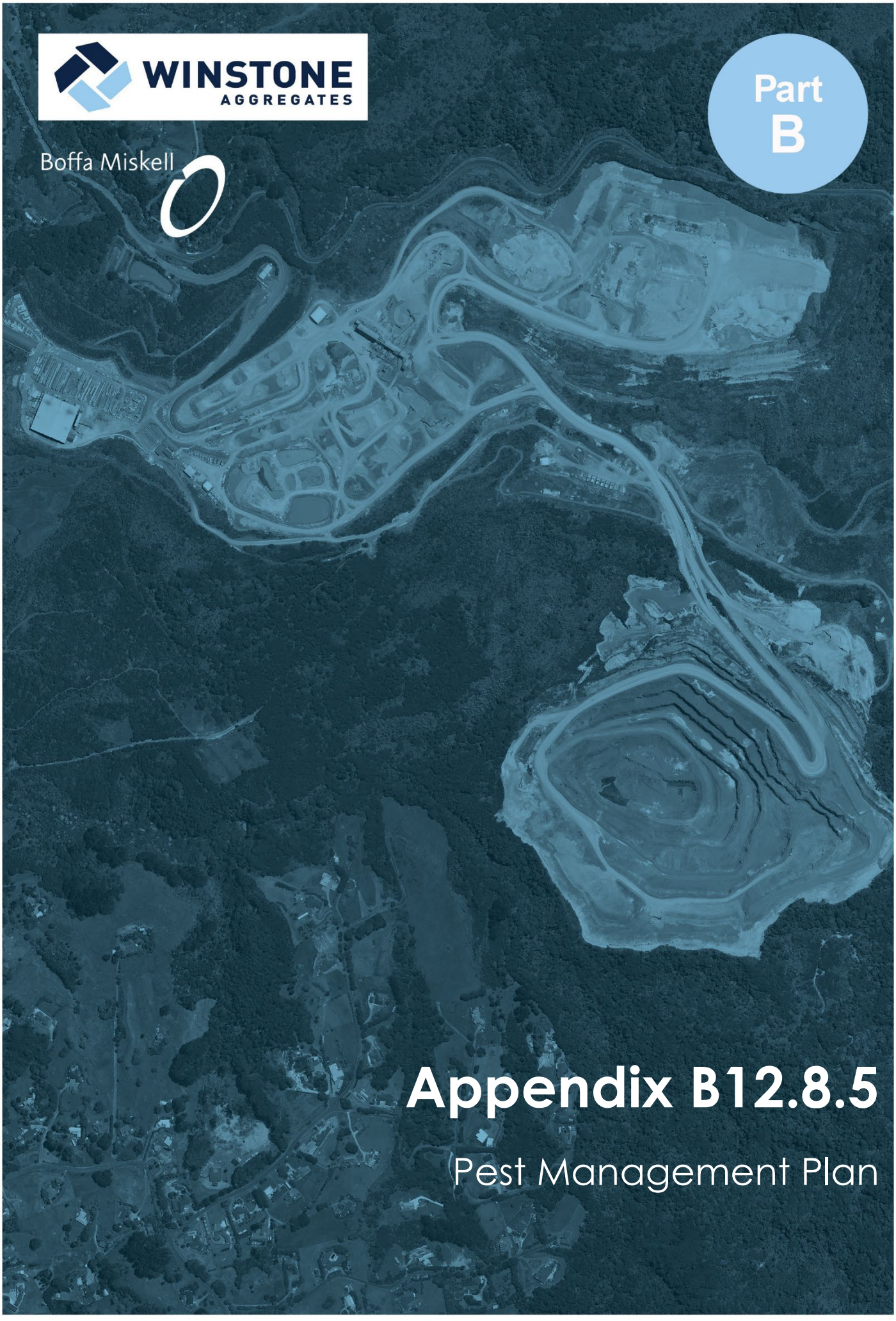
WINSTONE AGGREGATES

Boffa Miskell

Part B



Appendix B12.8.5

Pest Management Plan

Boffa Miskell

Hunua Quarry Development

Pest Management Plan
Prepared for Winstone Aggregates

24 March 2026

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Approved for issue:
Ian Boothroyd | Ecology | Senior Principal Ecology, Partner | 24 March 2026

Release and Reliance

This plan has been prepared by Boffa Miskell Limited on the instructions of our client, in accordance with the agreed scope of work. If it is intended to support an application under the Fast-track Approvals Act 2024, it may be relied upon by the Expert Panel and relevant administering agencies for the purposes of assessing the application.

While Boffa Miskell Limited has exercised due care in preparing this plan, it does not accept liability for any use of the plan beyond its intended purpose. Where information has been supplied by the Client or obtained from external sources, it has been assumed to be accurate unless otherwise stated.

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Cover photograph: View from Symonds Hill Pit, looking in a north-westerly direction, © BML, 2025.

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1.0 Introduction

1.1 Background

Winstone Aggregates (a division of Fletcher Concrete and Infrastructure Limited) proposes to expand and deepen the existing Symonds Hill Pit within the Hunua Quarry to secure additional high-quality greywacke resource and extend the operational life of the quarry for a further 50 years, with the potential to support further operations for up to 80 years. The location of the proposal is shown in Figure 1 below.

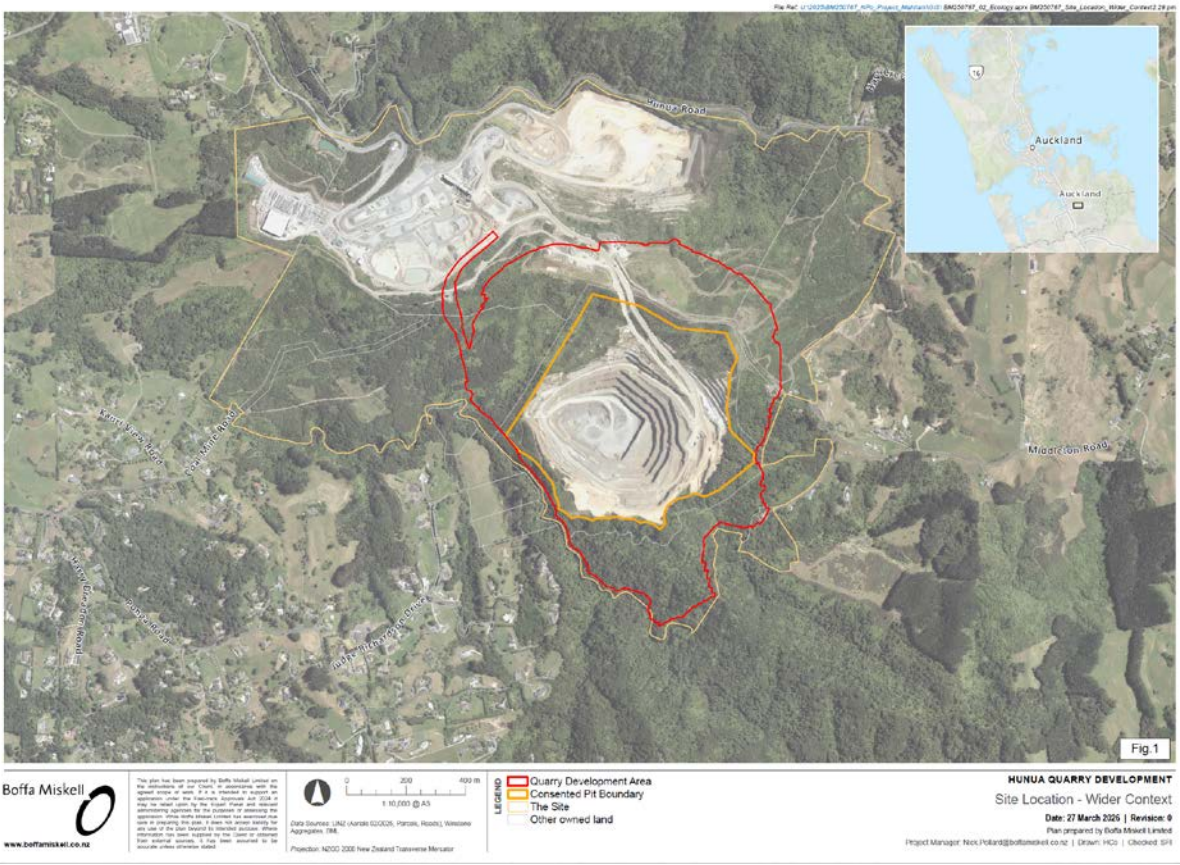

Figure 1: Location and context of Hunua Quarry and the proposed Symonds Hill Pit expansion.

Pest management forms part of the wider Hunua Quarry Environmental Management approach as part of offset but this enhanced pest strategy compensation for removal of vegetation and habitats. The pest management proposal forms an integral component of the effects management package for the long-term expansion as identified in the Assessment of Ecological Effects (AEcE, Boffa Miskell, 2026). The AEcE clearly details all offset enhancement modelling, principles followed and biodiversity net gain information and is therefore not included in this Plan.

This Pest Management Plan (**PMP**) outlines the proposed pest animal and pest plant management activities proposed to be applied to the offset planting areas, protecting the fauna of both new plantings and existing mature bush areas and as an upgrade to the existing pest management currently being undertaken on the Hunua Quarry site. The proposed pest management activities will be carried out as part of a staged process in line with the staged Symonds Hill pit long-term development.

This PMP has been prepared, on behalf of Winstone Aggregates, as part of their suite of approvals under the Fast Track Approvals Act 2024 (**FTAA**) as a Listed Project, reflecting its regional and national significance.

1.2 Consultation with mana whenua

Three separate iwi engagement workshops were held in January/February 2026 with Ngāti Tamaoho, Te Ākitai Waiohua and Ngāti Te Ata to discuss the Mangapū Stream tributary diversion. This consisted of a slide presentation to explain the existing environment, the proposed diversion and the range of effects. Each of the hydrogeology, hydrology, ecology and landscape experts presented information on their relevant technical areas for discussion. During the workshops, methodologies and techniques for realigning the tributary were discussed along with mitigation and management mechanisms for restoration of the new stream corridor and rehabilitation of the landscape and ecology.

Ngāti Tamaoho provided the project team with a cultural induction on 28 January 2026 to support a deeper understanding of Auckland's cultural landscape and its local context. The induction emphasised the importance of recognising historical narratives, cultural associations, and tikanga connected to different places and spaces across the region. Attention was given to waterbodies and the role of mana whenua as kaitiaki (guardians) of the land, reinforcing how these relationships should inform respectful, culturally responsive, and well-considered design outcomes.

1.3 Purpose, Objectives and Scope of the PMP

1.3.1 Purpose

This PMP for the proposed Project, follows on from the Assessment of Ecological Effects (2026) report, which describes the ecological values and effects management for the Project. The purpose of this plan is to provide the strategic approach, programme wide content and operational detail required to deliver effective, targeted pest animal and plant management.

1.3.2 Objectives

The objectives of this Plan are:

- To protect and enhance ecological values and connectivity at Winstone's Hunua Quarry and adjacent sites in Hunua Road and Judge Richardson Drive, and at the Meremere Quarry, through achieving sustained suppression of key target predators/pests at or below desired abundance targets within set timeframes over the lifespan of the consent.
- To protect new enhancement plantings from target pest animal browsers during establishment of the enhancement planting areas, from the initial enhancement planting installation until 5 years after final planting is completed by management area.
- To achieve removal of target invasive pest plants within enhancement planting areas prior to planting installations.
- To achieve sustained control of pest plants at or below desired targets throughout all other pest management areas within set timeframes over the lifespan of the consent.

1.3.3 Scope

The development of the Symonds Hill pit and associated effects mitigation at Hunua Quarry will be a long-term programme (80+ years). Over this period of time there will be many changes in pest management best practice/protocols as well as expected social, economic, environmental and political changes. Detailed, area specific pest management operational plans (**PMOP**) will therefore need to be developed separately for each stage or site and be reviewed regularly with an adaptive management approach to accommodate this expected change. This approach will mean pest management for the project will remain up to date, realistic and viable whilst delivering current best practice pest management activities and methodologies.

