



## **Ōtāhuhu / Mt Richmond Tree Removal Methodology**

**1110 Great South Road, Mt Wellington, Auckland 1060**

**Client: Tūpuna Maunga Authority**

**Prepared by: Treescape® Arboriculture Consultants**

**Amended by: Arborlab Consultancy Services – May 2021**

**Client: Tūpuna Maunga Authority**

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# Document Control

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## Disclaimer

This assessment and report have been prepared by Treescape Ltd (Treescape) and reviewed by Arborlab, for the Tūpuna Maunga Authority.

This report should be accepted and read in its entirety. No single statement or part of this report should be used individually in a manner that is outside the context of the whole report.

This assessment and report do not address the matter of environmental effects relating to arboriculture works as it was outside the scope of works.

Acknowledge that information from relevant reports and/or plans supplied by others may have been used in the formulation of this report, to support the information provided and authorised.

Treescape Ltd cannot accept responsibility for any use of or reliance upon the contents of this report by a third party.

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# Background

This Methodology supersedes an earlier version dated April 2019, for the removal of 443 exotic trees on Ōtahuhu. Following discussions with Auckland Council, the scope of the application has been reduced to limit the noise from the activity to 57dBA (excluding overflying helicopters). No works are now proposed within 100m of residential properties. This has reduced the processing areas and the number of trees proposed to be removed reduced from 443 to 278

## Introduction

The Tūpuna Maunga Authority has engaged Treescape Ltd to prepare a Tree Removal Methodology (Methodology) for the removal of 278 exotic trees on Ōtahuhu.

This Methodology includes an inventory of all exotic trees to be removed over 3m in height and their locations. The Methodology has been formed with advice from acoustics, archaeological, cultural and historical specialists in order to prevent damage of features or disturbance of the maunga.

This Methodology has been prepared by and/or overseen by appropriately qualified Arboriculture Consultants familiar with large scale tree removal. Treescape Limited undertook the recent removal works at Maungarei.

This Methodology does not give consideration to the environmental effects of the proposed tree removals. Reports by other specialists will assess ecological and amenity matters relevant to the wider restoration project.

Arborlab Consultancy Services Ltd has been engaged to assess and amend the tree removal methodologies where required, and to survey and identify native trees.

## Scope

Treescape Limited has been engaged by Tūpuna Maunga Authority to prepare a methodology for the removal of exotic species from Ōtahuhu. This has involved:

- Identifying each exotic tree, its location and a removal method
- Determining operating methodologies for their removal that are cost effective, safe and best protect the archaeological, cultural and historical features of the maunga from damage or disturbance; and
- Defining the operations management system and practices required to minimise implementation risks

This Methodology will be used to inform a detailed Arboriculture Works Specification from which potential tree removal contractors can sufficiently complete and provide an accurate service solution proposals and pricing estimates.

### Scope Exclusions

- An assessment of the environmental effects of planned arboriculture works
- Detailed review and refinement of work specifications at an individual tree level

### Operational Management Requirements and Protocols

The operational management requirements focus on compliance with health and safety and regulation compliance. Appendix D sets out operational management requirements for carrying out the works.

These requirements form part of a delivery plan and its purpose to achieve the desired outcomes within the various requirements and constraints of the project, as well as providing reassurance to the Authority. It is recommended that the contractor be required to adequately demonstrate appropriate operations management system controls.

# Operating Methods Assessment & Selection

## Assessment & Selection Factors

The factors relevant to, and considered in, developing the Methodology are detailed below in Table 1 below. Assessment & evaluation of these factors, and their interconnection, has determined the specific operating methods selected for given areas and trees.

The section in the table on Overlays has been informed by advice from the project archaeologist and planner. The remaining sections are informed by the arboricultural expertise of the Treescape consultants.

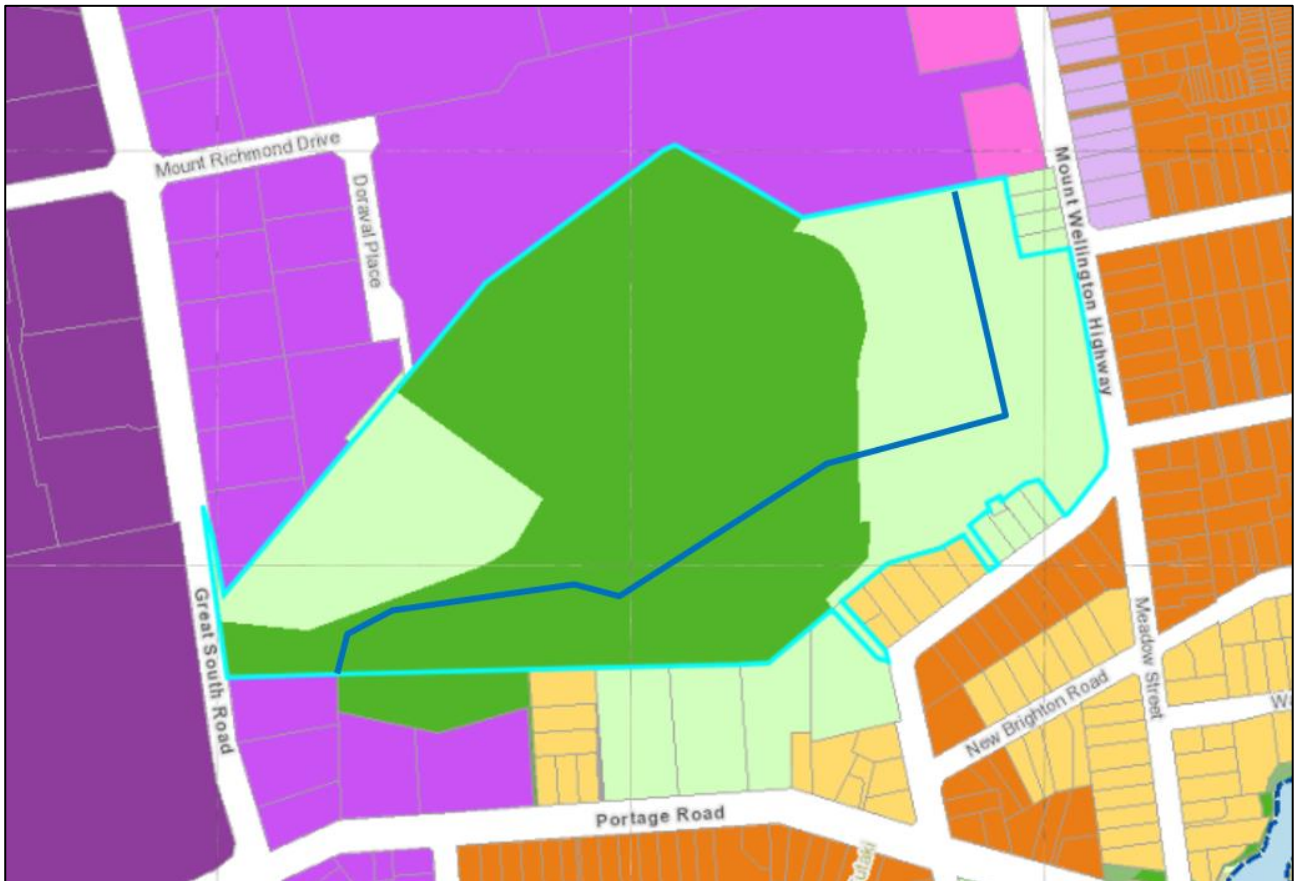
**Table 1: Assessment Factors**

Category	Factor	Relevance
Overlays	Natural Features	Ground disturbance is not permitted in a natural / unmodified area of the maunga unless approved by the Archaeologist.
	Archaeological sensitivity	Archaeologically sensitive areas must be protected from damage or alteration. The default position is that no ground disturbance, regardless of how minor, is permitted. This eliminates all removal methods that involve tree / tree sections being lowered to the ground at its original location. Crane assisted dismantling can be used to remove trees located less than 40m - 70m (crane size dependent) from a suitable operating area. Any increased tolerance for ground disturbance would give rise to the possible use of crash mats to lessen the impact when lowering tree sections on to sensitive ground. Used in conjunction with rigging techniques that offer maximum control may be a solution that meet acceptable risk thresholds.
Physical Factors	Topography	As the land gradient becomes steeper so to does the level of complexity and risk associated with tree removal. Manually assisted felling and dismantling methods can be used but, for larger trees especially, controlling the direction and resting place of the fall and the feasibility of processing in situ and moving tree rings or logs are important considerations. Crane or helicopter assisted dismantling is highly likely a more cost effective, as well as lower risk, method for removing large trees from sloped areas.
	Built features / Land Modifications	Modifications such as roading and pathways provide potential work areas, or access ways to work areas, for large machinery. In modified areas ground disturbance is permitted as the archaeological effect has already occurred and the risk significantly reduced. The size, gradient and stability of the modified area(s) will determine the size and type of machinery that can be used.
Tree Factors	Provenance	Provenance refers to a tree's place of origin. An objective of this project is remove any species not originating in NZ (exotics) from the maunga. Identifying exotics is a key function of the tree survey.
	Species	Tree species can define tree handling and removal requirements. E.g. species susceptible to diseases posing high biosecurity risk e.g. Dutch Elm, Myrtle and Kauri are subject to specific controls. Some, but not all species will require ringbarking or injecting with herbicides in advance of removal if stumps are to be left to rot and decay.
	Size	Size is a key determinant of the tree removal method. Felling methods require a clear area to land the tree and is only feasible in non-sensitive areas. Cutting large trees into sufficiently small sections to be loaded into trucks is generally not cost effective when compared to dismantling into large sections that can be loaded by crane or helicopter.
	Quantity	When all but a few trees require crane or helicopter assisted removal it is highly likely utilising these tools for the few will be more cost effective.
Regulatory Factors	Noise Disturbance	Noise restrictions will impact when and where helicopters and loud machinery can be operated.
	Traffic Management	Operating on or around roads will require either traffic management plans to be implemented or potentially temporary road closures.
	Health & Safety	An assessment of H&S risk relating to all aspects of planned operations for each site is mandatory and should be viewed as informing the evaluation and selection of tree removal methods.
Cost Factors	Method Cost	The cost to remove an individual tree depends upon the removal method, the scale and complexity of the removal, the required outcome and the processing location. Least expensive is manual felling (method one) of a small tree located in an area that is easily accessible, with few constraints and in-situ processing is permitted. Most expensive is helicopter assisted dismantling of a large tree located in area with significant constraints including the need to move tree sections to a remote processing site. Put in context, the former could take a crew of two, using small hand tools (e.g. chain saw), approx. 2 hours at a cost of \$300 - \$500 where as the later could take 6+ hours of helicopter time along at a cost of approx. \$3500 per hour.
	Overall Cost Efficiency	In some instances, such as when a small minority of trees in a particular location fit the criteria for a cheaper removal method, it is more cost effective to employ a method that, on a stand alone basis, would be more expensive. These opportunities are best identified once the operating methodologies are refined at an individual tree level.

