENT: Marsden Charitable Trust **DIAMETER:** 50mm **EASTING:**

PROJECT: New Winery Building & Extensions to Existing Building **SV DIAL:** DR4802 **ELEVATION:** Ground

SITE LOCATION: 56 Wiroa Road, Kerikeri **FACTOR:** 1.57 **DATUM:**

STRATIGRAPHY	SOIL DESCRIPTION	LEGEND	DEPTH (m)	WATER	SHEAR VANE: PEAK STRENGTH (kPa)	SHEAR VANE: REMOULD STRENGTH (kPa)	SHEAR VANE: SENSITIVITY	DCP - SCALA (Blows / 100mm)	COMMENTS, SAMPLES, OTHER TESTS
Topsoil	TOPSOIL, dark brown, moist.	TS	0.2	Groundwater Not Encountered					
Kerikeri Volcanic Group	NATURAL: Slightly Clayey SILT, brown with occasional orange and grey weakly and strongly fused clast mottles, very stiff, moist, low plasticity.		0.4		220+	-	-		
			0.6						
	Slightly Clayey & Gravelly (Clast) SILT, brown with orange and grey mottles, very stiff to hard, moist, low plasticity.		0.8		UTP	-	-		
			1.0						
			1.2		UTP	-	-		
			1.4						
			1.6		UTP	-	-	6	
	EOH: 1.60m - Refusal (Basalt Rock Obstruction)		1.8					6	
								7	
			2.0					7	
								8	
			2.2					9	
								10	
			2.4					10	
								10	
			2.6					11	
								11	
			2.8					12	
								12	
			3.0					14	
								14	
			3.2					16	
								18	
			3.4					20+	

SOIL DESCRIPTION

TOPSOIL | CLAY | SAND | PEAT

FILL | SILT | GRAVEL | ROCK

REMARKS

End of borehole @ 1.60m (Target Depth: 5.00m)

NZGS Definition of Relative Density for Coarse Grain soils: VL - Very Loose; L - Loose; MD - Medium Dense; D - Dense; VD - Very Dense

LOGGED BY: SJP

CHECKED BY: ANA

▼ Standing groundwater level

▽ GW while drilling

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HAND AUGER : HA02

CLIENT: Marsden Charitable Trust
PROJECT: New Winery Building & Extensions to Existing Building
SITE LOCATION: 56 Wiroa Road, Kerikeri

JOB NO.: 140407 **SHEET:** 1 OF 1
START DATE: 22/05/2025 **NORTHING:** **GRID:**
DIAMETER: 50mm **EASTING:**
SV DIAL: 1994 **ELEVATION:** Ground
FACTOR: 1.41 **DATUM:**

STRATIGRAPHY	SOIL DESCRIPTION	LEGEND	DEPTH (m)	WATER	SHEAR VANE PEAK STRENGTH (kPa)	SHEAR VANE REMOULD STRENGTH (kPa)	SHEAR VANE SENSITIVITY	DCP - SCALA (Blows / 100mm)	COMMENTS, SAMPLES, OTHER TESTS
Topsoil	TOPSOIL, dark brown, moist.	TS	0.2	Groundwater Not Encountered					
Kerikeri Volcanic Group	NATURAL: Slightly Clayey SILT, brown, very stiff, moist, low plasticity, occasional weakly and strongly fused clast inclusions, trace rootlets.		0.4		197+	-	-		
			0.6						
	EOH: 0.70m - Refusal (Basalt Rock Obstruction)		0.8		UTP	-	-	12	
			1.0					6	
			1.2					6	
			1.4					6	
			1.6					6	
			1.8					5	
			2.0					5	
			2.2					5	
			2.4					7	
			2.6					8	
			2.8					10	
			3.0					11	
			3.2					20+	
			3.4						

SOIL DESCRIPTION: TOPSOIL, CLAY, SAND, PEAT, FILL, SILT, GRAVEL, ROCK

REMARKS
End of borehole @ 0.70m (Target Depth: 3.00m)

NZGS Definition of Relative Density for Coarse Grain soils: VL - Very Loose; L - Loose; MD - Medium Dense; D - Dense; VD - Very Dense

LOGGED BY: JEM
CHECKED BY: ANA

▼ Standing groundwater level
▽ GW while drilling

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HAND AUGER : HA03

CLIENT: Marsden Charitable Trust
PROJECT: New Winery Building & Extensions to Existing Building
SITE LOCATION: 56 Wiroa Road, Kerikeri

JOB NO.: 140407 **SHEET:** 1 OF 1
START DATE: 22/05/2025 **NORTHING:** **GRID:**
DIAMETER: 50mm **EASTING:**
SV DIAL: DR4802 **ELEVATION:** Ground
FACTOR: 1.57 **DATUM:**

