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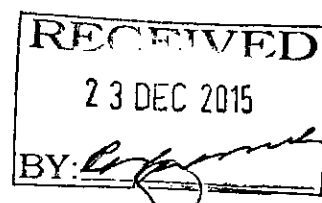
By Email

23 December 2015

Our Ref: 9030

Dunedin City Council
PO Box 9045
Moray Place
DUNEDIN 9058

Attention: Dunedin City Council Planning Department



Dear Sir/Madam

RE: LAND USE CONSENT APPLICATION - SCHEDULED TREE GROUP G028

Please find enclosed a copy of a resource consent application prepared on behalf of the Dunedin City Council Parks, Recreation and Aquatics, and Transportation Departments for the removal of 26 of the 58 trees identified within scheduled group G028, the pruning of remaining trees and revegetation of the site.

The site encompasses the northern portion of the Camp Road road reserve (approaching Larnach Castle) and part of the adjoining land at 239 Camp Road, Pukehiki.

We note that as a Category A application, no application fee applies. Furthermore, we note that Affected Person's Approvals will be provided in due course, as detailed in the 'Notification' section of the Assessment of Environmental Effects.

We trust the information submitted herein is sufficient for the processing of this application. However, should you have any queries, please contact the undersigned.

Yours sincerely,

MITCHELL PARTNERSHIPS LIMITED

A handwritten signature in black ink, appearing to be "Steven Tuck".

STEVEN TUCK

Email: Steven.Tuck@mitchellpartnerships.co.nz

cc: Richard Saunders

Dunedin City Council,
Manager Parks, Recreation & Aquatics

Also in Auckland and Tauranga
Ground Floor, 25 Anzac Street, Takapuna
PO Box 33 1642, Takapuna
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Dunedin City Council

Partial Removal and Management of
Scheduled Trees G028

Camp Road Reserve and 239 Camp Road
Pukehiki, Otago Peninsula

Resource Consent Application

23 December 2015

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partnerships

Application Form for a Resource Consent

50 The Octagon, PO Box 5045, Moray Place
Dunedin 9058, New Zealand
Ph 477 4000
www.dunedin.govt.nz

Application Details

I/We Dunedin City Council (must be the FULL name(s) of an individual or an entity registered with the New Zealand Companies Office. Family Trust names and unofficial trading names are not acceptable: in those situations, use the trustee(s) and director(s) names instead) hereby apply for:

☒ Land Use Consent ☐ Subdivision Consent

Brief description of the proposed activity: _____

The removal of 26 scheduled trees from Group G028 identified at Schedule 25.3 of the Dunedin City District Plan, pruning of retained trees and re-planting of the disturbed areas as described in the enclosed application material.

Have you applied for a Building Consent? ☐ Yes, Building Consent Number ABA _____ ☒ No

Site location/description

I am/We are the: (owner, occupier, lessee, prospective purchaser etc) of the site

Street Address of Site: 239 Camp Road Pukehiki, and Camp Road road reserve (no Cert. of Title for road reserve)

Legal Description: Lot 8 Deposited Plan 1453

Certificate of Title: OT413/33

Address for correspondence (this will be the first point of contact for all communications for this application)

Name: Steven Tuck (applicant/agent (delete one))

Address: C/- Mitchell Partnerships Ltd., PO Box 489 Dunedin Postcode: 9054

Phone (daytime): 03 477 7884 Fax: _____ Email: steven.tuck@mitchellpartnerships.co.nz

Address for Invoices or Refunds (if different from above)

Name: Mr Richard Saunders

Address: Dunedin City Council, PO Box 5045 Moray Place, Dunedin 9058

Bank Account Name _____

Account Number:

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--	--

Bank Branch

Account Number

Suffix

Ownership of the site

Who is the current owner of the site? DCC (Camp Road road reserve) and Graham Mark Hammond (239 Camp Road)

If the applicant is not the site owner, please provide the site owner's contact details:

Address: 239 Camp Road Pukehiki Postcode: 9077

Phone (daytime): 03 478 0058 Fax: _____ Email: _____

Monitoring of your Resource Consent

To assist with setting a date for monitoring, please estimate the date of completion of the work for which Resource Consent is required. Your Resource Consent may be monitored for compliance with any conditions at the completion of the work (If you do not specify an estimated time for completion, your Resource Consent, if granted, may be monitored three years from the decision date).

_____ (month and year)

Monitoring is an additional cost over and above consent processing. You may be charged at the time of the consent being issued or at the time monitoring occurs. Please refer to City Planning’s Schedule of Fees for the current monitoring fee.

Detailed description of proposed activity

Please describe the proposed activity for the site, giving as much detail as possible. Where relevant, discuss the bulk and location of buildings, parking provision, traffic movements, manoeuvring, noise generation, signage, hours of operation, number of people on-site, number of visitors etc. Please provide proposed site plans and elevations.

Please refer to the detailed description provided in the attached Assessment of Environmental Effects.

Description of site and existing activity

Please describe the existing site, its size, location, orientation and slope. Describe the current usage and type of activity being carried out on the site. Where relevant, discuss the bulk and location of buildings, parking provision, traffic movements, manoeuvring, noise generation, signage, hours of operation, number of people on-site, number of visitors etc. Please also provide plans of the existing site and buildings. Photographs may help.

Please refer to the detailed description provided in the attached Assessment of Environmental Effects.

_____ (Attach separate sheets if necessary)

District plan zoning

What is the District Plan zoning of the site? Rural Zone

Are there any overlaying District Plan requirements that apply to the site e.g. in a Landscape Management Area, in a Townscape or Heritage Precinct, Scheduled Buildings on-site etc? If unsure, please check with City Planning staff.

North-West Peninsula Landscape Conservation Area
Schedule 25.3

Breaches of district plan rules

Please detail the rules that will be breached by the proposed activity on the site (if any). Also detail the degree of those breaches. In most circumstances, the only rules you need to consider are the rules from the zone in which your proposal is located. However, you need to remember to consider not just the Zone rules but also the Special Provisions rules that apply to the activity. If unsure, please check with City Planning staff or the Council website.

Please refer to the detailed description provided in the attached Assessment of Environmental Effects.

Affected persons' approvals

I/We have obtained the written approval of the following people/organisations and they have signed the plans of the proposal:

Name: _____

Address: _____

Name: _____

Address: _____

Please note: You must submit the completed written approval form(s), and any plans signed by affected persons, with this application, unless it is a fully notified application in which case affected persons' approvals need not be provided with the application. If a written approval is required, but not obtained from an affected person, it is likely that the application will be fully notified or limited notified.

Assessment of Effects on Environment (AEE)

In this section you need to consider what effects your proposal will have on the environment. You should discuss all actual and potential effects on the environment arising from this proposal. The amount of detail provided must reflect the nature and scale of the development and its likely effect. i.e. small effect equals small assessment.

You can refer to the Council's relevant checklist and brochure on preparing this assessment. If needed there is the Ministry for the Environment's publication "A Guide to Preparing a Basic Assessment of Environmental Effects" available on www.mfe.govt.nz. Schedule 4 of the Resource Management Act 1991(RMA) provides some guidance as to what to include.

Please refer to the attached Assessment of Environmental Effects.

_____ (Attach separate sheets if necessary)

The following additional Resource Consents from the Otago Regional Council are required and have/have not (delete one) been applied for:

☐ Water Permit ☐ Discharge Permit ☐ Coastal Permit ☐ Land Use Consent for certain uses of lake beds and rivers ☒ Not applicable

Declaration

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

I accept that I have a legal obligation to comply with any conditions imposed on the Resource Consent should this application be approved.

Subject to my/our rights under section 357B and 358 of the RMA to object to any costs, I agree to pay all the fees and charges levied by the Dunedin City Council for processing this application, including a further account if the cost of processing the application exceeds the deposit paid.

Signature of ~~Applicant~~/Agent (delete one):

Date: 23/12/2015

Privacy – Local Government Official Information and Meetings Act 1987

You should be aware that this document becomes a public record once submitted. Under the above Act, anyone can request to see copies of applications lodged with the Council. The Council is obliged to make available the information requested unless there are grounds under the above Act that justify withholding it. While you may request that it be withheld, the Council will make a decision following consultation with you. If the Council decides to withhold an application, or part of it, that decision can be reviewed by the Office of the Ombudsmen.

Please advise if you consider it necessary to withhold your application, or parts of it, from any persons (including the media) to (tick those that apply):

- ☐ Avoid unreasonably prejudicing your commercial position
- ☐ Protect information you have supplied to Council in confidence
- ☐ Avoid serious offence to tikanga Maori or disclosing location of waahi tapu

What happens when further information is required?

If an application is not in the required form, or does not include adequate information, the Council may reject the application, pursuant to section 88 of the RMA. In addition (section 92 RMA) the Council can request further information from an applicant at any stage through the process where it may help to a better understanding of the nature of the activity, the effects it may have on the environment, or the ways in which adverse effects may be mitigated. The more complete the information provided with the application, the less costly and more quickly a decision will be reached.

Fees

Council recovers all actual and reasonable costs of processing your application. Most applications require a deposit and costs above this deposit will be recovered. A current fees schedule is available on www.dunedin.govt.nz or from Planning staff. Planning staff also have information on the actual cost of applications that have been processed. This can also be viewed on the Council website.

Further assistance

Please discuss your proposal with us if you require any further help with preparing your application. The Council does provide pre-application meetings without charge to assist in understanding the issues associated with your proposal and completing your application. This service is there to help you.

Please note that we are able to provide you with planning information but we cannot prepare the application for you. You may need to discuss your application with an independent planning consultant if you need further planning advice.

City Planning Staff can be contacted as follows:

In Writing: Dunedin City Council, PO Box 5045, Moray Place, Dunedin 9058

In Person: Customer Services Centre, Ground Floor, Civic Centre, 50 The Octagon

By Phone: (03) 477 4000

By Email: planning@dcc.govt.nz

There is also information on our website at www.dunedin.govt.nz.

Information requirements (two copies required)

- ☒ Completed and Signed Application Form
- ☒ Description of Activity and Assessment of Effects
- ☒ Site Plan, Floor Plan and Elevations (where relevant)
- ☒ Certificate of Title (less than 3 months old) including any relevant restrictions (such as consent notices, covenants, encumbrances, building line restrictions)
- ☐ Written Approvals
- ☐ Forms and plans and any other relevant documentation signed and dated by Affected Persons *J. King*
- ☐ Application Fee (cash, cheque or EFTPOS only; no Credit Cards accepted) *N/A*

In addition, subdivision applications also need the following information

- ☐ Number of existing lots.
- ☐ Number of proposed lots.
- ☐ Total area of subdivision.
- ☐ The position of all new boundaries.

In order to ensure your application is not rejected or delayed through requests for further information, please make sure you have included all of the necessary information. A full list of the information required for resource consent applications is in the Information Requirements Section of the District Plan.

OFFICE USE ONLY

Has the application been completed appropriately (including necessary information and adequate assessment of effects)?

☐ Yes ☐ No

Application: ☐ Received ☐ Rejected

Received by: ☐ Counter ☐ Post ☐ Courier ☐ Other: _____

Comments: _____

(Include reasons for rejection and/or notes to handling officer)

Planning Officer: _____ Date: _____

Dunedin City Council

Partial Removal and Management of
Scheduled Trees G028

Camp Road Reserve and 239 Camp Road
Pukehiki, Otago Peninsula

Assessment of Environmental Effects

23 December 2015

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Appendix B	Location Plan
Appendix C	ArborLab Arborist Report
Appendix D	Run 234 Landscape Assessment of Effects
Appendix E	Recent Camp Road Tree Management Costs, Dunedin City Council Transport Department
Appendix F	Draft conditions of consent

1. INTRODUCTION

This assessment is provided in accordance with the requirements of section 88 of the *Resource Management Act 1991* (the RMA), the Fourth Schedule to the RMA, and the provisions set out within the Dunedin City Operative District Plan (the District Plan).

This assessment is in support of a resource consent application made by the Dunedin City Council. The application is for land use consent for the removal of 26 trees listed under Schedule 25.3 of the District Plan as scheduled group G028 ("G028"). G028 consists of a shelterbelt of 58 exotic trees, located within the western side of the Camp Road road reserve and on the immediately adjacent land at 239 Camp Road.

Many of the trees in G028 are subject to failures of limbs and trunks. Camp Road is the only vehicle access point to Larnach Castle, one of Dunedin's primary tourist attractions. The failure of trees and limbs from G028 presents an unacceptable safety risk to road users and an ongoing cost burden to the community due to the ongoing need for Council's road contractors to attend the site to clear away fallen limbs. The closure of Camp Road for tree management purposes also results in costs and reputational damage to one of the region's leading tourist attractions (Larnach Castle).

On 24 June 2015 resource consent LUC-2015-221 was granted on a non-notified basis for the removal of seven trees from G028. The Commissioner's report considered the safety risks to users of Camp Road and the findings of arborist and landscape architect reports accompanying that application.

However, the tree removal approved under LUC-2015-221 has not resolved the ongoing safety issues. The selective removal of trees from G028 has exposed remaining trees to weather effects that they were previously protected from by the trees that have been removed. This has resulted in a continued decline in the health of the trees and the continuation of safety and maintenance issues.

It is reiterated that this application does not propose the removal of all of the trees within G028. G028 can be divided into three discrete groups. The removal of the two southernmost groups (referred to as Groups 1 and 2) is proposed while the northernmost group (Group 3) is proposed to be retained and managed. The three groups can be identified by reference to the Location Plan at **Appendix B** attached and the ArborLab report located at **Appendix C** attached.

2. DESCRIPTION OF THE PROPOSAL

2.1 APPENDICES

The following plans and drawings are attached as appendices:

Appendix A	Certificate of Title, 239 Camp Road, Pukehiki
Appendix B	Location Plan
Appendix C	ArborLab arborist report
Appendix D	Run 234 landscape assessment of effects
Appendix E	Recent Camp Road tree management costs, Dunedin City Council Transport Department
Appendix F	Draft conditions of consent

2.2 SITE AND LOCALITY

Site

This resource consent application relates to 26 of the trees contained within Schedule 25.3, G028 of the District Plan. Schedule 25.3 and Map 40 of the District Plan are imprecise with regards to the exact extent and location of the scheduled trees that constitute G028. Schedule 25.3 lists the address and legal description of the trees as "Camp Road – Road Reserve", and identifies the scheduled trees as "*Cupressus macrocarpa* / *Pinus radiata* (avenue)". District Plan Map no. 40 identifies G028 with a single point on the map rather than identifying the extent of the avenue of trees that would apparently constitute G028.

Arguably therefore, the trees included within G028 are only those within the Camp Road road reserve, and those specimens forming part of the shelterbelt but located within the land at 239 Camp Road could be excluded from G028. Furthermore, any specimens not identified as *Cupressus macrocarpa* or *Pinus radiata* would not form part of G028.

For the purposes of this application and to reflect the use of the term "avenue" in the District Plan schedule 25.3 listing, a conservative approach has been adopted with regards to ascertaining the extent of G028. This application has been prepared on the basis that G028 includes all of the mature *Cupressus macrocarpa* and *Pinus radiata* contained within the shelterbelt on the western side of Camp Road, regardless of whether located in the road reserve or on the immediately adjoining portion of no. 239 Camp Road.

It has been assumed that the G028 tree "avenue" is a shelterbelt of approximately 340 metres length which commences from the south at the Camp Road/Castlewood Road intersection, terminating at the north at a point slightly south of the boundary between 239 Camp Road and 145 Camp Road (this boundary is delineated by cyclone wire fencing). Preparation of the application on this basis reflects the on-site conditions, which make it difficult to determine which trees are not within the Road Reserve, and enables a more holistic

consideration of the proposal. For completeness it is noted that an additional tree is proposed to be removed in addition to the 26 scheduled trees and is referred to in the ArborLab report attached as **Appendix C**. However as this additional tree is a Eucalypt, no resource consent is required for its removal because eucalypts are not identified as a protected species in the details relating to G028 at Schedule 25.3 of the District Plan.

In summary, while arguably only the trees in the Camp Road road reserve are contained within G028, the application presumes that the trees on the adjacent portion of the land at 239 Camp Road (Lot 8 DP1453, SO10742, CFR OT413/33) that form part of the shelterbelt are also part of G028. It is considered that proceeding in this fashion better reflects the reference to an "avenue" of trees at Schedule 25.3, G028. It is also consistent with the approach that was adopted in the assessment and approval of application LUC-2015-221 in June 2015. Please refer to **Appendix B** attached for a location plan of the trees and **Appendix A** attached for a copy of the Certificate of Title for 239 Camp Road.

Locality

The G028 trees are located in a semi-rural landscape on the Otago Peninsula. The surroundings are a hilly landscape, on the western side of the Otago Peninsula. Topography in the area is undulating but has generally consistent fall down towards the Otago Harbour at the west. The trees are arranged in a north-south alignment along the western side of Camp Road/eastern boundary of 239 Camp Road, between the intersection of Camp Road – Castlewood Road and the southern boundary of 145 Camp Road.

239 Camp Road is a vacant rural allotment of approximately 24.9 hectares area, used for grazing of stock. 239 Camp Road slopes down towards the west, meaning G028 is at one of the higher points of that property.

To the north, Camp Road leads to 145 Camp Road. 145 Camp Road is approximately 13.7 hectares in area and contains Larnach Castle, a restored castle set within extensive landscaped garden surroundings. Larnach Castle is open daily and offers a variety of commercial attractions including castle and garden tours, events, accommodation and dining. Beyond the Castle, Dunedin City Council maintains the road to provide access to 240 Camp Road, where Camp Road terminates.

To the east, the 17.4 hectare property at 100 Camp Road is developed with a double-storey stone dwelling and associated outbuildings set back approximately 65 metres from Camp Road. This property is the "Camp Estate" and is owned and operated by the Larnach Castle. The property relies on Camp Road for access.

At the south, Camp Road continues past the intersection with Castlewood Road in a southerly direction with rural and rural-residential properties adjoining.

Camp Road is identified at Map 73 of the District Plan as a Local road. Information provided by the Transportation Department of Dunedin City Council indicates that

Camp Road experiences traffic volumes of approximately 239 vehicle movements daily.

2.3 PROPOSAL

The application seeks resource consent for the removal of 26 mature trees listed as Group G028 at Schedule 25.3 of the District Plan. The trees in question are mature pines and macrocarpas and are variously located in the Camp Road road reserve and on private land near the western boundary of 239 Camp Road.

As referred to in section 1 of this report and the Location Plan at **Appendix B**, the trees comprising G028 can be distinguished into three groups.

- Group 1, the most southerly (nearest the Camp Road – Castlewood Road intersection), consists of 18 trees. This group is located between the intersection and the southern side of the recessed farm gateway into 239 Camp Road.
- Group 2 consists of the nine trees located on the northern side of the gateway to 239 Camp Road, terminating at a point slightly south of a vehicle bay on the western side of Camp Road.
- Group 3 consists of 32 trees leading from the vehicle bay to the southern boundary of 145 Camp Road.