## Survey Area

The survey area has been amended (May 2021) to include only those trees 100m or further from residential properties. Residential zoned land is coloured pale and dark yellow in the extract from the planning maps. A survey of the subject-site and all trees >3m in height was undertaken by Treescape Limited.

**Figure 1: Aerial image of the subject site, surrounding zones and 100m private property delineation line**



## Tree Population

### Native Tree Species

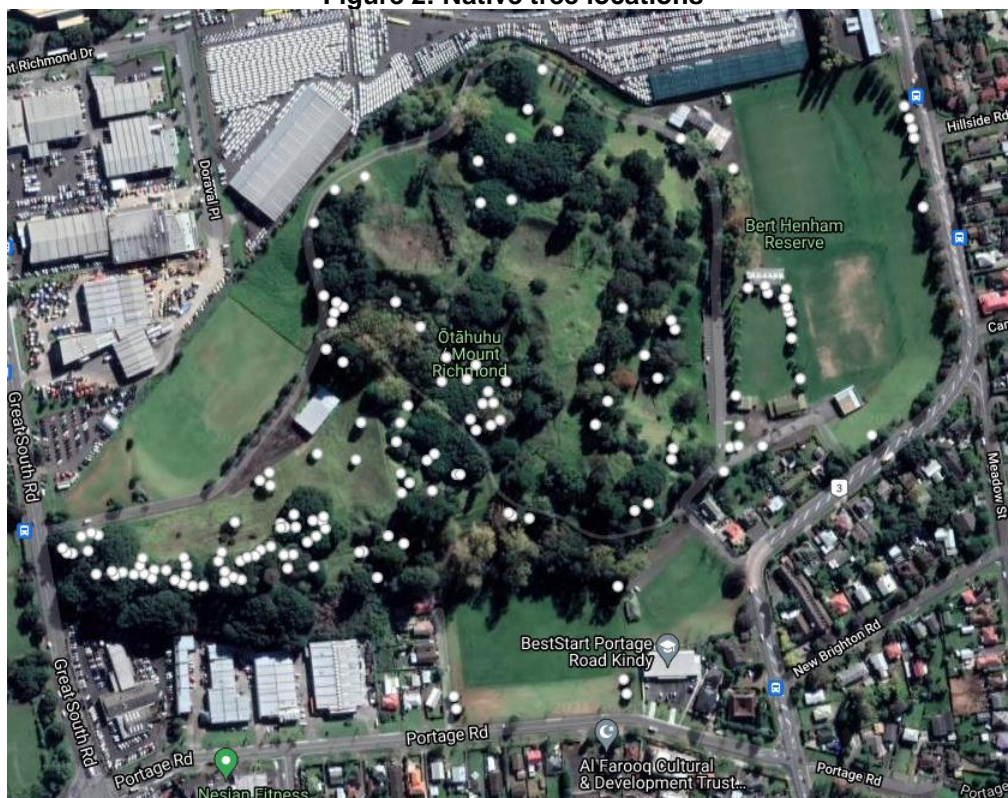
All native trees have been surveyed within the maunga. The following table outlines the species list and the number of native trees growing on the maunga and Figure 2 on the following page provides a location of the trees.

**Table 2: Native Tree List**

Species	Total trees
<i>Metrosideros excelsa</i>	57
<i>Griselinia littoralis</i>	2
<i>Pittosporum crassifolium</i>	5
<i>Pittosporum eugenioides</i>	1
<i>Pittosporum tenuifolium</i>	3
<i>Kunzea ericoides</i>	1
<i>Cordyline australis</i>	1
<i>Vitex lucens</i>	36
<i>Podocarpus totara</i>	16

Alectryon excelsus	3
Corynocarpus laevigatus	25
<b>Total</b>	<b>150</b>

**Figure 2: Native tree locations**



## Exotic Tree Species

In total 278 exotic trees (woody vegetation >3m in height) representing 30 species were identified for removal. One London Plane near the sports clubroom is to be retained and not included as part of this methodology. A breakdown of exotic trees to be removed by species is given in Table 3 on the following page.

The species composition is dominated by Olive (*Olea europaea*) with 83 trees representing 36% of the exotic stock. Morton Bay fig (*Ficus macrophylla*), London plane (*Platanus x acerifolia*) and Pines (*Pinus sp.*) each represent 7-8% of the exotic population.

A number of large figs are present, particularly upon the terracing on the western side and the presence of elms dictate full compliance with Dutch Elm Disease protocols (although no infected elms were detected at the time of inspection).

Three (3) species identified on site are listed as pests in the Regional Pest Management Strategy (RPMS): Acmena/monkey apple (*Syzygium smithii*); Hawthorn (*Crataegus laevigata*); Phoenix palm (*Phoenix canariensis*); are classified as 'Surveillance – Whole region'. Noteworthy, is that two of the most numerous species, Olive (*Olea sp.*) and Morton Bay fig (*Ficus macrophylla*) are classified under the RPMS as 'Species to be researched (not a Pest Plant) - Whole Region'.

**Table 3 Species and tree removal method**

Manual Felling	23
Camellia sp.	19
Quercus ilex - holm oak	2
Ulmus glabra - Scots wych elm	1

**Table 3 Species and tree removal method**

Casuarina sp. - she oak	1
<b>Manual dismantling</b>	<b>19</b>
"Acmena smithii, Syzygium - lilly pilly, monkey apple"	1
"Populus nigra - Lombardy poplar, black poplar"	1
Camellia sp.	1
Casuarina sp. - she oak	1
Quercus robur - English oak	1
"Populus nigra - Lombardy poplar, black poplar"	2
Liquidambar styraciflua - sweetgum	1
Quercus robur - English oak	1
"Populus nigra - Lombardy poplar, black poplar"	10
<b>MEWP assisted dismantling</b>	<b>9</b>
Castanea sativa - European chestnut	1
Ficus macrophylla-Morton Bay fig	1
Ulmus glabra - Scots wych elm	7
<b>Crane assisted dismantling</b>	<b>107</b>
"Acmena smithii, Syzygium - lilly pilly, monkey apple"	5
"Populus nigra - Lombardy poplar, black poplar"	3
Casuarina sp. - she oak	1
Cinnamomum camphora- camphor laurel	3
Crataegus laevigata - English hawthorn	2
Cupressus macrocarpa - Monterey cypress	4
Ficus macrophylla-Morton Bay fig	10
Ilex sp. - holly	3
Liriodendron tulipifera - tulip tree	1
Magnolia soulangeana x - Asian magnolia	1
Olea sp. - olive	12
Phoenix canariensis -phoenix palm	1
Pinus radiata - Monterey pine	14
Pinus sp.	2
Platanus x acerifolia - London Plane tree	16
Populus deltoides - cottonwood	1
Populus x euramericana - hybrid poplar P. nigra x P. deltoides	3
Quercus ilex - holm oak	2
Quercus palustris- pin oak	1
Ulmus sp.	2
Washingtonia filifera - fan palm	10
"Acmena smithii, Syzygium - lilly pilly, monkey apple"	1
"Populus nigra - Lombardy poplar, black poplar"	2
Ficus macrophylla-Morton Bay fig	1
Olea sp. - olive	1
Pinus radiata - Monterey pine	1
Platanus x acerifolia - London Plane tree	4
<b>Helicopter assisted dismantling</b>	<b>120</b>



**Table 3 Species and tree removal method**

"Acmena smithii, Syzyium - lilly pilly, monkey apple"	5
Castanea sativa - European chestnut	1
Crataegus laevigata - English hawthorn	10
Cupressus macrocarpa - Monterey cypress	3
Dead tree	1
Fagus sylvatica-european beech	1
Ficus macrophylla-Morton Bay fig	7
Grevillea robusta - silky oak	1
Olea sp. - olive	68
Phoenix canariensis -phoenix palm	2
Pinus radiata - Monterey pine	6
Platanus x acerifolia - London Plane tree	3
Quercus robur - English oak	3
"Populus nigra - Lombardy poplar, black poplar"	2
Camellia sp.	1
Cupressus macrocarpa - Monterey cypress	1
Cupressus x leylandii - Leyland cypress	1
Ficus macrophylla-Morton Bay fig	2
Pinus radiata - Monterey pine	1
Platanus x acerifolia - London Plane tree	1
<b>Grand Total</b>	<b>278</b>

# Operations Plan

## Operating Methods

The operating methods are the various tree removal and processing techniques.

Please note: the Tūpuna Maunga Authority preference is that with the exception of specific logs that may be suitable for carving, processing is to mulch on site. Where surplus to requirements, the mulch will be removed off site.

## Tree Removal

A suite of tree removal method options appropriate for the range of works required has been developed. These have been selected for inclusion on the basis of feasibility, effectiveness and cost. Selected methods are listed below and described in Appendix A.

- Manual felling
- Machine assisted manual felling
- Manual dismantling
- Manual dismantling using rigging techniques
- MEWP assisted dismantling
- Crane assisted dismantling
- Helicopter assisted dismantling

## Debris Processing

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A suite of processing method options appropriate for the range of works required has been developed. These have been selected for inclusion on the basis of feasibility, effectiveness and cost. Selected methods are listed below and described in Appendix B.

- Cut and leave
- Mulch on-site
- Mulch off-site
- Cut logs on-site
- Cut logs off-site

### **Tree Removal Standard Method**

The tree removal standard method includes:

- Felling a tree (as one section) or dismantling a standing tree by cutting and removing in sections
- Leaving the remnant stump in place (approx. <1m in height) – N.B. mandatory in archaeologically sensitive areas.
- Any pre-treatment of the tree.

The following variations to the standard method are identified for consideration by the relevant other experts.

**Stumps** In general, stumps will be left as close as practical to ground level, however, in some cases this will be problematic to achieve – for example large trees with prominent buttress roots. Where this is the case, the stumps may be left up to one metre above ground level.

**Use of Crash Mats** Crash mats will be used to minimise ground disturbance impact when lowering tree sections on to sensitive ground where it is determined that a part of the tree could cause damage.

Used in conjunction with rigging techniques that offer maximum control may be a solution that meet acceptable risk thresholds.

## **Operating Zones**

Two areas have been identified as processing sites on of which 2 is for helicopter drop zones. The processing zones have been identified to have negligible effects on the maunga and are over 100m from residential zoned land.

The maunga has generally been divided into two zones – East Tihi and West Tihi. The use of zones have been created to allow the staging of the tree removals in regards to helicopter fly times. In general, the western Tihi zone will utilise the processing area identified as processing area 2 and the eastern zone will utilise processing area 1. – The set down and take off of the helicopter for refuelling is limited to processing area 2 (western)

The formed roads in part of the maunga provides the option of additional minor processing areas. These are small, mobile working sites that include a crane, truck, chipper and excavator (with rubber tracks). These minor processing sites will be operated on top of existing roadways for short-lived operating periods.