SOIL DESCRIPTION: TOPSOIL, CLAY, SAND, PEAT, FILL, SILT, GRAVEL, ROCK

STRATIGRAPHY	LEGEND	DEPTH (m)	WATER	SHEAR VANE: PEAK STRENGTH (kPa)	SHEAR VANE: REMOULD STRENGTH (kPa)	SHEAR VANE: SENSITIVITY	DCP - SCALA (Blows / 100mm)	COMMENTS, SAMPLES, OTHER TESTS
Topsoil		0.0						
	TS	0.2						
Kerikeri Volcanic Group		0.4		220+	-	-		
NATURAL: Slightly Clayey SILT, brown, very stiff, low plasticity.		0.6						
0.5m: Frequent orange weakly and strongly fused clast mottles.		0.8		220+	-	-		
Slightly Gravelly (Clast) SILT, minor clay, brown with orange mottles, very stiff to hard, moist, no plasticity (friable).		1.0	Groundwater Not Encountered					
		1.2		UTP	-	-		
		1.4						
		1.6		UTP	-	-	20+	
EOH: 1.60m - Refusal (Basalt Rock Obstruction)		1.8						
		2.0						
		2.2						
		2.4						
		2.6						
		2.8						
		3.0						
		3.2						
		3.4						

REMARKS
End of borehole @ 1.60m (Target Depth: 5.00m)

NZGS Definition of Relative Density for Coarse Grain soils: VL - Very Loose; L - Loose; MD - Medium Dense; D - Dense; VD - Very Dense

LOGGED BY: SJP
CHECKED BY: ANA

▼ Standing groundwater level
▽ GW while drilling

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HAND AUGER : HA04

CLIENT: Marsden Charitable Trust
PROJECT: New Winery Building & Extensions to Existing Building
SITE LOCATION: 56 Wiroa Road, Kerikeri

JOB NO.: 140407 **SHEET:** 1 OF 1
START DATE: 22/05/2025 **NORTHING:** **GRID:**
DIAMETER: 50mm **EASTING:**
SV DIAL: DR4802 **ELEVATION:** Ground
FACTOR: 1.57 **DATUM:**

SOIL DESCRIPTION: TOPSOIL, CLAY, SAND, PEAT, FILL, SILT, GRAVEL, ROCK

STRATIGRAPHY	LEGEND	DEPTH (m)	WATER	SHEAR VANE PEAK STRENGTH (kPa)	SHEAR VANE REMOULD STRENGTH (kPa)	SHEAR VANE SENSITIVITY	DCP - SCALA (Blows / 100mm)	COMMENTS, SAMPLES, OTHER TESTS
Topsoil: TOPSOIL, dark brown, moist.	TS	0.2	Groundwater Not Encountered					
Kerikeri Volcanic Group: NATURAL: Slightly Clayey SILT, brown with occasional orange and grey weakly and strongly fused clast mottles, very stiff, moist, low plasticity.		0.4		220+	-	-		
Slightly Clayey & Gravelly (Clast) SILT, brown with orange and grey mottles, very stiff to hard, moist, low plasticity.		0.6						
		0.8		UTP	-	-		
		1.0						
EOH: 1.20m - Refusal (Hard Basalt Obstruction)		1.2		UTP	-	-	20+	
		1.4						
		1.6						
		1.8						
		2.0						
		2.2						
		2.4						
		2.6						
		2.8						
		3.0						
		3.2						
		3.4						

REMARKS
End of borehole @ 1.20m (Target Depth: 3.00m)

NZGS Definition of Relative Density for Coarse Grain soils: VL - Very Loose; L - Loose; MD - Medium Dense; D - Dense; VD - Very Dense

LOGGED BY: SJP
CHECKED BY: ANA

▼ Standing groundwater level
▽ GW while drilling

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HAND AUGER : HA05

JOB NO.: 140407 **SHEET:** 1 OF 1

START DATE: 22/05/2025 **NORTHING:** **GRID:**

CLIENT: Marsden Charitable Trust **DIAMETER:** 50mm **EASTING:**

PROJECT: New Winery Building & Extensions to Existing Building **SV DIAL:** 1994 **ELEVATION:** Ground

SITE LOCATION: 56 Wiroa Road, Kerikeri **FACTOR:** 1.41 **DATUM:**

STRATIGRAPHY	SOIL DESCRIPTION	LEGEND	DEPTH (m)	WATER	SHEAR VANE: PEAK STRENGTH (kPa)	SHEAR VANE: REMOULD STRENGTH (kPa)	SHEAR VANE: SENSITIVITY	DCP - SCALA (Blows / 100mm)	COMMENTS, SAMPLES, OTHER TESTS
Topsoil	TOPSOIL, dark brown, moist.	TS	0.2	Groundwater Not Encountered					
Kerikeri Volcanic Group	NATURAL: Slightly Clayey SILT, brown, very stiff, moist, low plasticity, occasional weakly and strongly fused inclusions, trace rootlets.		0.4		197+	-	-		
	0.7m: Occasional grey and white weakly and strongly fused clast and gravel inclusions.		0.6						
			0.8		197+	-	-		
	Gravelly SILT with trace clay (Ash), trace clay, whitish grey, very stiff, moist, no plasticity (friable).		1.0						
			1.2		UTP	-	-		
	Slightly Clayey SILT (Ash), whitish grey, very stiff, wet, no to low plasticity, frequent gravel inclusions.		1.4						
	Gravelly SILT with trace clay (Ash), trace clay, whitish grey, very stiff, wet, no plasticity (friable).		1.6		UTP	-	-		
	Slightly Clayey SILT (Ash), whitish grey, very stiff, wet, no to low plasticity, frequent gravel inclusions.		1.8						
	Gravelly SILT with trace clay (Ash), whitish grey, very stiff, wet to saturated, no plasticity (friable).		2.0		155	39	4.0		
	Slightly Clayey SILT (Ash), whitish grey, very stiff, wet to saturated, no to low plasticity, frequent gravel inclusions.		2.2						
			2.4		UTP	-	-		
	EOH: 2.50m - Refusal (Basalt Rock Obstruction)		2.6		UTP	-	-	20+	
			2.8						
			3.0						
			3.2						
			3.4						