The application proposes the removal of Groups 1 and 2. (It is noted that the number of trees in Groups 1 and 2 totals 27 – including the Eucalyptus for the removal of which no resource consent is required). Group 3 is proposed to be retained, with remedial pruning undertaken to remove broken and hanging limbs from some trees.

The application proposes that the areas of tree removal will be replanted in order to mitigate the effects of the proposed tree removal. As set out in the Landscape Assessment of Effects located at **Appendix D** attached, the planting of exotic Monterey cypress trees combined with under-plantings of indigenous New Zealand native vegetation is recommended to enhance the amenity of the site's environmental qualities, views and external appearance.

3. DISTRICT PLAN REQUIREMENTS

The G028 site is located in the Rural Zone. The site is also within the North-West Peninsula Landscape Conservation Area identified at section 14.5.3(b) and Map 78 of the District Plan. It is also a Visually Prominent Area as identified at Map 40 of the District Plan.

Land use resource consent is required for the proposed tree removal pursuant to Rule 15.5.1 (i) of the District Plan. This rule ascribes a Discretionary activity status to the proposed tree removal and management as follows:

Rule 15.5.1 Discretionary Activities (Unrestricted)

The following activities are discretionary activities (unrestricted):

- (i) The removal or modification of any tree or pruning, trimming or any other modification or activity within the canopy spread of any tree listed in Schedule 25.3.*

This rule does not apply where:

- (a) The work amounts only to minor trimming and maintenance undertaken by hand-operated pruning shears or secateurs in accordance with accepted arboricultural practice.*
- (b) The work is required as emergency work to safeguard life or property and is carried out by the Council or a statutory authority. In such cases the authority concerned shall notify the Council in writing as to the reason for the trimming within 10 working days.*
- (c) The tree or trees are subject to an order for removal or modification in terms of Section 129(C) 5(a), (b) and (c) of the Property Law Act 1952.*

The trees are identified by schedule 25.3 as G028, a significant group of trees and ergo, the consent requirements of Rule 15.5.1(i) of the Plan apply.

For completeness it is noted that the application is exempt from the Non-complying activity status of Rule 6.5.7(ii) of the Rural Zone. It is further noted that the application does not trigger a separate consent requirement under Rule 14.6.4 "Landscape Conservation Areas".

3.1 OBJECTIVES AND POLICIES

Operative Dunedin City District Plan

The relevant Objectives and Policies of the Operative District Plan are as follows:

Objective 15.2.1

Maintain and enhance the amenity and environmental quality of the City by encouraging the conservation and planting of trees.

Explanation

The encouragement and promotion of tree planting and conservation will contribute towards the maintenance and enhancement of amenity and the quality of the environment.

Objective 15.2.2

Protect Dunedin's most significant trees.

Explanation

Some trees have a greater impact on amenity and quality of the environment than others and require protection.

Policy 15.3.1

Ensure that landowners and developers are aware of the environmental benefits of trees and encourage them to conserve trees and undertake new plantings whenever possible.

Explanation

It is important that those with control over trees and who may be focused mainly on the nuisance a tree is causing them are made aware of the value of their trees to the wider community. It is also important that individuals are aware of the ways which negative impacts can be reduced without removing a tree (for example thinning to allow more light through the canopy) and of any positive impacts the tree has on their own property. Enhanced awareness is likely to result in conservation of many trees.

Policy 15.3.2

Identify and protect trees that make a significant contribution towards amenity and environmental quality.

Explanation

Certain trees have landscape, botanical, cultural and historic values which make them particularly important to the community. It is essential that these trees are identified and given protection.

Policy 15.3.3

Require tree planting or other landscape treatment associated with development where this will avoid, remedy or mitigate any adverse effects on the environment.

Explanation

Tree planting can be used effectively to screen undesirable views, provide enclosure, reduce street scale or provide natural impact. Development which is sympathetic to the character of its setting and where planting is considered an integral part of the project, can enhance the environment.

Assessment

The Operative District Plan provisions focus attention on the amenity values of significant trees to the wider community. It seeks to protect and conserve trees where environmental, landscape, botanic, cultural or historic qualities result in trees making a significant contribution to amenity. The conservation of existing

trees is supported and new plantings are encouraged for their environmental and amenity benefits.

As set out in the landscape assessment attached as **Appendix D**, the value of the G028 trees in terms of landscape amenity is predominantly the sense of enclosure the trees provide to the adjoining portion of Camp Road. Conversely however, the amenity values provided by the trees are reduced by the manner in which the trees substantially obscure sweeping, panoramic views from Camp Road to the west across the harbour. The ongoing risks to public safety associated with the trees, and the effects of road closures caused by tree failure, further reduce the contribution of the trees to the amenity of the site.

In the wider landscape context, the Landscape Assessment attached as **Appendix D** (in particular, section 6.2 of that report) identifies that from surrounding popular public viewing points, the trees are often indiscernible from the backdrop of vegetation surrounding Larnach Castle. On this basis, the contribution of the trees to the wider amenity and quality of the landscape is lessened and their removal would be considered to result in negligible to slight adverse landscape effects.

On balance, having regard to these matters it is considered that the application appropriately reflects the guidance of Objective 15.2.1 and Policy 15.3.2, having regard to the adverse amenity effects associated with the retention of the trees as well as the degree of contribution that the trees make to the visual amenity of the wider landscape.

The proposed replanting of a mixture of native and exotic vegetation in the disturbed areas is considered to be a positive response to the adverse effects of the tree removal, and complies with the guidance of Objective 15.2.1 and Policies 15.3.1 and 15.3.3. The replanting will enhance both the environmental (through use of native species) and visual amenity (through appropriate landscaping design to enable views to be obtained rather than obscured) of the site and surroundings. A condition of consent is proffered to ensure that the replanting is in general accordance with the replanting plan. Refer to **Appendix F** for proposed draft conditions).

Proposed Second Generation Dunedin City District Plan

The proposed Second Generation Dunedin City District Plan ("2GP") was notified by the Dunedin City Council on 26 September 2015. In the assessment of this resource consent application, the relevant Objectives and Policies of the 2GP must be considered alongside those of the Operative District Plan. Relevant provisions are as follows:

Objective 7.2.1

The contribution made by significant trees to the visual landscape and history of neighbourhoods is maintained.

Policy 7.2.1.2

Avoid the removal of a scheduled tree (except as provided for in Policy 7.2.1.1) unless:

- a. there is a significant risk to personal/public safety or property; or*
- b. the tree is shading existing residential buildings to the point that access to sunlight is significantly compromised; or*
- c. the removal of the tree is necessary to avoid significant adverse effects on public infrastructure; and*
- d. these adverse effects cannot be reasonably mitigated through pruning and the effects outweigh the loss of amenity from the removal of the tree.*

Policy 7.2.1.3

Only allow the modification of a scheduled tree where:

- a. the work is undertaken in accordance with best arboricultural practice, by a suitably qualified arborist and will maintain or improve the health of the tree;*
- b. any adverse effects from the modification of the tree on amenity values are avoided or, if avoidance is not possible, no more than minor; and*
- c. the modification is necessary to improve the health of the tree or to mitigate adverse effects of the tree on safety, sunlight access, or damage to property or infrastructure.*

Assessment

With regards to Objective 7.2.1 it is considered (as discussed at section 8 of the Landscape Assessment report attached as **Appendix D**) that the retention of 32 of the trees within the northern portion of G028 will assist to maintain the contribution of G08 to the character of this part of the Otago Peninsula. Nonetheless, it is acknowledged that minor adverse effects will arise as a result of the proposed tree removal. However the benefits that will arise from the replanting that is recommended will mitigate these effects to an acceptable degree, particularly as the recommended landscaping matures.

The application directly responds to the guidance of Policy 7.2.1.2, particularly sub-clauses (a), (c) and (d). The tree removal is necessary to avoid unacceptable risks to public health and safety, the intermittent closure of Camp Road (i.e. public infrastructure providing the only access to a significant historic place), and the proposed pruning of the retained trees will mitigate adverse effects on safety.

4. ASSESSMENT OF EFFECTS

The removal of 26 of the 58 scheduled trees within the G028 group and associated tree maintenance and replanting will have positive and adverse effects on the environment. Effects are predominantly associated with public health and safety, landscape values, public expenditure and the operation of the road network.

Positive Effects

A positive effect associated with the proposal stems from the removal of a significant risk to public safety. As identified by the ArborLab report (**Appendix C** attached) some trees within Groups 1 and 2 represent an unacceptable safety risk. The elimination of this risk is a high priority and its importance is reflected by Policy 7.2.1.2(a) of the 2GP. Camp Road accommodates reasonable traffic flow to and from Larnach Castle. The immediate and long-term consequences of an incident involving tree failure onto passing traffic would be substantial.

The proposal raises the potential to undertake replanting of the disturbed area in a manner that combines the amenity of new plantings with the capture of considerable views from Camp Road towards the west. In this manner, the sense of enclosure and drama of this portion of Camp Road can be maintained (particularly as replanted species mature) while providing a positive effect associated with the creation of a new view corridor from the site.

The proposal also represents a positive outcome for the community insofar as public funds can be allocated towards a long-term solution to the issues encountered so far through the incremental failure of trees. **Appendix E** attached provides a brief overview of the ongoing, intermittent costs incurred by Council associated with G028 in recent years. Rather than continuing a reactive approach to the management of G028, the proposal will enable a more refined allocation of resources to resolve the issues presented by the G028 trees on the community's behalf.

A related positive effect of the proposal is the manner in which the proposal will facilitate accessibility to one of Dunedin's leading tourist attractions, Larnach Castle. The closure of Camp Road in order to undertake maintenance of the trees and road management will be a less frequent occurrence if the proposal proceeds. This will benefit the community in terms of avoiding reputational damage that may arise when visitors (and local residents) cannot access Larnach Castle because of road closures associated with G028 maintenance.

Adverse Effects

The Landscape Assessment of Effects located at **Appendix D** attached discusses the proposal in terms of effects on the immediate and surrounding landscapes.

The site was reviewed in the context of the immediate (Camp and Castlewood Roads) and wider environs (various public viewing points from different orientations).

The landscape assessment states that "*visual effects on the immediate Camp Road surroundings will be moderate*" while "*landscape and visual effects arising from the removal of 26 trees from Group G028... will have negligible to low / slight effect on its setting as seen from distant viewpoints accessed by the public*".

In light of the anticipated negligible to moderate adverse effects, the landscape assessment recommends replanting of the disturbed areas with a combination of

Monterey cypress trees and native under-plantings. This recommended replanting will enhance the amenity of the disturbed area, assist to restore the values associated with the sense of enclosure provided by G028 to the immediate site environs, and will ensure that wider landscape effects on rural character and the patterns of shelterbelts on the Otago Peninsula will be largely unaffected by the removal of the 26 trees.

It is concluded that the slight to moderate adverse effects of the proposal can be adequately mitigated by way of the proposed replanting, while the proposal will also result in a range of positive effects, including a positive effect on public safety.

5. ASSESSMENT OF ALTERNATIVES

During the preparation of this resource consent application, consideration was given to the question of whether ongoing maintenance of the trees with no tree removal would be viable. It is considered that such an approach is not viable from public safety, cost effectiveness and public resource allocation perspectives. The ongoing maintenance measures required are intermittent, however typically occur at times when Council's Transportation and Parks units are under pressure. For example, during and after storm and snowfall events. Council resources are committed to priority operations. The diversion of Council resources to the management of G028 trees is necessary due to Camp Road being the only access point to Larnach Castle, however this detracts from Council's ability to respond to other priorities in such events.

Consideration was also given to whether selective removal of the most dangerous of the trees in G028 and retention and maintenance of the others would be an appropriate management response to the hazard.

However, as discussed in the ArborLab report attached as **Appendix C**, it is likely that previous selective removal has only complicated the situation by exposing previously sheltered trees to wind loading that has (and will continue to) adversely affect the trees stability.

Therefore, while additional selective removal may be a short-term response, it would expose previously sheltered trees to wind loading, making them vulnerable to failure in the medium- or long term. Additional selective removal therefore will not address the ongoing risk and public costs associated with the presence of these ageing trees in close proximity to Camp Road.

6. NOTIFICATION

The adverse effects of the proposal on the immediate site environs are considered to be moderate. The immediate site environs consist of the Camp Road road reserve and number 239 Camp Road, which contain the trees proposed to be removed, as well as adjacent properties at 100 and 145 Camp Road.

The written approval of the owners of these properties is currently being sought and will be forwarded to the Council in due course.

7. CONCLUSION

This application proposes the removal of 26 trees from within the G028 group of trees listed at Schedule 25.3 of the District Plan. Remedial pruning of broken and hanging branches from the trees that are retained is also proposed. Replanting with a combination of Monterey cypress and New Zealand native species is proposed to be undertaken in a manner that will improve the amenity of the site and surroundings.

The actual and potential effects of the proposed tree removal have been reviewed. Overall, it is concluded that the proposal as described is considered to have positive and adverse environmental effects. The scale of adverse effects ranges from “negligible” (in the wider area) to “moderate” (within the immediate site environs). However, the proposal is anticipated to generate positive safety, landscape and amenity outcomes.

The proposal is considered to be in accordance with the relevant Objectives and Policies set out by the Operative Dunedin City District Plan as well as the proposed Second Generation Dunedin City District Plan.

APPENDIX A

Certificate of Title



COMPUTER FREEHOLD REGISTER UNDER LAND TRANSFER ACT 1952



Search Copy


R. W. Muir
Registrar-General
of Land

Identifier OT413/33
Land Registration District Otago
Date Issued 10 December 1959

Prior References
OT246/184

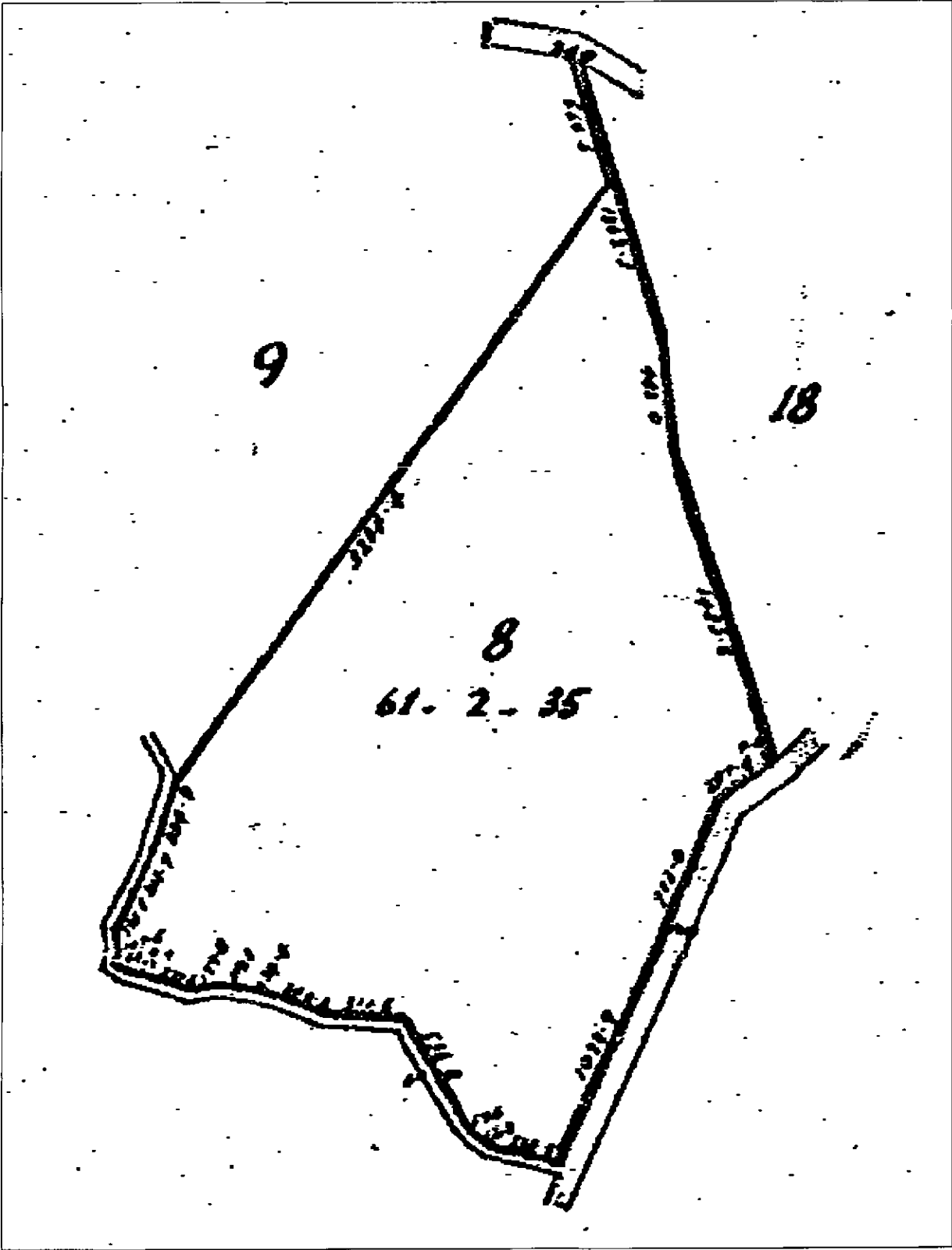
Estate Fee Simple
Area 24.9767 hectares more or less
Legal Description Lot 8 Deposited Plan 1453

Proprietors
Graham Mark Hammond

Interests
8950182.2 Mortgage to Southland Building Society - 21.12.2011 at 10:06 am