This PMP scope covers the provision of:

- **High-level pest management strategy/approach:**
    - High-level strategic detail on the proposed staged approach, outlining the target pest species to be managed, pest control targets and thresholds by species, performance standards, best practice requirements, and other programme wide content.
        - This detail will form the strategic approach and management context for the specific PMOP's.
- **High level methodology for future specific PMOPs:**
    - Best practice pest control and monitoring approach with recommended high-level activities, methodologies, guidelines and protocols
        - This shall guide the development of the specific PMOPs detail, to be designed prior to the implementation of each stage/management area.

This PMP includes an outline of:

- An outline of pest animal management areas (Section 4.0) and offset enhancement planting areas (Section 5.0)
- Staged approach to pest management (Section 6.0)
- Existing pest management at Hunua Quarry and the offset sites (Section 4.0)
- Indigenous biodiversity (Section 7.0)
- Existing pest management (Section 8)
- Target pest species (Section 9.0), performance standard for pest control (Section 10.0) and pest animal suppression (Section 11.0)
- Pest animal and pest plant management (Sections 12.0, 13.0 and 14.0)
- Specific PMOPs (Section Operational review and reporting (15.0)
- Other biosecurity risks, data management, operational review and reporting, new technologies, environmental protection measures, signage and health and safety (Sections 16 to 22)

The PMP is supported by operational details provided in the supporting Appendices (Appendix 1 and 2 of this PMP).

1.3.4 Statement of qualifications and relevant experience

This plan has been prepared by Adam Willetts (Senior professional ecologist/biosecurity consultant at Boffa Miskell) and reviewed by Dr Ian Boothroyd (Partner/Ecologist at Boffa Miskell). Their

qualifications and experience are provided in Appendix 1 along with confirmation that this plan has been prepared in accordance with the Environment Court's Code of Conduct for Expert Witnesses.

2.0 Proposed pest management approach

Based on the findings of the AEcE and Section 8 of this PMP we propose an integrated, staged pest management approach as a key part of the overall Hunua Quarry effects mitigation programme. The goal of this approach is to achieve sustained pest suppression across all pest management areas, and pest plant removal for enhancement planting areas, eventually establishing one larger, connected area defended from pest incursions. The desired outcome of this pest management approach is to protect indigenous species recovery and enhance ecological value across the sites.

Pest management is to continue with and build upon the existing programme (Hunua Quarry site), utilise new enhancement management areas (Hunua Quarry and Meremere Quarry sites) and align with the long-term staging of the Symonds Hill pit expansion.

The pest management programme will therefore continue to use existing protocols, guidelines and devices, supplemented and enhanced with new pest management technologies/systems overtime. This approach aims to gain efficiencies, improve pest management control, protect existing and enhance new areas, establishing defendable restoration areas with actual and potential future ecological connectivity.

The Hunua Quarry site has the potential to become a large, ecologically valuable area of local and regional significance over the long term. If successful, this restored site would form a key connection/corridor between the significant ecological areas surrounding the quarry.

The Meremere Quarry site offers the opportunity to enhance a new, defendable, moderately sized site through restoration, protection and sustainability of restored indigenous ecological values.

Going forward the pest management programme for the Hunua and Meremere Quarry sites will:

- Be divided into adequately sized, defendable and connected areas based on stage of management (existing management, enhancement management and/or potential future enhancement areas),
- Continue to maintain the existing pest control and monitoring activities (where applicable in Hunua Quarry site),
- Update the existing pest management network (where applicable),
    - fill in any gaps in existing networks on the same distribution layout,
    - supplement and enhance with a grid of new autonomous and Ai species recognition pest management technologies/tools,
    - intensify management network on external perimeters of management areas where these connect with suitable (external) pest habitats,
- Implement new pest management enhancement areas including pest animal and pest plant control and monitoring,

Pest management areas shall, by the time each area enters the final ongoing management phase, be generally of the same approach and methodology and have implemented all existing, supplementary and enhancement activities (with some small variations by area). This is to ensure the programme is consistent across areas and across both sites.

The proposed pest management programme will be a long-term project with multiple stages and phases spread out over many years. Therefore, pest management will need employ a flexible and nimble adaptive management approach with regular revisions, embracing advancements in pest management and remaining up to date with best practice, guidelines and protocols.

3.0 Pest management actions

Pest management actions will be implemented across Winstone Aggregates existing management areas (Hunua Quarry) and proposed new enhancement areas (Hunua surrounds, and Meremere Quarry). Actions include:

1. Sustained suppression of key target predator/pest animals (rats, possums, hedgehogs, mustelids, feral cats).
2. Sustained suppression of key target pest animal browsers (ungulates, possums, Leporidae).
3. Removal of wandering stock from enhancement planting areas.
4. Removal of pest plants in planting enhancement areas
5. Sustained suppression of key target invasive pest plants in all pest management areas outside of enhancement planting areas (elimination for some species if feasible).

4.0 Pest management areas

4.1 Overview

The proposed pest management areas align with those areas identified for offset sites to be replanted or enhanced (Hunua Quarry and surrounds, Meremere Quarry) as well as the wider Hunua Quarry site. The Hunua Ranges / Auckland Parks offset sites are not included in this plan as pest management is provided by the Council. The proposed offset areas are shown in Figure 2 below.

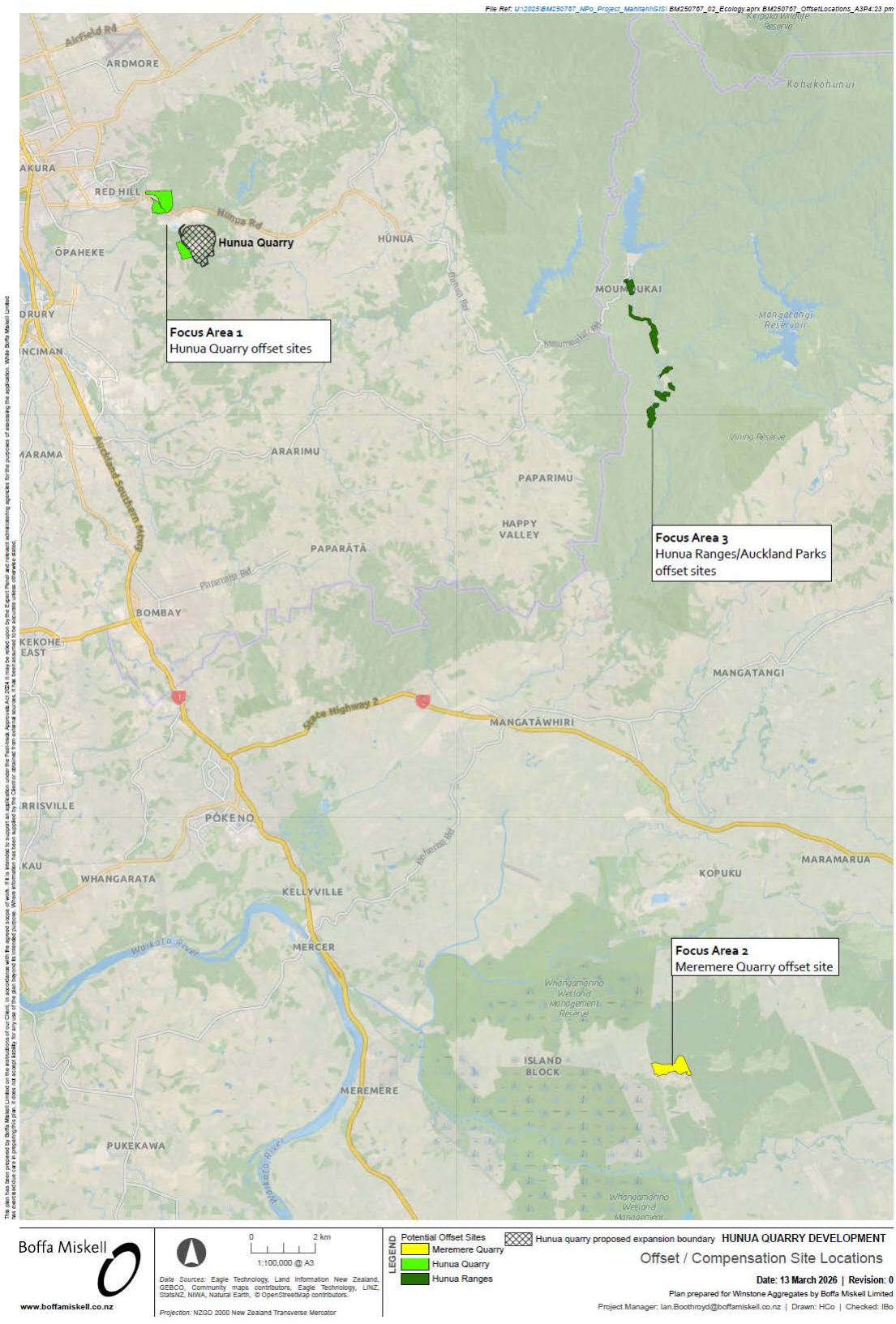

Figure 2: Offset Focus Areas

All identified pest management areas will receive pest animal management, with distinct methodologies and timings based upon each area's management status (either a new enhancement area, existing pest management area, combination of existing and new enhancements area or a

potential future enhancement area). Those areas with new planting enhancements will also receive pest plant management in order to protect the establishment of re vegetation plantings.

The following is a list of the proposed pest management areas at Hunua Quarry in Auckland, and at the Meremere site in the northern Waikato.

Hunua Quarry, south Auckland:

- Area A (17.8ha) – Northern side of Hunua Road. 484 Hunua Road.
    - New enhancement planting/existing bush - pest management.
- Area B (21.22ha) – Northwestern site. 411/397 and main entrance Hunua Road.
    - Continued existing pest management with supplementary and enhancement activities.
    - New enhancement planting/existing bush - pest management.
- Corridor between Areas B & C (1.93ha)
- Area C (50.96 ha) – Western site.
    - Continued existing pest management with supplementary and enhancement activities.
    - New enhancement planting/pest management for Judge Richardson Drive property.
- Area D (107.43 ha total (34.77ha pit infill area)) – Proposed Symonds Hill pit expansion area
    - Continued existing pest management with supplementary and enhancement activities.
- Area E (35.34ha)
    - Continued existing pest management with supplementary and enhancement activities.
- Area F (30.79ha) – Proposed Hunua Pit back fill area.
    - Proposed longer-term new enhancement planting/pest management in a 25.8ha back fill area.

Meremere, north Waikato:

- One site (21.12ha) – Proposed new offsite compensation site.
    - New enhancement planting/existing bush areas - pest management at 988 Falls Road, Meremere.

5.0 Offset enhancement planting areas

Within either the existing or new pest management areas for both the Hunua and Meremere Quarry sites, offset enhancement planting areas have been identified. A separate Ecological Management Plan has been prepared as part of the suite of FTAA documents for this project and provides further detail of planting to be undertaken. Figures 1 and 2 detail the planting enhancement sites within the Hunua and Meremere Quarry pest management areas for the purpose of this PMP and the PMOPs.