REMARKS

End of borehole @ 2.50m (Target Depth: 3.00m)

NZGS Definition of Relative Density for Coarse Grain soils: VL - Very Loose; L - Loose; MD - Medium Dense; D - Dense; VD - Very Dense

LOGGED BY: JEM

CHECKED BY: ANA

▼ Standing groundwater level

▽ GW while drilling

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HAND AUGER : HA06

CLIENT: Marsden Charitable Trust
PROJECT: New Winery Building & Extensions to Existing Building
SITE LOCATION: 56 Wiroa Road, Kerikeri

JOB NO.: 140407 **SHEET:** 1 OF 1
START DATE: 22/05/2025 **NORTHING:** **GRID:**
DIAMETER: 50mm **EASTING:**
SV DIAL: 1994 **ELEVATION:** Ground
FACTOR: 1.41 **DATUM:**

STRATIGRAPHY	SOIL DESCRIPTION	LEGEND	DEPTH (m)	WATER	SHEAR VANE PEAK STRENGTH (kPa)	SHEAR VANE REMOULD STRENGTH (kPa)	SHEAR VANE SENSITIVITY	DCP - SCALA (Blows / mm)	COMMENTS, SAMPLES, OTHER TESTS
Topsoil	TOPSOIL, dark brown, moist.	TS	0.2	Groundwater Not Encountered					
FILL	NON-ENGINEERED FILL: Silty CLAY, yellowish brown with red and brownish orange streaks, stiff, moist, low to moderate plasticity.		0.4		68	8	8.5		
			0.6						
Waipapa Group	NATURAL: Silty CLAY, brown, very stiff, moist, moderate to high plasticity.		0.8						
	0.8m: Becoming yellowish brown.				155	37	4.2		
			1.0						
	1.1m: Becoming yellowish brown with grey streaks.		1.2		127	28	4.5		
	1.4m: Becoming moderate plasticity.		1.4						
			1.6		130	45	2.9		
			1.8						
			2.0		180	65	2.8		
	2.2m: Becoming yellowish brown with red streaks.		2.2						
			2.4		183	99	1.8		
	2.5m: Becoming yellowish brown with reddish brown mottles, occasional weakly cemented clast inclusons.		2.6						
			2.8		186	104	1.8		
	EOH: 3.00m - Target Depth		3.0						
			3.2						
			3.4						

REMARKS
End of borehole @ 3.00m (Target Depth: 3.00m)

NZGS Definition of Relative Density for Coarse Grain soils: VL - Very Loose; L - Loose; MD - Medium Dense; D - Dense; VD - Very Dense

LOGGED BY: JEM
CHECKED BY: SJP

▼ Standing groundwater level
▽ GW while drilling

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HAND AUGER : HA07

JOB NO.: 140407 **SHEET:** 1 OF 1

START DATE: 22/05/2025 **NORTHING:** **GRID:**

CLIENT: Marsden Charitable Trust **DIAMETER:** 50mm **EASTING:**

PROJECT: New Winery Building & Extensions to Existing Building **SV DIAL:** DR4802 **ELEVATION:** Ground

SITE LOCATION: 56 Wiroa Road, Kerikeri **FACTOR:** 1.57 **DATUM:**

STRATIGRAPHY	SOIL DESCRIPTION	LEGEND	DEPTH (m)	WATER	SHEAR VANE: PEAK STRENGTH (kPa)	SHEAR VANE: REMOULD STRENGTH (kPa)	SHEAR VANE: SENSITIVITY	DCP - SCALA (Blows / mm)	COMMENTS, SAMPLES, OTHER TESTS
Topsoil	TOPSOIL, dark brown, moist.	TS	0.2	Groundwater Not Encountered					
Kerikeri Volcanic Group	NATURAL: Slightly Gravelly (Clast) Clayey SILT, brown with orange mottles, very stiff, moist, low plasticity.		0.4		220+	-	-		
	Clayey SILT, brown with occasional orange weakly fused clast mottles, very stiff, moist, low to moderate plasticity.		0.6						
			0.8		166	44	3.8		
	Slightly Gravelly (Clast) Clayey SILT, brown with orange and white mottles, very stiff, moist to wet, low to moderate plasticity.		1.0						
			1.2		220+	-	-		
			1.4						
			1.6						
	Slightly Clayey SILT, grey, very stiff, wet (perched groundwater table), low plasticity.				220+	-	-		
	1.7m: Becoming brown.								
	1.8m: Becoming brownish purple with white and yellow mottles, stiff.		1.8						
			2.0		82	25	3.3		
Waipapa Group	Slightly Silty CLAY, red with white mottles, very stiff, moist, high plasticity.		2.2						
			2.4						
			2.6		170	75	2.3		
	2.8m: Becoming brownish yellow with white mottles.		2.8						
			3.0						
	EOH: 3.00m - Target Depth				220+	-	-		
			3.2						
			3.4						