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## Work Durations

Treescape Limited has provided an estimated works duration for tree removals on the maunga. This is based on the current tree removal methodologies proposed. Alterations to the methodologies may alter the hours/days to complete the works. The estimated durations below exclude the set-up and 'pack-down' times required for the task as it is understood this does not impact on the consideration of noise beyond the works area, however, it can affect the costs and hours/days spent on site. In addition to the hours listed in the below table, which outlined the removal methodologies, it is expected that the total project operation will be 40 days in total, this allows for truck and chipper operations.

**Table 4: Tree Removal Operational Times**

Otahuhu / Mt Richmond	Helicopter Removals	Other Methods of Removals	Total
Northwest (NW) tihi, Sector 1	7 days	6 Days	13 Days
Southwest (SW) tihi, Sector 2	2 Days	4 Days	6 Days
Northeast (NE) tihi, Sector 3	8 Days	10 Days	18 Days
Southeast (SE) tihi, Sector 4	1 Day	2 Days	3 days
<b>Total Days</b>	<b>18</b>	<b>22</b>	<b>40</b>

## Discussion

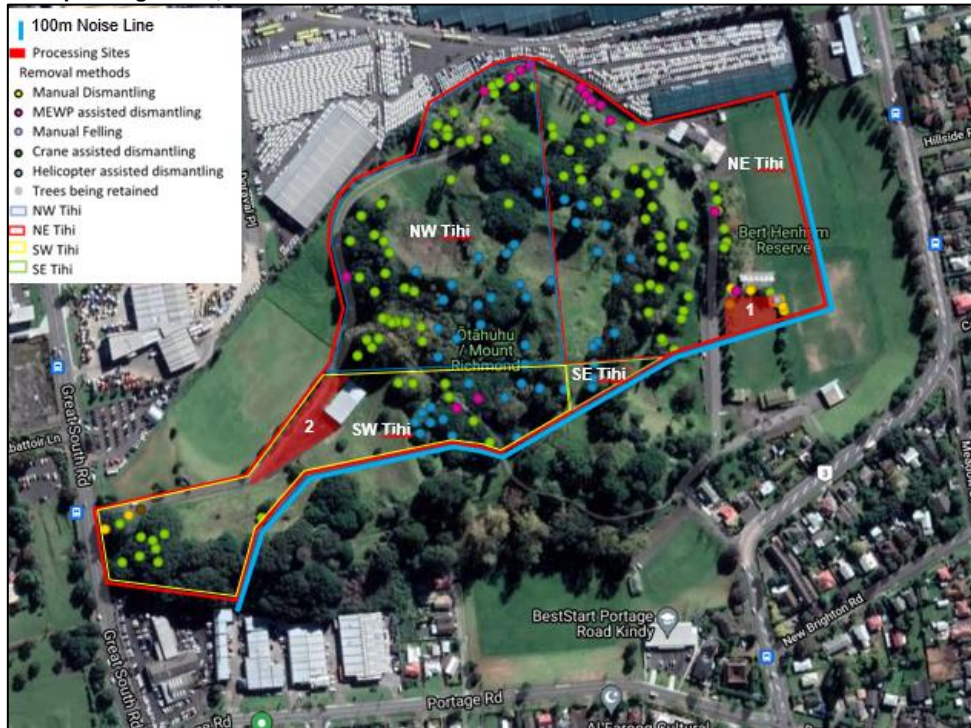
Generally, the method of removal has been identified using expert operators' advice, subject to experience and calculations, with consideration to the availability of archaeological, cultural and historical advice. Where there has been the need to avoid damage to archaeological values or uncertainty in the method achievable, the default method selected, as set out in Appendix C, is helicopter removal. It is understood this is a 'worst case' scenario from a noise perspective. However, the works are farther than 100m from residential properties to avoid effects on these receivers. Also relevant is that during the operation, it could be determined that some trees may be removed by crane. Where this is achievable, crane removal methods will be preferential. If it is determined during the operation that without compromising archaeological values, the trees may be removed manually.

Where practical, crane assisted tree dismantling will occur. These crane operations will only occur where damage to the archaeological aspects of the maunga can be avoided, for example where the crane can operate from paved roads. The crane size and operational limitations have been considered in the tree removal methodology.

Removal of trees from near the western boundary of the maunga will require temporary traffic management of Great South Road.

Figure 3 below outlines the processing sites, Tihi zones and the tree removal locations and recommended removal methods.

**Figure 3: Maps of Operating Zones, Tree Locations & Removal Methods**



## Tree Inventory

For purposes of the survey, the maunga has been divided into operating zones as outlined in the following overhead photograph (Figure 3). The trees to be removed have been summarised in Table 3 on the following page and itemised in full in Appendix C.

**Figure 4: Operating Zones for survey purposes.**



## Appendix A: Description of Tree Removal Methods

Method	Description
<b>Manual felling</b>	The tree is cut at the base using approved felling techniques. A pre-installed pull rope can be hand pulled by ground staff or attached to a hand winch to assist with directional felling. The cutting arborist (herein after referred to as the cutter) may use other tools such as hammer and wedges, felling lever, or jack to push open the back cut to assist with directional felling. Once the final cut (the back cut) has been completed, and the tree begins to fall, the cutter retreats from the base of the tree via pre-planned escape route. If pull assisted felling is being employed, the cutter may have the opportunity to retreat via the escape route before the tree is pulled over. A felled tree is typically dismantled using approved snedding or delimiting techniques to remove side branches. Logs can be cut to required lengths.
<b>Machine assisted manual felling</b>	The excavator operator positions the excavator in an appropriate position to push the tree in the intended direction of fell or is attached to a pull line and positioned to pull the tree in the intended felling direction. The cutter makes felling cuts at the base of the tree. Once the final cut (the back cut) has been completed, the cutting arborist retreats from the base of the tree via pre planned escape route. The excavator then pushes or pulls the tree over. A felled tree is typically dismantled using approved snedding or delimiting techniques to remove side branches. Logs can be cut to required lengths.
<b>Manual dismantling</b>	The tree may be accessed using a mobile elevated work platform (MEWP) or by a climber with a rope and harness. Approved cutting techniques can be used to cut the tree in sections. Sections can be cut and allowed to free fall to the ground or can be cut and snapped off by hand and then thrown to the ground. Cut sections can be pushed by the climber or pulled by ground staff using a pull line to assist cut sections to fall in a particular direction.
<b>Manual dismantling using rigging techniques</b>	The tree can be accessed using a MEWP or by a climber with a rope and harness. The tree can be dismantled in sections using approved cutting techniques. Where there are targets below and/or debris needs to be lowered or relocated in a controlled manner, rigging techniques can be employed. Rigging typically involves the use of a system of ropes, pulleys/rings, and a ground based friction device, and other hardware. Rigging techniques can be used to lift or lower cut sections, or more advanced techniques such as sky/speed line or compound rigging can be used to transport cut material to another location. Using appropriate rigging techniques can reduce or avoid the impact of falling debris. Additional impact prevention measures can be implemented for sensitive sites such as the use of padding or impact resistant materials for crash pads.
<b>MEWP assisted dismantling</b>	The MEWP operator will position the truck and set it up in an appropriate place. The work platform is used to access the tree. From the platform, the tree can be dismantled using proper cutting and rigging procedures. If the work is near overhead power lines, an insulated boom, insulated tools and other specialist equipment can be utilised by competent and suitably qualified staff to clear vegetation from the power lines. Specific procedures need to be followed for work around overhead power lines. The voltage, weather and proximity of vegetation, vehicles, tools, and staff all need to be considered. When working near overhead power lines, a dedicated safety observer is positioned to watch the MEWP operator to ensure no part accidentally comes in contact with the overhead lines. When working on network lines the network operator's control centre needs to be notified about timing and location of work. A MEWP may also be utilised to dismantle trees that are unsafe to climb or difficult for a climber to access. The MEWP operator can cut small sections that can be snapped off by hand. The MEWP can be used to fly the held piece over to an appropriate position where they can be safely dropped.

<p><b>Crane assisted dismantling</b></p>	<p>The crane will be setup in an appropriate location. A climber will access the tree using a rope and harness or via the crane. The lifting dogman will direct the crane operator to manoeuvre the hook to the climber. The climber will attach the crane hook using chains or sling to the section to be cut. The dogman will direct the crane operator to apply appropriate tension and position the hook over the section's centre of gravity. The climber will descend to a position agreed with the dogman to perform the cut sequence. Once directed by the dogman, the climber will proceed to cut the section to release it in a controlled manner. As the piece is released, the dogman will direct the crane operator to lift the section smoothly up and away from the climber. The crane operator will fly the load to the processing site where he will be directed by the landing dogman to lower and settle the section. Once the section has been stabilised, the sling/chains can be released by ground staff. The crane operator then directs the hook back to the climber for the next lift and the sequence is repeated.</p>
<p><b>Helicopter assisted dismantling</b></p>	<p>A suitably qualified climbing arborist (herein after referred to as the climber) will access the tree using a rope and harness. The tree may be pre-stropped (long choker slings/strops attached prior, to minimise flying time). The climber will check and adjust if necessary, sling. The lifting dogman will direct the helicopter pilot to manoeuvre the helicopter hook to the climber. The hook is attached to the helicopter via a long line. The climber will attach the sling to the hook and signal the dogman. The lifting dogman will direct the pilot to take up the slack and position the helicopter over the load's centre of gravity. The lifting dogman will communicate with the climber to place the cuts at an appropriate point to ensure the load is within the helicopter's lifting capabilities and so the loaded can be lifted smoothly away from the climber.</p> <p>Once the climber has completed the cut procedure, the lifting dogman will direct the pilot to lift the load away from the climber and transport it to the processing site, via planned extraction zones. The landing dogman will direct the pilot to lower and release the load at the processing site. All machinery, vehicles and staff are kept clear of the flight path and suspended load. Once the load has been released, the pilot will return for the next lift, and the procedure will be repeated.</p> <p>During flying operations, only work that is strictly necessary is to be carried out within the landing zone, e.g. releasing slings and safe placement of loads. Loads are only to be approached once they have been safely landed and stabilised.</p>

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## Appendix B: Description of Tree Processing Methods

Method	Description
<b>Cut and Leave</b>	Material can be left as it lies or stacked into eco piles that will provide habitat and decay over time returning nutrients to the soil.
<b>Mulch On Site</b>	Where mulch can be utilised on site, the chipped material can be chipped directly into a pile or chipped into a truck and tipped at an accessible location. If the cut material is to be chipped directly onto the site, a track mounted chipper can be used for less accessible sites.
<b>Mulch Off Site</b>	Chip-able material can be fed manually or by an excavator into a wood chipper that sprays the chip into the back of a tipper truck. Two 10t trucks will operate in rotation to remove mulch from site when processing higher volumes with an excavator. Truck movements can be up to 8-10 movements to and from site per day.
<b>Log On Site</b>	Logs can be left in length or cut into manageable sizes for the public to remove for firewood.
<b>Log Off Site</b>	Larger logs can be cut up and loaded into a truck manually, or loaded in larger lengths with a loader, crane, hiab or excavator. Logs can be transported from site in up to 5m lengths using a 10t tip truck or Hiab truck with of 5m deck which can tow a trailer with additional 5m deck. Truck movements are estimated to be up to 4-5 movements to and from site per day.

