APPENDIX F

Arboricultural Report – Tree Management Solutions

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Arboricultural Report

26 Donald Street and 37 Campbell Street, Karori, Wellington

Comprehensive Care Retirement Village

Report commissioned by: Ryman Healthcare Limited

Consultant: Andrew Barrell

Dated: 26 May 2020

Contents

1.0 Introduction

1.1 I have been engaged by Ryman Healthcare Ltd to provide an arboricultural assessment relating to the construction and operation of a comprehensive care retirement village ("Proposed Village") at 26 Donald Street and 37 Campbell Street, Karori ("Site"). The Site was previously a Victoria University Teachers' Training College campus.

1.2 The Proposal includes removal of existing buildings on the Site to enable construction of the Proposed Village. Three buildings are to remain and will be incorporated into the Proposed Village. There is an eclectic mix of native and exotic trees on the Site and some of them will need to be removed to accommodate the proposed works. Other trees, primarily groups of trees, will be retained and protected during construction so that they can be incorporated into the final layout of the Proposed Village.

1.3 I visited the Site initially on 22 May 2018 to produce a Preliminary Tree Audit of trees on the Site (relevant details contained in Attachment 1 at the end of this report). I visited the Site again on 6 March and 18 December 2019 to assess tree management matters in light of the design drawings for the Proposed Village. I assessed which trees could be retained, which trees would need to be removed and how to protect those trees being retained during construction works.

1.4 The aim of this report is to provide background information relating to vegetation on and adjacent to the Site, identify the main areas where conflicts between construction and vegetation may occur and provide guidance and recommendations to manage any such conflicts to maximise the useful life expectancy of retained vegetation.

1.5 The findings of this report are based on the abovementioned site visits and design drawings provided by Ryman, some of which are reproduced within the main body of this report as screenshots. Please note these images are not to scale and the clarity may have been compromised by copying for inclusion in this report therefore any detailed information should be taken from the original drawings provided with the application.

1.6 Overall the vegetation being removed is considered to be of fair to low quality and significance from an arboricultural perspective for a number of reasons. These reasons include suppression from adjacent vegetation and/or buildings, limited visual presence from beyond the Site and, in many cases, being of a size whereby replacement planting will adequately mitigate any loss. While some of the more sizeable trees are being lost, others are being retained along with existing bush areas. Retention of these trees along with proposed landscape planting will result in a net gain over the longer term with regards to the establishment and maintenance of a sustainable tree population on the Site.

1.7 I have arboricultural experience and qualifications, the details of which are summarised on my website at the following address: **http://tree3.co.nz/about-us/andy-barrel-cv/**.

2.0 Assessment Protocols

2.1 In general terms the value of trees from an arboricultural perspective is based primarily on the concept of their *useful life expectancy* (ULE). This relates to balancing the diverse benefits provided by trees in an urban environment against the expenditure of resources required to achieve those benefits. In an ideal situation trees suitable for an urban environment should have a minimal maintenance burden, should not cause excessive or unreasonable problems for either people or the built environment (by, for example, excessive shading, aggressive and intrusive root systems, dropping undesirable fruits or residues or having adverse effects on human health) and they should not present unreasonable levels of risk to either people or property (by way of partial or entire tree failure or by root damage). This concept has formed the basis of my assessment of trees on this Site.

2.2 In addition to this concept, trees of a size whereby their removal can be adequately mitigated by replacement planting have not been considered as a more than minor effect. Furthermore, the loss of trees which are suppressed or malformed by adjacent trees or buildings and/or contain significant structural defects has been assessed as a less than minor effect. The fact that many trees are obscured from view from beyond the Site further reduces their visual amenity value.

3.0 Proposal and background information

3.1 ***Proposal***. The Proposal is fully described in the Assessment of Environmental Effects. Figure 1 below shows the Proposed Village site layout (drawing number RC04 / A0-021).

Figure 1 *– Screenshot of RC 04 (A0-021) – Proposed Site Plan With Aerial*

3.2 The Proposal will require removal of some vegetation from the Site, retention of the remaining vegetation and also includes extensive replanting post-construction.

3.3 ***Existing environment***. The Site is currently vegetated with a diverse range of both exotic and native trees and lower-canopy vegetation. The Preliminary Tree Audit dated 9 July 2018 identified a number of trees considered worthy of consideration for retention. Relevant sections of the Preliminary Tree Audit have been reproduced in Attachment 1 at the end of this report.