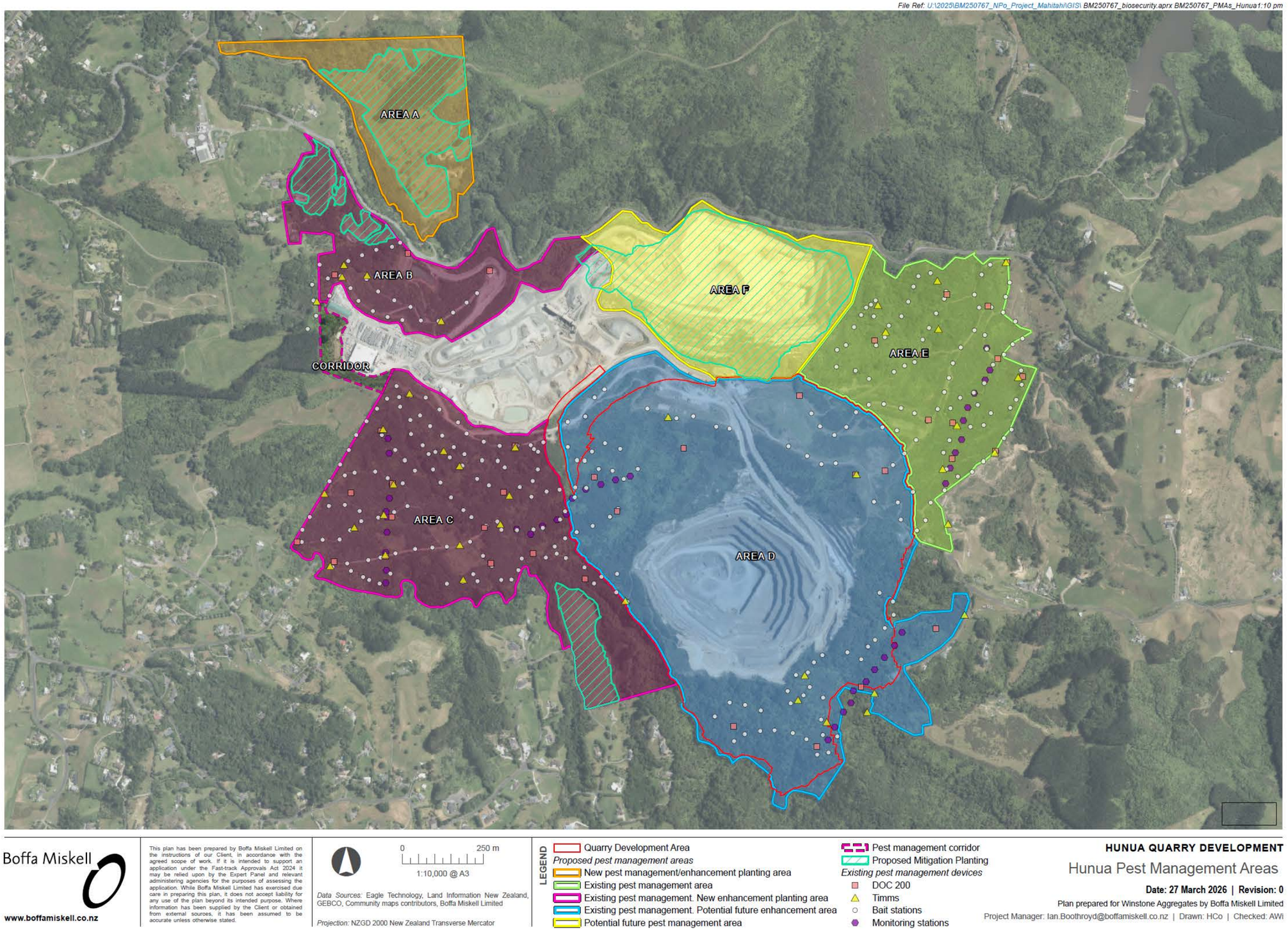

Figure 3: Proposed Symonds Hill pit long-term expansion – Hunua Quarry site pest management and planting enhancement areas.

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Data Sources: Eagle Technology, Land Information New Zealand, GEBCO, Community maps contributors, Boffa Miskell Limited

Projection: NZGD 2000 New Zealand Transverse Mercator

LEGEND
New pest management/enhancement planting area
Land boundary

HUNUA QUARRY DEVELOPMENT

Meremere Pest Management Areas

Date: 27 March 2026 | Revision: 0

Plan prepared for Winstone Aggregates by Boffa Miskell Limited

Project Manager: Ian.Boothroyd@boffamiskell.co.nz | Drawn: HCo | Checked: AWi

Figure 4: Proposed Symonds hill pit long-term expansion – Meremere Quarry site offset pest management and enhancement planting areas .

6.0 Staged approach to pest management

6.1 Development stages

The pest animal and pest plant management programme will be split into clear stages to align with the Symonds Hill pit expansion programme, and align with the varied biodiversity management requirements over time as part of the effects management programme. The exact timing of the staged pit expansion programme is set out in Table 1 and Figure 5.

***Table 1**: Stages of development of Symonds Hill Pit, Hunua Quarry Development.*

Stage	Activity	Nature of the works	Approximate duration (years)
1	Tributary realignment	Enabling works	4
	Stripping campaign to the northwest - already consented, occurs concurrently with the tributary realignment.	Extraction and processing	1-4
2	Stream diversion completed	Enabling works	1
	NW cut down to 105RL.	Extraction and processing	
	Construct the western haul road.	Enabling works	
3	Incremental stripping campaigns: south from current pit crest towards stream diversion down to 120RL	Extraction and processing	1
4	Incremental stripping campaigns: southwest of the stream diversion and adjacent to the southern site boundary	Extraction and processing	43-73
5	Incremental stripping campaigns: southern boundary towards the current pit	Extraction and processing	
6	Incremental stripping campaigns: in an anticlockwise direction, extending the pit to the south and northwest and deepening the pit	Extraction and processing	
7	Realign the western haul road, so that it runs, for a short distance, along the southeast extent of the pit. This will enable the pit to extend to the northwest	Enabling works	
	Incremental stripping campaigns: in an anticlockwise direction, extending the pit to the southwest and northwest and deepening the pit	Extraction and processing	
8	Incremental stripping campaigns: in an anticlockwise direction, extending the pit to the northwest and north	Extraction and processing	

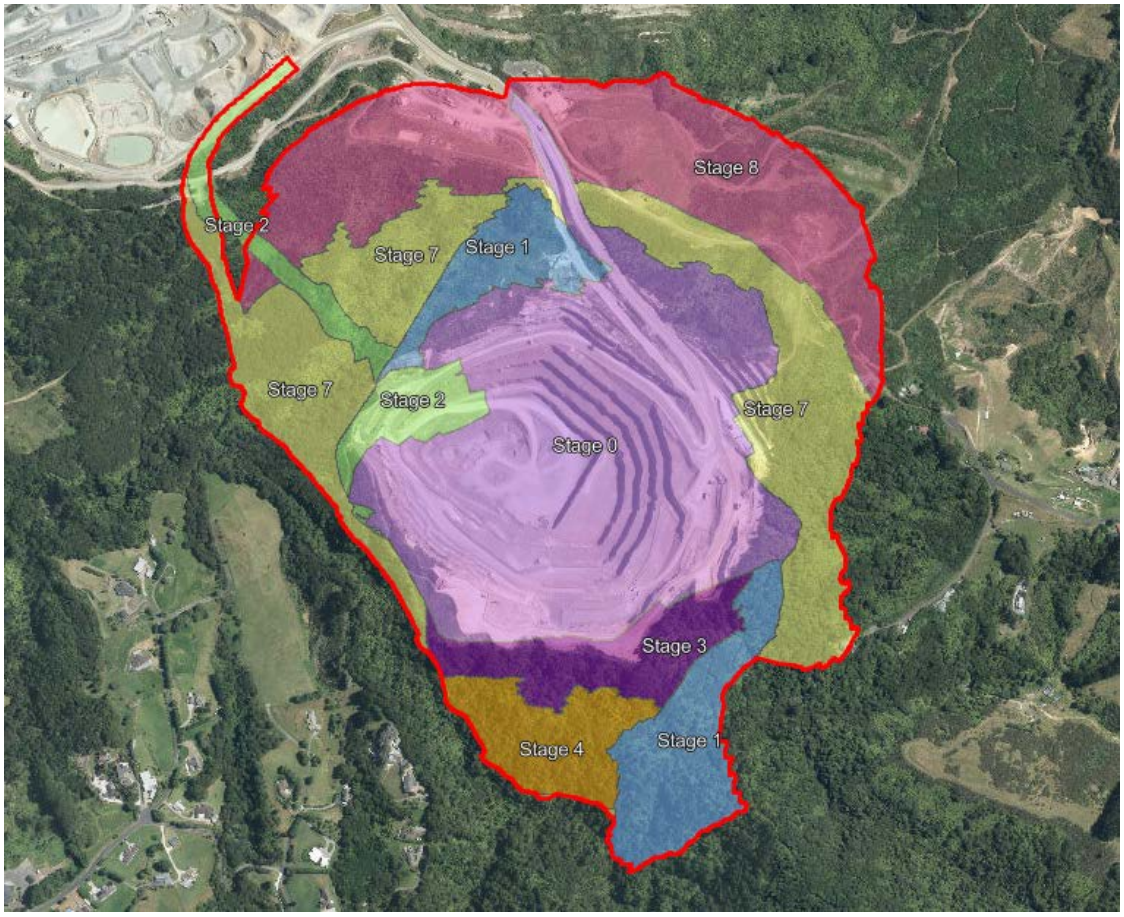

***Figure 5**: Proposed stages across the site for the Symonds Hill pit expansion.*

For the purposes of effects management for the residual loss of indigenous vegetation and habitat, the offset and compensation has been considered as two tranches as follows:

- Stages 1 – 4 of quarry development will involve removal of 17.03 ha of indigenous vegetation (mainly mature secondary broadleaf forest), requiring an offset of 40.2 ha. **Tranche 1 plantings** (58.22 ha) will commence with the granting of consent and **fully offset** Stages 1 – 4.
- Stages 5 – 8 of quarry development will involve removal of 27.39 ha of mature and early successional indigenous vegetation. **Tranche 2** (25.8 ha) of revegetation planting at the infilled Hunua Quarry Pit will commence at approximately Yr 30. This 25.8 ha, together with the additional 18.02 ha excess provided for Stages 1 – 4, equates to a total of 43.82 ha which **partly offsets** Stages 5 – 8.

Comprehensive pest control over the Hunua Quarry property and adjoining revegetation areas, and the Meremere Quarry area, is proposed by way of compensation to address the shortfall in planting area and ensure biodiversity benefits meet or exceed losses.

Specific, detailed pest management methodologies and timing for each area shall be developed as part of the PMOPs, which are to be designed and approved at a time closer to the implementation of each stage/event. These plans will be guided in approach and methodology by this PMP, best practice guidelines and protocols, expert advice and other key sources of information (as detailed in Table 11, Section 15).

Each area and stage will follow a process of key phase implementation, dictated by either planting establishment or further enhancement of existing pest management. A broad outline of the staging

process and key phases for pest management by management area type is provided in the following sub sections, and via a staged process flow chart (Figure 3).

6.2 Existing pest management areas

Phase 1: Continue existing pest management programme

- Continue existing pest monitoring (pest animal and pest plant)
- Continue existing pest suppression (trapping, toxin and hunting, pest plant control)

Phase 2: Supplement existing pest management network

- Upgrade/supplement in identified devices/activities
- Fill gaps in current pest management network (where required)

Phase 3: Enhance/intensify pest animal management network

- Add in new activities/autonomous devices
- Intensify external boundary pest management network (where connected to suitable pest habitat)

Phase 4: Ongoing pest management

- Continue intensified/enhanced pest management programme in existing pest management areas (including pest plant sustained suppression)

6.3 New enhancement pest management areas (includes new enhancement planting areas)

Phase 1: Prior to planting establishment

- Implement baseline pest monitoring (animal and plant pest)
- Implement new browser pest animal and pest plant management

Phase 2: During enhancement planting establishment (Years 1-5 after final planting installations are completed by enhancement area)

- Continue browser pest animal and pest plant management

Phase 3: Canopy cover established (Year 5 after final planting installations completed by enhancement area)

- Continue browser pest animal and pest plant management
- Implement new initial predator animal knockdown
- After successful completion of predator animal knockdown, implement new enhancement/intensification of pest animal management network/activities to full capability (add in new activities/autonomous devices/intensify external boundaries)

Phase 4: Ongoing pest management:

- Continue enhanced/intensified pest management programme in new enhancement pest management areas (pest animal and pest plant)

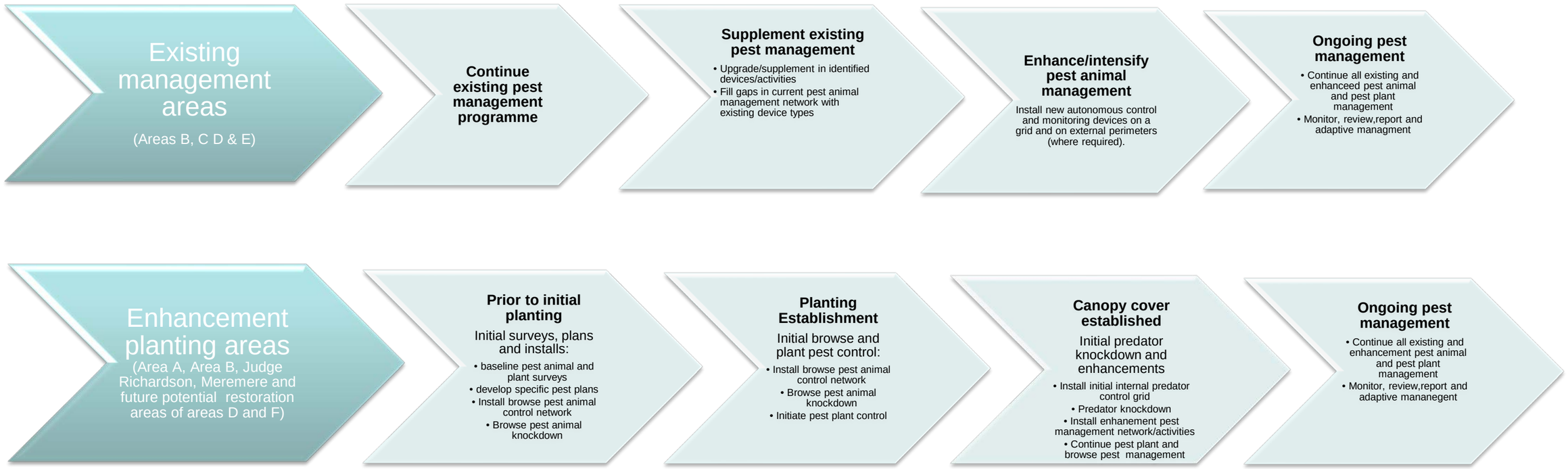

Figure 6: Staged pest management process flow chart, based on management area type.