## Appendix C: Itemised Tree Inventory – Trees to be removed

Item No.	Tree Species	Operating Area	Latitude	Longitude	RPMS Status	DBH (mm)	Height (m)	Crown Spread (m)	Removal Method
1	Olea sp. - olive	D- Water Tower	-36.9342	174.837	Not Pest Species	350	7	7	Crane assisted dismantling
2	Ulmus glabra - Scots wych elm	C - West Slope / Entrance	-36.9341	174.8358	Not Pest Species	550	18	8	MEWP assisted dismantling
3	Ulmus glabra - Scots wych elm	C - West Slope / Entrance	-36.9341	174.8358	Not Pest Species	550	18	8	MEWP assisted dismantling
4	Ulmus glabra - Scots wych elm	C - West Slope / Entrance	-36.9341	174.8358	Not Pest Species	550	18	8	MEWP assisted dismantling
5	Ulmus glabra - Scots wych elm	C - West Slope / Entrance	-36.9341	174.8358	Not Pest Species	550	18	8	MEWP assisted dismantling
6	Ulmus glabra - Scots wych elm	C - West Slope / Entrance	-36.9341	174.8358	Not Pest Species	550	18	8	MEWP assisted dismantling
7	Ulmus glabra - Scots wych elm	C - West Slope / Entrance	-36.9341	174.8358	Not Pest Species	550	18	8	MEWP assisted dismantling
8	Ulmus glabra - Scots wych elm	C - West Slope / Entrance	-36.9341	174.8358	Not Pest Species	550	18	8	MEWP assisted dismantling
22	Olea sp. - olive	D- Water Tower	-36.9334	174.8385	Not Pest Species	500	7	7	Helicopter assisted dismantling
23	"Acmena smithii, Syzygium - lilly pilly, monkey apple"	D- Water Tower	-36.9335	174.8386	Surveillance Pest Plant	900	8	8	Helicopter assisted dismantling
24	Ficus macrophylla-Morton Bay fig	D- Water Tower	-36.9334	174.8388	Not Pest Species	2500	25	25	Helicopter assisted dismantling
25	Grevillea robusta - silky oak	D- Water Tower	-36.9334	174.8386	Not Pest Species	900	20	12	Helicopter assisted dismantling
26	"Acmena smithii, Syzygium - lilly pilly, monkey apple"	D- Water Tower	-36.9333	174.8387	Surveillance Pest Plant	1000	9	6	Helicopter assisted dismantling
27	Platanus x acerifolia - London Plane tree	D- Water Tower	-36.9332	174.8388	Not Pest Species	1200	25	15	Helicopter assisted dismantling
28	Phoenix canariensis -phoenix palm	D- Water Tower	-36.9333	174.8389	Surveillance Pest Plant	650	12	4	Helicopter assisted dismantling
29	Ficus macrophylla-Morton Bay fig	D- Water Tower	-36.9336	174.8392	Not Pest Species	2500	250	25	MEWP assisted dismantling



Item No.	Tree Species	Operating Area	Latitude	Longitude	RPMS Status	DBH (mm)	Height (m)	Crown Spread (m)	Removal Method
30	Castanea sativa - European chestnut	D- Water Tower	-36.9334	174.8391	Not Pest Species	1700	20	20	MEWP assisted dismantling
31	Ficus macrophylla-Morton Bay fig	D- Water Tower	-36.9335	174.8389	Not Pest Species	1500	10	25	Helicopter assisted dismantling
32	Ficus macrophylla-Morton Bay fig	D- Water Tower	-36.9334	174.8387	Not Pest Species	1500	7	8	Helicopter assisted dismantling
34	"Acmena smithii, Syzyium - lilly pilly, monkey apple"	D- Water Tower	-36.9331	174.8384	Surveillance Pest Plant	1500	13	10	Crane assisted dismantling
35	Platanus x acerifolia - London Plane tree	D- Water Tower	-36.9331	174.8385	Not Pest Species	1250	22	30	Crane assisted dismantling
36	Platanus x acerifolia - London Plane tree	D- Water Tower	-36.9328	174.8382	Not Pest Species	1200	19	18	Crane assisted dismantling
37	Platanus x acerifolia - London Plane tree	D- Water Tower	-36.9328	174.8382	Not Pest Species	1200	19	18	Crane assisted dismantling
38	Platanus x acerifolia - London Plane tree	D- Water Tower	-36.9328	174.8382	Not Pest Species	1200	19	18	Crane assisted dismantling
39	Platanus x acerifolia - London Plane tree	D- Water Tower	-36.9328	174.8382	Not Pest Species	1200	19	18	Crane assisted dismantling
40	Platanus x acerifolia - London Plane tree	D- Water Tower	-36.9328	174.8382	Not Pest Species	1200	19	18	Crane assisted dismantling
41	Platanus x acerifolia - London Plane tree	D- Water Tower	-36.9328	174.8382	Not Pest Species	1200	19	18	Crane assisted dismantling
42	Cupressus macrocarpa - Monterey cypress	B - Motor Club	-36.9328	174.838	Not Pest Species	1850	22	16	Crane assisted dismantling
43	Pinus sp.	B - Motor Club	-36.9329	174.8381	Not Pest Species	850	18	10	Crane assisted dismantling
44	Pinus sp.	B - Motor Club	-36.9329	174.838	Not Pest Species	950	17	14	Crane assisted dismantling
46	Olea sp. - olive	E - Tihi	-36.9331	174.8396	Not Pest Species	400	6	5	Helicopter assisted dismantling
47	"Acmena smithii, Syzyium - lilly pilly, monkey apple"	E - Tihi	-36.933	174.8396	Surveillance Pest Plant	700	10	10	Helicopter assisted dismantling
48	Crataegus laevigata - English hawthorn	E - Tihi	-36.9325	174.8388	Surveillance Pest Plant	400	5	4	Helicopter assisted dismantling
49	Crataegus laevigata - English hawthorn	E - Tihi	-36.9325	174.8388	Surveillance Pest Plant	400	5	4	Helicopter assisted dismantling

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Item No.	Tree Species	Operating Area	Latitude	Longitude	RPMS Status	DBH (mm)	Height (m)	Crown Spread (m)	Removal Method
50	Crataegus laevigata - English hawthorn	E - Tihi	-36.9325	174.8388	Surveillance Pest Plant	400	5	4	Helicopter assisted dismantling
51	Crataegus laevigata - English hawthorn	E - Tihi	-36.9325	174.8388	Surveillance Pest Plant	400	5	4	Helicopter assisted dismantling
52	Crataegus laevigata - English hawthorn	E - Tihi	-36.9325	174.8388	Surveillance Pest Plant	400	5	4	Helicopter assisted dismantling
53	Crataegus laevigata - English hawthorn	E - Tihi	-36.9325	174.8388	Surveillance Pest Plant	400	5	4	Helicopter assisted dismantling
54	Crataegus laevigata - English hawthorn	E - Tihi	-36.9325	174.8388	Surveillance Pest Plant	400	5	4	Helicopter assisted dismantling
55	Crataegus laevigata - English hawthorn	E - Tihi	-36.9325	174.8388	Surveillance Pest Plant	400	5	4	Helicopter assisted dismantling
56	Crataegus laevigata - English hawthorn	E - Tihi	-36.9325	174.8388	Surveillance Pest Plant	400	5	4	Helicopter assisted dismantling
57	Crataegus laevigata - English hawthorn	E - Tihi	-36.9325	174.8388	Surveillance Pest Plant	400	5	4	Helicopter assisted dismantling
58	Olea sp. - olive	E - Tihi	-36.9324	174.8389	Not Pest Species	400	6	7	Helicopter assisted dismantling
59	Olea sp. - olive	E - Tihi	-36.9325	174.8396	Not Pest Species	400	5	7	Helicopter assisted dismantling
60	Pinus radiata - Monterey pine	E - Tihi	-36.9324	174.8395	Not Pest Species	1500		10	Helicopter assisted dismantling
61	Olea sp. - olive	B - Motor Club	-36.9323	174.8398	Not Pest Species	300	5	5	Helicopter assisted dismantling
62	Olea sp. - olive	B - Motor Club	-36.9323	174.8398	Not Pest Species	300	5	5	Helicopter assisted dismantling
63	Olea sp. - olive	B - Motor Club	-36.9323	174.8385	Not Pest Species	100	5	3	Helicopter assisted dismantling
64	Olea sp. - olive	B - Motor Club	-36.9323	174.8385	Not Pest Species	100	5	3	Crane assisted dismantling
65	Olea sp. - olive	B - Motor Club	-36.9318	174.838	Not Pest Species	300	6	5	Helicopter assisted dismantling
66	Olea sp. - olive	B - Motor Club	-36.9318	174.838	Being Researched	300	6	5	Helicopter assisted dismantling
67	Olea sp. - olive	B - Motor Club	-36.9318	174.838	Not Pest Species	300	6	5	Helicopter assisted dismantling