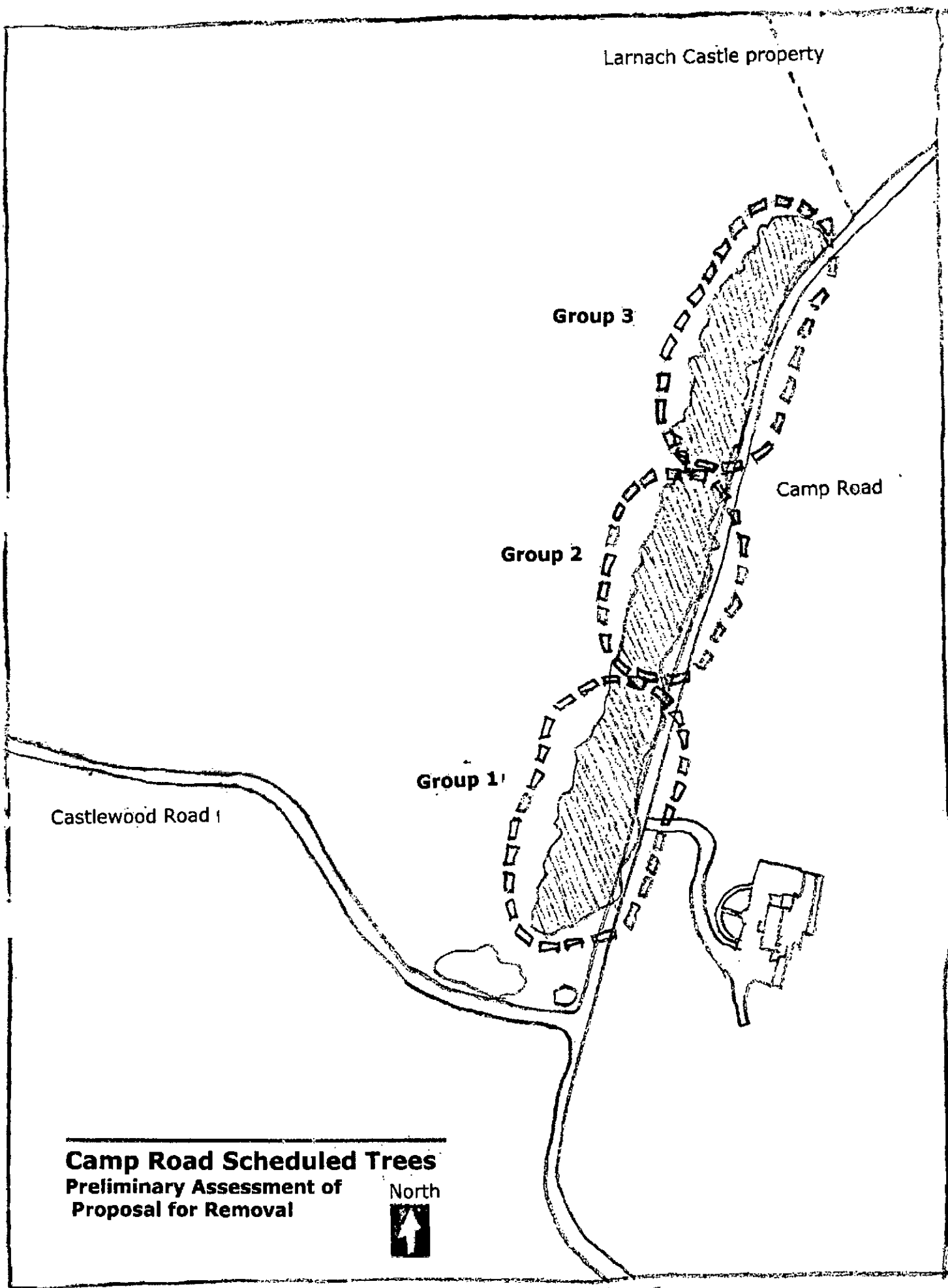
Identifier

OT413/33



APPENDIX B

Location Plan



Larnach Castle property

Group 3

Camp Road

Group 2

Group 1

Castlewood Road

Camp Road Scheduled Trees
Preliminary Assessment of
Proposal for Removal

North



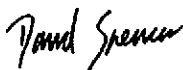
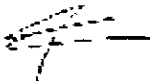
APPENDIX C

ArborLab Arborist Report



Shelter Belt
Camp Road, Dunedin

Risk Assessment

Arboricultural assessment. Camp Road, Dunedin		
Prepared for	Dunedin City Council	
Authors	David Spencer	
Reviewed	Andrew Benson	
Signed off	Karl Burgisser	

Document status

Version	Revision	Authors	Date
1	First draft for review	David Spencer	25 November 2015

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Appendix 3: Larnach Hedgerow Report – Peter Waymouth – June 2015.	
Appendix 4: QTRA Practice Note	

1. Executive Summary

- 1.1. Camp Road is the only entrance road to Larnach Castle on the Otago Peninsula. The macrocarpa and pine shelter belt running adjacent to the road from the junction with Castlewood Road is listed under the Dunedin City Council District plan Schedule 25.3 - Significant Trees.
- 1.2. The trees in question have a history of failures and removals, which has led to the group being exposed to changes in wind loading. Dunedin City Council officers have raised concerns that the trees pose an unacceptable level of risk to road users and represent an ongoing cost to the community, due to the diversion of Council resources towards road closures and tree management work, in addition to the inconvenience of frequent road closures to a major tourist attraction (Larnach Castle) arising from tree failure onto Camp Road.
- 1.3. As managers of the site the Dunedin City Council (DCC) have requested the risk is assessed. Arborlab have been engaged to carry out this risk assessment using the Quantified Tree Risk Assessment (QTRA) method.
- 1.4. The trees essentially form three groups, which should be managed in their entirety. The highest level of risk posed is an annual risk of harm of 1/5000 for trees within groups 1 and 2. This requires risk mitigation to be carried out. Any mitigation measures should treat each of the groups as a whole.
- 1.5. Recommendations for tree management and risk mitigation, inclusive of removal and replacement of groups 1 and 2 have been made to DCC.

2. Introduction

- 2.1. Arborlab Consultancy Services Ltd has been engaged by Dunedin City Council to undertake an independent arboricultural assessment of the Shelter Belt of trees growing alongside Camp Road from the junction with Castlewood Road to Larnach Castle on the Otago Peninsula. The scope of services includes a visual tree assessment in relation to the condition of the trees and a risk assessment with particular focus on the adjacent Camp Road.
- 2.2. The findings and recommendations contained herein are based on a visual ground based assessment of the trees undertaken during a single site visit on Wednesday 14th October 2015 by Mr David Spencer of Arborlab following a site meeting with Richard Saunders (Dunedin City Council), Louise Taylor and Steven Tuck (Mitchell Partnerships). The following documents were also reviewed as part of the assessment;

- Larnach Hedgerow Report – Peter Waymouth – June 2015.

3. Site details and background

3.1. The trees are located within the road reserve and private property which is adjacent to the section of Camp Road commencing at the junction with Castlewood Road and terminating at Larnach Castle. The trees form a shelter belt which runs along the western side of Camp Road. Figure 1 below depicts the trees location and other significant features.



Figure 1: Site aerial showing the trees outlined in red.

- 3.2. There is little information on the history of the trees or the reason for their inclusion in the District Plan. An inspection of aerial photography and on site observations of the peninsula shows that conifer shelter belts are commonplace on the Otago Peninsula.
- 3.3. The trees are listed on the Dunedin District Plan as a Scheduled Tree as follows;

Tree Number	Map No	Address	Species	Common Name	Legal Description
G028	40	Camp Road (Road Reserve)	Cupressus macrocarpa/Pinus radiata (Avenue)	Monterey cypress/Monterey Pine	Road Reserve (CAMP ROAD)

3.4. Their listing on the District Plan reflects the trees’ significance, heritage value and contribution to the maintenance or enhancement of amenity and the quality of the environment.

- 3.5. There has been a history of whole tree failure and branch failure from the shelter belt, which has increased in frequency with the age of the trees. This is evident from the information provided by DCC, showing calls to council regarding tree failure onto Camp Road.
- 3.6. Concern has been raised over the risk to the users of this section of Camp Road posed by the trees and the loss of revenue and reputational damage done when Larnach Castle cannot be accessed because of road closures caused by tree failure.

4. Scope and limitations

- 4.1. All observations were made from ground level only. Tree height, trunk girth and canopy spread measurements were estimated using the surveyor's experience.
- 4.2. A risk assessment was carried out using the Quantified Tree Risk Assessment (QTRA) method. Information on vehicle use of Camp Road was provided by DCC at 239 vehicles per day. The speed limit on this section of Camp Road varies from 50 to 70 Km/h.
- 4.3. No decay detecting equipment was used as part of the inspection process. All comments and recommendations that have been discussed and provided based on the visual observations recorded during the site visit.
- 4.4. Whilst this assessment is thorough it should be noted that trees are dynamic organisms exposed to varying weather conditions, which on occasion can be severe. This is taken into account by assessing the most likely events and not those, which could or might occur.

5. Quantified Tree Risk Assessment

- 5.1. Asset safety management is a matter of balancing the Risk of Harm (RoH) with the benefits of that asset or the cost of eliminating or mitigating that risk.
- 5.2. Although counterintuitive, when assessing a tree asset, the condition of the tree should not be the first consideration. Instead, tree managers should first consider the usage of the land or the land around the tree (the target zone), which in turn informs the process of assessing the tree.
- 5.3. Quantified tree risk assessment applies established and accepted risk management principles to tree safety management. By quantifying the annual risk of harm as a probability, QTRA enables the tree manager to manage the risk from the tree to within widely accepted thresholds.
- 5.4. The QTRA method moves the management of trees away from labelling them as either 'safe' or 'unsafe', thereby requiring definitive statements of tree safety from tree managers. Instead, QTRA quantifies the risk of harm from trees in a way that enables tree managers to balance safety with cost, and tree value, and operate within predetermined risk thresholds which can be seen in Figure 2 on the following page;

Figure 2: The QTRA advisory thresholds:

Thresholds	Description	Action
1/1 000	Unacceptable Risks will not ordinarily be tolerated	Control the risk
	Unacceptable (where imposed on others) Risks will not ordinarily be tolerated	- Control the risk - Review the risk
	Tolerable (by agreement) Risks may be tolerated if those exposed to the risk accept it, or the tree has exceptional value	- Control the risk unless there is broad stakeholder agreement to tolerate it, or the tree has exceptional value - Review the risk
1/10 000	Tolerable (where imposed on others) Risks are tolerable if ALARP	- Assess costs and benefits of risk control - Control the risk only where a significant benefit might be achieved at reasonable cost - Review the risk
1/1 000 000	Broadly Acceptable Risk is already ALARP	- No action currently required - Review the risk

- 5.5. When taking the QTRA approach tree managers often find they spend fewer resources on assessing and managing tree risk, whilst maximising the benefits trees provide. Furthermore, in the event of a ‘tolerable’ or ‘acceptable’ tree risk being realised, they are in a robust position to demonstrate that they have acted reasonably and proportionately.
- 5.6. The QTRA model also incorporates a cost benefit analysis in which a threshold is set for managing the risk to a level which is as low as reasonably practicable (ALARP). Where the cost of risk management exceeds the ALARP cost benefit value, then the cost of the risk management becomes disproportionate to the risk. These figures are thresholds proposed by the QTRA model, ultimately it is the decision of the risk manager (tree owner) whether or not the risks are acceptable or not given peoples’ different tolerances to risk.

6. Main findings

- 6.1. An inventory of the trees at the site is included in the following Table 1 and divided into the groups that are most likely to represent the District Plan maps. Each tree has been assigned a number which corresponds to the numbered tree plots depicted on the drawing DS-24105-01 included as Appendix 2. Each tree was individually inspected and the Annual Risk of Harm provided in this table. Smaller less significant trees have not been individually recorded, but may be referred to in the comments section.

Table 1: Inventory of trees (Group 1)

Tree #	Botanical name	Common name	Height (m)	Aggregate girth at 1.4m (mm)	DBH (mm)	CSR (m)	Form	Structure	Health	Age class	Protection status	Target	Size of Part	Probability of Failure	Annual Risk of Harm	ALARP(\$)	Comments
1	<i>Cupressus macrocarpa</i>	Monterey cypress	22	4980	1585	7	Fair	Fair	Fair	Mature	Protected	3	2	5	<1/1,000,000	N/A	Individual and not part of group. PoF 5 for branch failure. Previous limb failure on west side and associated dead stem section (photo). Previous historic removals to the north.
2	<i>Pinus radiata</i>	Monterey pine	26	4800	1528	9	Fair	Fair	Fair	Mature	Scheduled	3	N/A	N/A	<1/1,000,000	N/A	Previous historic removals to the south and east. PoF 7 for branch failure into road.
3	<i>Pinus radiata</i>	Monterey pine	22	3500	1114	7	Poor	Fair	Fair	Mature	Scheduled	3	2	3	1/100,000	30	Previous recent removals to the north and historic removals to the south. PoF 3 for branch failure into road. Damaged top.
4	<i>Cupressus macrocarpa</i>	Monterey cypress	16	3600	1146	8	Poor	Fair	Fair	Mature	Scheduled	3	2	3	1/100,000	30	Previous recent removals to the north and historic removals to the south. PoF 3 for branch failure into road. Damaged top.
5	<i>Pinus radiata</i>	Monterey pine	26	4100	1305	10	Poor	Fair	Fair	Mature	Scheduled	3	3	3	1/500,000	6	Previous recent removals to the south. PoF 3 for small branch failure into road.
6	<i>Cupressus macrocarpa</i>	Monterey cypress	20	2900	923	7	Fair	Fair	Fair	Mature	Scheduled	3	3	3	1/500,000	6	Previous recent removals to the south. PoF 3 for small branch failure into road.
7	<i>Eucalyptus sp.</i>	Gum tree	22	4100	1305	6	Fair	Fair	Fair	Mature	Scheduled	3	3	4	>1/1000,000	N/A	Previous recent removals to the south. PoF 4 for small branch failure into road. Basal damage likely from stock. Good reactive compensatory growth, no cause for increase in PoF.
8	<i>Cupressus macrocarpa</i>	Monterey cypress	28	5650	1798	11	Fair	Fair	Fair	Mature	Scheduled	3	3	6	>1/1000,000	N/A	Basal damage likely from stock. Good reactive compensatory growth, no cause for increase in PoF. Leans towards paddock. PoF 6 for branch failure into the road.
9	<i>Cupressus macrocarpa</i>	Monterey cypress	22	2450	780	11	Fair	Fair	Fair	Mature	Scheduled	3	3	6	>1/1000,000	N/A	Basal damage likely from stock. Good reactive compensatory growth, no cause for increase in PoF. Leans towards paddock. PoF 6 for branch failure into the road.
10	<i>Pinus radiata</i>	Monterey pine	18	2200	700	4	Poor	Fair	Fair	Semi-mature	Scheduled	3	3	6	>1/1000,000	N/A	Poor form and leans towards road. PoF 6 for branch failure into the road. Historic tree failure to the north.
11	<i>Pinus radiata</i>	Monterey pine	26	4250	1353	10	Fair	Fair	Fair	Semi-mature	Scheduled	3	N/A	N/A	>1/1000,000	N/A	Leans towards paddock. PoF 7 for branch failure into the road. Historic tree failure to the north east.
12	<i>Cupressus macrocarpa</i>	Monterey cypress	22	4150	1321	16	Fair	Fair	Fair	Semi-mature	Scheduled	3	N/A	N/A	>1/1000,000	N/A	Leans towards paddock. PoF 7 for branch failure into the road. Historic tree failure to the north east.
13	<i>Cupressus macrocarpa</i>	Monterey cypress	26	2850	907	8	Fair	Fair	Fair	Mature	Scheduled	3	N/A	N/A	>1/1000,000	N/A	Leans towards paddock. PoF 7 for branch failure into the road. Historic tree failure to the east. Dead tree resting in canopy.
14	<i>Cupressus macrocarpa</i>	Monterey cypress	24	3200	1019	10	Poor	Fair	Fair	Mature	Scheduled	3	N/A	N/A	>1/1000,000	N/A	Leans towards paddock. PoF 7 for branch failure into the road. Historic tree failure to the east. Dead tree resting in canopy.
15	<i>Pinus radiata</i>	Monterey pine	28	5200	1655	10	Poor	Fair	Fair	Mature	Scheduled	3	N/A	N/A	>1/1000,000	N/A	Leans parallel with road. PoF 7 for branch failure into the road. Recent tree failure to the north, south and west. Dead tree resting in canopy.
16	<i>Cupressus macrocarpa</i>	Monterey cypress	21	4800	1528	7	Fair	Fair	Fair	Mature	Scheduled	3	3	1	1/5000	600	Leans towards road. PoF 1 for branch failure into the road and PoF 4 for whole tree failure into road. Recent tree failure to the north, south and west.
17	<i>Cupressus macrocarpa</i>	Monterey cypress	20	3900	1241	9	Poor	Fair	Fair	Mature	Scheduled	3	3	2	1/50,000	60	Leans towards paddock. PoF 2 for branch failure into the road. Recent and historic tree failure and removal to the north, south and west.
18	<i>Cupressus macrocarpa</i>	Monterey cypress	15	4400	1401	8	Poor	Fair	Fair	Mature	Scheduled	3	3	2	1/50,000	60	Leans towards paddock. PoF 2 for branch failure into the road. Recent and historic tree failure and removal to the north, south and west. Recent and historic failures within canopy. Likely end of group 1.

Table 1: Inventory of trees continued (Group 2)

Tree #	Botanical name	Common name	Height (m)	Aggregate girth at 1.4m (mm)	DBH (mm)	CSR (m)	Form	Structure	Health	Age class	Protection status	Target	Size of Part	Probability of Failure	Annual Risk of Harm	ALARP(\$)	Comments
19	<i>Cupressus macrocarpa</i>	Monterey cypress	16	4200	1337	8	Poor	Fair	Fair	Mature	Scheduled	3	3	3	1/500,000	6	Leans towards paddock. PoF 3 for branch failure into the road. Historic tree failure and removal to the north. Likely start of group 2.
20	<i>Cupressus macrocarpa</i>	Monterey cypress	20	4600	1464	8	Poor	Fair	Fair	Mature	Scheduled	3	3	2	1/50,000	60	Leans towards paddock. PoF 2 for branch failure into the road. Historic tree failure and removal to the north. Damaged top. Under storey of self sown macrocarpa.
21	<i>Cupressus macrocarpa</i>	Monterey cypress	16	5150	1639	9	Fair	Fair	Fair	Mature	Scheduled	3	3	2	1/50,000	60	Leans towards paddock. PoF 2 for branch failure into the road. Historic tree failure and removal to the north. Damaged top. Under storey of self sown macrocarpa and small pine to the north growing from failed tree.
22	<i>Cupressus macrocarpa</i>	Monterey cypress	22	3800	1210	8.5	Fair	Fair	Fair	Mature	Scheduled	3	2	2	1/10,000	300	PoF 2 for branch failure into the road and PoF 4 for whole tree failure into road. Recent tree removal to the north. Failures within canopy both recent and historic.
23	<i>Cupressus macrocarpa</i>	Monterey cypress	17	4300	1369	10	Fair	Fair	Fair	Mature	Scheduled	3	2	2	1/10,000	300	PoF 2 for branch failure into the road. Recent tree removal to the south. Failures within canopy both recent and historic.
24	<i>Cupressus macrocarpa</i>	Monterey cypress	22	5200	1655	12	Fair	Fair	Fair	Mature	Scheduled	3	2	2	1/10,000	300	PoF 2 for branch failure into the road. Leans towards paddock. Historic tree removal to the southeast and recent removal to the north.
25	<i>Cupressus macrocarpa</i>	Monterey cypress	22	5600	1783	8	Fair	Fair	Fair	Mature	Scheduled	3	3	1	1/5000	600	PoF 1 for branch failure into the road and PoF 4 for whole tree failure into road. Historic tree removal to the southeast and recent removal to the north. Recent large limb failure into road.
26	<i>Cupressus macrocarpa</i>	Monterey cypress	19	3650	1162	6	Poor	Fair	Fair	Mature	Scheduled	3	3	3	1/500,000	6	PoF 3 for branch failure into the road. Leans towards paddock. Historic tree removal to the east and recent removal to the south.
27	<i>Cupressus macrocarpa</i>	Monterey cypress	16	3800	1210	6	Poor	Fair	Fair	Mature	Scheduled	3	3	3	1/500,000	6	PoF 3 for branch failure into the road. Leans towards paddock. Historic tree removal to the east and recent removal to the south. Likely end of group 2.