Note: Future restoration areas which are pit over-burden areas will not require pest baseline surveys due to the highly modified environment and lack of suitable pest habitat (both pest animal and pest plant).

7.0 Indigenous biodiversity

Understanding the existing and potential indigenous biodiversity within and adjacent to the Hunua Quarry provides further context to and support of pest management programme targets and outcome objectives of this PMP. The Hunua Quarry site is situated in dissected hill country near the eastern boundary of the Manukau Ecological District within the Auckland Ecological Region, and several Significant Ecological Areas (SEAs) are identified occurring within the vicinity of Hunua Quarry. The proposed pest management areas are therefore representative of, and connected to (for most areas), moderate to high ecological values for vegetation habitat. Further detail of the ecological context and SEAs is outlined in the AEcE (Boffa Miskell, 2026).

7.1 Vulnerable Indigenous Fauna

The Hunua Quarry pest management area *(Figure 1)*, and areas adjacent to these sites, are known to contain one At Risk – Naturally Uncommon, two At Risk - Relict, and one Threatened – Nationally increasing indigenous terrestrial fauna species. These species are vulnerable to predation by introduced pest animals known to live and move through the identified site. A survey of indigenous species has not been carried out for the Meremere Quarry site.

Table 2: Vulnerable indigenous fauna surveyed at Hunua Quarry (Boffa Miskell Limited fauna surveys, 2025).

Species list	Scientific Name	Conservation status (Robertson et al. 2021)
New Zealand Grebe	Poliocephalus rufopectus	Threatened - Nationally Increasing
New Zealand Pipit	Anthus novaeseelandiae	At Risk - Naturally Uncommon
Great Cormorant	Phalacrocorax carbo	At Risk - Relict
Little Pied Cormorant	Phalacrocorax melanoleucos	At Risk - Relict
Silvereye	Zosterops lateralis	Not Threatened
Welcome Swallow	Hirundo neoxena	Not Threatened
Tomtit	Petroica macrocephala toitoi	Not Threatened
New Zealand Fantail	Rhipidura fuliginosa placabilis	Not Threatened
Gray Gerygone	Gerygone igata	Not Threatened
Tui	Prosthemadera n. novaeseelandiae	Not Threatened
Sacred Kingfisher	Todiramphus sanctus vagans	Not Threatened
Morepork	Ninox n. novaeseelandiae	Not Threatened
Swamp Harrier	Circus approximans	Not Threatened
White-faced Heron	Egretta novaehollandiae	Not Threatened
Masked Lapwing	Vanellus miles	Not Threatened
Australasian Swamphen	Porphyrio melanotus	Not Threatened
Shining Bronze-Cuckoo	Chrysococcyx lucidus	Not Threatened
New Zealand Pigeon	Hemiphaga novaeseelandiae	Not Threatened
Pied Stilt	Himantopus leucocephalus	Not Threatened
Elegant Gecko	Naultinus elegans	At Risk - Declining

7.2 Vulnerable Indigenous Flora

The Hunua Quarry pest management site (*Figure 1*), and areas adjacent to the site, are known to contain six At Risk – Declining, three Threatened – Regionally Endangered, one Threatened – regionally Critical and one Threatened – Regionally Vulnerable indigenous flora species. Several of these species are vulnerable to predation via browsing pest animals. Kauri trees are also at risk from the soil borne disease *Phytophthora agathidicida* (PA, commonly known as kauri dieback disease), which can be spread by pest animal movement between infected sites. *Table 2* lists the key indigenous flora species present in the area.

Table 3: Key indigenous plants that are 'Threatened' or 'At Risk' on-site (source: Boffa Miskell Limited flora surveys, 2025)

Species name (*)	Common name	National Threat Status	Auckland Threat Status
Agathis australis	Kauri	At Risk - Declining	At Risk - Declining
Carex forsteri	Forster's sedge	Not Threatened	Threatened - Regionally Endangered
Chiloglottis cornuta	Bird orchid	Not Threatened	At Risk - Naturally Uncommon
Hiya distans		Not Threatened	At Risk - Declining
Leptospermum scoparium	Mānuka	Not Threatened	Threatened - Regionally Vulnerable
Leucopogon fasciculatus	Tall Mingimingi	Not Threatened	Not Threatened
Litsea calicaris	Mangeao	Not Threatened	At Risk - Declining
Melicope simplex	Poataniwha	Not Threatened	Threatened - Regionally Endangered
Metrosideros perforata	Akatea	Not Threatened	At Risk - Declining
Nestegis cunninghamii	Black Maire	Not Threatened	Threatened - Regionally Endangered
Ptisana salicina	King Fern	At Risk - Declining	At Risk - Declining
Syzygium maire	Swamp Maire	Threatened - Nationally Vulnerable	Threatened - Regionally Critical

8.0 Existing pest management

8.1 Existing programme

Pest management has been carried out since 2009 over restoration areas at Hunua Quarry in accordance with the Hunua Quarry Vegetation Management Plan (VMP, Tonkin and Taylor LTD, 2010). The purpose of the pest management is to enhance the ecological values, ecosystem integrity and viability of remaining fauna populations and protect remaining forest and enhancement planting areas within the Project Site. Pest population monitoring and pest control has used standard techniques and protocols current in 2010. Monitoring also includes surveying for forest health indicators and evidence of residual ungulate presence and damage. Appendix 2 provides detailed pest monitoring data and results for the programme to date and should be read in conjunction with this Section (Section 8) of this PMP.

There currently exists no pest management activity in proposed new enhancements areas, or the proposed Meremere Quarry offset enhancement site.

8.2 Forest health response to pest management

RMA Ecology (2024) reported that the overall trend has been one of increasing abundance of small seedlings and a maintenance of large seedlings since numbers levelled off in the early 2010s. Native bird species were more abundant than exotic species at all monitoring locations and kereru numbers continued to increase. However, in 2024 the abundance of native birds in Block 2 plots was slightly below the long term average, which the report noted may be due local environmental variability.

The report also stated that trap lines were observed during the 2024 site investigations for ecology monitoring and it was "…noticeable that traps may not have been rebaited or checked for some time". The report recommended that an assessment of the animal pest control programme results is conducted to establish if control is effective.

8.3 Summary of existing pest management

The data analysed in Appendix 2 indicates that populations of key pests monitored at Hunua Quarry have fluctuated from very low population indices to above desired target abundance overtime. This indicates that pest animal populations are likely being knocked down for periods of time, however some pest residual species are likely surviving, and along with new pest incursions are breeding at times between management pulses. Recent forest health monitoring reports observed a reduction in maintenance of the control programme and recommend that the pest management programme be assessed at Hunua Quarry.

As with most pest suppression programmes of this type operating for this length of time (18 years), the abundance of certain indigenous fauna species improves, and populations spread out to the edge of managed areas. This significantly increases food availability to pest animals therefore increasing the rate of pest breeding to match food resources, and the rate of pest incursion from connected external habitats. Residual pests also become more cryptic and harder to monitor. Over this time pest management has also evolved, best practice techniques and protocols have changed along with new technological advancements in management tools/systems.

The expansion of the Symonds Hill pit at Hunua Quarry presents a good opportunity to revitalise the existing pest management programme, utlising technological advancements to significantly reduce ongoing maintenance labour costs, improve pest interaction and kill rates and reduce incursions into management areas. This same methodology should be integrated into the proposed new enhancement management areas to improve ecological outcomes which will contribute to the overall value of the effects mitigation package.

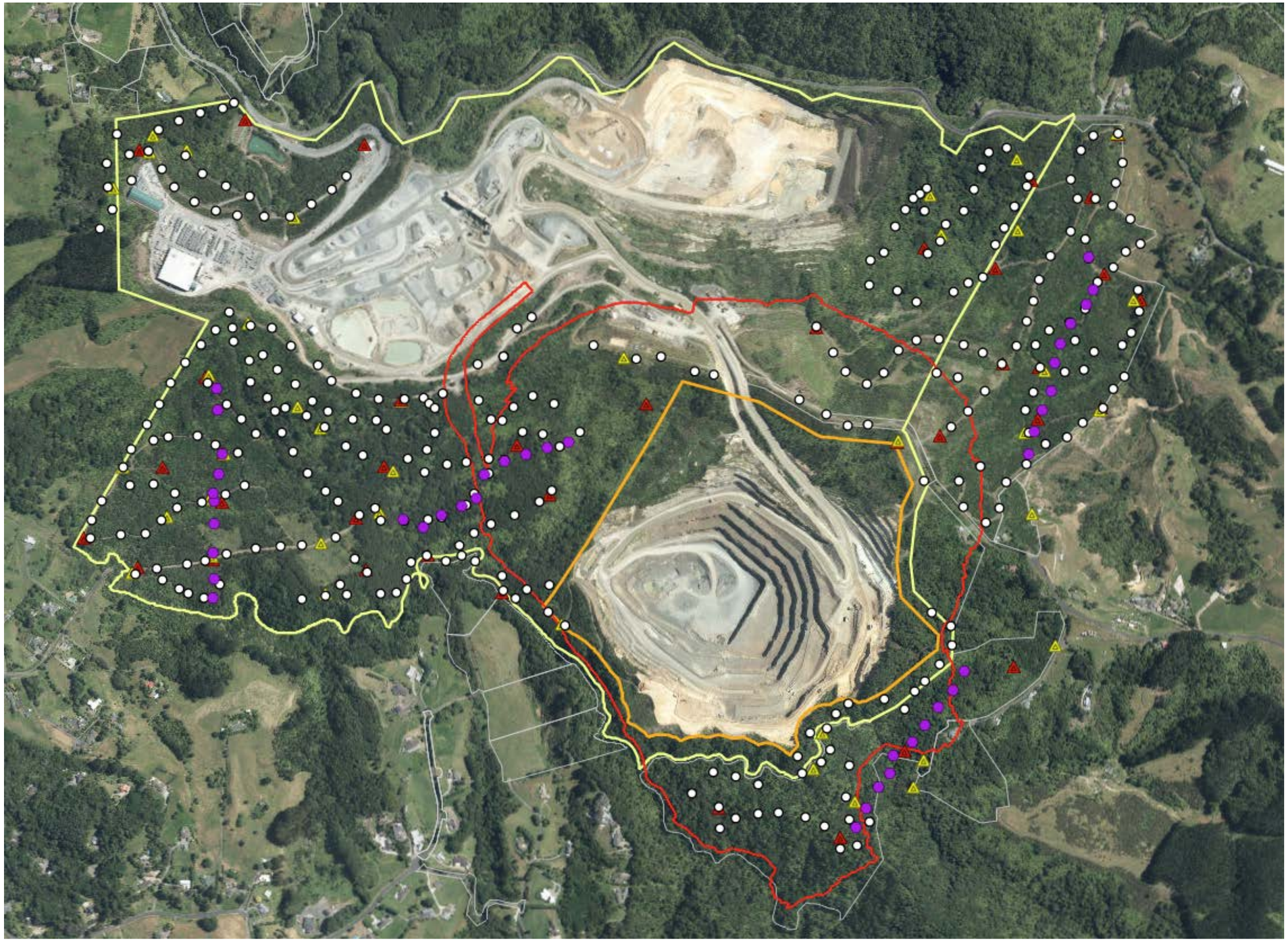

Figure 7: Existing Hunua Quarry pest management device locations and type (January 2026).