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Item No.	Tree Species	Operating Area	Latitude	Longitude	RPMS Status	DBH (mm)	Height (m)	Crown Spread (m)	Removal Method
68	Olea sp. - olive	B - Motor Club	-36.9318	174.838	Not Pest Species	300	6	5	Helicopter assisted dismantling
69	Olea sp. - olive	B - Motor Club	-36.9318	174.838	Not Pest Species	300	6	5	Helicopter assisted dismantling
70	Olea sp. - olive	B - Motor Club	-36.9318	174.838	Not Pest Species	300	6	5	Helicopter assisted dismantling
71	Olea sp. - olive	B - Motor Club	-36.9318	174.838	Not Pest Species	300	6	5	Helicopter assisted dismantling
72	Olea sp. - olive	B - Motor Club	-36.9318	174.838	Not Pest Species	300	6	5	Helicopter assisted dismantling
73	Olea sp. - olive	B - Motor Club	-36.9318	174.838	Not Pest Species	300	6	5	Helicopter assisted dismantling
74	Olea sp. - olive	B - Motor Club	-36.9318	174.838	Not Pest Species	300	6	5	Helicopter assisted dismantling
75	Olea sp. - olive	B - Motor Club	-36.9318	174.838	Not Pest Species	300	6	5	Helicopter assisted dismantling
76	Olea sp. - olive	B - Motor Club	-36.9318	174.838	Not Pest Species	300	6	5	Helicopter assisted dismantling
77	Olea sp. - olive	B - Motor Club	-36.9318	174.838	Not Pest Species	300	6	5	Helicopter assisted dismantling
78	Olea sp. - olive	B - Motor Club	-36.9318	174.838	Not Pest Species	300	6	5	Helicopter assisted dismantling
79	Olea sp. - olive	B - Motor Club	-36.9318	174.838	Not Pest Species	300	6	5	Helicopter assisted dismantling
80	Olea sp. - olive	B - Motor Club	-36.9318	174.838	Not Pest Species	300	6	5	Helicopter assisted dismantling
81	Olea sp. - olive	B - Motor Club	-36.9318	174.838	Not Pest Species	300	6	5	Crane assisted dismantling
82	Olea sp. - olive	B - Motor Club	-36.932	174.8381	Not Pest Species	300	6	5	Helicopter assisted dismantling
83	Olea sp. - olive	B - Motor Club	-36.932	174.8381	Not Pest Species	300	6	5	Crane assisted dismantling
84	Olea sp. - olive	B - Motor Club	-36.932	174.8382	Not Pest Species	300	6	5	Helicopter assisted dismantling
85	Olea sp. - olive	B - Motor Club	-36.932	174.8382	Not Pest Species	300	6	5	Helicopter assisted dismantling

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Item No.	Tree Species	Operating Area	Latitude	Longitude	RPMS Status	DBH (mm)	Height (m)	Crown Spread (m)	Removal Method
86	Olea sp. - olive	B - Motor Club	-36.932	174.8382	Not Pest Species	300	6	5	Helicopter assisted dismantling
87	Olea sp. - olive	B - Motor Club	-36.932	174.8382	Not Pest Species	300	6	5	Helicopter assisted dismantling
88	Olea sp. - olive	B - Motor Club	-36.932	174.8382	Not Pest Species	300	6	5	Helicopter assisted dismantling
89	Olea sp. - olive	B - Motor Club	-36.932	174.8382	Not Pest Species	300	6	5	Helicopter assisted dismantling
90	Olea sp. - olive	B - Motor Club	-36.932	174.8382	Not Pest Species	300	6	5	Helicopter assisted dismantling
91	Olea sp. - olive	B - Motor Club	-36.932	174.8382	Not Pest Species	300	6	5	Helicopter assisted dismantling
92	Olea sp. - olive	B - Motor Club	-36.932	174.8382	Not Pest Species	300	6	5	Helicopter assisted dismantling
93	Olea sp. - olive	B - Motor Club	-36.932	174.8382	Not Pest Species	300	6	5	Helicopter assisted dismantling
94	Olea sp. - olive	B - Motor Club	-36.932	174.8382	Not Pest Species	300	6	5	Helicopter assisted dismantling
95	Olea sp. - olive	B - Motor Club	-36.932	174.8382	Not Pest Species	300	6	5	Crane assisted dismantling
96	Olea sp. - olive	B - Motor Club	-36.9321	174.8383	Not Pest Species	300	6	4	Helicopter assisted dismantling
97	Olea sp. - olive	B - Motor Club	-36.9321	174.8383	Not Pest Species	300	6	4	Helicopter assisted dismantling
98	Olea sp. - olive	B - Motor Club	-36.9321	174.8383	Not Pest Species	300	6	4	Helicopter assisted dismantling
99	Olea sp. - olive	B - Motor Club	-36.9321	174.8383	Not Pest Species	300	6	4	Helicopter assisted dismantling
100	Olea sp. - olive	B - Motor Club	-36.9321	174.8383	Not Pest Species	300	6	4	Helicopter assisted dismantling
101	Olea sp. - olive	B - Motor Club	-36.9321	174.8383	Not Pest Species	300	6	4	Crane assisted dismantling
102	Ulmus glabra - Scots wych elm	C - West Slope / Entrance	-36.9342	174.8357	Not Pest Species	110	20	12	Manual Felling
103	Quercus ilex - holm oak	C - West Slope / Entrance	-36.9343	174.8355	Not Pest Species	600	11	12	Manual Felling

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Item No.	Tree Species	Operating Area	Latitude	Longitude	RPMS Status	DBH (mm)	Height (m)	Crown Spread (m)	Removal Method
104	Quercus ilex - holm oak	C - West Slope / Entrance	-36.9343	174.8355	Not Pest Species	600	11	12	Manual Felling
105	Ficus macrophylla-Morton Bay fig	C - West Slope / Entrance	-36.9342	174.8356	Not Pest Species	2100	16	26	Crane assisted dismantling
106	"Acmena smithii, Syzyium - lilly pilly, monkey apple"	C - West Slope / Entrance	-36.9344	174.836	Surveillance Pest Plant	600	12	9	Crane assisted dismantling
107	Quercus ilex - holm oak	C - West Slope / Entrance	-36.9343	174.8358	Not Pest Species	700	9	11	Crane assisted dismantling
108	Ficus macrophylla-Morton Bay fig	D - Water Tower	-36.9345	174.8357	Not Pest Species	1700	16	20	Crane assisted dismantling
109	Quercus ilex - holm oak	D - Water Tower	-36.9345	174.8358	Not Pest Species	1400	17	18	Crane assisted dismantling
110	Ficus macrophylla-Morton Bay fig	D - Water Tower	-36.9345	174.836	Not Pest Species	3300	15	40	Crane assisted dismantling
111	Ficus macrophylla-Morton Bay fig	D - Water Tower	-36.9344	174.836	Not Pest Species	3300	15	40	Crane assisted dismantling
112	Ficus macrophylla-Morton Bay fig	E - Tihi	-36.9343	174.8361	Not Pest Species	3300	15	40	Crane assisted dismantling
114	Olea sp. - olive	D - Water Tower	-36.9328	174.8396	Not Pest Species	800	8	5	Helicopter assisted dismantling
115	Olea sp. - olive	E - Tihi	-36.9328	174.8396	Not Pest Species	800	8	5	Helicopter assisted dismantling
116	Olea sp. - olive	E - Tihi	-36.9328	174.8396	Not Pest Species	800	8	5	Helicopter assisted dismantling
117	Olea sp. - olive	E - Tihi	-36.9328	174.8396	Not Pest Species	800	8	5	Helicopter assisted dismantling
118	Olea sp. - olive	E - Tihi	-36.9328	174.8396	Not Pest Species	800	8	5	Helicopter assisted dismantling
119	Olea sp. - olive	E - Tihi	-36.9332	174.84	Not Pest Species	500	6	5	Helicopter assisted dismantling
120	Olea sp. - olive	E - Tihi	-36.9332	174.84	Not Pest Species	500	6	5	Helicopter assisted dismantling
121	Olea sp. - olive	E - Tihi	-36.9332	174.84	Not Pest Species	500	6	5	Helicopter assisted dismantling
122	Olea sp. - olive	E - Tihi	-36.9332	174.84	Not Pest Species	500	6	5	Helicopter assisted dismantling

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Item No.	Tree Species	Operating Area	Latitude	Longitude	RPMS Status	DBH (mm)	Height (m)	Crown Spread (m)	Removal Method
123	Olea sp. - olive	E - Tihi	-36.9332	174.84	Not Pest Species	500	6	5	Helicopter assisted dismantling
124	Olea sp. - olive	E - Tihi	-36.9332	174.84	Not Pest Species	500	6	5	Helicopter assisted dismantling
125	Olea sp. - olive	E - Tihi	-36.9332	174.84	Not Pest Species	500	6	5	Helicopter assisted dismantling
126	Olea sp. - olive	E - Tihi	-36.9332	174.84	Not Pest Species	500	6	5	Helicopter assisted dismantling
127	Olea sp. - olive	E - Tihi	-36.9332	174.84	Not Pest Species	500	6	5	Helicopter assisted dismantling
128	Olea sp. - olive	E - Tihi	-36.9332	174.84	Not Pest Species	500	6	5	Helicopter assisted dismantling
129	Olea sp. - olive	E - Tihi	-36.9332	174.84	Not Pest Species	500	6	5	Helicopter assisted dismantling
130	Olea sp. - olive	E - Tihi	-36.9332	174.84	Not Pest Species	500	6	5	Helicopter assisted dismantling
131	Olea sp. - olive	E - Tihi	-36.9332	174.84	Not Pest Species	500	6	5	Helicopter assisted dismantling
132	Cupressus macrocarpa - Monterey cypress	E - Tihi	-36.9332	174.8397	Not Pest Species	1200	12	10	Crane assisted dismantling
172	Ficus macrophylla-Morton Bay fig	E - Tihi	-36.9336	174.8395	Not Pest Species	1000	8	25	Helicopter assisted dismantling
173	Quercus robur - English oak	E - Tihi	-36.9328	174.8389	Not Pest Species	1800	22	20	Helicopter assisted dismantling
174	Populus deltoides - cottonwood	E - Tihi	-36.9327	174.8386	Not Pest Species	1800	28	15	Crane assisted dismantling
175	Quercus robur - English oak	E - Tihi	-36.9327	174.8387	Not Pest Species	900	20	10	Helicopter assisted dismantling
176	Quercus robur - English oak	E - Tihi	-36.9327	174.8387	Not Pest Species	900	20	10	Helicopter assisted dismantling
177	Platanus x acerifolia - London Plane tree	E - Tihi	-36.9328	174.8386	Not Pest Species	700	15	10	Crane assisted dismantling
178	Platanus x acerifolia - London Plane tree	E - Tihi	-36.9329	174.8387	Not Pest Species	2000	25	25	Helicopter assisted dismantling
179	Castanea sativa - European chestnut	E - Tihi	-36.9331	174.8388	Not Pest Species	1800	25	10	Helicopter assisted dismantling