REMARKS

End of borehole @ 3.00m (Target Depth: 3.00m)

NZGS Definition of Relative Density for Coarse Grain soils: VL - Very Loose; L - Loose; MD - Medium Dense; D - Dense; VD - Very Dense

LOGGED BY: SJP

CHECKED BY: ANA

▼ Standing groundwater level

▽ GW while drilling

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Foundation Maintenance and Footing Performance:
A Homeowner's Guide

PUBLISHING

BTF 18-2011 replaces Information Sheet 10/91

Buildings can and often do move. This movement can be up, down, lateral or rotational. The fundamental cause of movement in buildings can usually be related to one or more problems in the foundation soil. It is important for the homeowner to identify the soil type in order to ascertain the measures that should be put in place in order to ensure that problems in the foundation soil can be prevented, thus protecting against building movement.

This Building Technology File is designed to identify causes of soil-related building movement, and to suggest methods of prevention of resultant cracking in buildings.

Soil Types

The types of soils usually present under the topsoil in land zoned for residential buildings can be split into two approximate groups – granular and clay. Quite often, foundation soil is a mixture of both types. The general problems associated with soils having granular content are usually caused by erosion. Clay soils are subject to saturation and swell/shrink problems.

Classifications for a given area can generally be obtained by application to the local authority, but these are sometimes unreliable and if there is doubt, a geotechnical report should be commissioned. As most buildings suffering movement problems are founded on clay soils, there is an emphasis on classification of soils according to the amount of swell and shrinkage they experience with variations of water content. The table below is Table 2.1 from AS 2870-2011, the Residential Slab and Footing Code.

Causes of Movement

Settlement due to construction

There are two types of settlement that occur as a result of construction:

- Immediate settlement occurs when a building is first placed on its foundation soil, as a result of compaction of the soil under the weight of the structure. The cohesive quality of clay soil mitigates against this, but granular (particularly sandy) soil is susceptible.
- Consolidation settlement is a feature of clay soil and may take place because of the expulsion of moisture from the soil or because of the soil's lack of resistance to local compressive or shear stresses. This will usually take place during the first few months after construction, but has been known to take many years in exceptional cases.

These problems are the province of the builder and should be taken into consideration as part of the preparation of the site for construction. Building Technology File 19 (BTF 19) deals with these problems.

Erosion

All soils are prone to erosion, but sandy soil is particularly susceptible to being washed away. Even clay with a sand component of say 10% or more can suffer from erosion.

Saturation

This is particularly a problem in clay soils. Saturation creates a bog-like suspension of the soil that causes it to lose virtually all of its bearing capacity. To a lesser degree, sand is affected by saturation because saturated sand may undergo a reduction in volume, particularly imported sand fill for bedding and blinding layers. However, this usually occurs as immediate settlement and should normally be the province of the builder.

Seasonal swelling and shrinkage of soil

All clays react to the presence of water by slowly absorbing it, making the soil increase in volume (see table below). The degree of increase varies considerably between different clays, as does the degree of decrease during the subsequent drying out caused by fair weather periods. Because of the low absorption and expulsion rate, this phenomenon will not usually be noticeable unless there are prolonged rainy or dry periods, usually of weeks or months, depending on the land and soil characteristics.

The swelling of soil creates an upward force on the footings of the building, and shrinkage creates subsidence that takes away the support needed by the footing to retain equilibrium.

Shear failure

This phenomenon occurs when the foundation soil does not have sufficient strength to support the weight of the footing. There are two major post-construction causes:

- Significant load increase.
- Reduction of lateral support of the soil under the footing due to erosion or excavation.

In clay soil, shear failure can be caused by saturation of the soil adjacent to or under the footing.

GENERAL DEFINITIONS OF SITE CLASSES

Class	Foundation
A	Most sand and rock sites with little or no ground movement from moisture changes
S	Slightly reactive clay sites, which may experience only slight ground movement from moisture changes
M	Moderately reactive clay or silt sites, which may experience moderate ground movement from moisture changes
H1	Highly reactive clay sites, which may experience high ground movement from moisture changes
H2	Highly reactive clay sites, which may experience very high ground movement from moisture changes
E	Extremely reactive sites, which may experience extreme ground movement from moisture changes

Notes

1. Where controlled fill has been used, the site may be classified A to E according to the type of fill used.
2. Filled sites. Class P is used for sites which include soft fills, such as clay or silt or loose sands; landslip; mine subsidence; collapsing soils; soil subject to erosion; reactive sites subject to abnormal moisture conditions or sites which cannot be classified otherwise.
3. Where deep-seated moisture changes exist on sites at depths of 3 m or greater, further classification is needed for Classes M to E (M-D, H1-D, H2-D and E-D).