9.0 Target pest species

9.1 Pest Animals

Common pest animals have been detected and/or observed via existing monitoring at Hunua Quarry, as well as those likely to reside or move through the pest management areas (including the Meremere Quarry management site). These target pest animal species, and their biological/ecological characteristics are described in Table 3 below.

Table 4: Pest animal characteristics and behaviour descriptions

Possums (*Trichosurus vulpecula*)	Possums are found in a diverse range of habitats, with highest densities in native podocarp-broadleaf forests. Possums heavily browse on native vegetation and can eat bird eggs, chicks and invertebrates, negatively impacting the ecosystem. Home range size is strongly influenced by habitat. In native forests, typical home ranges are 1-2 ha, but ranges can be much larger in pine forest fragments (6-12 ha), and at dryland sites (22-60 ha). Home ranges of males are usually larger than those of females.
Rats (*Rattus spp.*)	Both Ship rats (*Rattus rattus*) and Norway rats (*Rattus norvegicus*) feed on native vegetation, especially seeds in mast events, negatively impacting forest health. They are known predators of invertebrates, herpetofauna, and native bird eggs, chicks, fledglings, and adults. Home range size is inversely related to population density. At typical density of 2-9 rats/ha in podocarp-broadleaf forest, average ship rat home range size is 0.1-1.0 ha, while in low-density beech forest home ranges can be much larger at up to 11 ha. Norway rats occupy larger home ranges of approximately 0.8-21 ha in size.
Mustelids *(Mustela spp.)*	Stoats (*Mustela erminea*) are the most common and destructive mustelid in New Zealand. Stoats are found in all ecosystems, and breed once a year, however, they can produce up to ten young per litter, multiplying to uncontrollable levels quickly. Stoats seriously impact native avifauna, especially ground dwelling/feeding birds, such as kiwi and saddleback. Weasels (*Mustela nivalis*) can easily be displaced by stoats and because of this, are present in most New Zealand ecosystems, but not all, in low numbers. Even at low densities, weasels are known to impact native wildlife, including invertebrates herpetofauna, and birds. They produce two to three litters a season, with four to six young per litter.
Feral cats *(Felis catus)*	Feral cats are those living independently and not relying on people for survival. Feral cats are one of the most ferocious predators in NZ's ecosystem. They feed on rabbits, birds and bird eggs, rats, hares, bats, lizards, mice, wētā and other insects. In 2020, a feral cat caught in Canterbury had 17 skinks in its stomach.
Hedgehogs *(Erinaceus europaeus)*	Hedgehogs prey upon lizards, particularly in cooler periods when lizard activity slows. Hedgehogs also predate upon endemic birds' eggs and chicks, and invertebrates. Hedgehogs breed from spring (September) into autumn (May), have 4-7 young per litter, and can have up to two litters per year. Young hedgehogs become independent from their mothers at around 7 weeks old. Hedgehogs reach sexual maturity at around 253 days old.

Leporidae: Rabbits *(Oryctolagus cuniculus)* **and Hares** (*Lepus europaeus occidentalis)*	Rabbits breed rapidly and populations can recover quickly after being reduced by disease, control pressures or environmental changes. They eat a variety of plant matter including grasses, seedlings and crops. Rabbits can breed rapidly. Females may be pregnant for 70% of a year and can produce a total of 20 – 50 young each annually. Some wild rabbits may live up to seven years, but life spans are generally much shorter. Hares cause damage to new tree plantings and horticultural crops, amenity plantings and shelter belts by eating tree bark and young shoots.
Ungulates: **Feral Deer** *(Cervus spp),* **Pigs** *(Sus scrofa),* **Goats** (*Capra hircus)*	Deer damage native forests by feeding on forest plants, trees, and seedlings. This takes vital food and shelter from other animals. Over time this can hinder or stop forest regeneration. Pigs prey upon ground dwelling animals and this can impact populations of birds, their eggs, native land snails, frogs and lizards. Rutting disturbance of the soil substrate could affect ecosystem processes in the long term. Goats consume a wide variety of vegetation including plants such as ngaio and tutu which are poisonous to most other animals. Continued goat browsing of understory shrubs and regenerating trees in native forests will halt succession and alter forest structure; this also creates a more favourable habitat for other pests such as possums.

9.2 Pest Plants

Pest plants invade natural ecosystems, competing with native flora for resources such as light, water, and nutrients, leading to a loss of native species and habitat degradation.

The pest plant target list (Table 4) has been compiled from the Regional Pest Management Plan (RPMP) for the Auckland Council. This list will need to be reviewed during the initial implementation of each pest management stage/area and updated based on the proposed baseline monitoring results and any exclusions/additions to the regional pest management plans.

Table 5: Key target pest plants (Source: Auckland Council, Auckland Regional Pest Management Plan 2020-2030).

Common Name	Scientific Name	Description	Environmental Impacts
African olive	*Olea europaea subsp. cuspidata*	Evergreen tree/shrub with narrow, dark green leaves (silvery underneath) and small black fruit.	Forms dense, long-lived stands that prevent native seedlings from establishing; outcompetes native canopy trees.
Blue morning glory	*Ipomoea indica*	High-climbing vine with purple-blue trumpet flowers and hairy, heart-shaped leaves.	Rapidly smothers native vegetation; its weight can break branches and replace forest with a "weedy blanket".
Boneseed	*Chrysanthemoides monilifera*	Bushy shrub with leathery, serrated leaves and bright yellow daisy-like flowers in spring.	Displaces low-growing coastal plants; highly flammable and prevents native regeneration by shading out seedlings.
Brush wattle	*Paraserianthes lophantha*	Fast-growing tree with fern-like leaves and yellow-green "bottle-brush" flower spikes.	Rapidly colonises open or disturbed areas, outgrowing and shading out native pioneer species.
Climbing asparagus	*Asparagus scandens*	Fine-leaved, scrambling vine with tiny white flowers and orange-red berries.	Forms a dense mat on the forest floor and climbs into the understorey, strangling seedlings and preventing forest regeneration.

Cotoneaster	*Cotoneaster glaucophyllus / C. pannosus*	Shrub with small, dull-green leaves and clusters of bright red berries.	Replaces native shrubs in forest margins and open areas; berries are widely dispersed by birds, spreading the infestation.
Gorse	*Ulex europaeus*	Prickly, woody shrub with yellow pea-like flowers and needle-like leaves.	Invades open land and forest margins; while it can act as a nursery for some natives, it creates a massive fire risk and blocks access.
Grey willow	*Salix cinerea*	Deciduous shrub or small tree with silver-grey "pussy willow" catkins in spring.	Dominates wetlands and riparian margins, altering water flow, increasing sedimentation, and displacing native wetland species.
Japanese honeysuckle	*Lonicera japonica*	Vigorous climber with sweet-scented white/yellow flowers and oval leaves.	Forms dense, tangled masses that smother native plants and suppress regeneration in forest margins and scrublands.
Moth plant	*Araujia hortorum*	Twining vine with milky sap, white flowers, and large, choko-like seed pods.	Smothers native canopies; its seeds are wind-dispersed over long distances, and its sap is toxic to humans and animals.
Pampas grass	*Cortaderia jubata / C. selloana*	Large clump-forming grass with sharp-edged leaves and tall, fluffy flower plumes.	Outcompetes native **toetoe** and colonises disturbed ground, increasing fire risk and harbouring pests like rats and possums.
Phoenix palm	*Phoenix canariensis*	Large palm tree with a thick trunk and long, arching fronds with sharp spines at the base.	Displaces native coastal vegetation and creates dense shade; the sharp spines are a significant hazard to humans and animals.
Smilax	*Asparagus asparagoides*	Scrambling vine with shiny, oval leaves and small white flowers; dies back to tubers in summer.	Smothers low-growing plants and forest understorey; underground tubers make it extremely difficult to eradicate once established.
Tree privet	*Ligustrum lucidum*	Tall evergreen tree with glossy leaves and large clusters of creamy-white, scented flowers.	Forms a dense canopy that shades out native forest; produces massive amounts of bird-dispersed seeds and can trigger hay fever.
Wild ginger	*Hedychium gardnerianum / H. flavescens*	Large leafy plant with thick rhizomes and fragrant yellow or cream flowers.	Forms massive, heavy mats of rhizomes that prevent any other plants from growing; highly invasive in forest understories.
Woolly nightshade	*Solanum mauritianum*	Small tree with large, furry, grey-green leaves and clusters of purple flowers.	Rapidly forms dense stands that crowd out native species; the dust from leaves can cause respiratory irritation.

10.0 Performance standards for pest control

Management targets in pest animal control relate to the “maximum allowable residual pest abundance” which allow native species to recover (Brown et al., 2015) and be sustained. That is, the management target for each species is the ideal goal that the control actions aim to achieve, and to meet the objectives as set out in Section 1.3.2.

10.1 Pest animal targets and thresholds

The proposed management targets for rats, possums, hedgehogs, mustelids and feral cats, as well as the thresholds for initiating additional control measures, are based on the Chew Card Index (CCI), or camera trapping index (CTI) for each target species. We recommend the use of the CCI over Tracking Tunnel Index (TTI) as it provides a single measure for mice, rats, hedgehogs and possums. The proposed management targets for ungulates are based upon observational data gained from faecal observation counts, during hunting activities, and other ungulate indicators (foliar browsing, rutting, tree rubbing).

The target species are those that pose a threat to the establishment and sustainability of indigenous biodiversity and are commonly found within the Auckland and Waikato regions.

We note that the camera trapping index is still in development by DOC, and as such targets and thresholds for mustelids and feral cats may need to be updated as new information becomes available.

The proposed management targets for each species, as well as the thresholds for initiating additional control measures (based on the monitoring results for each species), are provided in Table 5. If monitoring identifies that the targets are not met on any single monitor, this will trigger a requirement for further control via response to exceedance of thresholds (Section 10.1.1).

Table 6: Summary of pest animal management targets and thresholds

Pest Species	Management Target	Threshold	Monitoring frequency
Rats	<5% CCI (year-round)	≥10% CCI (year-round)	Survey prior to and after each area knockdown and/or exceedance of threshold (if required). Biannual surveys thereafter.
Possums	<3% CCI	≥5% CCI	
Hedgehogs	<5% CCI	≥10% CCI	
Mustelids	5 detections per 2000 CH[1]	>10 detections per 2000 CH[1]	
Feral Cats	Zero detections	Zero detections	
Rabbits and Hares	Modified McLean Scale (MMS) level 2 or below for 100% of survey lines	MMS level 3 on all survey lines	
Ungulates. Feral Deer, Pigs and Goats	Reduction to less than 1/20ha of area	≥1/20ha of area	Timing to be determined by expert hunting contractor

[1] These numbers are based on the draft DOC best-practice guidelines for targets and thresholds for mustelids using camera trap indices. The completion of the new DOC best practice guidelines is still in progress.

10.1.1 Response to exceedance of pest animal thresholds (EOT)

The use of thresholds facilitates adaptive management and ensures that pest animal populations are continuously and effectively suppressed. If monitoring identifies that the thresholds for pest control targets have not been achieved, this will trigger a requirement for further control.

Table 7: Summary of threshold exceedance response measures including additional control for each target pest species.