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Item No.	Tree Species	Operating Area	Latitude	Longitude	RPMS Status	DBH (mm)	Height (m)	Crown Spread (m)	Removal Method
180	Ficus macrophylla-Morton Bay fig	E - Tihi	-36.9331	174.839	Not Pest Species	2500	25	25	Helicopter assisted dismantling
181	Phoenix canariensis -phoenix palm	E - Tihi	-36.9333	174.8391	Surveillance Pest Plant	800	18	3	Helicopter assisted dismantling
182	Platanus x acerifolia - London Plane tree	E - Tihi	-36.9332	174.8394	Not Pest Species	1200	25	25	Helicopter assisted dismantling
183	Ulmus sp.	A - Ring Road	-36.9329	174.841	Not Pest Species	700	16	15	Crane assisted dismantling
184	"Populus nigra - Lombardy poplar, black poplar"	A - Ring Road	-36.9328	174.8409	Not Pest Species	1000	20	20	Crane assisted dismantling
185	Ulmus sp.	A - Ring Road	-36.9328	174.8409	Not Pest Species	300	12	10	Crane assisted dismantling
188	"Acmena smithii, Syzygium - lilly pilly, monkey apple"	A - Ring Road	-36.9326	174.8411	Surveillance Pest Plant	400	9	5	Crane assisted dismantling
189	Platanus x acerifolia - London Plane tree	E - Tihi	-36.9327	174.8383	Not Pest Species	900	20	10	Crane assisted dismantling
190	Platanus x acerifolia - London Plane tree	E - Tihi	-36.9327	174.8384	Not Pest Species	2000	25	20	Crane assisted dismantling
191	Platanus x acerifolia - London Plane tree	E - Tihi	-36.9326	174.8382	Not Pest Species	900	20	10	Crane assisted dismantling
192	Platanus x acerifolia - London Plane tree	E - Tihi	-36.9327	174.8383	Not Pest Species	900	20	10	Crane assisted dismantling
194	Liquidambar styraciflua - sweetgum	A - Ring Road	-36.9309	174.8402	Not Pest Species	900	7	6	Manual dismantling
195	Casuarina sp. - she oak	A - Ring Road	-36.931	174.8403	Not Pest Species	800	7	6	Manual dismantling
196	"Populus nigra - Lombardy poplar, black poplar"	A - Ring Road	-36.9311	174.8404	Not Pest Species	1000	15	8	Manual dismantling
197	Casuarina sp. - she oak	A - Ring Road	-36.9311	174.8406	Not Pest Species	1300	8	12	Crane assisted dismantling
198	Olea sp. - olive	A - Ring Road	-36.9315	174.8409	Not Pest Species	400	6	6	Crane assisted dismantling
200	Cinnamomum camphora- camphor laurel	F - Sports Field Area	-36.9316	174.8414	Not Pest Species	0	18	20	Crane assisted dismantling
201	Populus x euramericana - hybrid poplar P. nigra x P. deltoides	F - Sports Field Area	-36.9317	174.8415	Not Pest Species	1700	35	25	Crane assisted dismantling

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Item No.	Tree Species	Operating Area	Latitude	Longitude	RPMS Status	DBH (mm)	Height (m)	Crown Spread (m)	Removal Method
202	Liriodendron tulipifera - tulip tree	F - Sports Field Area	-36.9318	174.8415	Not Pest Species	1900	13	12	Crane assisted dismantling
203	Casuarina sp. - she oak	F - Sports Field Area	-36.9318	174.8414	Not Pest Species	700	15	15	Manual dismantling
204	Quercus palustris- pin oak	F - Sports Field Area	-36.9319	174.8415	Not Pest Species	800	16	17	Crane assisted dismantling
205	Populus x euramericana - hybrid poplar P. nigra x P. deltoides	F - Sports Field Area	-36.932	174.8415	Not Pest Species	1000	26	20	Crane assisted dismantling
206	Populus x euramericana - hybrid poplar P. nigra x P. deltoides	F - Sports Field Area	-36.9321	174.8415	Not Pest Species	1890	35	25	Crane assisted dismantling
207	Camellia sp.	F - Sports Field Area	-36.9324	174.8416	Not Pest Species	100	4	3	Manual Felling
234	Platanus x acerifolia - London Plane tree	E - Tihi	-36.9326	174.8382	Not Pest Species	900	20	10	Crane assisted dismantling
235	Pinus radiata - Monterey pine	B - Motor Club	-36.932	174.8379	Not Pest Species	1500	15	15	Crane assisted dismantling
236	Quercus robur - English oak	B - Motor Club	-36.9323	174.8378	Not Pest Species	500	8	15	Manual dismantling
237	Ficus macrophylla-Morton Bay fig	B - Motor Club	-36.9323	174.838	Not Pest Species	1500	20	20	Crane assisted dismantling
238	Pinus radiata - Monterey pine	B - Motor Club	-36.9324	174.8381	Not Pest Species	1000	20	8	Crane assisted dismantling
239	Pinus radiata - Monterey pine	B - Motor Club	-36.9323	174.8382	Not Pest Species	2500	30	25	Crane assisted dismantling
240	Pinus radiata - Monterey pine	E - Tihi	-36.9317	174.8382	Not Pest Species	800	12	15	Crane assisted dismantling
241	Pinus radiata - Monterey pine	E - Tihi	-36.9324	174.8384	Not Pest Species	1500	25	15	Crane assisted dismantling
242	Pinus radiata - Monterey pine	E - Tihi	-36.9324	174.8385	Not Pest Species	1800	25	10	Crane assisted dismantling
243	Olea sp. - olive	E - Tihi	-36.9322	174.8391	Not Pest Species	400	6	5	Helicopter assisted dismantling
244	Olea sp. - olive	E - Tihi	-36.9322	174.8391	Not Pest Species	400	6	5	Helicopter assisted dismantling
245	Cupressus macrocarpa - Monterey cypress	E - Tihi	-36.9321	174.8394	Not Pest Species	1200	10	15	Helicopter assisted dismantling

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Item No.	Tree Species	Operating Area	Latitude	Longitude	RPMS Status	DBH (mm)	Height (m)	Crown Spread (m)	Removal Method
246	Olea sp. - olive	E - Tihi	-36.9321	174.8395	Not Pest Species	200	6	6	Helicopter assisted dismantling
247	Pinus radiata - Monterey pine	E - Tihi	-36.9327	174.8392	Not Pest Species	2000	20	15	Helicopter assisted dismantling
248	Pinus radiata - Monterey pine	E - Tihi	-36.9325	174.8391	Not Pest Species	2500	25	20	Helicopter assisted dismantling
249	Ficus macrophylla-Morton Bay fig	E - Tihi	-36.9325	174.8393	Not Pest Species	3000	15	30	Helicopter assisted dismantling
250	Olea sp. - olive	A - Ring Road	-36.9309	174.8393	Not Pest Species	400	6	5	Crane assisted dismantling
251	"Acmena smithii, Syzygium - lilly pilly, monkey apple"	A - Ring Road	-36.9308	174.8395	Surveillance Pest Plant	800	10	8	Crane assisted dismantling
252	Cinnamomum camphora- camphor laurel	A - Ring Road	-36.9319	174.8411	Not Pest Species	0	12	12	Crane assisted dismantling
268	Camellia sp.	F - Sports Field Area	-36.9325	174.842	Not Pest Species	400	4	4	Manual Felling
269	Camellia sp.	F - Sports Field Area	-36.9325	174.842	Not Pest Species	400	4	4	Manual Felling
270	Camellia sp.	F - Sports Field Area	-36.9325	174.842	Not Pest Species	400	4	4	Manual Felling
271	Camellia sp.	F - Sports Field Area	-36.9325	174.842	Not Pest Species	400	4	4	Manual Felling
272	Camellia sp.	F - Sports Field Area	-36.9325	174.842	Not Pest Species	400	4	4	Manual Felling
273	Camellia sp.	F - Sports Field Area	-36.9325	174.842	Not Pest Species	400	4	4	Manual Felling
274	Camellia sp.	F - Sports Field Area	-36.9325	174.842	Not Pest Species	400	4	4	Manual Felling
275	Camellia sp.	F - Sports Field Area	-36.9325	174.842	Not Pest Species	400	4	4	Manual Felling
276	Camellia sp.	F - Sports Field Area	-36.9325	174.842	Not Pest Species	400	4	4	Manual Felling
277	Camellia sp.	F - Sports Field Area	-36.9325	174.842	Not Pest Species	400	4	4	Manual Felling
278	Camellia sp.	F - Sports Field Area	-36.9325	174.842	Not Pest Species	400	4	4	Manual Felling

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Item No.	Tree Species	Operating Area	Latitude	Longitude	RPMS Status	DBH (mm)	Height (m)	Crown Spread (m)	Removal Method
279	Camellia sp.	F - Sports Field Area	-36.9325	174.842	Not Pest Species	400	4	4	Manual Felling
280	Camellia sp.	F - Sports Field Area	-36.9325	174.842	Not Pest Species	400	4	4	Manual Felling
281	Camellia sp.	F - Sports Field Area	-36.9325	174.8421	Not Pest Species	400	4	4	Manual Felling
282	Camellia sp.	F - Sports Field Area	-36.9326	174.8421	Not Pest Species	400	4	4	Manual Felling
283	Camellia sp.	F - Sports Field Area	-36.9325	174.8421	Not Pest Species	400	4	4	Manual Felling
285	Camellia sp.	F - Sports Field Area	-36.9325	174.8421	Not Pest Species	400	4	4	Manual Felling
288	Ficus macrophylla-Morton Bay fig	F - Sports Field Area	-36.9324	174.842	Not Pest Species	800	8	12	Crane assisted dismantling
289	Camellia sp.	F - Sports Field Area	-36.9324	174.8418	Not Pest Species	350	4	4	Manual Felling
290	Camellia sp.	F - Sports Field Area	-36.9324	174.8418	Not Pest Species	150	4	4	Manual Felling
311	Camellia sp.	F - Sports Field Area	-36.9324	174.8416	Not Pest Species	400	4	5	Manual dismantling
312	Washingtonia filifera - fan palm	F - Sports Field Area	-36.9325	174.8416	Not Pest Species	700	13	5	Crane assisted dismantling
313	Washingtonia filifera - fan palm	F - Sports Field Area	-36.9325	174.8416	Not Pest Species	700	13	5	Crane assisted dismantling
314	Washingtonia filifera - fan palm	F - Sports Field Area	-36.9325	174.8416	Not Pest Species	700	13	5	Crane assisted dismantling
315	Washingtonia filifera - fan palm	F - Sports Field Area	-36.9325	174.8416	Not Pest Species	700	13	5	Crane assisted dismantling
316	Washingtonia filifera - fan palm	F - Sports Field Area	-36.9325	174.8416	Not Pest Species	700	13	5	Crane assisted dismantling
317	Washingtonia filifera - fan palm	F - Sports Field Area	-36.9325	174.8416	Not Pest Species	700	13	5	Crane assisted dismantling
318	Washingtonia filifera - fan palm	F - Sports Field Area	-36.9325	174.8416	Not Pest Species	700	13	5	Crane assisted dismantling
319	Washingtonia filifera - fan palm	F - Sports Field Area	-36.9325	174.8416	Not Pest Species	700	13	5	Crane assisted dismantling