Tree root growth
Trees and shrubs that are allowed to grow in the vicinity of footings can cause foundation soil movement in two ways:

- Roots that grow under footings may increase in cross-sectional size, exerting upward pressure on footings.
- Roots in the vicinity of footings will absorb much of the moisture in the foundation soil, causing shrinkage or subsidence.

Unevenness of Movement

The types of ground movement described above usually occur unevenly throughout the building's foundation soil. Settlement due to construction tends to be uneven because of:

- Differing compaction of foundation soil prior to construction.
- Differing moisture content of foundation soil prior to construction.

Movement due to non-construction causes is usually more uneven still. Erosion can undermine a footing that traverses the flow or can create the conditions for shear failure by eroding soil adjacent to a footing that runs in the same direction as the flow.

Saturation of clay foundation soil may occur where subfloor walls create a dam that makes water pond. It can also occur wherever there is a source of water near footings in clay soil. This leads to a severe reduction in the strength of the soil which may create local shear failure.

Seasonal swelling and shrinkage of clay soil affects the perimeter of the building first, then gradually spreads to the interior. The swelling process will usually begin at the uphill extreme of the building, or on the weather side where the land is flat. Swelling gradually reaches the interior soil as absorption continues. Shrinkage usually begins where the sun's heat is greatest.

Effects of Uneven Soil Movement on Structures

Erosion and saturation
Erosion removes the support from under footings, tending to create subsidence of the part of the structure under which it occurs. Brickwork walls will resist the stress created by this removal of support by bridging the gap or cantilevering until the bricks or the mortar bedding fail. Older masonry has little resistance. Evidence of failure varies according to circumstances and symptoms may include:

- Step cracking in the mortar beds in the body of the wall or above/below openings such as doors or windows.
- Vertical cracking in the bricks (usually but not necessarily in line with the vertical beds or perpends).

Isolated piers affected by erosion or saturation of foundations will eventually lose contact with the bearers they support and may tilt or fall over. The floors that have lost this support will become bouncy, sometimes rattling ornaments etc.

Seasonal swelling/shrinkage in clay
Swelling foundation soil due to rainy periods first lifts the most exposed extremities of the footing system, then the remainder of the perimeter footings while gradually permeating inside the building footprint to lift internal footings. This swelling first tends to create a dish effect, because the external footings are pushed higher than the internal ones.

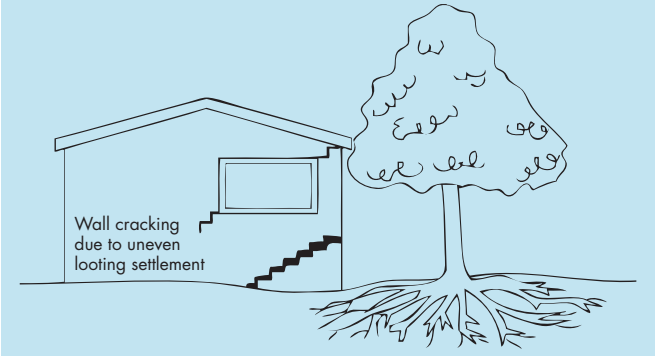
The first noticeable symptom may be that the floor appears slightly dished. This is often accompanied by some doors binding on the floor or the door head, together with some cracking of cornice mitres. In buildings with timber flooring supported by bearers and joists, the floor can be bouncy. Externally there may be visible dishing of the hip or ridge lines.

As the moisture absorption process completes its journey to the innermost areas of the building, the internal footings will rise. If the spread of moisture is roughly even, it may be that the symptoms will temporarily disappear, but it is more likely that swelling will be uneven, creating a difference rather than a disappearance in symptoms. In buildings with timber flooring supported by bearers and joists, the isolated piers will rise more easily than the strip footings or piers under walls, creating noticeable doming of flooring.

As the weather pattern changes and the soil begins to dry out, the external footings will be first affected, beginning with the locations where the sun's effect is strongest. This has the effect of lowering the external footings. The doming is accentuated and cracking reduces or disappears where it occurred because of dishing, but other cracks open up. The roof lines may become convex.

Doming and dishing are also affected by weather in other ways. In areas where warm, wet summers and cooler dry winters prevail, water migration tends to be toward the interior and doming will be accentuated, whereas where summers are dry and winters are cold and wet, migration tends to be toward the exterior and the underlying propensity is toward dishing.

Trees can cause shrinkage and damage



Movement caused by tree roots
In general, growing roots will exert an upward pressure on footings, whereas soil subject to drying because of tree or shrub roots will tend to remove support from under footings by inducing shrinkage.