Table 1: Inventory of trees continued (Group 3)

Tree #	Botanical name	Common name	Height (m)	Aggregate girth at 1.4m (mm)	DBH (mm)	CSR (m)	Form	Structure	Health	Age class	Protection status	Target	Size of Part	Probability of Failure	Annual Risk of Harm	ALARP (\$)	Comments
28	<i>Cupressus macrocarpa</i>	Monterey cypress	20	3600	1146	12	Fair	Fair	Fair	Mature	Scheduled	3	3	3	1/500,000	6	PoF 3 for branch failure into the road. Leans towards road. Historic and recent removal to the south. Likely start of group 3.
29	<i>Cupressus macrocarpa</i>	Monterey cypress	22.5	3200	1019	5	Fair	Fair	Fair	Mature	Scheduled	3	3	3	1/500,000	6	PoF 3 for branch failure into the road. Historic and recent removal to the south.
30	<i>Cupressus macrocarpa</i>	Monterey cypress	21	5900	1878	8	Fair	Fair	Fair	Mature	Scheduled	3	3	3	1/500,000	6	PoF 3 for branch failure into the road. Historic and recent removal to the south.
31	<i>Cupressus macrocarpa</i>	Monterey cypress	20	5100	1623	14	Fair	Fair	Fair	Mature	Scheduled	3	3	3	1/500,000	6	PoF 3 for branch failure into the road. Historic and recent removal to the south.
32	<i>Cupressus macrocarpa</i>	Monterey cypress	24	4800	1528	9	Fair	Fair	Fair	Mature	Scheduled	3	3	5	<1/1000,000	N/A	PoF 5 for branch failure into the road.
33	<i>Eucalyptus sp.</i>	Gum tree	21	2200	700	3	Fair	Fair	Fair	Mature	Scheduled	3	3	5	<1/1000,000	N/A	PoF 5 for branch failure into the road. Small macrocarpa to northwest leaning into paddock, not individually recorded.
34	<i>Cupressus macrocarpa</i>	Monterey cypress	20	7100	2260	11	Fair	Fair	Fair	Mature	Scheduled	3	3	5	<1/1000,000	N/A	PoF 5 for branch failure into the road. Small macrocarpa to northwest leaning into paddock, not individually recorded.
35	<i>Cupressus macrocarpa</i>	Monterey cypress	13	2300	732	10	Poor	Fair	Fair	Mature	Scheduled	3	N/A	N/A	N/A	N/A	Leans into paddock.
36	<i>Cupressus macrocarpa</i>	Monterey cypress	22	4950	1576	11	Fair	Fair	Fair	Mature	Scheduled	3	3	5	<1/1000,000	N/A	PoF 5 for branch failure into the road.
37	<i>Cupressus macrocarpa</i>	Monterey cypress	17	4200	1337	10	Poor	Fair	Fair	Mature	Scheduled	3	3	5	<1/1000,000	N/A	PoF 5 for branch failure into the road.
38	<i>Cupressus macrocarpa</i>	Monterey cypress	22	6400	2037	10	Poor	Fair	Fair	Mature	Scheduled	3	3	5	<1/1000,000	N/A	PoF 5 for branch failure into the road.
39	<i>Cupressus macrocarpa</i>	Monterey cypress	17	2800	891	7	Poor	Fair	Fair	Mature	Scheduled	3	3	5	<1/1000,000	N/A	PoF 5 for branch failure into the road.
40	<i>Cupressus macrocarpa</i>	Monterey cypress	21	3500	1114	7	Fair	Fair	Fair	Mature	Scheduled	3	3	5	<1/1000,000	N/A	PoF 5 for branch failure into the road. Recent removal to north.
41	<i>Cupressus macrocarpa</i>	Monterey cypress	19	3300	1050	5	Fair	Fair	Fair	Mature	Scheduled	3	3	5	<1/1000,000	N/A	PoF 5 for small branch failure into road. Recent removal to north.
42	<i>Cupressus macrocarpa</i>	Monterey cypress	12	4200	1337	10	Poor	Fair	Fair	Mature	Scheduled	3	N/A	N/A	N/A	N/A	Heavy lean into paddock. Recent removal to north. Small eucalyptus growing to northeast not recorded.
43	<i>Cupressus macrocarpa</i>	Monterey cypress	22	3600	1146	5	Fair	Fair	Fair	Mature	Scheduled	3	3	4	<1/1000,000	N/A	PoF 4 for branch failure into road.
44	<i>Cupressus macrocarpa</i>	Monterey cypress	22	4700	1496	9	Fair	Fair	Fair	Mature	Scheduled	3	3	4	<1/1000,000	N/A	PoF 4 for branch failure into road.
45	<i>Cupressus macrocarpa</i>	Monterey cypress	20	4700	1496	8	Fair	Fair	Fair	Mature	Scheduled	3	3	4	<1/1000,000	N/A	PoF 4 for branch failure into road.
46	<i>Cupressus macrocarpa</i>	Monterey cypress	16	2300	732	8	Poor	Fair	Fair	Mature	Scheduled	3	N/A	N/A	N/A	N/A	Leans towards paddock.
47	<i>Pinus radiata</i>	Monterey pine	19	3850	1225	10	Poor	Fair	Fair	Mature	Scheduled	3	N/A	N/A	N/A	N/A	Leans towards paddock.
48	<i>Cupressus macrocarpa</i>	Monterey cypress	22	3900	1241	6	Fair	Fair	Fair	Mature	Scheduled	3	3	5	<1/1000,000	N/A	PoF 5 for small branch failure into road.
49	<i>Cupressus macrocarpa</i>	Monterey cypress	15	2300	732	8	Poor	Fair	Fair	Semi-mature	Scheduled	3	3	5	<1/1000,000	N/A	PoF 5 for small branch failure into road. Leans towards paddock.
50	<i>Cupressus macrocarpa</i>	Monterey cypress	17	2600	828	8	Poor	Fair	Fair	Semi-mature	Scheduled	3	3	5	<1/1000,000	N/A	PoF 5 for small branch failure into road. Leans towards paddock. Historic tree failure to south.
51	<i>Cupressus macrocarpa</i>	Monterey cypress	24	3400	1082	9	Fair	Fair	Fair	Mature	Scheduled	3	3	5	<1/1000,000	N/A	PoF 5 for small branch failure into road. Historic tree failure to south.
52	<i>Cupressus macrocarpa</i>	Monterey cypress	8	2900	923	9	Poor	Fair	Fair	Mature	Scheduled	3	N/A	N/A	N/A	N/A	Leans towards paddock. Historic tree failure to southwest.
53	<i>Cupressus macrocarpa</i>	Monterey cypress	13	3400	1082	9	Poor	Fair	Fair	Mature	Scheduled	3	N/A	N/A	N/A	N/A	Leans towards paddock. Historic tree failure to southwest.
54	<i>Cupressus macrocarpa</i>	Monterey cypress	24	3800	1210	8	Fair	Fair	Fair	Mature	Scheduled	3	3	5	<1/1000,000	N/A	
55	<i>Cupressus macrocarpa</i>	Monterey cypress	16	3200	1019	7	Poor	Fair	Fair	Mature	Scheduled	3	N/A	7	<1/1000,000	N/A	Suppressed by neighbouring trees.
56	<i>Cupressus macrocarpa</i>	Monterey cypress	23	4100	1305	9	Fair	Fair	Fair	Mature	Scheduled	3	3	5	<1/1000,000	N/A	PoF 5 for branch failure into road.
57	<i>Cupressus macrocarpa</i>	Monterey cypress	23	4000	1273	7	Fair	Fair	Fair	Mature	Scheduled	3	3	5	<1/1000,000	N/A	PoF 5 for branch failure into road.
58	<i>Cupressus macrocarpa</i>	Monterey cypress	23	4400	1401	7	Fair	Fair	Fair	Mature	Scheduled	3	3	5	<1/1000,000	N/A	PoF 5 for branch failure into road.
59	<i>Cupressus macrocarpa</i>	Monterey cypress	23	5400	1719	11	Fair	Fair	Fair	Mature	Scheduled	3	N/A	N/A	N/A	N/A	Leans towards paddock. Likely end of group 3.
60	<i>Cupressus macrocarpa</i>	Monterey cypress	22	4800	1528	8	Fair	Fair	Fair	Mature	Scheduled	3	3	7	<1/1000,000	N/A	Not within heritage grouping, but treat as part of group from stand dynamics perspective. Small pine growing to south as well.

7. QTRA Analysis

- 7.1. The findings have been used to calculate the greatest annual risk of harm posed by each tree to users of Camp Road. Any lower risks to property or people have not been included, as any mitigation or remedial pruning will reduce the risk to within broadly acceptable or tolerable limits.
- 7.2. For ease of interpretation the table has been colour coded using the colours in the QTRA Advisory Risk Thresholds.
- 7.3. Information provided by DCC gives an average daily traffic count of 239 vehicles per day. This information puts the road in QTRA target range 3 for both the 50kmph and 70kmph zones.
- 7.4. As can be seen from Table 1 the greatest annual risk of harm is posed by tree 16 from group 1 and trees 22, 23, 24 and 25 from group 2. These trees all pose a level of risk that is unacceptable and risk mitigation is required.

8. Discussion and Comments

- 8.1. It is understood from conversation with Mr Saunders and a map used during the site meeting that the trees are divided into three groups for the purposes of their listing within the District Plan. For simplicity the trees have been divided into these groups for inclusion into the tree inventory.
- 8.2. All the trees have been inspected using Visual Tree Assessment¹ method (VTA) and there are no immediate signs of imminent failure and subsequent risk to users of Camp Road. It should however be noted that the risk posed by trees 16, 22, 23, 24 and 25 is at an unacceptable level and risk mitigation should therefore be carried out.
- 8.3. It should also be noted that the level of risk that is tolerable should be decided by the asset owner, and that QTRA is to be used as a guide. As the manager of the asset DCC can decide to carry out further risk mitigation of the other trees, but QTRA thresholds and cost benefit analyses do not require this approach.
- 8.4. When considering stands or groups of trees it is important to address the way the group behaves as one. This is generally known as stand dynamics and refers to the varying ability of trees within the group to effectively tolerate wind conditions. Trees at the edge of the group have grown used to being exposed to prevailing winds and have accordingly produced adaptive growth to compensate for the increased loading. Trees within the stand have been sheltered by these edge trees and are therefore less likely to be able to tolerate normal wind conditions if exposed. The same applies to a shelter belt or linear group of trees, those which have been protected on one or more sides are less likely to tolerate exposure if that shelter has been removed or altered.

¹ The VTA method is an internationally recognized method of tree inspection wherein potentially hazardous symptoms are analysed, defects are confirmed and measured and the probability of failure is assessed.

- 8.5. This change in stand dynamics along with the confirmed history of failure has increased the probability of failure for the trees in the shelter belt as they are no longer sheltered or protected in the same way. This is of particular concern with regard to groups 1 and 2 where the most trees have been removed and historic failures have predominantly occurred.
- 8.6. When considering the management of these groups it is important to consider the entire group and the likely consequences of removal or alteration of trees within the group. Previous management of the groups has shown that removal of individuals from within the shelter belt has resulted in increased failure potential (probability of failure) and therefore any associated risk.
- 8.7. Overall the highest cumulative level of risk is posed by group 2, which contains four trees with an unacceptable level of risk and five trees with a tolerable level of risk. Mitigation work is required to reduce the level of risk posed by these trees to within tolerable or broadly acceptable levels.
- 8.8. Group 1 contains one tree that poses an unacceptable level of risk, thus requiring mitigation to be carried out. The remaining trees within the group have either a tolerable or broadly acceptable level of risk.
- 8.9. Removal of the trees with an unacceptable level of risk from groups 1 and 2 will have further effects on the stand dynamics of the remainder of the groups, which will likely increase the risk posed by these remaining trees to an unacceptable level.
- 8.10. Group 3 contains trees with a broadly acceptable or tolerable level of risk. The level of risk for these trees is already as low as reasonably practicable (ALARP); therefore no tree removal is required. As there is no requirement to remove trees from group 3 the stand dynamics will remain unaltered and group 3 can remain in its entirety.

9. Conclusion

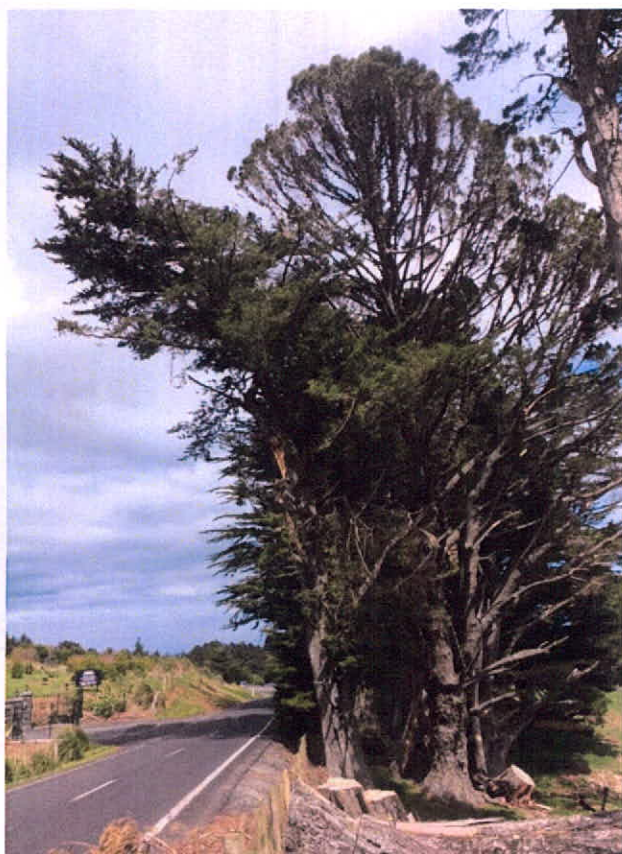
- 9.1. The shelter belt is formed by three groups of trees, consisting of a total of 60 trees that have been recorded and some smaller trees that have not been included due to their size.
- 9.2. All the trees within the shelter belt have been individually inspected and the annual risk of harm calculated for each tree recorded.
- 9.3. Historic failures and previous management approaches entailing the selective removal of trees have led to an increased likelihood of failure for several trees within Groups 1 and 2, such that they now pose an unacceptable level of risk.
- 9.4. The highest cumulative level of risk is posed by trees within groups 1 and 2. These are namely trees 16, 22, 23, 24 and 25. Risk mitigation work should be carried out for these trees, however as shown by previous management the remainder of the group should be considered prior to any removals.

- 9.5. Several trees within groups 1 and 2 have been assessed as having an unacceptable annual risk of harm and accordingly intervention is required to address the risk. Intervention in the form of selective tree removal will almost certainly increase the probability of failure of the remaining trees in these groups. Accordingly, groups 1 and 2 need to be removed in their entirety to ensure that the risk does not propagate further.

10. Recommendations and Management Options

- 10.1. Remove groups 1 and 2 from the shelter belt, whilst leaving group 3.
- 10.2. Group 3 should be re-inspected on an annual basis subsequent to the removals by a suitably trained and qualified arborist. This inspection should include details of any change to the group dynamics and look for signs of failure subsequent to the removal of groups 1 and 2. Any broken or hanging branches should be removed from Group 3 in conjunction with the removal of groups 2 and 3, so that a clear bench mark is established for future maintenance.
- 10.3. The removal of any vegetation shall be undertaken by suitably trained and experienced individuals and in a manner which avoids any unnecessary damage or disturbance to any retained vegetation and their root zones (for example sectional felling in conjunction with modern rigging techniques where required).

Appendix 1: Photoset



Tree 16: RoH 1/5000 – Unacceptable.



Tree 22: RoH 1/10,000 – Unacceptable



Tree 25: RoH 1/5000 - Unaccapetable



Aerial images may not accurately reflect the actual vegetation cover. Vegetation is plotted as accurately as possible using existing landmarks and property boundaries. The size of the plot may not accurately represent the dimensions of the actual vegetation. Unless otherwise stated, project specific vegetation only has been plotted and captured.

Vegetation alteration/removal may be subject to resource consent requirements/conditions. It shall be the client's responsibility to determine whether or not this is the case.

Works within the root zone of any tree requires supervision from an appointed works arborist.

Legend



Vegetation plot



09 379 3302

www.arborlab.co.nz

Camp Road, Peninsula Bay

VEGETATION INVENTORY

Requested by		Date	
Surveyed by	DS	14/10/15	
Plotted by	DS	24/11/15	
Checked by	ARB	24/10/15	
Drawing number	DS-24105-01[RevA]		Rev
			A



Quantified Tree Risk Assessment
Simply Balancing Risks With Benefits



Quantified Tree Risk Assessment **PRACTICE NOTE**

VERSION 5

Quantified Tree Risk Assessment Practice Note

"When you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind"

William Thomson, Lord Kelvin, Popular Lectures and Addresses [1891-1894]

1. INTRODUCTION

Every day we encounter risks in all of our activities, and the way we manage those risks is to make choices. We weigh up the costs and benefits of the risk to determine whether it is acceptable, unacceptable, or tolerable. For example, if you want to travel by car you must accept that even with all the extensive risk control measures, such as seat-belts, speed limits, airbags, and crash barriers, there is still a significant risk of death. This is an everyday risk that is taken for granted and tolerated by millions of people in return for the benefits of convenient travel. Managing trees should take a similarly balanced approach.

A risk from falling trees exists only if there is both potential for tree failure and potential for harm to result. The job of the risk assessor is to consider the likelihood and consequences of tree failure. The outcome of this assessment can then inform consideration of the risk by the tree manager, who may also be the owner.

Using a comprehensive range of values¹, Quantified Tree Risk Assessment (QTRA) enables the tree assessor to identify and analyse the risk from tree failure in three key stages. 1) to consider land-use in terms of vulnerability to impact and likelihood of occupation, 2) to consider the consequences of an impact, taking account of the size of the tree or branch concerned, and 3) to estimate the probability that the tree or branch will fail onto the land-use in question. Estimating the values of these components, the assessor can use the QTRA manual calculator or software application to calculate an annual Risk of Harm from a particular tree. To inform management decisions, the risks from different hazards can then be both ranked and compared, and considered against broadly acceptable and tolerable levels of risk.

A Proportionate Approach to Risks from Trees

The risks from falling trees are usually very low and high risks will usually be encountered only in areas

with either high levels of human occupation or with valuable property. Where levels of human occupation and value of property are sufficiently low, the assessment of trees for structural weakness will not usually be necessary. Even when land-use indicates that the assessment of trees is appropriate, it is seldom proportionate to assess and evaluate the risk for each individual tree in a population. Often, all that is required is a brief consideration of the trees to identify gross signs of structural weakness or declining health. Doing all that is reasonably practicable does not mean that all trees have to be individually examined on a regular basis (HSE 2013).

The QTRA method enables a range of approaches from the broad assessment of large collections of trees to, where necessary, the detailed assessment of an individual tree.

Risk of Harm

The QTRA output is termed the Risk of Harm and is a combined measure of the likelihood and consequences of tree failure, considered against the baseline of a lost human life within the coming year.