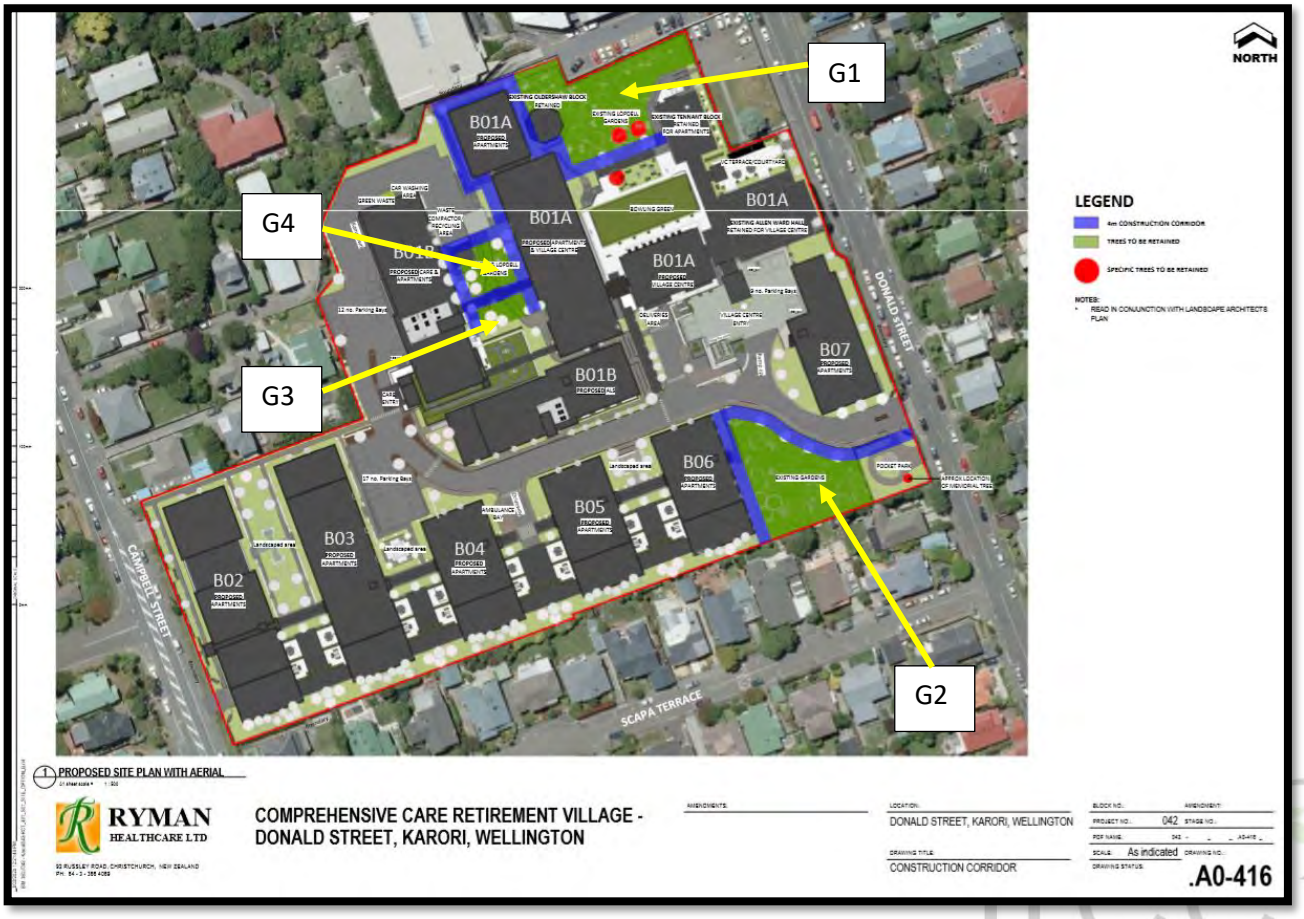
3.4 The remaining vegetation consists of a random mix of native and exotic species interspersed between and adjacent to the existing buildings on the Site. There may be scope to retain some of this vegetation however it is anticipated most will need to be removed. This vegetation is described in section 3.

3.5 ***Planning context***. Mitchell Daysh has advised that none of the trees on the Site are protected by the Wellington District Plan or any other statutory mechanisms. However, restricted discretionary consent is required for the Proposed Village. Landscaping is a relevant matter of discretion. Policy 4.2.3.7 of the District Plan also encourages the retention of mature visually prominent trees and bush in association with site development. I understand this policy seeks to address residential amenity rather than the protection of the trees themselves.