Species	Threshold	Exceedance response measures
Rats	≥10% CCI	• Up to two additional ground-based toxic control operations will be repeated per year where possible (i.e. where bait station networks targeting rats have been established), as per the methods outlined in this Plan) • Trap checks and rebaiting of DOC traps needs to increase to once every two weeks, if not already at this interval. Fortnightly trap checks for up to two months after EoT result. A follow-up monitor 4 weeks after the start of any additional toxic control operations needs to occur to determine whether the rat population has been successfully reduced to below the threshold.
Possums	≥10% CCI and/or RTC	• Potentially switch to a new toxin such as Feracol or Feratox (CSL required) • Trap checks and rebaiting needs to increase to once every two weeks, if not already at this interval. Fortnightly trap checks for up to two months after EoT result. A follow-up monitor 4 weeks after the start of any additional toxin/trapping control operation needs to occur to determine whether the possum population has been successfully reduced to below the threshold.
Mustelids	≥10 detections per 2000 CH[1]	• Trap checks and rebaiting of DOC traps needs to increase to once every two weeks, if not already at this interval. Fortnightly trap checks for up to two months after EoT result. A follow-up monitor for 3 weeks after 1 week at the end of the additional control operation needs to occur to determine whether the mustelid population has been successfully reduced to below the threshold.
Feral Cat	≥1 detections per 2000 CH[1]	• Trap checks and rebaiting needs to increase to once every two weeks, if not already at this interval. Fortnightly trap checks for up to two months after EoT result. • Trap checks and rebaiting of feral cat traps needs to increase to once every two weeks, if not already at this interval. A follow-up monitor 4 weeks after the start of the EoT trapping operation needs to occur to determine whether the feral cat population has been successfully reduced to below the threshold.
Ungulates	≥1/20ha of area	• Increase frequency of hunting sessions
Leporidae	MMS level 3 on all survey lines	• Increase frequency of hunting sessions • Conduct one round of rabbit burrow fumigation operation in areas where threshold has been exceeded. A follow-up monitor 4 weeks after the start of any additional EoT control operations needs to occur to determine whether Leporidae populations have been successfully reduced to below the threshold.

10.2 Pest plant targets and thresholds

All identified target pest plant species within new planting enhancement areas are to be removed (zero detectability) prior to planting installations. All other pest management areas are to achieve sustained suppression of the target pest plants identified. If other invasive pest plants are identified via the baseline surveys within the new enhancement planting areas, then these will need to be added to the target and control list.

Table 8: Pest plant targets and thresholds by management area

Management area	Target	Threshold
All pest management areas (excluding new enhancement planting areas years 1-5 after final planting installations by area). Sustained suppression.	zero detectability of mature/ reproductive individuals. ≤10m2 of vegetatively reproductive species.	≥10 mature/reproductive stage individuals per pest management area ≥15m2 of vegetatively reproductive species
New enhancement planting areas Zero detectability	Zero detectability of any mature/reproductive individual pest plants (years 1-5 after final planting installations by area) Target will shift to sustained suppression after year 5 onward for each new enhancement planting area.	Identification of one or more target pest plants will trigger control response during planting establishment period (year 1-5 after final planting installation by area).

10.2.1 Response to exceedance of pest plant thresholds

If any pest plants exceed the set thresholds, pest plant control methods shall be repeated within the identified pest management area/new enhancement planting area until:

- pest plants are reduced below the acceptable threshold level(s) as per Table 7.

11.0 Pest animal suppression – best practice

Suppression of pest animals is the ongoing control of introduced pest animals using a range of tools and techniques to decrease (and hold) population densities to low levels. Over large landscapes pests can generally be suppressed to low population density, but without concentrated ongoing efforts to defend against reinvasion, pests will quickly reinvade, re-establish, and re-populate these areas. Pest animal population suppression requires ongoing and repeated pest control activities to keep population densities low enough for biodiversity protection and restoration.

Throughout the project it will also be vital to monitor the target pest's responses to control activities and the associated outcomes. This will result in a valuable dataset, which project managers can use to track the success of the programme and determine where adaptive management is required.

12.0 Pest animal management

Introduced mammalian predators and pests (including rats, mustelids, possums, hedgehogs, ungulates and Leporidae) have a profound impact on native flora and fauna in New Zealand. Inferable research and evidence show that indigenous birds, bats, lizards, invertebrates, freshwater species and native flora populations (such as those listed in section 7.0) are severely compromised where these pest and predators exist.

Reducing these impacts via pest management is known to result in substantial benefits for native biodiversity. Effective pest control has an immediate benefit on native fauna, including decreasing predation of birds, bats, lizards and invertebrates, increasing reproductive success due to lower instances of nest predation, and decreasing the impact of pest browse on native flora (increasing availability of food resources and plant survival).

This Section details the pest animal monitoring and control activities for pest management at the Hunua and Meremere Quarry offset pest management sites. The activities are separated into existing, supplementary to existing and new enhancement activities.

Table 10, Section 14 provides a recommended toolbox list of proven current best practice pest animal management devices/activities this plan recommends for this project. The table also provides suggested methodology and guideline/protocol detail for these devices and activities.

The specific and detailed device/activity type and associated methodologies will be further developed when the PMOPs are designed for each management area/stage.

All pest animal management implementation must be carried out by qualified, experienced and certified operator(s) and must:

- follow all current best practice and standard protocols
- follow all regulations and safe handling procedures when using controlled substances and herbicides.
- develop a site-specific safety plan that covers pest plant management and ideally work under a current, approved, prequalified health and safety system (e.g, Sitewise, pre qual).

12.1 Pest animal monitoring

Within the pest management areas current standardised monitoring methods, protocols and techniques will be used to monitor pest animal presence and abundance against the intended targets, and to initiate further control if thresholds are exceeded (as stated in Section 10.1.1).

The programme will continue to use existing pest animal monitoring in existing management areas, with additional supplementary/new enhancement monitoring activities proposed for existing and new enhancement areas.

Table 9: Monitoring methods by target species

Target Species	Monitoring Method/s
Possum	CCI and RTC
Ship rat	CCI and RTC
Norway rat	CCI and RTC
Mustelids	Camera Trapping and RTC
Feral Cat	Camera Trapping and RTC
Hedgehog	CCI and RTC
Leporidae	Survey and control (ground based with drone support)
Ungulates	Survey and control (ground based with drone support)
Wandering stock	Search/survey

- **Continue existing pest animal monitoring (existing management areas):**
    - Continue to monitor trap catch data and ungulate observations to attain residual trap catch (RTC) indices and ungulate presence data.
- **Supplement existing pest animal monitoring (existing management areas):**
    - Replace tracking tunnels (TTs) with chew cards[2] (CCs) using existing monitoring lines (reduced to 20m spacing along existing lines) in existing management areas,
        - Abundance data for possum, rat and hedgehogs
        - Mustelid and feral cat presence
    - Install new chew card lines in existing management areas to meet protocol density of lines per area (only if required)
- **Pest animal monitoring enhancements (all areas):**
    - Implement continuous camera trap monitoring on a grid (1 per 10ha) using remote reporting, real-time autonomous 'smart' cams,
        - Abundance data for feral cats, mustelids
        - Incidental presence/real-time location data for ungulates, Leporidae.
    - Use drone thermal camera monitoring in feasible habitat to support ground hunting,

[2] Chew cards are a common, cost-effective, and sensitive detection and monitoring tool suitable for determining the presence, and provide a coarse index of relative abundance, of a range of pests, including rats, mice, possums. Chew cards, rather than wax tags, have been found to be more effective at attracting possums and rodents, and are recommended by DOC in their National Biodiversity Monitoring and Reporting Framework (Forsyth et al., 2018).

        - Guide ground hunters to targets with thermal scopes.
        - Presence/real-time location data for ungulates, Leporidae (and potentially other medium sized mammals such as cats and possums)
    - Baseline pest animal surveys (In new enhancement areas only).
        - Implement one round of all animal monitoring activities prior to initial pest animal knockdowns for each stage/area.

Table 10 in Section 14 summaries the proposed monitoring activities above and provides current best practice pest animal monitoring methodologies, guidelines and protocols which shall guide the development of the specific monitoring plans for each area/stage.

12.2 Pest animal control

The combined and continuous use of high-quality pest animal trapping and Vertebrate Toxin Agent (VTA) control is a very effective formula capable of suppressing pest species to low abundance across the landscape (Table 9). There are many factors that need to be considered to create an efficient trapping and VTA network, such as the behaviour of the target predator, efficacy of the trap or VTA, habitat and landscape types, and the pest control contractor's capacity and skills. Trapping/VTA operations need to be a dynamic process whereby pests are monitored regularly and efforts amended to reflect any changes to pest populations (adaptive management).

Pest animal control methods/activities for this project will include an adaptive and integrated approach using approved single set kill traps, live cage trapping, the use of vertebrate toxin agents (VTAs) and ground-based hunting (supported by thermal drone searches).

Table 10: Control methods by target species

Target Species	Control methods/activities
Possum	Vertebrate toxic agents/kill traps
Ship rat	Vertebrate toxic agents/kill traps
Norway rat	Vertebrate toxic agents/kill traps
Mustelids	Kill traps
Feral Cat	Kil traps/ Live Cage Traps/Hunting
Hedgehog	Kill traps
Leporidae	Burrow fumigation/hunting
Ungulates	Hunting
Wandering stock	Remove stock. Repair/maintain/install fences.

The programme will continue to use existing pest animal control in existing management areas, with additional control activities proposed to supplement existing control and for new offset enhancement management areas.

- **Continue existing pest animal control (existing management areas):**
    - Continue existing Hunua Quarry pest animal trapping, toxin and hunting programme in existing areas
- **Supplement existing pest animal control (existing management areas):**
    - Replace Timms traps with AT220 multi-kill traps using existing locations in existing management areas,
    - Install new AT220s on same grid layout (1 per 4ha) in gaps in existing management areas to improve cover density (only if required)

        - Able to kill possum, rat, mice, mustelids and feral cats at a higher interaction rate,
        - Do not install AT220s near areas sensitive to potential pet cat interaction. Replace Timms traps with Ai species recognition multispecies kill traps instead in these areas, set trap to **not** kill cats.
    - Switch out existing VTAs with different toxins for each annual spring pulse per annum to reduce toxin shyness potential.
    - Implement fumigation of rabbit burrows to support ground hunting efforts of rabbits
- **Pest animal control enhancements (all pest management areas):**
    - Install remote reporting, real-time, autonomous, Ai multi-kill traps on grid (1/10ha)
        - Able to kill possum, rat, mice, mustelids, feral cats at a higher interaction rate (feral cat killing capability can be turned off in pet sensitive areas)
    - Install intensified density of external perimeter devices where there is connectivity to external habitat suitable to pest animals
    - Support ground hunting of ungulates, Leporidae, and possums with drone thermal imagery surveying
    - Toxins (VTAs) – Utlise multispecies or target specific toxins depending on monitoring results prior to pulse event.
- **Pest animal control enhancements (new enhancement management areas only):**
    - Knockdowns – implement 28-day knockdown of pest animals using toxin and/or trapping and/or hunting activities
    - Remove any wandering stock in pest management areas. Install any necessary stock proof fencing to new enhancement areas. Repair stock fences (if needed). Maintain stock fences.

Table 10 in Section 14 summaries the proposed pest animal control activities above and provides current best practice methodologies, guidelines and protocols for pest animal trapping, hunting and vertebrate toxin control. These methodologies shall guide the development of the specific operational monitoring plans for each area/stage.

12.2.1 Pest animal knockdowns

Each new enhancement area shall receive an initial pest animal 28-day knockdown immediately prior to the implementation of the ongoing control programme

- A pre and post pest animal knockdown monitor shall be carried out using all pest animal monitoring activities identified in the monitoring plan to be developed for each stage/area
- Each pest animal control device shall be topped up/re-baited at the following intervals after the initial install date
- After the 28-day knockdown period is finished, and once post knockdown monitoring results are at or below the desired threshold, then the ongoing pest animal control phase of the pest management programme will commence for that area/stage
- Knockdown process
    - Pre pest animal knockdown monitor

- Day 1 - Initial install
- Day 3, Day 7, Day 14 and Day 28 – top ups/rebaiting
- Post pest animal knockdown monitor
- Ongoing pest control implementation (if pest animal abundance thresholds are met).

- All VTA bait stations and traps used for each initial knockdown stage shall be checked, poor condition bait/toxin/dead animal removed (if any) and catches/toxin take recorded in TrapNZ

- All pest control devices shall be installed **at least two weeks prior** to first use to reduce the likelihood of neophobia (fear of new objects) in the target pest animals

13.0 Pest plant management

Invasive pest plants have the ability to be highly detrimental to New Zealand's indigenous ecosystems. If left uncontrolled, invasive pest plants can quickly crowd out suitable habitat for indigenous plant species (such as those listed in section 7.2) to propagate within and even kill indigenous plants by choking them out via dense canopy coverage. The sites are known to be impacted by several invasive pest plant species which will require further survey to determine accurate pest plant abundance and location, if other pest plant species are present and to be used to plan pest plant control activities.