ALARP (As Low As Reasonably Practicable)

Determining that risks have been reduced to As Low As Reasonably Practicable (HSE 2001) involves an evaluation of both the risk and the sacrifice or cost involved in reducing that risk. If it can be demonstrated that there is gross disproportion between them, the risk being insignificant in relation to the sacrifice or cost, then to reduce the risk further is not 'reasonably practicable'.

Costs and Benefits of Risk Control

Trees confer many benefits to people and the wider environment. When managing any risk, it is essential to maintain a balance between the costs and benefits of risk reduction, which should be considered in the determination of ALARP. It is not only the financial cost of controlling the risk that should be considered, but also the loss of tree-related benefits, and the risk to workers and the public from the risk control measure itself.

¹ See Tables 1, 2 & 3.

When considering risks from falling trees, the cost of risk control will usually be too high when it is clearly 'disproportionate' to the reduction in risk. In the context of QTRA, the issue of 'gross disproportion'², where decisions are heavily biased in favour of safety, is only likely to be considered where there are risks of 1/10 000 or greater.

Acceptable and Tolerable Risks

The Tolerability of Risk framework (ToR) (HSE 2001) is a widely accepted approach to reaching decisions on whether risks are broadly acceptable, unacceptable, or tolerable. Graphically represented in Figure 1, ToR can be summarised as having a Broadly Acceptable Region where the upper limit is an annual risk of death 1/1 000 000, an Unacceptable Region for which the lower limit is 1/1 000, and between these a Tolerable Region within which the tolerability of a risk will be dependent upon the costs and benefits of risk reduction. In the Tolerable Region, we must ask whether the benefits of risk control are sufficient to justify their cost.

In respect of trees, some risks cross the Broadly Acceptable 1/1 000 000 boundary, but remain tolerable. This is because any further reduction would involve a disproportionate cost in terms of the lost environmental, visual, and other benefits, in addition to the financial cost of controlling the risk.

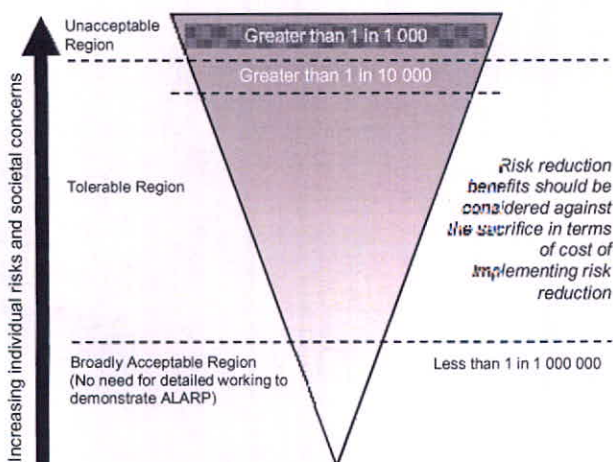


Figure 1. Adapted from the Tolerability of Risk framework (HSE 2001).

Value of Statistical Life

The Value of Statistical Life (VOSL), is a widely applied risk management device, which uses the value of a hypothetical life to guide the proportionate allocation of resources to risk reduction. In the UK, this value is currently in the region of £1 500 000

(\$2 900 000), and this is the value adopted in the QTRA method.

In QTRA, placing a statistical value on a human life has two particular uses. Firstly, QTRA uses VOSL to enable damage to property to be compared with the loss of life, allowing the comparison of risks to people and property. Secondly, the proportionate allocation of financial resources to risk reduction can be informed by VOSL. "A value of statistical life of £1 000 000 is just another way of saying that a reduction in risk of death of 1/100 000 per year has a value of £10 per year" (HSE 1996).

Internationally, there is variation in VOSL, but to provide consistency in QTRA outputs, it is suggested that VOSL of £1 500 000 (\$2 900 000) should be applied internationally. This is ultimately a decision for the tree manager.

2. OWNERSHIP OF RISK

Where many people are exposed to a risk, it is shared between them. Where only one person is exposed, that individual is the recipient of all of the risk and if they have control over it, they are also the owner of the risk. An individual may choose to accept or reject any particular risk to themselves, when that risk is under their control. When risks that are imposed upon others become elevated, societal concern will usually require risk controls, which ultimately are imposed by the courts or government regulators.

Although QTRA outputs might occasionally relate to an individual recipient, this is seldom the case. More often, calculation of the Risk of Harm is based on a cumulative occupation – i.e. the number of people per hour or vehicles per day, without attempting to identify the individuals who share the risk.

Where the risk of harm relates to a specific individual or a known group of people, the risk manager might consider the views of those who are exposed to the risk when making management decisions. Where a risk is imposed on the wider community, the principles set out in the ToR framework can be used as a reasonable approach to determine whether the risk is ALARP.

3. THE QTRA METHOD - VERSION 5

The input values for the three components of the QTRA calculation are set out in broad ranges³ of Target, Size, and Probability of Failure. The assessor

² Discussed further on page 5.

³ See Tables 1, 2 & 3.

estimates values for these three components and inputs them on either the manual calculator or software application to calculate the Risk of Harm.

Assessing Land-use (Targets)

The nature of the land-use beneath or adjacent to a tree will usually inform the level and extent of risk assessment to be carried out. In the assessment of Targets, six ranges of value are available. Table 2 sets out these ranges for vehicular frequency, human occupation and the monetary value of damage to property.

Human Occupation

The probability of pedestrian occupation at a particular location is calculated on the basis that an average pedestrian will spend five seconds walking beneath an average tree. For example, ten pedestrians per day, each occupying the Target for five seconds, is a daily occupation of fifty seconds. The total seconds in a day are divided to give a probability of Target occupation ($50/86\,400 = 1/1\,728$). Where a longer occupation is likely, as with a habitable building, outdoor café, or park bench, the period of occupation can be measured, or estimated as a proportion of a given unit of time, e.g. six hours per day (1/4). The Target is recorded as a range (Table 2).

Weather Affected Targets

Often the nature of a structural weakness in a tree is such that the probability of failure is greatest during windy weather, while the probability of the site being occupied by people during such weather is often low. This applies particularly to outdoor recreational areas. When estimating human Targets, the risk assessor must answer the question 'in the weather conditions that I expect the likelihood of failure of the tree to be initiated, what is my estimate of human occupation?' Taking this approach, rather than using the average occupation, ensures that the assessor considers the relationship between weather, people, and trees, along with the nature of the average person with their ability to recognise and avoid unnecessary risks.

Vehicles on the Highway

In the case of vehicles, likelihood of occupation may relate to either the falling tree or branch striking the vehicle or the vehicle striking the fallen tree. Both types of impact are influenced by vehicle speed; the faster the vehicle travels the less likely it is to be struck by the falling tree, but the more likely it is to strike a fallen tree. The probability of a vehicle

occupying any particular point in the road is the ratio of the time it is occupied - including a safe stopping distance - to the total time. The average vehicle on a UK road is occupied by 1.6 people (DfT 2010). To account for the substantial protection that the average vehicle provides against most tree impacts and in particular, frontal collisions, QTRA values the substantially protected 1.6 occupants in addition to the value of the vehicle as equivalent to one exposed human life.

Property

Property can be anything that could be damaged by a falling tree, from a dwelling, to livestock, parked car, or fence. When evaluating the exposure of property to tree failure, the QTRA assessment considers the cost of repair or replacement that might result from failure of the tree. Ranges of value are presented in Table 2 and the assessor's estimate need only be sufficient to determine which of the six ranges the cost to select.

In Table 2, the ranges of property value are based on a VOSL of \$2 900 000, e.g. where a building with a replacement cost of \$29 000 would be valued at 0.01 (1/100) of a life (Target Range 2).

When assessing risks in relation to buildings, the Target to be considered might be the building, the occupants, or both. Occupants of a building could be protected from harm by the structure or substantially exposed to the impact from a falling tree if the structure is not sufficiently robust, and this will determine how the assessor categorises the Target.

Multiple Targets

A Target might be constantly occupied by more than one person and QTRA can account for this. For example, if it is projected that the average occupation will be constant by 10 people, the Risk of Harm is calculated in relation to one person constantly occupying the Target before going on to identify that the average occupation is 10 people. This is expressed as Target 1(10T)/1, where 10T represents the Multiple Targets. In respect of property, a Risk of Harm 1(10T)/1 would be equivalent to a risk of losing \$29 000 000 as opposed to \$2 900 000.

Tree or Branch Size

A small dead branch of less than 25mm diameter is not likely to cause significant harm even in the case of direct contact with a Target, while a falling branch with a diameter greater than 450mm is likely to cause some harm in the event of contact with all but the most robust Target. The QTRA method categorises

Size by the diameter of tree stems and branches (measured beyond any basal taper). An equation derived from weight measurements of trees of different stem diameters is used to produce a data set of comparative weights of trees and branches ranging from 25mm to 600mm diameter, from which Table 1 is compiled. The size of dead branches might be discounted where they have undergone a significant reduction in weight because of degradation and shedding of subordinate branches. This discounting, referred to as 'Reduced Mass',

reflects an estimated reduction in the mass of a dead branch.

Table 1. Size

Size Range	Size of tree or branch	Range of Probability
1	> 450mm (>18") dia.	1/1 - >1/2
2	260mm (10½") dia. - 450mm (18") dia.	1/2 - >1/8.6
3	110mm (4½") dia. - 250mm (10") dia.	1/8.6 - >1/82
4	25mm (1") dia. - 100mm (4") dia.	1/82 - 1/2 500

* Range 1 is based on a diameter of 600mm.

Table 2. Targets

Target Range	Property (repair or replacement cost)	Human (not in vehicles)	Vehicle Traffic (number per day)	Ranges of Value (probability of occupation or fraction of \$2 900 000)
1	\$2 900 000 - >\$290 000 (£1 500 000 - >£150 000)	Occupation: Constant - 2.5 hours/day Pedestrians & cyclists: 720/hour - 73/hour	26 000 - 2 700 @ 110kph (68mph) 32 000 - 3 300 @ 80kph (50mph) 47 000 - 4 800 @ 50kph (32mph)	1/1 - >1/10
2	\$290 000 - >\$29 000	Occupation: 2.4 hours/day - 15 min/day Pedestrians & cyclists: 72/hour - 8/hour	2 600 - 270 @ 110kph (68mph) 3 200 - 330 @ 80kph (50mph) 4 700 - 480 @ 50kph (32mph)	1/10 - >1/100
3	\$29 000 - >\$2 900	Occupation: 14 min/day - 2 min/day Pedestrians & cyclists: 7/hour - 2/hour	260 - 27 @ 110kph (68mph) 320 - 33 @ 80kph (50mph) 470 - 48 @ 50kph (32mph)	1/100 - >1/1 000
4	\$2 900 - >\$290	Occupation: 1 min/day - 2 min/week Pedestrians & cyclists: 1/hour - 3/day	26 - 4 @ 110kph (68mph) 32 - 4 @ 80kph (50mph) 47 - 6 @ 50kph (32mph)	1/1 000 - >1/10 000
5	\$290 - >\$29	Occupation: 1 min/week - 1 min/month Pedestrians & cyclists: 2/day - 2/week	3 - 1 @ 110kph (68mph) 3 - 1 @ 80kph (50mph) 5 - 1 @ 50kph (32mph)	1/10 000 - >1/100 000
6	\$29 - \$2	Occupation: <1 min/month - 0.5 min/year Pedestrians & cyclists: 1/week - 6/year	None	1/100 000 - 1/1 000 000

Vehicle, pedestrian and property Targets are categorised by their frequency of use or their monetary value. The probability of a vehicle or pedestrian occupying a Target area in Target Range 4 is between the upper and lower limits of 1/1 000 and >1/10 000 (column 5). Using the VOSL \$2 900 000, the property repair or replacement value for Target Range 4 is \$2 900 - >\$290.

Probability of Failure

In the QTRA assessment, the probability of tree or branch failure within the coming year is estimated and recorded as a range of value (Ranges 1 - 7, Table 3).

Selecting a Probability of Failure (PoF) Range requires the assessor to compare their assessment of the tree or branch against a benchmark of either a non-compromised tree at Probability of Failure Range 7, or a tree or branch that we expect to fail within the year, which can be described as having a 1/1 probability of failure.

During QTRA training, Registered Users go through a number of field exercises in order to calibrate their estimates of Probability of Failure.

Table 3. Probability of Failure

Probability of Failure Range	Probability
1	1/1 - >1/10
2	1/10 - >1/100
3	1/100 - >1/1 000
4	1/1 000 - >1/10 000
5	1/10 000 - >1/100 000
6	1/100 000 - >1/1 000 000
7	1/1 000 000 - 1/1 000 000

The probability that the tree or branch will fail within the coming year.

The QTRA Calculation

The assessor selects a Range of values for each of the three input components of Target, Size and Probability of Failure. The Ranges are entered on either the manual calculator or software application to calculate a Risk of Harm.

The Risk of Harm is expressed as a probability and is rounded, to one significant figure. Any Risk of Harm that is lower than 1/1 000 000 is represented as <1/1 000 000. As a visual aid, the Risk of Harm is colour coded using the traffic light system illustrated in Table 4 (page 7).

Risk of Harm - Monte Carlo Simulations

The Risk of Harm for all combinations of Target, Size and Probability of Failure Ranges has been calculated using Monte Carlo simulations⁴. The QTRA Risk of Harm is the mean value from each set of Monte Carlo results.

In QTRA Version 5, the Risk of Harm should not be calculated without the manual calculator or software application.

Assessing Groups and Populations of Trees

When assessing populations or groups of trees, the highest risk in the group is quantified and if that risk is tolerable, it follows that risks from the remaining trees will also be tolerable, and further calculations are unnecessary. Where the risk is intolerable, the next highest risk will be quantified, and so on until a tolerable risk is established. This process requires prior knowledge of the tree manager's risk tolerance.

Accuracy of Outputs

The purpose of QTRA is not necessarily to provide high degrees of accuracy, but to provide for the quantification of risks from falling trees in a way that risks are categorised within broad ranges (Table 4).

4. INFORMING MANAGEMENT DECISIONS

Balancing Costs and Benefits of Risk Control

When controlling risks from falling trees, the benefit of reduced risk is obvious, but the costs of risk control are all too often neglected. For every risk reduced there will be costs, and the most obvious of these is the financial cost of implementing the control measure. Frequently overlooked is the transfer of risks to workers and the public who might be directly affected by the removal or pruning of trees. Perhaps

more importantly, most trees confer benefits, the loss of which should be considered as a cost when balancing the costs and benefits of risk control.

When balancing risk management decisions using QTRA, consideration of the benefits from trees will usually be of a very general nature and not require detailed consideration. The tree manager can consider, in simple terms, whether the overall cost of risk control is a proportionate one. Where risks are approaching 1/10 000, this may be a straightforward balancing of cost and benefits. Where risks are 1/10 000 or greater, it will usually be appropriate to implement risk controls unless the costs are grossly disproportionate to the benefits rather than simply disproportionate. In other words, the balance being weighted more on the side of risk control with higher associated costs.

Considering the Value of Trees

It is necessary to consider the benefits provided by trees, but they cannot easily be monetised and it is often difficult to place a value on those attributes such as habitat, shading and visual amenity that might be lost to risk control.

A simple approach to considering the value of a tree asset is suggested here, using the concept of 'average benefits'. When considered against other similar trees, a tree providing 'average benefits' will usually present a range of benefits that are typical for the species, age and situation. Viewed in this way, a tree providing 'average benefits' might appear to be low when compared with particularly important trees – such as in Figure 2, but should nonetheless be sufficient to offset a Risk of Harm of less than 1/10 000. Without having to consider the benefits of risk controls, we might reasonably assume that below 1/10 000, the risk from a tree that provides 'average benefits' is ALARP.

In contrast, if it can be said that the tree provides lower than average benefits because, for example, it is declining and in poor physiological condition, it may be necessary to consider two further elements. Firstly, is the Risk of Harm in the upper part of the Tolerable Region, and secondly, is the Risk of Harm likely to increase before the next review because of an increased Probability of Failure. If both these conditions apply then it might be appropriate to consider the balance of costs and benefits of risk reduction in order to determine whether the risk is ALARP. This balance requires the tree manager to take a view of both the reduction in risk and the costs of that reduction.

⁴ For further information on the Monte Carlo simulation method, refer to http://en.wikipedia.org/wiki/Monte_Carlo_method

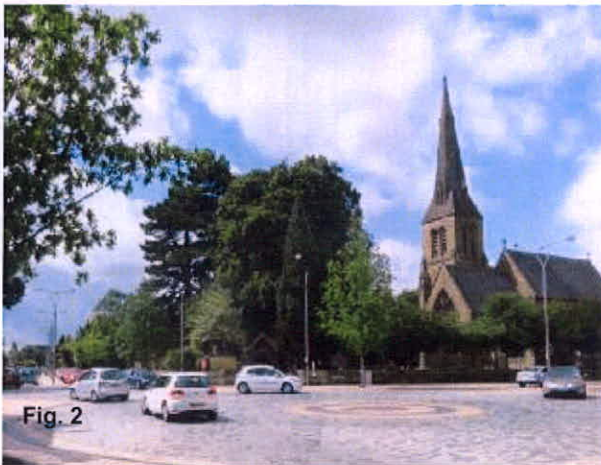


Fig. 2

Lower Than Average Benefits from Trees

Usually, the benefits provided by a tree will only be significantly reduced below the 'average benefits' that are typical for the species, age and situation, if the life of the benefits is likely to be shortened, perhaps because the tree is declining or dead. That is not to say that a disbenefit, such as undesirable shading, lifting of a footpath, or restricting the growth of other trees, should not also be considered in the balance of costs and benefits.

The horse chestnut tree in Figure 3 has recently died, and over the next few years, may provide valuable habitats. However, for this tree species and the relatively fast rate at which its wood decays, the lifetime of these benefits is likely to be limited to only a few years. This tree has an already reduced value that will continue to reduce rapidly over the coming five to ten years at the same time as the Risk of Harm is expected to increase. There will be changes in the benefits provided by the tree as it degrades. Visual qualities are likely to reduce while the decaying wood provides habitats for a range of species, for a short while at least. There are no hard and fast measures of these benefits and it is for the tree manager to decide what is locally important and how it might be balanced with the risks.

Where a risk is within the Tolerable Region and the tree confers lower than average benefits, it might be appropriate to consider implementing risk control while taking account of the financial cost. Here, VOSL can be used to inform a decision on whether the cost of risk control is proportionate. Example 3 below puts this evaluation into a tree management context.

There will be occasions when a tree is of such minimal value and the monetary cost of risk reduction so low that it might be reasonable to

further reduce an already relatively low risk. Conversely, a tree might be of such considerable value that an annual risk of death greater than 1/10 000 would be deemed tolerable.

Occasionally, decisions will be made to retain elevated risks because the benefits from the tree are particularly high or important to stakeholders, and in these situations, it might be appropriate to assess and document the benefits in some detail. If detailed assessment of benefits is required, there are several methodologies and sources of information (Forest Research 2010).