4.0 Assessment of effects: *vegetation removal and works around retained trees*

4.1 Figure 2 below shows the location of construction corridors and vegetation to be retained during construction of the Proposed Village. The green shaded areas (marked as G1-G4 inclusive) show the approximate extent of the groups of trees which are expected to be retained. It is anticipated that most of the remaining vegetation will need to be removed although the intention is to retain as many trees as possible where site constraints allow. See Figure 3 for an approximation of the extent of vegetation being removed.

Figure 2 *– Screenshot of 042-RCT_401_S01_SITE_OPTION_B_CONSTRUCTION_CORRIDOR showing site layout, location of construction buffer zones and locations of vegetation being retained.*

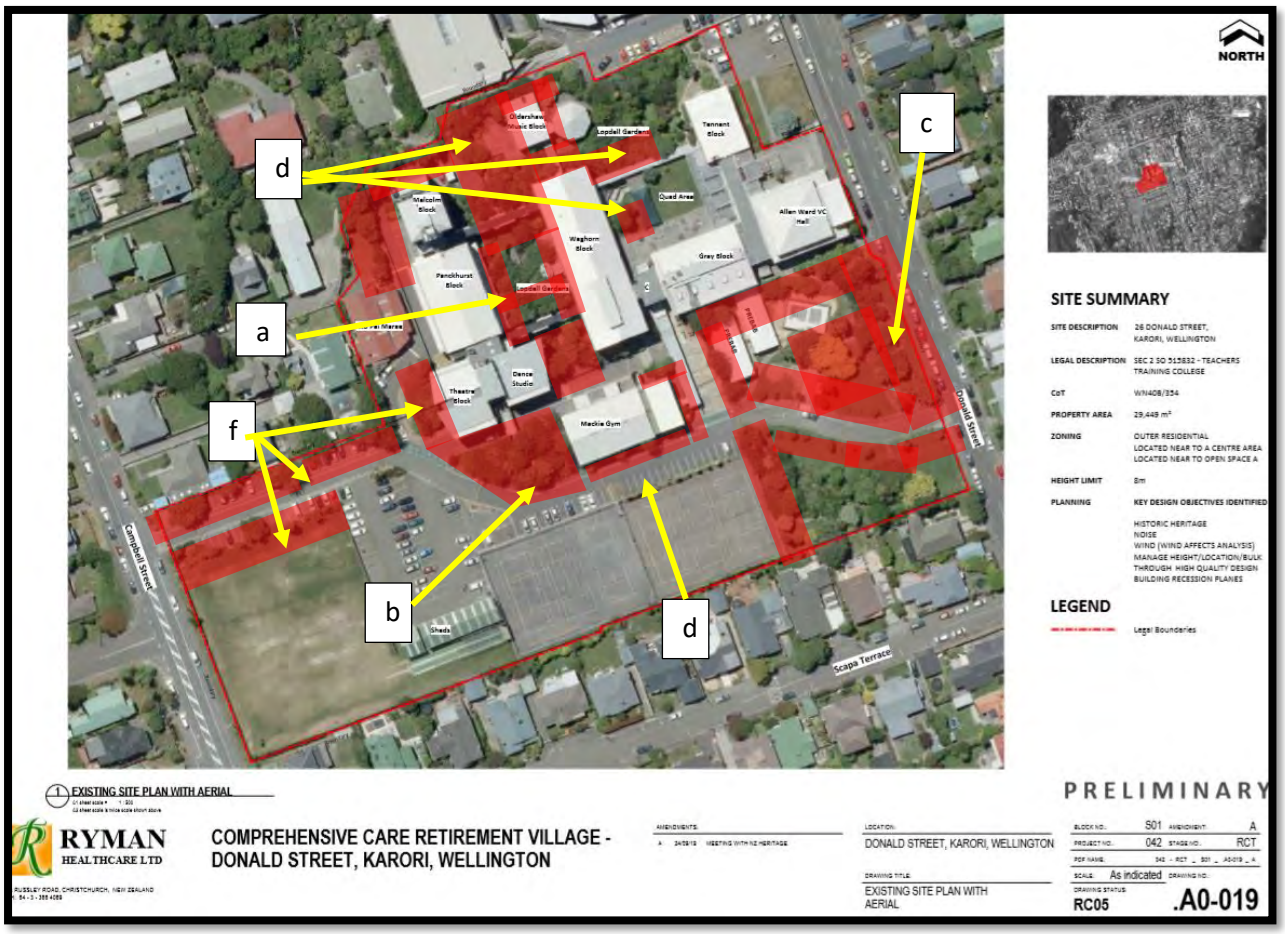


4.2 Retention of some existing buildings and structures within what is already a relatively confined Site introduces additional constraints that will affect logistical requirements such as crane placement, machinery operation and location of areas for lay down/storage of materials and machinery. These constraints will potentially affect how many trees can be retained around the development footprint. The full extent of these limitations is not expected to extend beyond the construction corridors shown in Figure 2.