In addition to existing pest plant management continuing within both sites, pest plant management will also occur within the new enhancement offset planting areas. The Hunua and Meremere pest management enhancement planting areas shall be surveyed for the target pest plant species, as well as regularly monitored and controlled to a contained suppression level over the lifespan of the programme. If it is deemed feasible, certain pest plant species may be controlled to elimination level, whereby the identified species is not detectable during subsequent monitoring.

This Section provides an overview of the pest plant monitoring and control approach. Table 10 in Section 14 provides the recommended high level pest plant management methods, devices, activities and current best practice guidelines.

The specific and detailed device/activity type and associated methodologies will be further developed when the PMOPs are designed for each management area/stage.

All pest plant management implementation must be carried out by qualified, experienced and certified operator(s) and must:

- follow all current best practice and standard protocols
- follow all regulations and safe handling procedures when using controlled substances and herbicides.
- develop a site-specific safety plan that covers pest plant management and ideally work under a current, approved, prequalified health and safety system (e.g, Sitewise, pre qual).

13.1 Pest plant monitoring

Within the pest management areas current best practice monitoring methods, protocols and techniques will be used to monitor for target pest plant presence, guide pest plant control and measure the effectiveness of pest plant control activities.

The programme will continue to use existing pest plant monitoring in existing management areas, with additional supplementary monitoring activities proposed for all areas, including the proposed planting enhancement areas.

- **Continue existing pest plant monitoring in existing management areas at Hunua Quarry**
    - Continue annual (spring/summer) pest plant monitoring surveys using existing methods
- **Supplement existing pest plant monitoring (existing management areas):**
    - Support ground-based grid search methods with aerial drone searches
- **Monitor for pest plants in new pest management and enhancement planting areas**
    - Conduct baseline pest plant surveys prior to the initial enhancement planting implementation phase for those management areas receiving enhancement planting.
        - Conduct systematic ground-based grid survey of entire enhancement planting area
        - Support ground-based grid search methods with aerial drone searches
    - Conduct post initial control monitoring surveys of residual pest plants
        - Conduct systematic ground-based grid survey of entire enhancement planting area
        - Support ground-based grid search methods with aerial drone searches

Pest plant surveys for all management areas shall concentrate on known infestation sites, open paddocks, in light wells and forest edges/scrub habitat using a systematic ground-based grid monitoring methodology with aerial drone thermal imagery support.

All pest plant species must be recorded and mapped using an appropriate GIS system. Pest species can be measured in a m2 area size of infestation, or as individual plants.

Table 10 in Section 14 summaries the proposed monitoring activities above and provides current best practice pest plant monitoring methodologies, guidelines and protocols which shall guide the development of the specific monitoring plans for each area/stage.

13.2 Pest plant control

Pest plant species identified in the baseline surveys and ongoing monitoring shall be controlled using current best practice pest plant control methods. The baseline pest plant survey results shall be used to help develop the specific pest plant control section of the PMOPs for the pest management areas. Those plans shall utlise Auckland Council's Tiaki Tamaki Makaurau website Pest search database for best practice pest plant management. The Weed Manager application developed by Auckland Council is recommended for weed data management in this project https://weedmanager.nz/

All operators conducting pest plant control activities must have the required experience, skills, training and qualifications to manage agrichemicals over the lifecycle of their use. These operators must have a site-specific safety plan that covers pest plant management and ideally work under a current, approved, prequalified health and safety system (e.g, Sitewise, pre qual).

Table 10 in Section 14 summaries the proposed monitoring activities above and provides current best practice pest plant monitoring methodologies, guidelines and protocols which shall guide the development of the specific monitoring plans for each area/stage.

14.0 Pest management methodology

The following table provides a summary of the recommended pest management activities for the Hunua Quarry expansion pest management programme. Some preferred device type and activity examples have been provided. Subsequent PMOPs shall be developed using this table, other sections of this PMP, best practice guidelines and protocols and expert biosecurity advice as each pest management area/stage is implemented. Further specific operational detail such as device type, device distribution, frequency of checks, timings, lure types (as specified in Section 14) will need to be added to this table for each species when developing the PMOPs prior to stage/area implementation. New enhancement areas shall implement all of the pest management activities recommended for the existing pest management areas including existing, supplementary and

Table 11: Recommended pest management activity and guideline/protocols

Target Pest Species	Target	Activity type	Activity description by area/stage	Guideline/protocols
Possum, rats and Hedgehogs	Rat and hedgehog 5% CCI and RTC Possum 3% CCI and RTC	Monitoring	Replace TTs with chew cards in existing management areas Add chew card lines into new enhancement management areas and conduct CCI	Possum Population Monitoring
			Continue RTC indexing – All management areas via all traps targeting these species	
			New Enhancement areas only - Conduct baseline CCI monitoring surveys for possums, rats and hedgehogs prior to any control implementation New enhancement areas only - Conduct post knockdown CCI monitoring for possums, rats and hedgehogs	
		Trapping	Continue existing trapping activities on existing distribution layout in existing management areas for possums, rats and hedgehogs.	Practical guide to trapping DOC Skillable video A4.2-Kill-Traps-best practice guidelines
			Fill any gaps in existing trap network layout for possums, rats and hedgehogs	
			Add supplementary grid of autonomous (self-resetting, long life self-luring) traps (e.g. AT220) to existing management areas at 1 device per 4ha.	
			Enhance possum, rat and hedgehog control by implementing 28-day knockdown trapping in new enhancement management areas only.	
			New enhancement management areas - Implement all trapping activities above to match those of the existing management areas when fully enhanced (i.e. implement all existing, supplementary and enhanced activities).	
		Toxin	Continue existing toxin activities on existing distribution layout in existing management areas for rats. Utlise longer life VTAs (e.g. D block extreme for rats). Enhance existing possum control with possum specific toxin pulse twice per annum (e.g. feracol strikers) in all management areas at 1 per 4ha spacing, and 1 every 50m along external boundaries of management areas with connectivity to suitable possum habitat. Enhance existing rat control by installing rat toxin stations every 50m along external boundaries of management areas Enhance existing rat control by switching out rodent toxin type for each spring pulse round per annum New enhancement management areas - Implement all toxin activities above, to match those of the existing management areas when fully enhanced (i.e. implement all existing, supplementary and enhanced activities).	A13 - Responsible use of bait stations guidelines B2-VTA-guide-2021-2.pdf B7- VTA Signage guidelines-2018-04-LR.pdf B8-VTAs-Tracking-guidelines-2018-04-LR.pdf C5-Cholecalciferol-guidelines-2015-Nov-HR.pdf
		Hunting	Enhance existing possum control with thermal hunting supported by thermal drone (as part of hunting for ungulates and Leporidae) in all management areas.	

Target Pest Species	Target	Activity type	Activity description by area/stage	Guideline/protocols
Mustelids and feral cats	Mustelids - 5 detections per 2000CH (CTI) Feral cats – Zero detections	Monitoring	Enhance mustelid and feral cat monitoring – instal labour reducing, autonomous, remote reporting Ai species recognition camera traps (e.g. OWL 'smart cams) paired to auto lure dispenser, on a 1 per 10ha grid over all management areas.	2023-08-01 EzyLure_Manual_V1.11.pdf OWL-Camera SOP.pdf A11 - Feral and stray cat monitoring and control best practice guidelines A8 - Mustelid monitoring and control guidelines A11 - Feral and stray cat monitoring and control best practice guidelines A4.2-Kill-Traps-best practice guidelines Practical guide to trapping DOC Skillable video
			RTC – Continue RTC index monitoring in existing pest management areas and add into new enhancement management areas	
			New Enhancement areas only - Conduct baseline camera trap monitoring surveys for mustelids and feral cats prior to any control implementation New enhancement areas only - Conduct post knockdown camera trap monitoring for mustelids and feral cats	
		Trapping	Continue existing trapping activities on existing distribution layout in existing management areas for mustelids and feral cats	
			Fill any gaps in existing mustelid and feral cat trap network layouts	
			Utliise the recommended possum, rat and hedgehog supplementary grid of autonomous (self-resetting, long life self-luring) traps (e.g. AT220) to also target feral cats in areas where pet/domestic cats are not likely to exist. Add remote reporting, autonomous (self-resetting, long life self-luring) AI species recognition traps in all management areas (e.g. Multispecies AI traps) to areas where pet/domestic cats are likely to exist (set to not kill cats). Recommended grid spacing of 1 device per 10ha.	
			Enhance mustelid and feral cat control by implementing 28-day knockdown trapping in new enhancement management areas only.	
			New enhancement management areas - Implement all trapping activities to match those of the existing management areas when fully enhanced (i.e. implement all existing, supplementary and enhanced activities).	
Ungulates	Reduction to less than 1/20ha of area	Monitoring	All management areas with suitable ungulate habitat: • Continue existing hunting kill recording and observational data for ungulate presence analysis • Enhance ungulate monitoring using thermal drone support for ground hunting crews • Enhance ungulate monitoring via incidental 'smart cam' presence observations.	A10-Feral-Pigs-guidelines-2020.pdf camera-trap-catch-indices-for-deer-goats.pdf
		Hunting	All management areas with suitable ungulate habitat: • continue existing hunting activities • enhance hunting control using thermal drone support for ground hunting crews	
Leporidae	Modified McLean Scale (MMS) level 2 or below for 100% of survey lines	Monitoring	Conduct Modified McClean Scale (MMS) surveys on all areas of suitable habitat for Leporidae species in all management areas once per annum in Spring	
		Toxin	New enhancement planting areas - enhance rabbit control via burrow fumigation in all areas with suitable Leporidae habitat	A5-Rabbit-guide-minor-revision-2020.pdf A7-Pest-Hares-guidelines 2015-Nov-HR.pdf
		Hunting	Continue existing hunting activities in suitable Leporidae habitat in existing management areas and add as activity to new enhancement management areas Enhance hunting for Leporidae species with thermal scope (if not already) and thermal drone support (if required).	
Wandering stock	Zero detectability	Stock control	All management areas - Remove all wandering stock using farming best practice herding methods (e.g. farming dogs) Install new and/or repair existing stock fences around management areas where needed to keep stock out of pest management areas.	Current farming best practice methods
Pest Plants	**Existing management areas** • zero detectability of mature/ reproductive individuals. • ≤10m2 of vegetatively reproductive species. **Enhancement management areas** • Zero detectability of any target pest plant individuals (years 1-5)	Monitoring	Existing pest management areas: • Continue annual (spring/summer) pest plant monitoring surveys using existing methods • Supplement existing pest plant monitoring - support ground-based grid search methods with aerial drone surveys in suitable habitats New enhancement planting areas: • conduct baseline pest plant monitoring surveys (with the support of drones) prior to the initial enhancement planting implementation phase • Conduct a post initial control monitoring survey(s) of residual pest plants (with the support of drones)	https://www.tiakitamakimakaurau.nz/resource-library/pest-plants-and-management/ https://weedmanager.nz/
		Control	Existing pest management areas: • Continue pest plant control activities and methods to supress pest plants in existing areas • Enhance existing pest plant control in existing areas with aerial drone thermal imagery support.	

15.0 Specific pest management operational plans

As outlined throughout this PMP, due to the long-term lifespan of the Symonds Hill pit expansion project, Winstone Aggregates will be required to develop specific pest management operational plans (PMOP) prior to the implementation of certain stages in the programme. PMOPs may be developed individually for each management area or for multiple management areas If they proceed within the same or a similar timeframe. This PMOP development process will be determined by the specific timings associated with the long-term pit expansion programme, which are currently unknown.

Each PMOP shall be developed and approved prior to implementation of the first activities of the plan, but no earlier than six (6) months prior to that implementation. This is to ensure each PMOP includes the most current specified detail pertaining to best practice methodologies, technologies, protocols and guidelines.

The following table provides a guide to the minimum detail that shall be included in each PMOP. More sections/detail may be required as best practice and technology evolves, or as required through adaptive management based on further information available at that time.