Complications caused by the structure itself
Most forces that the soil causes to be exerted on structures are vertical – i.e. either up or down. However, because these forces are seldom spread evenly around the footings, and because the building resists uneven movement because of its rigidity, forces are exerted from one part of the building to another. The net result of all these forces is usually rotational. This resultant force often complicates the diagnosis because the visible symptoms do not simply reflect the original cause. A common symptom is binding of doors on the vertical member of the frame.

Effects on full masonry structures
Brickwork will resist cracking where it can. It will attempt to span areas that lose support because of subsided foundations or raised points. It is therefore usual to see cracking at weak points, such as openings for windows or doors.

In the event of construction settlement, cracking will usually remain unchanged after the process of settlement has ceased.

With local shear or erosion, cracking will usually continue to develop until the original cause has been remedied, or until the subsidence has completely neutralised the affected portion of footing and the structure has stabilised on other footings that remain effective.

In the case of swell/shrink effects, the brickwork will in some cases return to its original position after completion of a cycle, however it is more likely that the rotational effect will not be exactly reversed, and it is also usual that brickwork will settle in its new position and will resist the forces trying to return it to its original position. This means that in a case where swelling takes place after construction and cracking occurs, the cracking is likely to at least partly remain after the shrink segment of the cycle is complete. Thus, each time the cycle is repeated, the likelihood is that the cracking will become wider until the sections of brickwork become virtually independent.

With repeated cycles, once the cracking is established, if there is no other complication, it is normal for the incidence of cracking to stabilise, as the building has the articulation it needs to cope with the problem. This is by no means always the case, however, and monitoring of cracks in walls and floors should always be treated seriously.

Upheaval caused by growth of tree roots under footings is not a simple vertical shear stress. There is a tendency for the root to also exert lateral forces that attempt to separate sections of brickwork after initial cracking has occurred.

The normal structural arrangement is that the inner leaf of brickwork in the external walls and at least some of the internal walls (depending on the roof type) comprise the load-bearing structure on which any upper floors, ceilings and the roof are supported. In these cases, it is internally visible cracking that should be the main focus of attention, however there are a few examples of dwellings whose external leaf of masonry plays some supporting role, so this should be checked if there is any doubt. In any case, externally visible cracking is important as a guide to stresses on the structure generally, and it should also be remembered that the external walls must be capable of supporting themselves.

Effects on framed structures
Timber or steel framed buildings are less likely to exhibit cracking due to swell/shrink than masonry buildings because of their flexibility. Also, the doming/dishing effects tend to be lower because of the lighter weight of walls. The main risks to framed buildings are encountered because of the isolated pier footings used under walls. Where erosion or saturation causes a footing to fall away, this can double the span which a wall must bridge. This additional stress can create cracking in wall linings, particularly where there is a weak point in the structure caused by a door or window opening. It is, however, unlikely that framed structures will be so stressed as to suffer serious damage without first exhibiting some or all of the above symptoms for a considerable period. The same warning period should apply in the case of upheaval. It should be noted, however, that where framed buildings are supported by strip footings there is only one leaf of brickwork and therefore the externally visible walls are the supporting structure for the building. In this case, the subfloor masonry walls can be expected to behave as full brickwork walls.

Effects on brick veneer structures
Because the load-bearing structure of a brick veneer building is the frame that makes up the interior leaf of the external walls plus perhaps the internal walls, depending on the type of roof, the building can be expected to behave as a framed structure, except that the external masonry will behave in a similar way to the external leaf of a full masonry structure.

Water Service and Drainage

Where a water service pipe, a sewer or stormwater drainage pipe is in the vicinity of a building, a water leak can cause erosion, swelling or saturation of susceptible soil. Even a minuscule leak can be enough to saturate a clay foundation. A leaking tap near a building can have the same effect. In addition, trenches containing pipes can become watercourses even though backfilled, particularly where broken rubble is used as fill. Water that runs along these trenches can be responsible for serious erosion, interstrata seepage into subfloor areas and saturation.

Pipe leakage and trench water flows also encourage tree and shrub roots to the source of water, complicating and exacerbating the problem. Poor roof plumbing can result in large volumes of rainwater being concentrated in a small area of soil:

- Incorrect falls in roof guttering may result in overflows, as may gutters blocked with leaves etc.
- Corroded guttering or downpipes can spill water to ground.
- Downpipes not positively connected to a proper stormwater collection system will direct a concentration of water to soil that is directly adjacent to footings, sometimes causing large-scale problems such as erosion, saturation and migration of water under the building.

Seriousness of Cracking

In general, most cracking found in masonry walls is a cosmetic nuisance only and can be kept in repair or even ignored. The table below is a reproduction of Table C1 of AS 2870-2011.

AS 2870-2011 also publishes figures relating to cracking in concrete floors, however because wall cracking will usually reach the critical point significantly earlier than cracking in slabs, this table is not reproduced here.