4.3 The blue shaded outlines in Figure 2 represent construction corridors of 4m where ground disturbance is anticipated, and the trees within these blue areas will most likely need to be removed. The exceptions to this generalisation are the two trees marked by red dots within the area referenced as G1 and the individual tree to the south of this area. Each of these three trees were identified in the Preliminary Tree Audit as worthy of consideration for retention.

4.4 ***Vegetation to be removed***. The main areas of vegetation being removed are described and assessed below. Figure 3 shows areas where vegetation is to be removed and the lettering refers to the following text below.

Figure 3 *– Annotated screenshot of drawing AO-019 showing location of vegetation to be removed (red shading).*



a) The central section of the Lopdell Gardens feature (between Waghorn and Panckhurst blocks) includes a lower canopy (up to 3m above ground level) of mixed native and exotic shade-tolerant plants along with a mid- to upper-canopy of larger (up to 8-10m tall) exotics at the southern end including plane (*Platanus* species) and birch (*Betula* species). Whilst there is an established vegetative mass up to 10m or more above ground level in this area, none of the trees or groups of trees stand out as exceptional or significant in any way. It is intended to retain trees in two sections within this area, referenced as Groups 3 and 4 in Figure 2 above and described below.
The trees in these areas stand outside the construction corridors and therefore their retention is feasible. Trees in this area are obscured from view from beyond the site by the surrounding buildings.

b) The cluster of vegetation to the west of the Mackie Gym consists of mixed species up to 10m tall including birch, cherry (*Prunus* species), akeake (*Dodonaea viscosa*), *Coprosma* species, *Hebe* species, *Pittosporum* species, cabbage trees (*Cordyline australis*) and one sycamore (*Acer pseudoplatanus*) of 10m height. None of these trees were considered to be worthy of retention due primarily to them all having developed within a group situation and being subject to the mutual suppression associated with that environment which renders them inappropriate for retention on an individual basis because of their developed dependency on their neighbours for support and protection. In other words they function ok as a group but not as individuals because of the significant changes in their surrounding environment. These trees are partially visible from Campbell Street but stand some distance from this viewpoint and their visible prominence is limited to the wider viewing public by other trees and adjacent buildings.

c) The area to the north of the entrance from Donald Street contains several mature clusters of cabbage trees up to 8m tall, golden elms (*Ulmus* species) about 5m tall, six kowhai (*Sophora* species) along the driveway of 3-4m height and several other kowhai further to the north of the group. Some of these individual trees are in reasonable condition and possible candidates for relocation (the kowhai trees alongside the road – see *Relocation* section below) however the remaining trees were not considered as viable for relocation due to the logistical burdens and physiological stress associated with this process. This section is the most visually prominent of the trees being removed. It stands immediately adjacent to Donald Street and the edge trees form an almost solid vegetative screen along the road frontage. This screen obscures the remaining trees within the Site and diminishes their visual prominence from beyond the Site boundary.

d) Remaining vegetation that is likely to be removed includes trees along the southern side of the Mackie Gym (mixed natives and exotics less than 4m tall), trees in the construction perimeter within and to the north of the Quad (see Figure 2) which include totara (*Podocarpus totara*), mahoe (*Melicytus ramiflorus*), matipo (*Myrsine australis*) and other exotic species (all under 5m tall), and trees located within the area between the Oldershaw Music block and the Malcolm block. These include trees planted within multi-level structures and along the northern boundary, some of which are in excess of 9m in height. The ULE of these trees is compromised by the planting locations and/or suppression by adjacent trees and buildings.

e) The construction corridor encroaches into the north and west aspects of Group 2 and this will necessitate removal of five individual kowhai trees along the driveway, two banksia (*Banksia* species), three akeake, one holly (*Ilex aquifolium*), a plum (*Prunus* species), tarata (*Pittosporum eugenioides*) and karaka, all of which range in height from 3-5m, and two phoenix palms (*Phoenix canariensis*) of about 8m height. The remaining trees are relatively insignificant due primarily to malformed and/or structurally defective canopies.

f) All other vegetation not detailed below in section 3.6 is expected to be removed. This includes a group of sub-6m tall cherry and cabbage trees either side of the entrance driveway from Campbell Street, a mature pine (tree 9 in the Preliminary Tree Audit) and adjoining cherry trees (all about 7m tall) with mixed native and exotic understory to the west of the Theatre Block along with a random mix of unremarkable native and exotic trees ranging from 4-7m tall in planter beds located around the various buildings. Trees numbered 7, 8, 9 and 11 in the Preliminary Tree Audit are to be removed too.