Fig. 3

Delegating Risk Management Decisions

Understanding of the costs with which risk reduction is balanced can be informed by the risk assessor's knowledge, experience and on-site observations, but the risk management decisions should be made by the tree manager. That is not to say that the tree manager should review and agree every risk control measure, but when delegating decisions to surveyors and other staff or advisors, tree managers should set out in a policy, statement or contract, the principles and perhaps thresholds to which trees and their associated risks will ordinarily be managed.

Based on the tree manager accepting the principles set out in the QTRA Practice Note and or any other specific instructions, the risk assessor can take account of the cost/benefit balance and for most

situations will be able to determine whether the risk is ALARP when providing management recommendations.

Table 4. QTRA Advisory Risk Thresholds

Thresholds	Description	Action
1/1 000	Unacceptable Risks will not ordinarily be tolerated	Control the risk
	Unacceptable (where imposed on others) Risks will not ordinarily be tolerated	- Control the risk - Review the risk
	Tolerable (by agreement) Risks may be tolerated if those exposed to the risk accept it, or the tree has exceptional value	- Control the risk unless there is broad stakeholder agreement to tolerate it, or the tree has exceptional value - Review the risk
1/10 000	Tolerable (where imposed on others) Risks are tolerable if ALARP	- Assess costs and benefits of risk control - Control the risk only where a significant benefit might be achieved at reasonable cost - Review the risk
1/1 000 000	Broadly Acceptable Risk is already ALARP	- No action currently required - Review the risk

QTRA Informative Risk Thresholds

The QTRA advisory thresholds in Table 4 are proposed as a reasonable approach to balancing safety from falling trees with the costs of risk reduction. This approach takes account of the widely applied principles of ALARP and ToR, but does not dictate how these principles should be applied. While the thresholds can be the foundation of a robust policy for tree risk management, tree managers should make decisions based on their own situation, values and resources. Importantly, to enable tree assessors to provide appropriate management guidance, it is helpful for them to have some understanding of the tree owner's management preferences prior to assessing the trees.

A Risk of Harm that is less than 1/1 000 000 is Broadly Acceptable and is already ALARP. A Risk of Harm 1/1 000 or greater is unacceptable and will not ordinarily be tolerated. Between these two values, the Risk of Harm is in the Tolerable Region of ToR and will be tolerable if it is ALARP. In the Tolerable

Region, management decisions are informed by consideration of the costs and benefits of risk control, including the nature and extent of those benefits provided by trees, which would be lost to risk control measures.

For the purpose of managing risks from falling trees, the Tolerable Region can be further broken down into two sections. From 1/1 000 000 to less than 1/10 000, the Risk of Harm will usually be tolerable providing that the tree confers 'average benefits' as discussed above. As the Risk of Harm approaches 1/10 000 it will be necessary for the tree manager to consider in more detail the benefits provided by the tree and the overall cost of mitigating the risk.

A Risk of Harm in the Tolerable Region but 1/10 000 or greater will not usually be tolerable where it is imposed on others, such as the public, and if retained, will require a more detailed consideration of ALARP. In exceptional circumstances a tree owner might choose to retain a Risk of Harm that is 1/10 000 or greater. Such a decision might be based on the agreement of those who are exposed to the risk, or perhaps that the tree is of great importance. In these circumstances, the prudent tree manager will consult with the appropriate stakeholders whenever possible.

5. EXAMPLE QTRA CALCULATIONS AND RISK MANAGEMENT DECISIONS

Below are three examples of QTRA calculations and application of the QTRA Advisory Thresholds.

Example 1.

	Target	Size	Probability of Failure	Risk of Harm
Range	6	x 1	x 3	= <1/1 000 000

Example 1 is the assessment of a large (Size 1), unstable tree with a probability of failure of between 1/100 and >1/1 000 (PoF 3). The Target is a footpath with less than one pedestrian passing the tree each week (Target 6). The Risk of Harm is calculated as less than 1/1 000 000 (green). This is an example of where the Target is so low consideration of the structural condition of even a large tree would not usually be necessary.

Example 2.

	Target	Size	Probability of Failure	Risk of Harm
Range	1	x	4	x
			3	=
				1(2T)/50 000

In Example 2, a recently dead branch (Size 4) overhangs a busy urban high street that is on average occupied constantly by two people, and here Multiple Target occupation is considered.

Having an average occupancy of two people, the Risk of Harm 1(2T)/50 000 (yellow) represents a twofold increase in the magnitude of the consequence and is therefore equivalent to a Risk of Harm 1/20 000 (yellow). This risk does not exceed 1/10 000, but being a dead branch at the upper end of the Tolerable Region it is appropriate to consider the balance of costs and benefits of risk control. Dead branches can be expected to degrade over time with the probability of failure increasing as a result. Because it is dead, some of the usual benefits from the branch have been lost and it will be appropriate to consider whether the financial cost of risk control would be proportionate.

Example 3.

	Target	Size	Probability of Failure	Risk of Harm
Range	3	x	3	x
			3	=
				1/500 000

In Example 3, a 200mm diameter defective branch overhangs a country road along which travel between 470 and 48 vehicles each day at an average speed of 50kph (32mph) (Target Range 3). The branch is split and is assessed as having a probability of failure for the coming year of between 1/100 and 1/1 000 (PoF Range 3). The Risk of Harm is calculated as 1/500 000 (yellow) and it needs to be considered whether the risk is ALARP. The cost of removing the branch and reducing the risk to Broadly Acceptable (1/1 000 000) is estimated at \$670. To establish whether this is a proportionate cost of risk control, the following equation is applied. \$2 900 000 (VOSL) $\times$ 1/500 000 = \$5.8 indicating that the projected cost of \$670 would be disproportionate to the benefit. Taking account of the financial cost, risk transfer to arborists and passers-by, the cost could be described as being grossly disproportionate, even if accrued benefits over say ten years were taken into account.

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APPENDIX D

Run 234 Landscape Assessment of Effects

PROPOSED TREE REMOVAL

CAMP ROAD

PUKEHIKI

OTAGO PENINSULA

Landscape Assessment Of Effects

23.12.2015

Prepared for
DUNEDIN CITY COUNCIL

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1. INTRODUCTION

Dunedin City Council have raised concerns about the risk to public safety and the ongoing maintenance and cost burden associated with a group of trees, which line the western edge of Camp Road, north of the intersection of Castlewood Road, Otago Peninsula. Council officers have requested an assessment of the landscape and visual effects that would arise if tree removal was undertaken in this location.

The trees for proposed removal are included in the Dunedin City Council District Plan Schedule 25.3 Significant Tree register – Map notation G028. Schedule 25.3 contains a list of trees that have been identified as being particularly worthy of protection from modification and removal because of their contribution to the maintenance or enhancement of amenity and the quality of the environment. The reason for the protection of this tree group and not many similar shelterbelts located within the surrounding Otago Peninsula landscape is unclear.

Dunedin City Council officers have concerns relating to the health status of the trees, many of which are old and wind damaged, and the potential risk they pose to the health and safety of road users, including visitors to Larnach Castle, neighbouring residents and landowners. Council officers propose to lodge an application for resource consent to remove 26 of the 58 tree listed under G028 to resolve these concerns. An additional non-scheduled (*Eucalyptus sp.*) tree would also be removed as part of this proposal.

RUN394 Landscape Architecture has been engaged to provide a landscape and visual assessment of the potential effects of the proposed removal of the trees on the amenity values of the immediate and broader landscape surroundings, including consideration of methods to mitigate any adverse effects.

1.1 METHODOLOGY

The following methodology was used to assess the site, the proposal, and its potential adverse landscape and visual effects:

- Site visit and analysis of the site from surrounding viewing locations.
- A description of the proposal.
- Appraisal of the existing landscape character of the site and surrounding area.
- Review of the proposal against the relevant landscape planning provisions in the Dunedin City District Plan – with both Operative and Proposed District Plans reviewed.
- Assessment of the actual and potential landscape and visual effects of the proposal on the site and its wider landscape context.
- Outline the mitigation and enhancement measures incorporated into the proposal; and
- Conclusions and discussion.

The graphic attachment accompanying this report is to be read in conjunction with the report. The contents include:

- (1) Landscape Context Plan.
- (2) Camp Road Site -Tree Groups 1,2 & 3.
- (3) Site Context and Site Location Plan.
- (4) Photograph Location Plan.
- (5) Site Photographs.
- (6) Landscape Concept Plan.
- (7) Landscape Planting Palette.

2. DESCRIPTION OF THE PROPOSAL

Council Officers from the Dunedin City Council Transportation and Parks, Recreation and Aquatics Department propose to seek resource consent to remove 26 scheduled trees from the group of trees situated on the western edge of Camp Road, Pukehiki, Otago Peninsula. The trees are variously located within the Camp Road road reserve, owned by the Dunedin City Council and within a adjoining private property at 239 Camp Road. There are 58 trees (excluding smaller trees and stumps) within the G028 group, made up predominately of 51 Monterey cypress - *Cupressus macrocarpa*, with seven *Monterey Pine* - *Pinus radiata*. Three subgroups have been identified (Groups 1,2 and 3), for ease of reference to trees within the wider G028 group. (*refer graphic attachment – Sheet 2*).

Camp Road is a narrow roadway, which provides the only access to Larnach Castle, and has a constant flow of traffic throughout the day, many of which are tourists. The Dunedin City Council has recently undertaken the removal of seven trees from the G028 group, which were identified following an Arborists Assessment as being particularly at risk of falling onto Camp Road, and therefore posing an unacceptable threat to the health and safety of road users. The Dunedin City Council is now requesting removal of a further 26 of the scheduled trees.

3. LANDSCAPE CONTEXT

The Otago Peninsula is situated 3kms to the east of Dunedin City. It is an exposed, rugged and windswept rural landscape with narrow roadways, residential settlements (which vary from suburbs to small rural clusters, with farm buildings dotted throughout), historic dry-stone walls, and groups of tree shelter plantings – many of which are Monterey cypress. Its dramatic landform is unique in character, and provides the city with stunning rural views, recreational opportunities and amenity value. The area is a popular tourist destination, with the Lonely Plant Guide describing the Otago Peninsula as having “*the South Island’s most accessible diversity of wildlife. Albatross, penguins, fur seals and sea lions are some of the highlights, as well as rugged countryside, wild walks, beaches and interesting historical sites. Despite a host of tours exploring the peninsula, the area maintains its quiet rural air.*”

4. THE SITE

Camp Road is a narrow laneway situated at the top of a prominent ridgeline near Pukehiki settlement on the Otago Peninsula, some 13kms from Dunedin City via Highcliff Road. The road is the main access-way to Larnach Castle (1871), one of Dunedin's most popular tourist destinations and New Zealand's only castle. Due to their exposed ridgeline location, the trees are clearly visible from many of the Otago Peninsula roads and lookouts used and visited by both locals and tourists. The trees contribute to the existing landscape patterns and form part of the unique Otago Peninsula landscape character, and in many distant views they are seen in conjunction with other tree groups, including trees surrounding Larnach Castle.

The trees proposed for removal (*refer graphic attachment - sheet 3*) are mostly large mature trees, some 20-30M in height and canopy spread, which currently screen views of Otago Harbour and provide shelter from prevailing winds. However gaps from fallen trees, coupled with recent tree removal allow occasional glimpses of the views out over Otago Harbour to the west and Dunedin City to the south.

The trees appear to be very old, and of similar age, size and scale to many other groups planted as shelterbelts by the early settlers of Dunedin in the early 1800's, and which form part of the rural character and unique landscape patterns of the Otago Peninsula. Together with the narrow sunken laneway of Camp Road, the trees create a strong sense of enclosure, conveying a sense of history and an intimate entrance to Larnach Castle.

The trees are windshorn, many having a gnarled and sculptured form, with some trees leaning over the roadway. There is obvious evidence of wind damage, with some hanging broken branches and fallen trees, possibly windblown, lying on the ground.

5. PLANNING CONTEXT

The relevant planning documents against which the landscape and visual effects of the proposal are assessed include:

Resource Management Act (RMA) 1991

The RMA provides for matters of national importance under Section 6 and other matters under Section 7. Of relevance to this proposal, persons exercising functions and powers under Section 7, should have particular regard to:

7(c) the maintenance and enhancement of amenity values.

7(f) the maintenance and enhancement of the quality of the environment.

Under the RMA the definition provided for "amenity values" is:

"Amenity values are those natural or physical qualities and characteristics of an area that contribute to people's appreciation of its pleasantness, aesthetic coherence, and cultural and recreational attributes".

Part II of the RMA sets out the responsibilities of territorial authorities, regional councils, and members of the community in protecting amenity values. In addition, Section 75 requires councils to provide for amenity values in their District Plans.

The effects of the removal of 26 of the G028 trees on the rural character of the site and its wider landscape are assessed under Section 6 of this report.

OPERATIVE DUNEDIN CITY DISTRICT PLAN

The principal statutory document for the assessment of the application is the Dunedin City District Plan (The Plan). The Plan includes Section 14.5 Landscape Management Areas, which lists the most significant site landscapes within the Dunedin City Council area in three categories:

- Outstanding landscape Areas.
- Coastal Landscape Preservation Areas.
- Landscape Conservation Areas.

The Camp Road site is zoned Rural within the Plan, and lies within the North-West Peninsula Landscape Conservation Area.

The areas specified in Schedule 14.5.3 Landscape Conservation Areas are described as:

"Areas which have particular impact on landscape quality due to high levels of visibility from major public viewing locations and / or the presence of particular landscape character and values. The areas are generally the higher land visually containing the most densely settled urban and rural areas of Dunedin. All of these areas are characterized to a greater or lesser degree by an open, rural character . . ."

It concludes by stating: *"All areas which have been included have been assessed as key areas in providing natural / rural landscape impact for the wider City environment. It is important that their remaining natural characteristics are maintained and enhanced."*

The Camp Road site lies within Schedule 14.5.3 (b) North-West Peninsula Landscape Conservation Area, which describes the extent of the area as follows:

"This area includes the higher, rural land on the harbor-facing side of the Otago Peninsula. It provides a significant portion of the setting, visual containment and skyline for the urban areas of Dunedin and the harbour communities. Its visual quality therefore has a substantial impact on the visual quality of wider areas."

Features and characteristics identified as requiring protection within the North-West Peninsula Landscape Conservation Area and which may be affected by the proposed removal of the Monterey cypress tree group are:

"The extent and quality of views from the principal public routes and viewpoints", together with potential effects and changes to "the human-made features, which are relics of the past and provide highlights at the detailed scale, e.g.: stone walls, remnant shelter plantings, Larnach Castle."

Other potential threats of removal of the group of *Macrocarpa* trees as a significant natural and cultural feature, and the potential effects to the visual quality of the surrounding landscape by the *"removal or diminution of significant natural features such as areas of indigenous vegetation or significant cultural features such as stone walls."*

Objective 4.2.1 of the Dunedin City Council District Plan Sustainability Section seeks to enhance the amenity values of Dunedin in the future.

"Throughout the city there is a variety of significant amenity values in different locations. These include:

- *Spaciousness and separation of activities in the rural area*
- *Heritage values throughout the City*
- *Urban and rural landscapes*
- *Natural and recreation areas*

The Council seeks to enhance all amenity values in the future."

With the principal reasons for this objective being:

"The Council wishes to protect the existing amenity value and character of the various parts of the District.

Objective 15.2.2 of the Dunedin City Council District Plan Trees Section seeks to protect Dunedin's most significant trees:

"Some trees have a greater impact on amenity and quality of the environment than others and require protection"

with the principal reasons for this objective being:

"Sections 7(c) and 7(f) of the Act require the Council to have particular regard to the maintenance and enhancement of amenity values and the quality of the environment. Trees are significant contributors to both amenity and environmental quality and the protection of significant trees, and encouragement of conservation and planting of trees is therefore important."

PROPOSED SECOND GENERATION DUNEDIN CITY DISTRICT PLAN

The Proposed District Plan re-zones the Camp Hill site as Rural Hill Slopes with a North-west Peninsula Significant Natural Landscape overlay still applying.

Appendix 3.3.5.2 of the Proposed District Plan, North-west Peninsula Significant Natural Landscape identifies cultural, historic, aesthetic and amenity values of the area deemed important in protecting the landscape character of this area:

(b) iii. *"Historical significance: historic cultural features throughout the area include drystone walls and remnant Macrocarpa shelter trees and building sites . . ."*

(c) *"Visual prominence: The extent and quality of the outstanding panoramic views, which are available both of the area and from the area. The skyline generally defined by natural elements. The area is very visible from the Dunedin CBD and from the western side of the harbour."*

Section 7: Scheduled Trees of the Proposed Dunedin City Council District Plan notes the important role of scheduled trees in protecting both urban and rural amenity, however also recognizes the need for long term care and management of scheduled trees, and proposes to:

- Promote the retention of trees.
- Promote new plantings in recognition of their important role in enhancing the urban environment.
- Provide for individual landowners who may need to modify or remove trees that are no longer suitable for their location.

Despite all the protection of significant trees within both the Dunedin District Plan and Proposed District Plan, trees are living organisms, require ongoing maintenance, and have an expected lifetime and death.

With new policies being proposed for the long term care and management of scheduled trees Policy 7.2.1 enables the removal of a scheduled tree where they are certified as being dead or in terminal decline by a suitably qualified Arborist or where subject to an order for removal in terms of the Property Law Act 2007.

Policy 7.2.1.2 avoids the removal of a scheduled tree (except as provided for in Policy 7.2.1.1) unless:

- (a) There is significant risk to personal / public safety.
- (b) The tree is shading existing residential buildings to the point that access to sunlight is significantly compromised; or
- (c) The removal of the tree is necessary to avoid significant adverse effects on public infrastructure.
- (d) These adverse effects cannot be reasonably mitigated through pruning and the effects outweigh the loss of amenity from the removal of the tree.

6. ASSESSMENT OF ACTUAL AND POTENTIAL LANDSCAPE AND VISUAL EFFECTS

The actual and potential landscape and visual effects of the proposed removal of 26 scheduled trees from Camp Road include:

- Effects on the character and amenity value of the immediate site.
- Visual effects on the composition of the surrounding landscape character.
- Visual effects of the proposed tree removal on views from neighbouring properties, roads, walking tracks and public viewing points.

Visual effects are generally accepted as relating to the changes that arise in the composition of available views as a result of changes to the landscape and to the overall effects with respect to amenity value.

With regard to the effects of the proposed tree group removal on visual amenity values, the following hierarchy of descriptive terms¹ has been used as a guide to convey the magnitude and degrees of effects on visual amenity.

<i>None</i>	No part of the development, or work or activity associated with it, is discernible.
<i>Negligible</i>	Only a very small part of the proposal is discernible and / or it is at such a distance that it is scarcely appreciated. Consequently it has very little effect on the scene.
<i>Low / Slight</i>	The proposal constitutes only a minor component of the wider view, which might be missed by the casual observer. Awareness of the proposal would not have a marked effect on the overall quality of the scene.
<i>Moderate</i>	The proposal may form a visible and recognizable new element within the overall scene and may be readily noticed by the observer.
<i>Substantial</i>	The proposal forms a significant and immediately apparent part of the scene that affects and changes its overall character.
<i>Severe</i>	The proposal becomes the dominant feature of the scene to which other elements become subordinate and they significantly affect and change its character.