Prevention/Cure

Plumbing
Where building movement is caused by water service, roof plumbing, sewer or stormwater failure, the remedy is to repair the problem. It is prudent, however, to consider also rerouting pipes away from the building where possible, and relocating taps to positions where any leakage will not direct water to the building vicinity. Even where gully traps are present, there is sometimes sufficient spill to create erosion or saturation, particularly in modern installations using smaller diameter PVC fixtures. Indeed, some gully traps are not situated directly under the taps that are installed to charge them, with the result that water from the tap may enter the backfilled trench that houses the sewer piping. If the trench has been poorly backfilled, the water will either pond or flow along the bottom of the trench. As these trenches usually run alongside the footings and can be at a similar depth, it is not hard to see how any water that is thus directed into a trench can easily affect the foundation's ability to support footings or even gain entry to the subfloor area.

Ground drainage
In all soils there is the capacity for water to travel on the surface and below it. Surface water flows can be established by inspection during and after heavy or prolonged rain. If necessary, a grated drain system connected to the stormwater collection system is usually an easy solution.

It is, however, sometimes necessary when attempting to prevent water migration that testing be carried out to establish watertable height and subsoil water flows. This subject is referred to in BTF 19 and may properly be regarded as an area for an expert consultant.

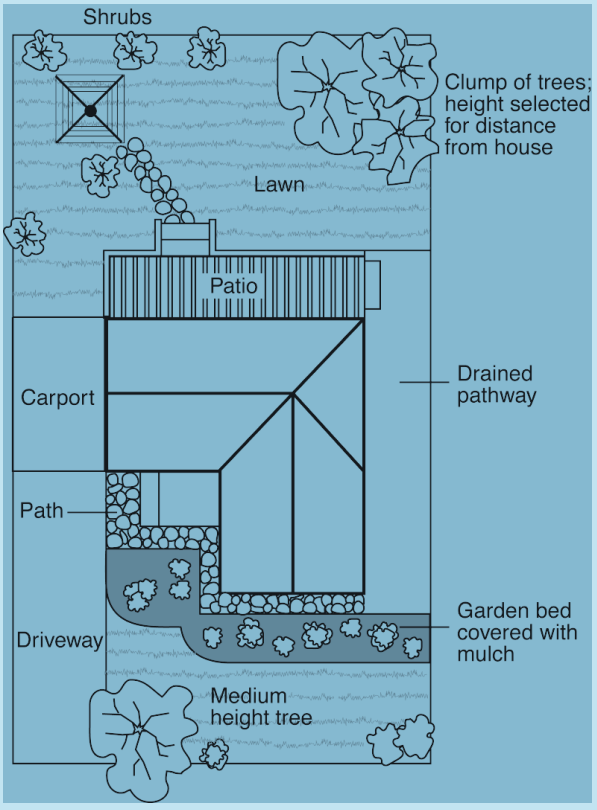
Protection of the building perimeter
It is essential to remember that the soil that affects footings extends well beyond the actual building line. Watering of garden plants, shrubs and trees causes some of the most serious water problems.

For this reason, particularly where problems exist or are likely to occur, it is recommended that an apron of paving be installed around as much of the building perimeter as necessary. This paving should

CLASSIFICATION OF DAMAGE WITH REFERENCE TO WALLS

Description of typical damage and required repair	Approximate crack width limit (see Note 3)	Damage category
Hairline cracks	<0.1 mm	0
Fine cracks which do not need repair	<1 mm	1
Cracks noticeable but easily filled. Doors and windows stick slightly.	<5 mm	2
Cracks can be repaired and possibly a small amount of wall will need to be replaced. Doors and windows stick. Service pipes can fracture. Weathertightness often impaired.	5–15 mm (or a number of cracks 3 mm or more in one group)	3
Extensive repair work involving breaking-out and replacing sections of walls, especially over doors and windows. Window and door frames distort. Walls lean or bulge noticeably, some loss of bearing in beams. Service pipes disrupted.	15–25 mm but also depends on number of cracks	4

Gardens for a reactive site



extend outwards a minimum of 900 mm (more in highly reactive soil) and should have a minimum fall away from the building of 1:60. The finished paving should be no less than 100 mm below brick vent bases.

It is prudent to relocate drainage pipes away from this paving, if possible, to avoid complications from future leakage. If this is not practical, earthenware pipes should be replaced by PVC and backfilling should be of the same soil type as the surrounding soil and compacted to the same density.

Except in areas where freezing of water is an issue, it is wise to remove taps in the building area and relocate them well away from the building – preferably not uphill from it (see BTF 19).

It may be desirable to install a grated drain at the outside edge of the paving on the uphill side of the building. If subsoil drainage is needed this can be installed under the surface drain.

Condensation

In buildings with a subfloor void such as where bearers and joists support flooring, insufficient ventilation creates ideal conditions for condensation, particularly where there is little clearance between the floor and the ground. Condensation adds to the moisture already present in the subfloor and significantly slows the process of drying out. Installation of an adequate subfloor ventilation system, either natural or mechanical, is desirable.

Warning: Although this Building Technology File deals with cracking in buildings, it should be said that subfloor moisture can result in the development of other problems, notably:

- Water that is transmitted into masonry, metal or timber building elements causes damage and/or decay to those elements.
- High subfloor humidity and moisture content create an ideal environment for various pests, including termites and spiders.
- Where high moisture levels are transmitted to the flooring and walls, an increase in the dust mite count can ensue within the living areas. Dust mites, as well as dampness in general, can be a health hazard to inhabitants, particularly those who are abnormally susceptible to respiratory ailments.