g) In general terms the ULEs of the majority of trees being removed are compromised by either the existing planting locations (e.g. in multi-level concrete structures), their suppression by adjacent trees and buildings, the presence of structural defects or a combination of some or all three of these factors.

h) No trees that are being removed are considered, on an individual basis, to be worthy of extraordinary efforts to retain for the reasons mentioned above.

i) The most visually prominent trees are those that can be viewed from the south east and south west corners of the Site i.e. from Campbell Street in the south west and Donald Street in the south east. Of these trees the most visually prominent are the ones along Donald Street. This visual prominence applies to views from the roads into the Site and limited views from individual properties around the southern Site boundary (Scapa Terrace). The remainder of trees within the Site are of a size whereby adjacent properties effectively screen them from view from beyond each individual property. The only other aspect where trees within the Site may be viewed is from the north east, adjacent to the car park. Trees are being retained in this area (Lopdell Gardens) therefore there will be no adverse visual impacts from this perspective. Removal of boundary trees will result in visual impacts which are mostly limited to the properties immediately adjacent to each tree i.e. the trees are not big enough to be visible beyond these individual properties, many of which are fenced anyway so the trees are already

partially obscured. More detailed assessments relating to visual amenity will be provided by the Urban Design Specialist.

4.5 ***Vegetation to be retained***. Groups 1-4 inclusive are to be retained (except as described above) and are described below.

Group 1: This is the northern section of the Lopdell Gardens and includes trees numbered 3 & 6 in the Preliminary Tree Audit. In addition to these trees the group contains a mature rimu (*Dacrydium cupressinum*) about 6m tall, a 10m multi-stem cabbage tree (tree number 3) and a random mix of other native and exotic species. There is a gully running east-west through the middle of this group which provides a natural demarcation between retained vegetation and that which may need to be removed. Most of the vegetation to the south of the gully will need to be removed as it stands within (or very close to) the construction corridor shown in Figure 2. As mentioned above, two kauri trees are to be retained in this area to the south of the gully. Including the pohutukawa to the south of this area, a total of five trees that were identified in the Preliminary Tree Audit (tree numbers 2-6 inclusive) as worthy of consideration for retention will be retained in the vicinity of Group 1.

Group 2: This group stands in the south east corner of the Site and trees within it that may be retained include a 5m-tall golden elm, one horse chestnut (*Aesculus hippocastanum*) of 9m height, several willows (*Salix* species) about 8m tall, and a mix of karaka (*Corynocarpus laevigatus*), several akeake and cherry trees, all less than 6m tall.

Group 3. Significant trees within this area which are to be retained include a kowhai, tarata, cabbage tree and two birches (all around 8-10m tall), along with sub-6m tall *Pseudopanax* species, mahoe, matipo, tarata, kohuhu (*Pittosporum tenuifolium*) and assorted exotic species.

Group 4: Significant trees within this area which are to be retained include five kowhai up to 6m tall, two kohuhu at 8m tall, two birch at 7m tall, as well as an assorted native and exotic understory of less than 4m height.

4.6 ***Preliminary Tree Audit.*** Trees numbered as 2-6 inclusive in the Preliminary Tree Audit will be retained (tree 10 stands outside the Site so is not considered). Accordingly, half of the trees initially identified as worthy of consideration for retention will be retained. In addition, these retained trees include all the trees with the highest retention category (AA) as defined in that Audit. While the remaining trees were acknowledged as being worthy of *consideration* for retention in that report, this recommendation was based on the premise that there were no compelling arboricultural reasons to remove them at the time of the report and did not consider construction practicalities. It did not infer that they were exemplary or outstanding specimens in any way. Consequently their loss is not considered to present a significant adverse impact overall.
They were, at best, mediocre specimens, some with misshapen canopies (arising from close proximity to adjacent buildings/other trees) and structural defects. The trees originally identified as being the most desirable (having the longest ULE) on the Site will be retained.

4.7 ***Relocation options***. Several kowhai trees adjacent to the entrance drive off Donald Street were identified as potential candidates for relocation either within or beyond the Site. Ryman had early conversations with WCC about the relocation of these kowhai trees to a nearby park however this is not proposed as part of the consent application. Furthermore the Landscape Architect has advised Ryman that native trees generally don't respond well to relocation No other trees on the Site were considered as viable for relocation.