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Item No.	Tree Species	Operating Area	Latitude	Longitude	RPMS Status	DBH (mm)	Height (m)	Crown Spread (m)	Removal Method
320	Washingtonia filifera - fan palm	F - Sports Field Area	-36.9325	174.8416	Not Pest Species	700	13	5	Crane assisted dismantling
321	Washingtonia filifera - fan palm	F - Sports Field Area	-36.9325	174.8416	Not Pest Species	700	13	5	Crane assisted dismantling
322	"Acmena smithii, Syzyium - lilly pilly, monkey apple"	A - Ring Road	-36.9312	174.8392	Surveillance Pest Plant	2500	15	12	Crane assisted dismantling
323	"Acmena smithii, Syzyium - lilly pilly, monkey apple"	E - Tihi	-36.9317	174.8397	Surveillance Pest Plant	600	10	7	Helicopter assisted dismantling
324	"Acmena smithii, Syzyium - lilly pilly, monkey apple"	E - Tihi	-36.9317	174.84	Surveillance Pest Plant	700	10	43322	Helicopter assisted dismantling
325	Ficus macrophylla-Morton Bay fig	A - Ring Road	-36.9308	174.8397	Not Pest Species	3000	15	20	Crane assisted dismantling
326	"Populus nigra - Lombardy poplar, black poplar"	A - Ring Road	-36.9313	174.839	Not Pest Species	1600	11		Crane assisted dismantling
327	Platanus x acerifolia - London Plane tree	A - Ring Road	-36.9312	174.839	Not Pest Species	1600	27	25	Crane assisted dismantling
328	Platanus x acerifolia - London Plane tree	A - Ring Road	-36.9311	174.8392	Not Pest Species	0	25	25	Crane assisted dismantling
329	Cinnamomum camphora- camphor laurel	A - Ring Road	-36.9311	174.8402	Not Pest Species	2500	15	15	Crane assisted dismantling
330	Pinus radiata - Monterey pine	A - Ring Road	-36.9316	174.8389	Not Pest Species	800	20	10	Crane assisted dismantling
331	Ilex sp. - holly	A - Ring Road	-36.9311	174.8398	Not Pest Species	800	8	6	Crane assisted dismantling
332	"Populus nigra - Lombardy poplar, black poplar"	A - Ring Road	-36.9312	174.8399	Not Pest Species	800	20	5	Crane assisted dismantling
333	Pinus radiata - Monterey pine	A - Ring Road	-36.9313	174.84	Not Pest Species	1000	20	10	Crane assisted dismantling
334	Ficus macrophylla-Morton Bay fig	A - Ring Road	-36.9313	174.8402	Not Pest Species	0	25	25	Crane assisted dismantling
335	Ficus macrophylla-Morton Bay fig	A - Ring Road	-36.9312	174.8403	Not Pest Species	1000	12	10	Crane assisted dismantling
336	Ficus macrophylla-Morton Bay fig	E - Tihi	-36.9314	174.8394	Not Pest Species	3000	25	25	Crane assisted dismantling
337	Ficus macrophylla-Morton Bay fig	E - Tihi	-36.9317	174.8394	Not Pest Species	5000	10	25	Crane assisted dismantling

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Item No.	Tree Species	Operating Area	Latitude	Longitude	RPMS Status	DBH (mm)	Height (m)	Crown Spread (m)	Removal Method
338	Ficus macrophylla-Morton Bay fig	E - Tihi	-36.9316	174.8398	Not Pest Species	2500	15	20	Helicopter assisted dismantling
339	Ficus macrophylla-Morton Bay fig	E - Tihi	-36.9315	174.84	Not Pest Species	3000	25	25	Crane assisted dismantling
340	Magnolia soulangeana x - Asian magnolia	E - Tihi	-36.9315	174.8401	Not Pest Species	1000	22	10	Crane assisted dismantling
341	Ilex sp. - holly	E - Tihi	-36.9316	174.8401	Not Pest Species	300	6	6	Crane assisted dismantling
381	Pinus radiata - Monterey pine	E - Tihi	-36.9317	174.8405	Not Pest Species	3000	30	20	Crane assisted dismantling
382	Olea sp. - olive	E - Tihi	-36.9322	174.8406	Not Pest Species	400	6	4	Helicopter assisted dismantling
383	Olea sp. - olive	E - Tihi	-36.9322	174.8406	Not Pest Species	400	6	4	Helicopter assisted dismantling
384	"Populus nigra - Lombardy poplar, black poplar"	A - Ring Road	-36.9313	174.8387	Not Pest Species	800	13	10	Crane assisted dismantling
385	"Populus nigra - Lombardy poplar, black poplar"	A - Ring Road	-36.931	174.8389	Not Pest Species	1800	15	10	Crane assisted dismantling
386	"Populus nigra - Lombardy poplar, black poplar"	A - Ring Road	-36.9312	174.8388	Not Pest Species	1600	13	10	Crane assisted dismantling
387	Platanus x acerifolia - London Plane tree	E - Tihi	-36.9311	174.8387	Not Pest Species	600	20	15	Crane assisted dismantling
388	Platanus x acerifolia - London Plane tree	E - Tihi	-36.9311	174.8387	Not Pest Species	600	20	15	Crane assisted dismantling
389	Platanus x acerifolia - London Plane tree	E - Tihi	-36.9311	174.8387	Not Pest Species	600	20	15	Crane assisted dismantling
390	Platanus x acerifolia - London Plane tree	A - Ring Road	-36.9311	174.8387	Not Pest Species	600	20	15	Crane assisted dismantling
391	"Acmena smithii, Syzyium - lilly pilly, monkey apple"	A - Ring Road	-36.9312	174.8388	Surveillance Pest Plant	1400	16	15	Crane assisted dismantling
392	"Populus nigra - Lombardy poplar, black poplar"	A - Ring Road	-36.9309	174.8392	Not Pest Species	1400	12	7	Manual dismantling
393	Cupressus x leylandii - Leyland cypress	A - Ring Road	-36.9308	174.8393	Not Pest Species	1200	7	5	Crane assisted dismantling
394	"Populus nigra - Lombardy poplar, black poplar"	A - Ring Road	-36.9308	174.8393	Not Pest Species	1200	8	6	Crane assisted dismantling

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Item No.	Tree Species	Operating Area	Latitude	Longitude	RPMS Status	DBH (mm)	Height (m)	Crown Spread (m)	Removal Method
395	Quercus robur - English oak	A - Ring Road	-36.9308	174.8394	Not Pest Species	1200	13	18	Manual dismantling
396	"Populus nigra - Lombardy poplar, black poplar"	A - Ring Road	-36.9307	174.8395	Not Pest Species	900	7	5	Manual dismantling
397	"Acmena smithii, Syzyium - lilly pilly, monkey apple"	A - Ring Road	-36.9307	174.8396	Surveillance Pest Plant	1000	7	8	Manual dismantling
398	"Populus nigra - Lombardy poplar, black poplar"	A - Ring Road	-36.9308	174.8401	Not Pest Species	609	10	5	Manual dismantling
399	"Populus nigra - Lombardy poplar, black poplar"	A - Ring Road	-36.9308	174.8401	Not Pest Species	609	10	5	Manual dismantling
400	"Populus nigra - Lombardy poplar, black poplar"	A - Ring Road	-36.9308	174.8401	Not Pest Species	609	10	5	Manual dismantling
401	"Populus nigra - Lombardy poplar, black poplar"	A - Ring Road	-36.9308	174.8401	Not Pest Species	609	10	5	Manual dismantling
402	"Populus nigra - Lombardy poplar, black poplar"	A - Ring Road	-36.9308	174.8401	Not Pest Species	609	10	5	Manual dismantling
403	"Populus nigra - Lombardy poplar, black poplar"	A - Ring Road	-36.9308	174.8401	Not Pest Species	609	10	5	Manual dismantling
404	"Populus nigra - Lombardy poplar, black poplar"	A - Ring Road	-36.9309	174.8402	Not Pest Species	1000	10	7	Manual dismantling
405	"Populus nigra - Lombardy poplar, black poplar"	A - Ring Road	-36.9309	174.8402	Not Pest Species	1000	10	7	Manual dismantling
406	"Populus nigra - Lombardy poplar, black poplar"	A - Ring Road	-36.9309	174.8402	Not Pest Species	1000	10	7	Manual dismantling
407	"Populus nigra - Lombardy poplar, black poplar"	A - Ring Road	-36.9309	174.8402	Not Pest Species	1000	10	7	Manual dismantling
409	Pinus radiata - Monterey pine	A - Ring Road	-36.9321	174.8411	Not Pest Species	0	30	8	Crane assisted dismantling
410	Cupressus macrocarpa - Monterey cypress	A - Ring Road	-36.9321	174.8411	Not Pest Species	1000	20	15	Crane assisted dismantling
411	Cupressus macrocarpa - Monterey cypress	A - Ring Road	-36.9322	174.8409	Not Pest Species	2000	30	20	Crane assisted dismantling
412	Pinus radiata - Monterey pine	A - Ring Road	-36.9322	174.841	Not Pest Species	1500	30	8	Crane assisted dismantling
413	Crataegus laevigata - English hawthorn	A - Ring Road	-36.9321	174.8409	Surveillance Pest Plant	300	6	6	Crane assisted dismantling

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Item No.	Tree Species	Operating Area	Latitude	Longitude	RPMS Status	DBH (mm)	Height (m)	Crown Spread (m)	Removal Method
414	Pinus radiata - Monterey pine	A - Ring Road	-36.932	174.8409	Not Pest Species	2000	25	20	Crane assisted dismantling
415	Pinus radiata - Monterey pine	A - Ring Road	-36.9319	174.8408	Not Pest Species	300	15	7	Crane assisted dismantling
416	Olea sp. - olive	A - Ring Road	-36.9318	174.8408	Not Pest Species	400	6	5	Helicopter assisted dismantling
417	Olea sp. - olive	A - Ring Road	-36.9318	174.8408	Not Pest Species	400	6	5	Crane assisted dismantling
418	Ilex sp. - holly	A - Ring Road	-36.9317	174.8407	Not Pest Species	400	6	6	Crane assisted dismantling
419	Pinus radiata - Monterey pine	A - Ring Road	-36.9316	174.8408	Not Pest Species	800	20	10	Crane assisted dismantling
420	Cupressus macrocarpa - Monterey cypress	A - Ring Road	-36.9315	174.8408	Not Pest Species	2000	18	9	Crane assisted dismantling
421	Pinus radiata - Monterey pine	A - Ring Road	-36.9315	174.8406	Not Pest Species	700	12	12	Crane assisted dismantling
422	Olea sp. - olive	E - Tihi	-36.9317	174.8403	Not Pest Species	500	7	7	Helicopter assisted dismantling
423	Olea sp. - olive	E - Tihi	-36.9317	174.8403	Not Pest Species	500	7	7	Crane assisted dismantling
424	Cupressus macrocarpa - Monterey cypress	E - Tihi	-36.9318	174.8401	Not Pest Species	0	15	15	Helicopter assisted dismantling
425	Olea sp. - olive	E - Tihi	-36.9319	174.8404	Not Pest Species	500	6	5	Helicopter assisted dismantling
426	Olea sp. - olive	E - Tihi	-36.9319	174.8404	Not Pest Species	500	6	5	Helicopter assisted dismantling
427	Cupressus macrocarpa - Monterey cypress	E - Tihi	-36.9319	174.8401	Not Pest Species	2500	15	15	Helicopter assisted dismantling
428	Pinus radiata - Monterey pine	E - Tihi	-36.9321	174.8403	Not Pest Species	1500	20	10	Helicopter assisted dismantling
429	Pinus radiata - Monterey pine	E - Tihi	-36.9323	174.8405	Not Pest Species	3000	20	20	Helicopter assisted dismantling
430	Olea sp. - olive	E - Tihi	-36.9324	174.8407	Not Pest Species	200	6	5	Crane assisted dismantling
431	Pinus radiata - Monterey pine	E - Tihi	-36.9324	174.8408	Not Pest Species	2000	25	20	Crane assisted dismantling