The garden

The ideal vegetation layout is to have lawn or plants that require only light watering immediately adjacent to the drainage or paving edge, then more demanding plants, shrubs and trees spread out in that order.

Overwatering due to misuse of automatic watering systems is a common cause of saturation and water migration under footings. If it is necessary to use these systems, it is important to remove garden beds to a completely safe distance from buildings.

Existing trees

Where a tree is causing a problem of soil drying or there is the existence or threat of upheaval of footings, if the offending roots are subsidiary and their removal will not significantly damage the tree, they should be severed and a concrete or metal barrier placed vertically in the soil to prevent future root growth in the direction of the building. If it is not possible to remove the relevant roots without damage to the tree, an application to remove the tree should be made to the local authority. A prudent plan is to transplant likely offenders before they become a problem.

Information on trees, plants and shrubs

State departments overseeing agriculture can give information regarding root patterns, volume of water needed and safe distance from buildings of most species. Botanic gardens are also sources of information. For information on plant roots and drains, see Building Technology File 17.

Excavation

Excavation around footings must be properly engineered. Soil supporting footings can only be safely excavated at an angle that allows the soil under the footing to remain stable. This angle is called the angle of repose (or friction) and varies significantly between soil types and conditions. Removal of soil within the angle of repose will cause subsidence.

Remediation

Where erosion has occurred that has washed away soil adjacent to footings, soil of the same classification should be introduced and compacted to the same density. Where footings have been undermined, augmentation or other specialist work may be required. Remediation of footings and foundations is generally the realm of a specialist consultant.

Where isolated footings rise and fall because of swell/shrink effect, the homeowner may be tempted to alleviate floor bounce by filling the gap that has appeared between the bearer and the pier with blocking. The danger here is that when the next swell segment of the cycle occurs, the extra blocking will push the floor up into an accentuated dome and may also cause local shear failure in the soil. If it is necessary to use blocking, it should be by a pair of fine wedges and monitoring should be carried out fortnightly.

This BTF was prepared by John Lewer FAIB, MIAMA, Partner, Construction Diagnosis.

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WILTON JOUBERT
Consulting Engineers

Construction Monitoring Services

Northland, Auckland-Waikato, Canterbury, Southern Lakes

Need a PS4?

- Please read the conditions of your Building Consent to determine which section of the works Council wants an engineer to sign off on.
- Book an inspection with Wilton Joubert Ltd or with a suitable qualified engineer.
- Have the Consent documents on site at the time of the inspection
- Be sure to verify both the grounding conditions (soil parameters) as well as the structural elements of works in question
- If in doubt what to get inspected please clarify with Council.

Producer Statements 4 - Construction Review Documents (PS4's) relates to Building Consents (BC) only, not Resource Consents (RC), unless there is an element of the RC which requires a BC, e.g. a retaining wall needed to develop a subdivision.
In soils, RC's are usually verified with a "Statement of Professional Opinion as to Suitability for Building Development", or variations on that title.

CONSTRUCTION MONITORING SERVICES

Construction monitoring refers to the physical inspection of selective components of the design or works as required by Council and as specified in the Consented documents. It is up to the Consent holder to read the special conditions set out by Council and arrange for the required inspections to be done. No PS4 can be issued without the physical inspection of works and sighting of Consented plans either by the design engineer, his representative, or another qualified engineer. (download PDF with more info via our website)

It is also important to note that, more often than not, there are two physical components that needs verification:

1. Geotechnical or grounding Conditions –referring to the strength or bearing capacity of the soil
2. Structural Components – verify that works are done as per design and in accordance with the consented plans.

To complicate matters there can be multiple engineers that might be engaged on the same site:

- Civil Engineer – To do storm water and wastewater designs
- Geotechnical Engineer – to do a Geotech report and specificity soil parameters as required
- Structural Engineer – to design structural components such as retaining walls, raft floors, beams and so on.

In cases where engineers from different companies are appointed it is important to make sure all the required boxes are ticked as not to complicate matters when it comes to the issuing of all the relevant PS4's.
Note: sites in the Auckland area might requires multiple PS4's for the same component (e.g. a raft floor requires a Geotechnical Engineer to verify the bearing capacity of the platform and a Structural engineer needs to verify the structural components are according to the design.
Not to mention a Council inspection is also required on the same floor to verify position, plumbing and so on.

In Summary:

- Read the conditions as laid out in the Consent documents to which elements of the design requires a PS4's from the design engineer.
- Have Consented plans on site during inspection time
- Book inspections ahead of time (a minimum of 48 hours in advanced)
- Ensure both grounding conditions as well as structural components are inspected. In some cases, this might mean two separate inspections if different engineers are involved.
- If you have any further questions, feel free to contact us at any time during business hours.

Construction Monitoring Enquiries
Email: *jobs@wjl.co.nz*
or scan QR code to visit our website