4.8 ***Memorial tree***. During my initial site visit in 2018 I inspected an individual kowhai tree within the Site that had been planted several years ago as a memorial tree. This tree was in very poor condition and located within an area proposed for development. In August 2018, the tree was uplifted and replanted in the south east corner of the Site in an area that is not anticipated to be affected by the Proposed Village. This was done because the

tree was in very poor condition and needed to be replanted in order for it to survive. Had it been left in its current state (loose in the ground and likely to fall over) it would have died. It was relocated to firstly give it the best chance for survival and secondly to place it in a location where it could be retained indefinitely and grow to its full potential as anticipated by those who planted it as a memorial to a lost friend and colleague. It showed signs of new growth during my recent site visit in December 2019 although it was not flourishing. This outcome is as expected, given the very poor condition of the tree prior to replanting. Given the tree is still alive and showing signs of new growth I am confident it is on the path to recovery, although this will likely be a slow process. The immediate area is to be retained as a pocket park and this memorial tree is to form a focal point for that park and as such it will be subject to robust protection during construction works.

4.9 ***Tree retention constraints***. Works around retained trees may require minor canopy trimming to provide clearance to facilitate works and avoid canopy damage. This may also be necessary where limbs overhang the Site from neighbouring trees. Provided any such trimming is done in general accordance with arboricultural industry best practice any adverse impacts on these trees are anticipated to be less than minor.

4.10 One of the limitations imposed by the retention of mature trees is the requirement to ensure an adequate area of ground remains undisturbed to maintain sufficient root material for survival. The New Zealand Arboricultural Association publication "*A guideline for tree protection fencing on construction sites*" indicates that protective fencing should be located 1m beyond the actual canopy spread of the tree/s or 4x the trunk girth to ensure adequate root zone area is protected. In site management terms this is often referred to as the *Tree Protection Zone* (TPZ). Successful retention of the trees on this Site will be dependent upon this TPZ being established and maintained.

4.11 The above TPZ definition represents a starting point for how much root zone area needs to be retained and this can be modified depending on variables which include tree health, species tolerance and nature and scale of environmental disturbance. However any adjustments to the extent of the TPZ will need to be subject to arboricultural supervision during any works in this critical root zone area and will need to be subject to prior arboricultural evaluation. The extent of TPZs should be ascertained and confirmed prior to commencement of construction works.

4.12 Groundwater modifications can be problematical for trees. However, trees are more dependent on water that comes from above (i.e. rain and overland flow paths), than water which resides sometimes several metres below ground (ground water). Consequently I consider that groundwater disturbances which occur deeper than half a metre below ground level are likely to have no impact whatsoever on trees.

4.13 What is conceivably of much greater significance is the possibility of localised waterlogging and/or flooding. This has the potential to cause more immediate and potentially-fatal impacts on existing or new vegetation by excluding available oxygen from roots in the immediate short term and causing the soil to become anaerobic over the longer term. Anaerobic conditions do not support tree growth in most situations.

4.14 Moderate changes in soil moisture content can however be managed to a certain degree by remedial ground treatments including mulching, establishing vegetative canopy cover and maintaining as much of the existing soil profile intact as possible. These treatments will reduce and mitigate the effects of solar radiation and wind, both of which can rapidly desiccate exposed soils. In addition such treatments will improve the structure and biological integrity of the soil which in turn will assist with maintaining and moderating appropriate soil moisture levels throughout seasonal variations.

4.15 Therefore, flooding/waterlogging can have more immediate and long term adverse impacts on tree health and longevity but can be adequately managed through the remedial ground treatments described above.

4.16 ***Summary of assessment***. Overall the vegetation being removed is considered to be of relatively low significance from an arboricultural perspective. Much of it is malformed due to suppression by adjacent buildings or other trees, ecological values are compromised by the abundance of exotic species and close proximity to human activity, and the majority is relatively obscured from views beyond the Site due primarily to the dominance of the existing buildings. The trees which are most visible from beyond the Site are located along the Donald Street frontage. The remaining trees are either partially visible (from surrounding residential sites or the road frontages on Donald and Campbell Street frontages) or entirely obscured by buildings within the Site. The ULE of the trees being removed is considered to be relatively low within the anticipated environment of the Proposed Village. In contrast, the trees identified in the Preliminary Tree Audit as having the highest desirability for retention have been incorporated into the Proposed Village and will be retained. Appropriate management of retained trees during construction works combined with the proposed extensive replanting will serve to offset the loss of vegetation from this Site and contribute to the establishment of a sustainable tree population which will benefit those within and beyond the Site.