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Item No.	Tree Species	Operating Area	Latitude	Longitude	RPMS Status	DBH (mm)	Height (m)	Crown Spread (m)	Removal Method
432	Crataegus laevigata - English hawthorn	E - Tihi	-36.9324	174.8409	Surveillance Pest Plant	400	5	7	Crane assisted dismantling
433	Platanus x acerifolia - London Plane tree	A - Ring Road	-36.9325	174.8412	Not Pest Species	300	10	8	Crane assisted dismantling
434	Phoenix canariensis -phoenix palm	A - Ring Road	-36.9326	174.8411	Surveillance Pest Plant	600	12	6	Crane assisted dismantling
435	Platanus x acerifolia - London Plane tree	E - Tihi	-36.9326	174.8408	Not Pest Species	2000	20	20	Crane assisted dismantling
439	Dead tree	E - Tihi	-36.9332	174.8402		3000			Helicopter assisted dismantling
440	Fagus sylvatica-european beech	E - Tihi	-36.9331	174.8402	Not Pest Species	1200	16	19	Helicopter assisted dismantling
441	Olea sp. - olive	E - Tihi	-36.933	174.8403	Not Pest Species	600	7	13	Crane assisted dismantling
442	Olea sp. - olive	E - Tihi	-36.9328	174.8403	Not Pest Species	1200	7	12	Helicopter assisted dismantling
443	Olea sp. - olive	E - Tihi	-36.9328	174.8402	Not Pest Species	700	7	9	Crane assisted dismantling
444	Pinus radiata - Monterey pine	E – Tihi	-36.9327	174.8405	Not Pest Species	1500	18	20	Helicopter assisted dismantling

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## Appendix D: Recommended Operational Management Requirements

### Environmental Management

A detailed plan showing the processes and procedures the contractor will use to ensure the service meets all of the legislative / regulatory requirements;

### Resource Plan

A detailed plan showing the resources (equipment and labour) the contractor will use to ensure the works meet all of the requirements stated in an agreement yet to be drawn up. This agreement would detail the number of staff, qualification levels and competencies with regard to arboricultural operations. This plan will also include management of response work requests, including 24/7 call centre or equivalent processing to take account of incidents which could arise at the site;

### Traffic Management Plan

The contractor will provide a detailed plan showing processes and procedures to ensure that appropriate traffic management systems are used to ensure the work processes will meet all of the legislative requirements:

- (i) The contractor is to adopt/develop, implement and manage suitable generic and specific traffic management plans (TMPs) so that the works requiring public highway access can be undertaken in accordance with the relevant legislative requirements;
- (ii) Temporary traffic control shall be in accordance with 'The NZTA Code of Practice for Temporary Traffic Management' and any other Codes of Practice adopted by the Authority, depending upon the specific traffic control requirements for the site; and

### Relationship Management Plan

A detailed plan showing the processes and procedures the contractor will use to ensure that all communications relating to the management and operation of the works facilitates understanding and provides a 'No surprises' regime. This is likely to be a high profile undertaking and regular exchanges of information will be required to field potential external queries and inform timely intervention where matters unexpectedly deviate from the plan.

### Emergency Work Plan

A detailed plan showing the processes and procedures the contractor will use to manage any Emergency Work that is required to be undertaken as part of the works;

### Business Continuity Plan

A detailed plan showing the processes and procedures the contractor will use to manage uninterrupted continuation of the works;

### Risk Mitigation Plan

A detailed plan showing the processes and procedures the contractor will use to manage risk assessment and management of risks identified by the contractor. The contractor will need to ensure Public liability cover of at least \$2 million indemnity is current for the duration of the works;

### Information and Reporting

A detailed plan showing the processes for gathering, managing, checking and reporting information;



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## Billing

A detailed plan showing the processes for ensuring invoicing is on time, with enough information for the Authority to be able to easily ask questions, understand what is being billed for, and assess the progress of works to date.

## Quality Management Plan (QMP)

A detailed Quality Management Plan should be provided by the contractor.

It may prove expedient for the Authority to agree with any prospective contractor the standard to be adopted for the purposes of the contract as a baseline reference point. The content of the Quality Management Plan should include but not be limited to:

- *Quality management processes to ensure all works are delivered to the appropriate standard and comply with all relevant industry practises and legislation;*
- *A compliments and complaints procedure, including a process for effectively responding to complaints; and*
- *All other things necessary to ensure the quality of the works as may be required by the Authority.*

The Quality Management Plan should be approved in writing by the Authority. If such a quality management plan is rejected by the Authority the contractor should address all issues regarding the Quality Management Plan made known to the contractor by the Authority and re-submit until approval is obtained.

Variation to the QMP may be required from time to time by mutual agreement.

The contractor must regularly update and maintain the Quality Assurance Plan throughout the works period.

## Working Hours

The contractor shall need to ensure that all works, particularly helicopter extractions, which generate excessive noise or other hindrances are carried out at times that minimise the impact to the public and local residents and comply with any relevant bylaws and/or specific noise restrictions.

The contractor shall comply with operations limitations such as helicopter fly times and noise restrictions as set out in any conditions of consent and specific management plans.

## Operational Protocols

In general, tree operational control and management will be led by an appointed arborist engaged to oversee the works and be a conduit between the consent holder, contractor and stakeholders.

Prior to works commencing, the appointed arborist shall arrange a pre-start meeting with the principal contractor, The Tūpuna Maunga Authority, consent holder (other than listed) and stakeholders. The pre-start meeting will identify:

- *Roles and responsibilities of the works, including consultation and communication to stakeholders and the wider public.*
- *The conditions of consent and how these will affect the management and timings of the works.*
- *Detail the archaeological, cultural and historical features, requirements and limitations of the maunga, and outline the maunga protection areas and how these are to be protected.*
- *Operational zones, processing areas and other operational limitations.*
- *Tree removal methods, safety requirements, handling of material and storage requirements.*

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- *Post works requirements (if any)*
  - *At the completion of works, the appointed arborist shall “sign off” the work and provide a brief account of the project to The Tūpuna Maunga Authority.*

It shall be the responsibility of the consent holder in conjunction with the appointed arborist to ensure that all persons engaged or otherwise to work on the site are made aware of the conditions of consent and tree protocols and that these conditions are adhered to at all times.

Prior to the removal of the tree, the appointed arborist will physically identify each tree with a removal methodology demarcation and a corresponding processing method.

The appointed arborist in conjunction with the arboricultural contractor shall determine the processing options and maunga protection methods. This could include the identification of areas where ground protection is appropriate. The ground protection will be sufficient and appropriate for the task so that the ground is protected from damage. Prior to the works the ground protection will be emplaced and removed at the completion of the works. Where loads will exceed the ground protection and alternative ground protection methods are not applicable, the manner of removal will be altered or if this cannot be altered safely, the tree removal method will be changed. The contractor shall ensure that they can source sufficient ground protection mats.

All work shall be undertaken in a manner that avoids damage to the trees being retained. If pruning is required to allow for machinery and/or vehicle access, the works will be undertaken to modern tree pruning targets. All pruning will be recorded and a brief report of any adverse effects will be provided to the Tūpuna Maunga Authority. Mitigation of the pruning will be undertaken as outlined by the appointed arborist.

## **Matting**

Matting will be of a robust material that can be pinned to the ground using a small gauge looped pin. The matting will cover any areas that could possibly be affected by the dismantling or processing areas. All ‘dragging’ / transport of material and branches will be undertaken on top of the matting. The contractor will procure and supply all matting. The composition / type of matting will be with the agreement of the Tūpuna Maunga Authority.

## **Load Bearing Boards**

Load bearing boards will be robust in nature that can sufficiently distribute the load of the machinery and vehicles required for the task. There will be sufficient load bearing boards available for use. The contractor will procure and supply all load bearing boards.

## **Manual Dismantling Protocol**

Where the manual dismantling method is proposed, the tree will be manually dismantled using rigging techniques and then transported carefully by hand on top of a robust matting that will prevent scarification of the ground. The branch shall be held by the wooded end of a branch so the branchlets and leaves will act as a flexible, absorbent layer that distributes the weight of the branch when ‘dragged’ from the dismantling site to the processing site.

Matting will be staked to the ground using a small gauge looped pin that will leave only a small hole of shallow depth. The contractors will ensure that the matting will be maintained in place for the duration of the time required to complete the task.

Trees will not be felled or branches ‘thrown’ to the ground as the matting won’t protect the ground from impact damage.

Where branches need to be ‘thrown’ / rolled down a bank adjacent to the road, care will be taken so that no impact damage occurs to the ground surface, including the sealed road. Load bearing boards may need to be placed on top of the ground to absorb the impact.

Dragging / transporting branches or material is not permitted in areas where archaeological features are

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visible such as the edges of pits or terracing.

## **Trimming**

Any trimming required to allow access of the cranes and vehicles will be undertaken by the contracting arborist. The trimming will be carried out in accordance with best arboricultural practices. The trimming will only remove branches and foliage that could be damaged during the transit of the cranes and vehicles. No more than 10% of live growth will be removed, trimming will not remove any branches measuring 100mm (at the point of severance) or greater, and will retain the natural shape, form and branch habit of the tree.

## **Crane and Helicopter Assisted Dismantling**

All works shall be under the direction of a nominated person from the arboricultural contractor. A site-specific works methodology will be agreed to by the crane, helicopter and arboricultural contractor. The processing sites outlined within this report shall be utilised for the processing sites. The traverse of the cranes shall be undertaken to avoid damage to the ground. Any damage to the processing site shall be remedied by the engaged arboricultural contractor.

## **Health and safety**

A detailed plan showing the contractor's site-specific hazards and how it will be specifically applied to the maunga will be compiled and implemented by the contracting arborist.

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**Appendix E: Figure 2: Maps of Operating Zones, Tree Locations & Removal Methods**