¹ Adapted from - The Landscape Institute with the Institute of Environmental Management and Assessment (2002). "Guidelines for Landscape and Visual Impact Assessment" (Appendix 6 – p. 139). (2nd ed.). London, England. Taylor & Francis.

6.1 EFFECTS ON RURAL CHARACTER AND AMENITY

Landscape character may be defined as a distinct and recognizable pattern of elements, or characteristics, in the landscape that makes one landscape different from another.

An aspect of *landscape character* is natural character, which can be thought of as the extent to which naturally occurring elements, patterns and processes of a place remain intact. It does not include structures, modifications to landform or other human-induced changes such as the plantings of exotic shelterbelts – these simply reduce natural character. Natural character is generally understood to occur on a continuum from pristine to totally modified and criteria for naturalness are generally recognized to include:

- Relatively unmodified and legible physical landform and relief.
- The landscape being uncluttered by structures and / or “obvious” human influences.
- The presence of water – lakes, rivers, sea.
- The vegetation (especially native) and other ecological patterns.

Amenity values encompass a broad range of issues and *visual amenity* is a measure of the visual quality of a landscape as experienced by people living in, working or travelling through it. Visual amenity is invariably associated with the pleasantness, memorability and aesthetic coherence of an area or view.

The landscape values of the application site are derived from its character and amenity. These are largely determined by visual considerations, but not always exclusively so. Rural character mostly results from a high proportion of open space to built form.

As described, this portion of Camp Road site is essentially rural in character. It contains the G028 shelterbelt sited within open paddocks. The Larnach Castle private lodge (Camp Estate Country Lodge), is set some 70m to the east and uphill from the road, while open farmland to the west slopes steeply downhill, providing dramatic views out over Otago Harbour, and Dunedin City to the south.

The group of existing mature Monterey cypress and Monterey Pine that line the western edge of Camp Road hold significant amenity value, both within the Camp Road site, and to the wider landscape surroundings. They form one of the many groups of historic Monterey cypress shelterbelts, which create patterns and coherence to form the special landscape character of the Otago Peninsula. Their prominent ridgeline location means they are visible from many vantage points both on the peninsula and from across Otago Harbour.

The proposed removal of 26 trees from the existing group of large mature Monterey cypress trees will have a noticeable effect on changing the amenity values of the immediate site, although tree removal will open up previously screened views east across the Otago Harbour and south to Dunedin City, thus enhancing the area in a different way.

The effects on the wider Otago Peninsula rural landscape character is that of diminution of the Monterey cypress shelter belts and the patterns they create, which are a significant element of the historical and cultural character of the area.

The proposed removal of 26 large trees from this G028 scheduled tree group will have a moderate effect on amenity values from within the site and a low / slight effect on the rural landscape character values of the surrounding Otago Peninsula environment.

6.2 VISUAL EFFECTS

People potentially affected by the proposed tree removal include:

- Residents living near the site - Larnach Castle, Lodge, surrounding Otago Peninsula area, Dunedin City, and those living on the western side of Otago Harbour with views across to the site.
- Motorists driving through the Otago Peninsula and in particular, along Camp Road to Larnach Castle, including staff and visitors of Larnach Lodge and Larnach Castle.

The assessment of landscape and visual effects of the proposed tree removal have been assessed from six viewpoints which are common stopping points and representative viewing locations used by the viewing audience listed above - locals and tourists alike. Photographic images portray the trees as one large group, making it difficult to discern the 26 G028 trees for removal from trees, or the background trees of Larnach Castle.

Fallen Soldier's Memorial Walking Track – (refer graphic attachment – site photo 1-3)

The Fallen Soldier's Memorial car park is located on Highcliff Road – a popular tourist route and known locally as the “high road” over the Otago Peninsula. The roadside car park is the first opportunity for motorists to stop, providing open views of Otago Harbour and the Otago Peninsula. The Camp Road trees for proposed removal are clearly visible from this location, and also from the walking track and Soldier's Memorial, however they are a component of a large group of trees including those in the grounds of the nearby Larnach Castle. The viewing distance to the trees is 6.2kms and because of the viewing distance and the fact that the 26 G028 trees to be removed are part of a large group of trees their removal will be scarcely appreciated and have very little effect on the overall quality of the scene, the visual effect will be negligible to low.

Claremont Farm Entrance – (refer graphic attachment – site photo 4)

Claremont Farm Gateway is another popular stopping point when driving some 2kms further north along Highcliff Road, again the subject trees are clearly visible from this viewing point. The viewing distance from the trees is 4.2kms from the viewpoint, with a section of the tree group possibly obscured from this viewpoint. Because of the viewing distance it is difficult to clearly identify the 26 G028 trees for proposed removal from the surrounding tree groups. Visual effects of tree removal will be scarcely appreciated from this viewpoint, and therefore will have little effect on the overall quality of the scene, therefore the visual effect will be negligible to low.

Penzance Kennels – (refer graphic attachment – site photo 5)

This viewing point is a gravel roadside layby located opposite Penzance Kennels some 1km further at the highest point of Highcliff Road, before the road descends toward the eastern Otago Peninsula coastline. Views from this point are extensive, extending from views over the Otago Peninsula and Port Chalmers, to Pukehiki settlement, and include small scale farm buildings, Monterey cypress shelter belts and historic stone walls. The viewing distance to the trees is 3.2kms from the viewpoint. From this distance the proposed 26 G028 trees for proposed removal are barely discernable from the greater group and constitute only a minor component of the wider view, therefore their removal would have little effect on the overall scene and visual effects would be negligible to low.

Camp Road – (refer graphic attachment – site photo's 6-8)

These viewing points are taken from the proposal site looking along the Camp Road site as a passing motorist would, with views from the north and south. The G028 Group 1 trees (refer graphic attachment – site photo 6) are positioned north of the Castlewood Road and Camp Road intersection. There are gaps evident within this tree group, created from wind damage and recent tree removal.

Travelling southward from Larnach Castle entrance, the G028 Group 3 trees are prominently positioned immediately along the edge of Camp Road (*refer graphic attachment – site photo 7*). The most noticeable effect of the proposed tree removal will be on the southern section of Camp Road and its immediate surrounds. The present degree of strong spatial enclosure, drama, and sense of history, which the trees create at the entrance to Larnach Castle will be lessened, however, on a more positive note, the proposed removal of the trees will open up extensive views (*as shown in photo 8*) out over the Otago Peninsula, Otago Harbour and Dunedin City - which are currently obscured by the subject trees. The viewing distance from the trees is 10-100m from the viewpoint. Because of the proximity of the trees to the viewer, and the visual and spatial dominance created by the trees from these viewpoints within the site, the effects of tree removal on the immediate Camp Road site would be significant and immediately apparent, affecting and changing the overall character of the immediate scene, therefore the visual effects would be moderate to substantial.

Castlewood Road – (*refer graphic attachment – site photo 9*)

Castlewood Road is a steep narrow road linking Company Bay with Camp Road. This viewing point is taken some 150-200m down the hill from the intersection of Castlewood and Camp Road, looking up hill in an easterly direction toward the subject trees and ridgeline. The subject tree group is clearly visible from this close viewing point, although their appearance from this angle shows a less cohesive grouping, with gaps evident from wind damage and recent tree removal. The viewing distance to the trees is 200m from the viewpoint. Because of the trees prominent ridgetop location and dominance on the skyline, removal will be visible and immediately apparent to people familiar with the area, and will affect and change the overall character of the scene, therefore the visual effects of the removal of 26 G028 trees from this viewpoint would be moderate to substantial.

Maia Cycleway – (*refer graphic attachment – site photo 10*)

Maia is located across the Otago Harbour to the west of the site. This photo is taken from the Maia cycleway, 6kms from Dunedin CBD, and shows clear views of the subject trees situated on the ridgeline opposite. The viewing distance to the trees is 7.4km from the viewpoint – although the wider group of trees of the stand of trees which the subject group are a component of are clearly visible on the ridgeline from this distance, it is not possible to identify the 26 G028 trees for removal from the larger tree group. The visual effects of tree removal would have little effect on this scene with the 26 G028 trees constituting a only a minor component of the wider view, therefore the visual effects from this viewpoint would be negligible to low.

Cycle & Pedestrian Overbridge - Dunedin Railway Station – (*refer graphic attachment – site photo 11*)

The Dunedin Railway Station is an iconic building located at the bottom of lower Stuart Street. This photo was taken from the Pedestrian Railway overbridge located at the southern end of the Dunedin Railway Station. It is a popular pedestrian and cycle route which gives direct access over the railway corridor to the Dunedin CBD. The viewing distance to the trees is 9kms from the viewpoint. The subject tree group is visible on the distant skyline from this location, however because the tree group is at such a distance, it is scarcely appreciated and impossible to differentiate the 26 trees for removal from the wider G028 group and surrounding trees. Consequently, the proposed tree removal would have little effect on the scene, and visual effects from this viewpoint would be negligible.

The Octagon – Dunedin – (*refer graphic attachment – site photo 12-13*)

The Octagon is the central business district of Dunedin City – the epicenter of the city, and a mix of arts, culture, entertainment and business activities. These photos were taken from the upper Octagon – outside St. Paul's Cathedral steps and from Forsyth Barr House, Stuart Street. These locations provide the only views of the subject tree group from within the Octagon due to screening

by surrounding buildings, however more extensive views will be possible from within some of these buildings. The viewing distance to the trees is 9.5kms from the viewpoint. The subject tree group is visible in their distant ridgeline position from this location, framed by buildings. Because of the distance, it is impossible to differentiate trees for removal from the wider surrounding tree group and at this distance removal of 26 G028 trees would have very little effect on the scene and would not have a marked effect on the overall quality, or amenity value, of the scene. Visual effects from this viewpoint would be negligible to low.

The Roslyn Overbridge "Highgate Bridge" — (refer graphic attachment – site photo 14)

The Roslyn overbridge is situated at the top of Stuart Street in the residential hill suburbs and provides stunning views over Dunedin City, Otago Harbour and Otago Peninsula.

The viewing distance to the trees is 10kms from the viewpoint. From this point the subject tree group is visible against the distant skyline, however the trees are more difficult to identify, as they are on the periphery of the main views and possibly partially screened by Logan Point ridgeline - the southernmost spur of Signal Hill. Because the G028 Camp Road tree group constitutes only a minor component of the wider view and the trees are at such a distance that tree removal would not be appreciated, visual effects from this viewpoint would be negligible. From this Roslyn overbridge viewpoint, removal of the trees would have a negligible effect on the surrounding rural landscape character of the Otago Peninsula.

My landscape and visual assessment has determined that from a number of viewpoints the removal of 26 scheduled trees of G028 will give rise to varying degrees of landscape and visual effects from surrounding viewpoints, ranging from low to slight to a moderate to substantial effect on the landscape and amenity values experienced within the existing tree lined Camp Road site. This level of effect represents an objective measure of the degree of change to the status quo.

The most noticeable effect of the proposed tree removal will be on this southern portion of Camp Road and its immediate surrounds. The present degree of strong spatial enclosure, drama, and sense of history, which they currently create at the entrance to Larnach Castle, will be lessened, however, the unaffected group of 32 trees positioned immediately prior to the Larnach Castle entrance, will retain these qualities within the northern area of the site. Removal of the trees will open up extensive panoramic views out over the Otago Harbour to the north and west, and south to Dunedin City – views that are currently obscured by trees.

The Otago Peninsula forms the backdrop to Dunedin City and is visible from numerous vantage points throughout the city and suburbs. Although the removal of the 26 G028 trees will noticeably change the landscape character of the immediate Camp Road and Castlewood Road surrounds, the fundamental character of the existing wider rural landscape of the Otago Peninsula will remain unchanged.

7. RECOMMENDED MITIGATION OF EFFECTS

The extensive Arborist Report ² gives a Comprehensive Risk Assessment of the scheduled trees within group G028 lining Camp Road between Castlewood Road and the Larnach Castle entrance. The report recommends the removal of 27 trees (including one *Eucalyptus sp.* that is not included in the schedule) - all trees within Group One and Group Two due their potential risk to public safety.

² Arborlab 2015 "Shelter Belt, Camp Road Dunedin Risk Assessment"

The assessment found the majority of the trees in Group Three are currently healthy, posing a low level of risk to public safety. The trees within Group Three are the most northerly group, situated in close proximity to the Larnach Castle entrance, and hold a great presence within the site in creating a sense of history and spatial enclosure. (*refer graphic attachment – sheet 11-12*)

The aim of the following recommended mitigation actions is to ensure that the removal of 26 of the 58 trees within Group G028 will have minimal long-term adverse effects on the surrounding landscape character of the Otago Peninsula and that the visual amenity of the Camp Road surrounds and entranceway to Larnach Castle will be enhanced.

- Concept plantings have been judiciously located so as to afford maximum views of the Otago Harbour from Camp Road, enhance the amenity of Larnach Castle entrance and mitigate effects of tree removal (*refer graphic attachment – sheet 11*).
- The proposed landscape plantings are historically significant hardy New Zealand plant species, which are considered native to the Otago Peninsula environment. Recommended plantings include a mix of hardy native and exotic plantings, and include Monterey cypress trees as illustrated in the recommended Planting Palette. (*refer graphic attachment – sheet 12*)
- Replacement planting of large specimen Monterey cypress trees in accordance with the Landscape Concept Plan and a detailed Landscape Planting Plan will serve to help retain the Monterey cypress shelterbelt patterns of the Otago Peninsula long-term.
- A carefully staged program to manage the removal of existing trees and replanting of the disturbed area with a combination of exotic Monterey cypress with under plantings of indigenous New Zealand native vegetation will further enhance the natural qualities of this area.
- Tree removal should be carried out in a staged manner, with tree felling commencing at the Castlewood Road intersection and proceeding northwards along Camp Road toward Larnach Castle to provide the least visual disturbance. Trees should be removed in sequence, ensuring minimal visual disturbance to the users of Camp Road.
- Planting should be carried out in stages following tree felling, stump removal and clearing of the site surrounds, in accordance with the Landscape Concept Plan. In order to implement the Concept Plan, a detailed Planting Plan would be required.
- All native plant species should be locally sourced indigenous plant species to ensure they are in context with existing species of the surrounding environment and to promote maximum durability for survival in this exposed and windswept site.
- All planting should be maintained and any diseased or deceased plants to be replaced as necessary.

Section 5(2)(c) of the Resource Management Act (1991), requires that the adverse effects of activities on the environment be avoided, remedied or mitigated. The recommendations contained within this section for the landscape assessment report will ensure that the combination of retention of 32 existing G028 trees together with the planting of new vegetation will appropriately mitigate the adverse landscape effects associated with the removal of 26 scheduled tree from Group G028 to the extent that the effects will be moderate / low within the site and low / slight beyond the site.

8. CONCLUSION AND DISCUSSION

The proposal is to remove 26 trees from Group G028 of 58 scheduled trees situated on the western edge of Camp Road, a narrow roadway located near Pukehiki - a small settlement on the Otago Peninsula. The trees for removal have been identified as being particularly at risk of falling onto the road and therefore posing an unacceptable threat to the health and safety of road users. Camp Road provides access to Larnach Castle and has a constant flow of traffic throughout the day.

The landscape and visual amenity effects have been considered from public locations both from the immediate site, and from prominent viewing points within the vicinity of the site surrounds. There will be an effect on landscape character of the immediate site, however the visual consequence on the effects of change to the wider landscape character varies depending on the position and distance of the viewpoint, and will be minor.

It has been determined that overall, with respect to landscape matters, landscape and visual effects arising from the removal of 26 trees from Group G028 of 58 scheduled trees will have negligible to low / slight effect on its setting as seen from distant viewpoints accessed by the public. Although the removal of trees will change the spatial qualities of a portion of the southern section of Camp Road, viewpoints allowing extensive and somewhat outstanding panoramic views of Otago Harbour, Dunedin City and beyond will be created from within the site.

Visual effects on the immediate Camp Road and Castlewood Road surroundings will be moderate to substantial – effects will be visible with recognisable changes to those familiar with the site, however the retention of 32 scheduled trees of the G028 tree group, in close proximity to Larnach Castle entrance will minimise these effects, preserving the sense of history and intimate spatial enclosure. The recommended extensive mass plantings of New Zealand native species will provide visual cohesion and amenity enhancement to Camp Road and the Larnach Castle entry surrounds, further mitigating adverse visual effects arising from the felling of existing trees.

The long-term visual effects on the composition of the surrounding Otago Peninsula rural landscape character and shelterbelt patterns will be low / slight and therefore remain largely unaffected by the removal of 26 scheduled trees from Group G028 if successional and replacement planting of large specimen Monterey cypress trees is carried out as recommended.

The existing character of the Otago Peninsula is an exposed, rugged and windswept rural landscape with narrow roadways, small-scale residential settlements, historic dry-stone walls and groups of tree shelter plantings. Although there will be changes to the character of the immediate landscape surrounding Castlewood Road and Camp Road, the existing broader landscape character of the Otago Peninsula will essentially remain unchanged.

Public safety is paramount. If removal of 26 of the 58 trees within the G028 scheduled tree group is deemed the only practical means of managing the site in terms of maintaining public health and safety, it is my recommendation that tree removal is undertaken in a staged manner over a period of time, allowing for replanting to be carried out and become established in the interim.



Graphic Attachments to accompany Landscape and Visual
Assessment

**Proposed Tree Removal
Camp Road, Pukehiki
Otago Peninsula.**

Prepared for

Dunedin City Council Transport Department

By

RUN394 Landscape Architecture Ltd.