5.0 Recommendations

5.1 A Tree Management Plan (TMP) should be prepared to address the management of retained vegetation during and after construction works to ensure the useful life expectancy of that vegetation is maximised while enabling construction activities to proceed. This TMP should be based primarily on appropriate industry guidelines but also contain site-specific tree management recommendations. These recommendations should include:

a. *Initial onsite meeting prior to commencement of works with all relevant parties to confirm which trees are to be retained and how they are to be protected;*
b. *Confirmation of the extent of tree protection zones for individual trees and groups of trees and the type of protection that will be used;*
c. *Confirmation of effective communication procedures to ensure a works arborist is involved when works are to occur that may harm retained trees and*
d. *Provision for ongoing remedial works, the nature of which will be decided by the works arborist throughout the Project as and when such remedial measures may be deemed necessary to offset any activities that may adversely affect retained trees.*

5.2 Groups 1-4 inclusive represent the main areas where vegetation is to be retained and will need to be adequately managed in accordance with the TMP. Adhering to the recommendations in the TMP will ensure that any vegetation conflicts can be managed appropriately so that vegetation to be retained will be adequately protected and managed during any ongoing site works.

5.3 The TMP should be formulated to address specific situations but also needs to be flexible enough to deal with any unexpected tree-related conflicts that may arise during construction works. Invariably even the most thorough plans can change therefore any effective tree management regime needs to be flexible enough to accommodate unexpected situations so that retained vegetation remains viable whilst achieving specific development objectives.

6.0 Conclusions

6.1 Vegetation clearance associated with this Proposal will include the loss of some mature trees (8-10m tall) as well as a varied mix of native and exotic species, most of which are less than 5m tall.

6.2 The majority of vegetation being removed is of limited significance with regard to arboricultural value for a number of reasons including limited visibility from beyond the Site and suppression of shape and health caused by adjacent buildings, structures or other trees.

6.3 The preparation and implementation of a site-specific TMP will provide for the successful protection of retained trees and ensure any adverse arboricultural impacts are less than minor.

6.4 It is considered that the Proposed Village will result in an overall net gain in tree cover on the Site and result in a well-managed and sustainable tree population that will provide benefits both within and beyond the Site into the long-term future.

Andrew Barrell

Consultant Arborist, Director Tree3 Ltd

26 May 2020

Attachment 1 – Excerpts from preliminary tree audit dated 9 July 2018

Attachment 1 – Excerpts from preliminary tree audit dated 9 July 2018.

Tree inventory & assessment methodology (Page 3 of 14, tree report by Tree3 Ltd dated 09/07/2018)

Assessment methodology

Trees or groups of trees have been categorised to classify their status with regard to their suitability for retention, as described below.

'A' category trees

These trees are considered to be worthy of consideration for retention and are further subdivided as follows:

Category	***Description***
AA	Large mature specimen tree with long useful life expectancy* and minimal maintenance
A1	Mature tree, not as significant as AA tree but has potential for long useful life expectancy with minimal intervention and maintenance.
A2	Mature tree with potential for long useful life expectancy however there will be a requirement for intervention by way of remedial pruning to address structural or health defects within the canopy as well as the possibility of ongoing management for the remaining lifespan of the tree.
A3	Not particularly significant at the time of inspection but no arboricultural reason to justify removal.

*The term "*useful life expectancy*" is generally considered to be a balance between the values provided by trees against the amount of resources that need to be expended to achieve those values i.e. how much maintenance and ongoing pruning needs to be done to maintain the trees in an acceptable condition for health and safety and amenity purposes.

Site plan annotation

'A' category trees are marked with blue triangle outlines on the annotated site plan in Attachment 3; 'AA' trees are solid blue triangles, as below.