CONTENTS

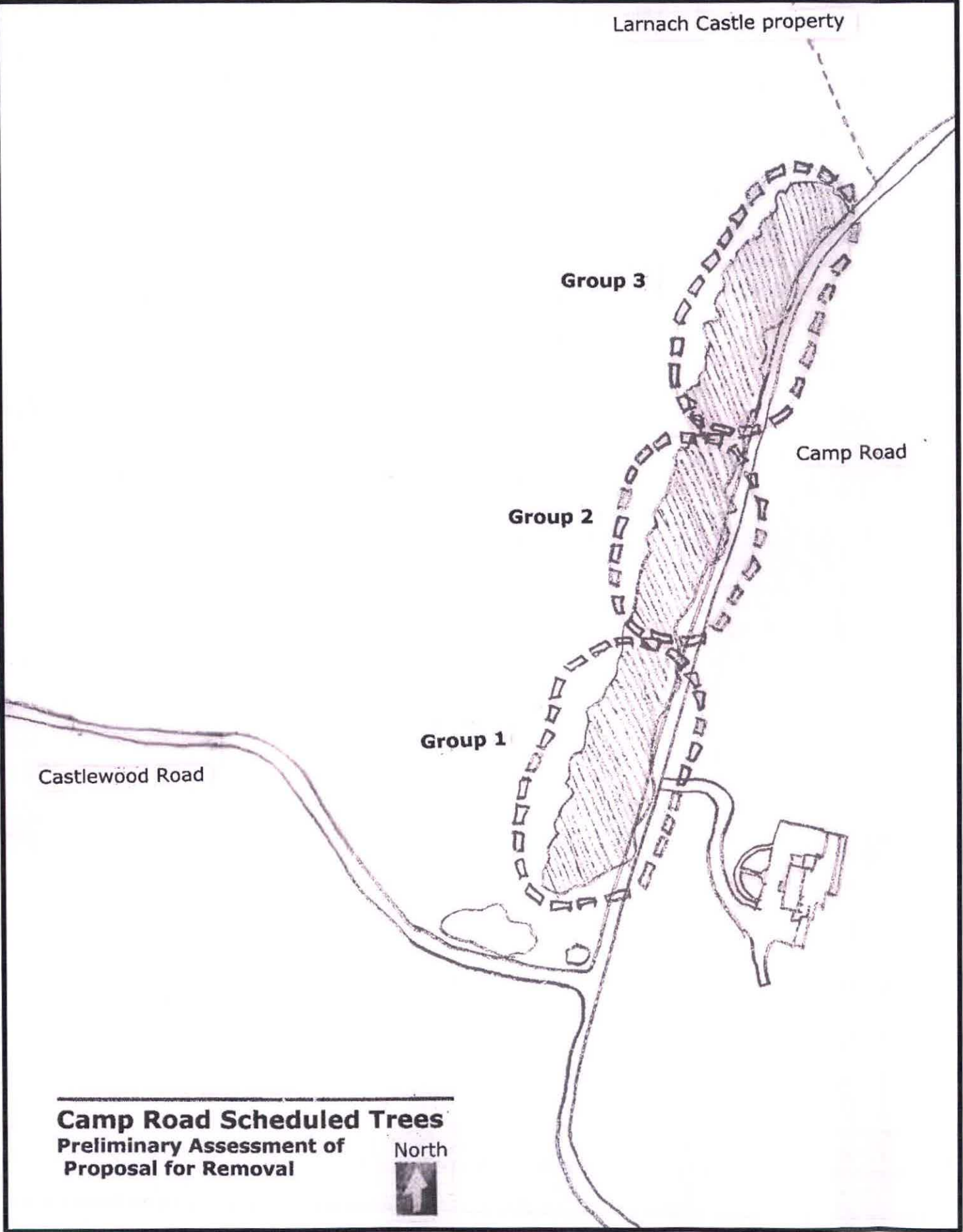
APPENDIX 1 - GRAPHIC SUPPLEMENT

- SHEET 1 - LANDSCAPE CONTEXT PLAN
- SHEET 2 - CAMP ROAD SITE TREE GROUPS 1,2 & 3
- SHEET 3 - SITE CONTEXT AND SITE PHOTOGRAPH LOCATION PLAN
- SHEET 4 - SITE PHOTOGRAPHS 1-2
- SHEET 5 - SITE PHOTOGRAPHS 3-4
- SHEET 6 - SITE PHOTOGRAPHS 5-6
- SHEET 7 - SITE PHOTOGRAPH 7-8
- SHEET 8 - SITE PHOTOGRAPH 9-10
- SHEET 9 - LANDSCAPE CONCEPT PLAN
- SHEET 10 - PLANT PALETTE

SCALE - NOT TO SCALE
Map / Aerial Photo Source Google Earth



SCALE - NOT TO SCALE
Map / Aerial Photo Source Google Maps



Camp Road Scheduled Trees
Preliminary Assessment of
Proposal for Removal



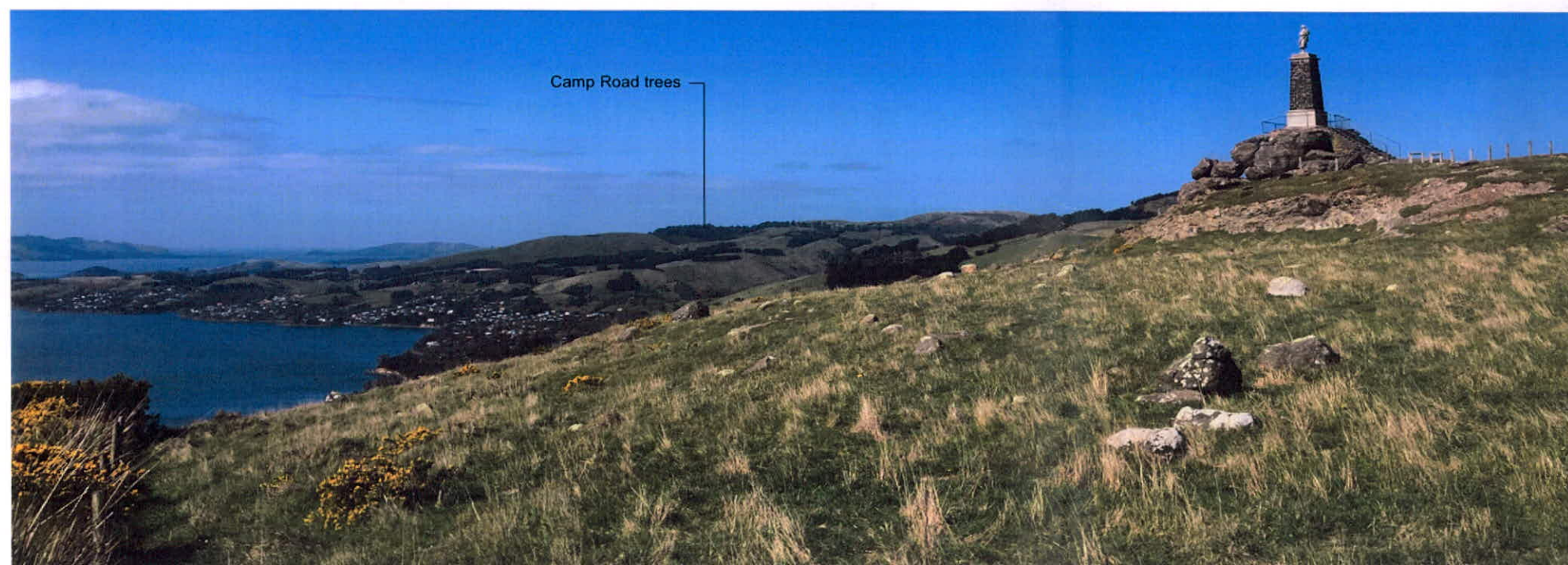
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Graphic Source Dunedin City Council



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Map / Aerial Photo Source Google Earth



Site Photograph 1. From Highcliff Road Car Park - Fallen Soldiers Memorial Track .



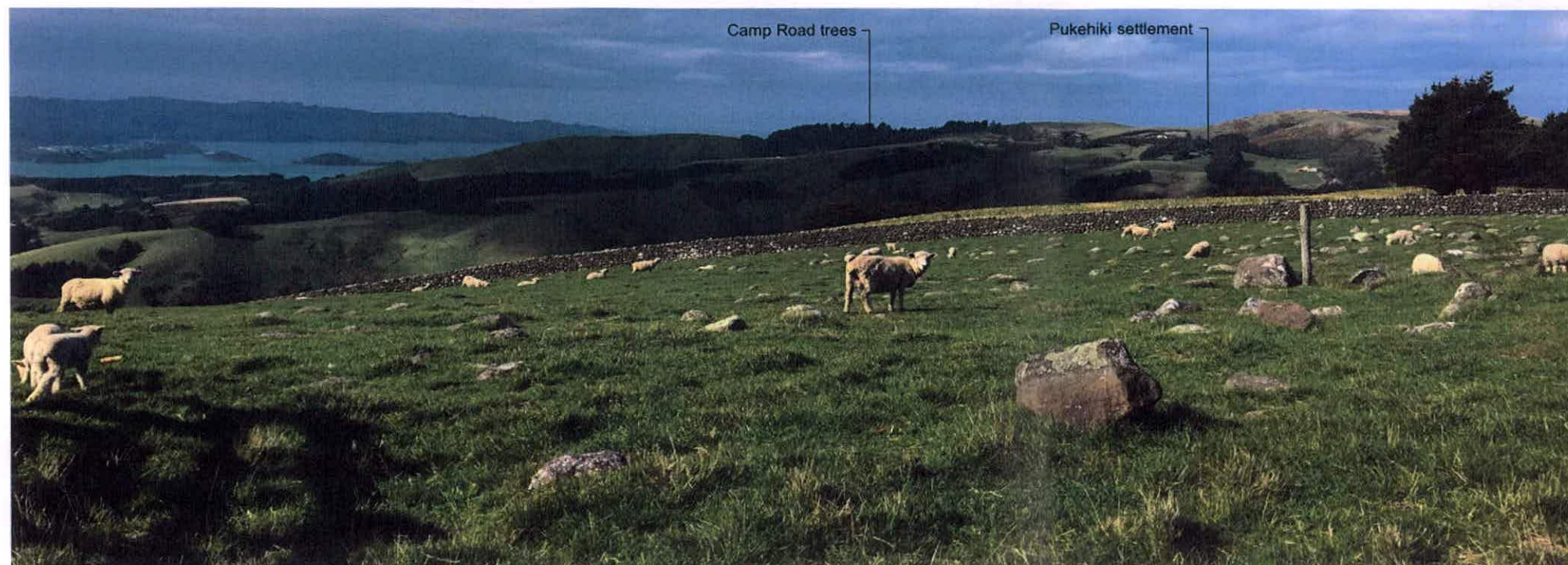
Site Photograph 2. From Fallen Soldiers Memorial Track.



Site Photograph 3. From Fallen Soldiers Memorial.



Site Photograph 4. From Roadside Viewpoint Claremont Farm Entrance.



Site Photograph 5. From Roadside Viewpoint Penzance Kennels.



Site Photograph 6. From Camp Road - Existing Trees travelling Northward to Larnach's Castle.



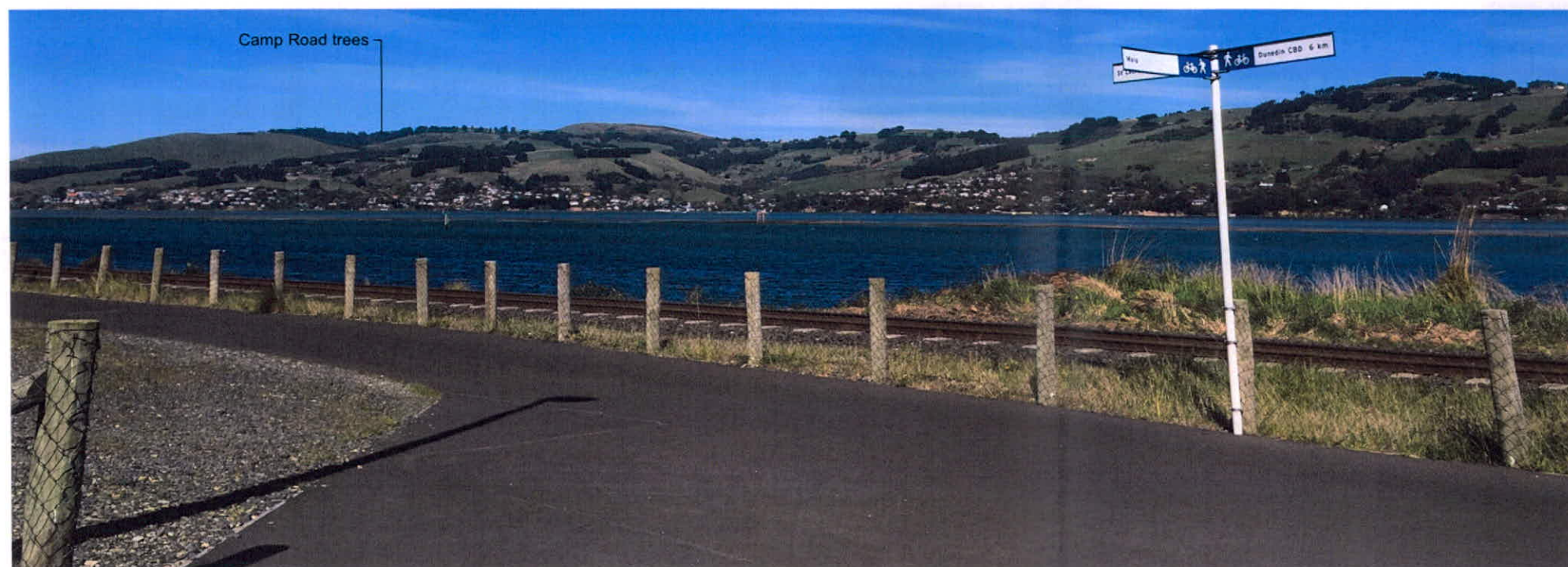
Site Photograph 7. From Camp Road - Existing Trees Travelling South from Larnach's Castle.



Site Photograph 8. From Camp Road looking toward Highcliff Road, Fallen Soldiers Memorial Otago Harbour and Dunedin City.



Site Photograph 9. From Castlewood Road - looking up towards Camp Road.



Site Photograph 10. From Maia Cycleway - looking across Otago Harbour.



SCALE - 1:5000 @ A3 / 1:2500 @ A1
 Map / Aerial Photo Source DCC

LEGEND:

- Group Three Trees**
Cupressus macrocarpa - *Macrocarpa*
- Proposed Trees**
Cupressus macrocarpa - *Macrocarpa*
- Proposed Mass Plantings**
Coprosma crassifolia
 Mikimiki
Coprosma propinqua
 Mingingi
Chionochloa conspicua
 Wide Leaved Snow Tussock
Phormium cookianum
 Mountain Flax
Chionochloa rigida
 Narrow Leaved Snow Tussock
- Contours**
 10 metre contour lines



RUN 394 landscape architecture limited

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**DUNEDIN CITY COUNCIL. TRANSPORTATION
 CAMP ROAD TREE REMOVAL
 PUKEHIKI, OTAGO PENINSULA
 DUNEDIN.**

LANDSCAPE CONCEPT PLAN - DRAFT CONCEPT

SCALE	1:5000 @ A3 / 1:2500 @ A1
DATE	07.12.2015
DESIGNED	WENDY CHARTRES-MOGINIE
DRAWN	WENDY CHARTRES-MOGINIE
STATUS	FOR REVISION
DRAWING NO.	INITIAL CONCEPT

LDD - 1.0



Cupressus macrocarpa - Macrocarpa Tree



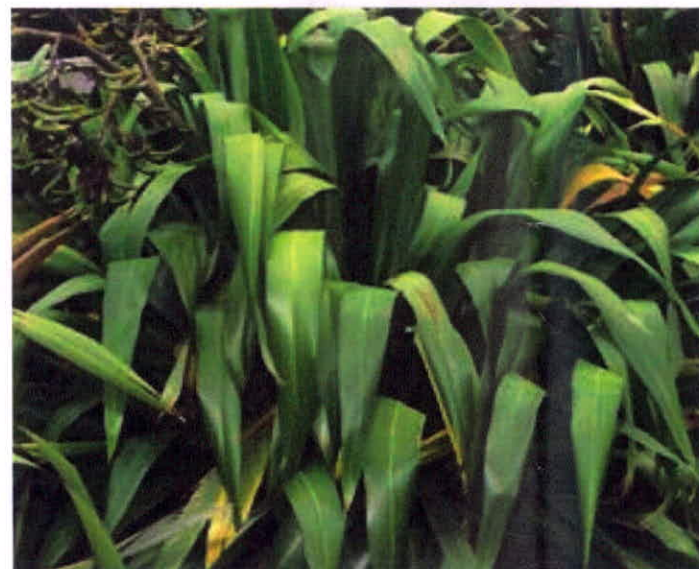
Coprosma crassifolia - Mikimiki



Coprosma propinqua - Mingimingi



Chionochloa conspicua - Snow Tussock



Phormium cookianum - Mountain Flax



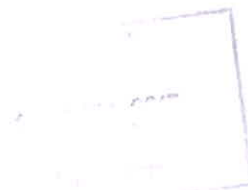
Chionochloa rigida - Narrow Leaved Snow Tussock

APPENDIX E

Recent Camp Road Tree Management Costs,
Dunedin City Council Transport Department

10 November 2015

Mitchell Partnerships
Attn: Steven Tuck
PO Box 489
Dunedin 9054



Dear Sir

The Dunedin City Council Transportation Group (owner of the trees signified as G028 in the Dunedin City District Plan) has incurred significant ongoing costs associated with the maintenance of this treeline. As road controlling authority we also have safety concerns relating to damage to private property, and the injury, or fatality, of road users.

The legal road on which the trees are sited is the only access to Larnach Castle, an internationally recognised tourist attraction. The trees' proximity to the formed road, combined with their size, means any work on the trees requires traffic management involving road closures. Such closures cause significant disruption to road users, particularly the Castle.

The Council's contractor and a number of arborists have inspected the tree line in recent years. They have recommended removal of trees and limbs for safety reasons after weather events that have caused damage. The Council has spent a significant amount of money on this reactive and planned work, the recent costs of which are detailed below. In spite of doing this work when advised, limbs and main tree members previously not identified as a risk have continued to fail during adverse weather conditions, such as high winds, and snow. There have been instances where inspection of the fallen trees (or limbs) has shown that the damage has been exacerbated by internal damage or weaknesses within the tree, which are not outwardly visible by inspection prior to the failing of the tree (or limb).

The Council's costs for the last three years for both planned and unplanned tree work in association with this stand of trees (this current contract period) were:

- 2013 - \$1,478.63
- 2014 - \$914.82
- 2015 - \$50,003.84 (Note that the 2015 work included consented removal of some trees at a cost of \$37,670.84).

Any mitigation measures not involving removal of a number of the trees would require extensive road closures and expense. This expense would be out of proportion with the category of local road with relatively low traffic volumes, and would significantly impact on the operation of Larnach Castle who relies solely on Camp Road for access. Our experience having already performed work on the trees is that intensive pruning or other such mitigation work may not necessarily remove the risk to road users.

The Dunedin City Council, Transportation Group, are mindful of the amenity and ecological values of trees, however, the maintenance of a group of trees for these values is not in general accordance with the core duties of cost effectively maintaining a safe transportation network.

Yours faithfully

A handwritten signature in black ink, consisting of a stylized 'M' followed by a horizontal line.

Michael Tannock
Transport Network Team Leader

APPENDIX F

Draft conditions of consent

- The proposal shall be undertaken in general accordance with relevant details submitted with Resource Consent Application LUC 2015-[insert consent number], received by the Council on 23 December 2015.
- Renewal planting shall be undertaken in general accordance with the Run 394 Landscape Architecture Limited Landscape Concept Plan dated 23 December 2015.
- The trees shall be removed by a suitably qualified and experienced professional, in a safe manner, so that people and properties are not put at risk. In particular traffic management shall ensure the public are excluded when there is any risk from falling branches or the tree itself. All debris shall be removed promptly from the site.
- All work associated with felling the tree and removing the debris shall be limited to the times set out below and shall comply with the following noise limits (dBA):

	L10	L95	Lmax
Monday to Friday 7.30 am – 6.00 pm	75	60	90
Saturdays 8.30 am – 5.00 pm	75	60	90
Sundays 9.00 am – 4.00 pm	75	60	90
Public Holidays	No work permitted		

Sound levels shall be measured and assessed in accordance with the provisions of NZS 6803: 1999 Acoustics – Construction noise.