AA trees = ▲

A trees = △

Acknowledgement

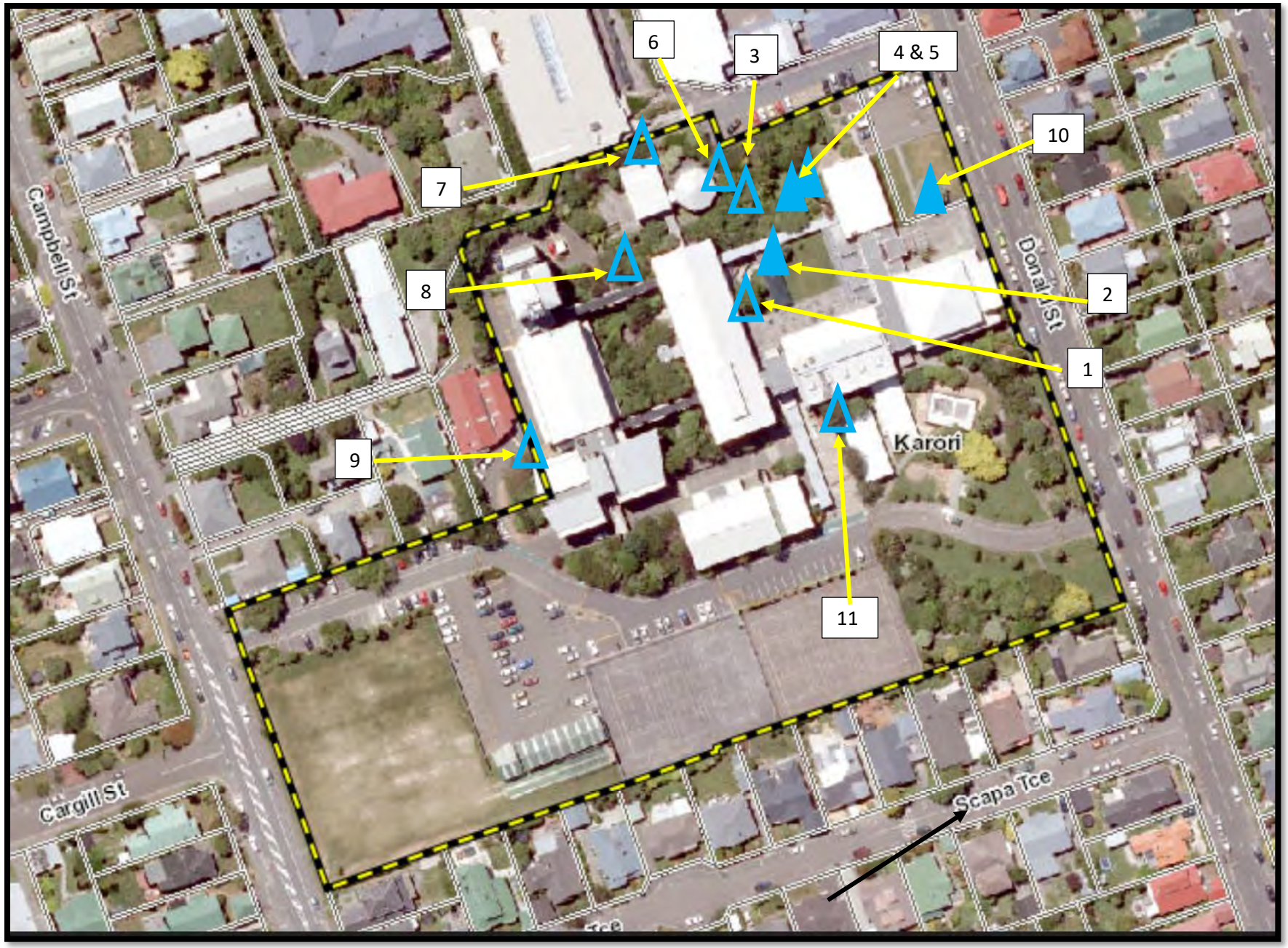
This classification methodology is derived from the TreeAZ assessment system (www.treeaz.com).

Table details

- *Tree number* (column 1) relates to the numbers on the images in Attachment 2 and the numbers on the annotated site plan in Attachment 3.
- *Size* is represented by *height x canopy spread* in metres, and is approximate.
- *Comments* provide generalised evaluations of tree condition.
- 'AA' trees are marked with **bold** type.

Table 1 – tree inventory *(Page 4 of 14, tree report by Tree3 Ltd dated 09/07/2018)*

Tree #	Species	Size	Comments	Retention category
1	Ash	8 x 8	Fair condition.	A1
2	**Pohutukawa**	**7 x 6**	**Good condition**	**AA**
3	Cabbage tree	10 x 5	Big tree for species, located within bush environment	A2
4	**Kauri**	**10 x 5**	**Good condition (existing tag # 2)**	**AA**
5	**Kauri**	**8 x 3**	**Good condition (existing tag # 1)**	**AA**
6	Totara	9 x 8	On edge of bush area, partially suppressed canopy	A2
7	Kowhai	7 x 5	Small-leaf kowhai, prominent by entrance to pool	A1
8	Birch	9 x 10	Fair condition, located in area of changing ground levels	A3
9	Pine	7 x 6	Fair condition, partially suppressed on one side by building	A2
10	**Atlas cedar**	**9 x 9**	**Good condition. Well-formed standalone specimen.**	**AA**
11	Birch	12 x 8	Fair condition.	A2


6
3
4 & 5
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11
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Donald St
Karori
Cargill St
Scapa Tce