Table 12: PMOP - Detail required and sources of information

Section of PMOP	Detail required	Source of information
Introduction/background	• Objectives and scope of the plan and programme • Life span of the plan	• This PMP (Section 1.0) • Winstone Aggregates
Pest management approach	• Approach detail • Staging detail • Phase detail	• This PMP (Section 2.0) • Winstone Aggregates
Pest management area(s)	• Description of area • Boundaries • Enhancement planting areas (if any) • Existing pest management devices • Maps	• This PMP (Section 4.0) • Updated imagery • Winstone Aggregates • Consent documents
Target pest animals and pest plants	• Species name • Invasive impacts	• This PMP (Section 9.0) • Regional Pest Management Plans • Baseline survey data
Pest management targets/thresholds	• Species name • Target pest density • Threshold for further control	This PMP (Section 10.0)
Response to exceedance of thresholds	• Threshold level by species • Follow up control methodology	This PMP (Sections 10.1.1 and 10.2.1)
Pest animal and pest plant monitoring methods	• Target species • Existing pest monitoring methods • Supplementary pest monitoring methods • New enhancement pest monitoring methods	• This PMP (Sections 12.1 and 13.1) • Auckland and Waikato RPMPs • Industry best practice pest monitoring guidelines and protocols (e.g. Bionet, Predator Free NZ, ZIP, DOC, Regional Councils). • Professional expert biosecurity advice. • Winstone Aggregate environmental staff
Pest animal and pest plant control methods	• Pest animal trapping, VTA and Hunting control methods o Pest species o Device/activity type o Guidelines/Protocols o Distribution/location of devices o Frequency of checks o Lure types • Pest plant control methods o Pest species o Elimination or sustained control o Control methods including recommended herbicides, drone use, search systems. o Frequency of checks	• This PMP (Section 13) • Auckland and Waikato RPMPs • Industry best practice pest control guidelines and protocols (e.g. Bionet, Predator Free NZ, ZIP, DOC, Regional Councils). • Professional expert biosecurity advice. • Winstone Aggregate environmental staff
Schedule of activities	• Gantt type chart/table scheduling specific detail of pest management activities over each 12-month period	• This PMP (Section 6.0) • Winstone Aggregate operational timings • Best practice guidelines/protocols to set monitoring and control timings.
Estimated budget	• Estimated budget per annum including governance/project management, equipment and labour costs factoring in inflation.	• Professional expert biosecurity advice. • Professional pest management contractor advice. • Pricing from suppliers
Equipment list	• List of equipment and estimated quantities for install and ongoing maintenance per annum	• PMOP - Operational device layout maps. • Professional expert biosecurity advice. • Professional pest management contractor advice. • Pricing from suppliers
Other Biosecurity risks	• Other potential biosecurity risks associated with pest management at the sites (e.g. Kauri Dieback spread, accidental invasive species introduction, other pathogens/diseases. • How to mitigate these risks	• MPI • Regional Councils • DOC
Data Management	• How data is to be collected, stored and analysed. • Which data collection and management apps to use • Use of AI species recognition • Security and IP of data	• Professional biosecurity expert advice
Review and reporting	• What will be required in the PMP and individual PMOP reviews and report • Frequency of reviews and reports • List of stakeholders to receive reviews	Professional biosecurity expert advice
Environmental protection measures	• Environmental incident management details • Ecosystem disturbance measures	Professional biosecurity expert advice
Appendices	• Any technical information/guidelines/protocols not already included in the PMOP sections.	Appendix 2 of this PMP.

Note: Sources of information may also include any new or updated industry best practice documents/intel, professional biosecurity expert/contractor advice as well as changes in national and/or regional regulations/policy/plans.

16.0 Other Biosecurity Risks

16.1 Kauri dieback

Pest control contractors must prevent the spread of the pest organism *Phytophthora agathidicida* (commonly known as kauri dieback disease, or PA), to the extent reasonably practicable.

Pest control contractors must ensure that all vehicles and equipment, including clothing, arethoroughly cleaned of all visible soil. Footwear, once cleaned, must be sprayed with SteriGENE solution before entering when moving between, and when leaving areas where there are Kauri.

All pest management vehicles, equipment plant and machinery shall be washed with SteriGENE® 2% solution upon entry into the Project Site(s).

The following links are recommended guidelines for kauri dieback disease management: Kauri Dieback

best-practice-guides/vehicle-and-heavy-machinery-hygiene/

Kauri protection - Kauri Dieback hygiene trapping guidelines

17.0 Data management

The capture and recording of data collected during this project are of vital importance. High quality data provides invaluable insight for project managers and allows the effectiveness of pest control to be assessed, both in terms of pest numbers and the relative abundance of native species being monitored.

It is a requirement that the project be set up in Trap.NZ, and that all predator control data (trap catch data and toxin information) and monitoring data be entered into the database at each check. We also recommend using the Weed Manager app. as detailed in Section 12.1 for weed data management.

Trap.NZ is an online database that is free to use within New Zealand. It is the most commonly used database by both professional and community-based predator control projects throughout New Zealand. Once a project is set up, it is used to record data relating to the following:

- Date of trap servicing & time taken to complete trap/bait station servicing;
- Name of the trap servicer;
- Trap networks (trap type, location, bait / lure type, predators caught, etc);
- Bait station networks (bait station type, location, toxin type, etc);
- Monitoring (monitoring tool, location, predators identified etc); and
- Points of interest (can be used for locations of native species value areas, or signage locations, etc).

Once data is entered into Trap.NZ or similar database, project managers can access valuable information pertaining to the success of the control operation. Reports can be produced with visual mapping of all catch data locations and hot spots over time, or within a specified time period. This data empowers managers to make informed decisions about the control programme and if any adaptive management changes are necessary.

18.0 Operational review and reporting

It is a requirement that this PMP is reviewed as required to remain current and aligned with changes to pest management best practice and technological developments. The review shall be carried out by an independent pest management professional and an annual report developed which reports upon the determined objectives and outcomes.

Each annual report needs to align with consent condition reporting requirements. At a minimum it should include:

- A summary of all pest control (plant and animal) activities undertaken within the applicable pest management areas in the preceding 12 months, detailing dates, and methods of each control activity:
- Maps of control devices/area, labelled by type;
- Summaries of trap catch statistics by species (both target and any non-target catch), including by trap type, trap location, lure type as well as CCI, hunting/survey observation and camera trap monitoring analysis of the target species with comparison to management targets and thresholds for additional control;
- Summaries of results of toxic control operations, including target species, bait type and bait take;
- Any trends in the data, such as high-catch/high bait-take locations, the main species caught and comparisons to previous years and;
- Any challenges/issues encountered in undertaking control or monitoring, and how these difficulties were overcome or if they remain ongoing;

The recommended implementation review and associated annual report(s) shall be shared with all key stakeholders of this project including mana whenua.

It is also imperative that key personnel regularly utilise monitoring data throughout the implementation process, to guide adaptive management decisions and foster a deep understanding of project-specific knowledge.

If pest monitoring analysis reveals ongoing exceedance of thresholds (exceedance for more than two monitoring rounds), then additional improvements may be required to relevant pest control and monitoring activities. Advice on analysis and any subsequent changes shall be sought from suitably qualified biosecurity professionals.

19.0 New technologies

Technological advancements are rapidly evolving within the pest/predator animal management space, with greater efficiency and control/monitoring capabilities over current options. AI is reducing the human labour requirement significantly and is now over taking human accuracy in species identification for monitoring and control.

It is recommended that this pest management programme consistently investigates and reviews new technologies that have been vigorously tested and proven successful and ethical in their application (i.e. meet NAWAC standards).

If budgets allow then this programme should look to adopt new technologies that will reduce costs, improve pest control/monitoring outcomes and increase the capability and accuracy of pest management going forward.

20.0 Environmental protection measures

It is a requirement that this pest management project is delivered using processes that aim to minimise (as far as practicable) any negative effects on the environment and ecosystems connected to the project site. The lead operational delivery organisation will ensure site specific environmental protection measures are implemented to minimise impacts on the environment from associated activities. These measures should include environmental incident management and ecosystem disturbance risks and mitigation measures.

The protection measures must be adhered to by any contractor/sub-contractor of this pest management project and shall be reviewed annually, or as new incidents require changes/updates. Contractor/sub-contractor operational field work activities shall be audited regularly by the lead operational delivery organisation to ensure the environmental protection measures are complied with.

20.1 Environmental incident management

The environmental incident management measures shall clearly outline the necessary information which personnel must follow in order to minimise detrimental effects on the environment. The measures should include:

- Identifying the risks and mitigation measures to minimise those risks.
- Clear lines of responsibility
- Incident management response process (flow chart)
- Key contacts and communication flow.
- Auditing, review and reporting requirements.
- Initial and ongoing training/qualification requirements

20.2 Ecosystem disturbance minimisation

The ecosystem disturbance minimisation measures should provide a detailed outline of the following:

- Set the thresholds of acceptable disturbance.
- Research, and where feasible, engage new technologies that reduce need for human activity within the project site (e.g.,Self resetting traps.
- Forest clearance minimisation techniques (e.g., minimal vegetation clearance, only use markers on trees for access lines).
- Control lines installation. (e.g, where practicable control lines shall be installed using gullies, ridges and contours to minimise disturbance).
- Waste management processes.
- Fire risk minimisation (e.g., electric tools instead of petrol-powered tools, no smoking/vaping in forest, carry fire extinguishers in vehicles).

21.0 Signage:

It is a legal requirement when applying VTAs in New Zealand to erect approved VTA warning signage at all known main entrances to the property on which toxin operations are being conducted. Signs shall be clear and visible at all times and should be checked regularly by the pest controller conducting VTA operations, especially after damaging weather events.

At a minimum the sign shall outline the toxin name and concentration, a photo of the toxin bait and/or bait station, the date period the VTA will be in bait stations and any caution period after bait removal (if applicable). VTA warning signs shall also provide the contact number of the pest controller or project manager, as well as any non-target groups (pets, humans etc) that should be supervised and take caution in and around the operational area.

B2-Vertebrate-Toxic-Agents-Guidelines-2018-04-LR.pdf

Double Tap warning-sign-36.pdf

Diphacinone warning-sign-17.pdf

Pindone warning-sign-27.pdf

22.0 Health and safety:

All contractors associated with supplying services to the delivery of the pest management programme shall be experienced, professional operators with the relevant skills to conduct the required pest management operations. Contractors shall hold a current Health and Safety pre-qualification from an independent certifier. All pest management contractors' delivering any of the operational activities of this plan shall also:

- Adhere to the applicable rules and regulations of the Health and Safety at Work Act 2015.
- Produce and regularly maintain a site-specific safety plan
- Conduct and record regular pre-work health and safety meetings (e.g. toolbox talks), carry out site inspections and record/report any hazards or incidents.
- Hold the relevant skills, experience and any relevant qualifications to deliver pest control and monitoring, including the handling of VTAs and use of pest kill traps.
- Record and maintain toxin type, quantity and disposal records in an appropriate spreadsheet.

23.0 References

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Appendix 1: Qualifications and relevant experience

Adam Willetts: Statement of Qualifications and Experience

I am a Senior Professional Biosecurity Consultant at Boffa Miskell Limited. Boffa Miskell is a multi-disciplinary environmental consultancy specialising in planning, urban design, landscape design, ecology and biosecurity and engagement. I hold the qualifications of a Bachelor of Parks, Recreation and Tourism Management, with a postgraduate in commerce. I am a Certified Environmental Practitioner (General) as well as a full member of the New Zealand Biosecurity Institute (NZBI) and the Environmental Institute of Australia and New Zealand (EIANZ).

I have 24+ years' experience in the private sector, local government and central government with roles in biodiversity management, ecological restoration and project management throughout New Zealand. Recent experience includes design and project management of multiple Predator Free New Zealand 2050 eradication plans/projects, biosecurity and ecology plan development for RMA and Fast Track Approval applications as well as research and development of new tools and technology for biosecurity and ecological restoration.

I can confirm that I have read and abide by the Environment Court of New Zealand's Code of Conduct for Expert Witnesses Practice Note 2023.

Adam Willetts, March 2026

Dr Ian Boothroyd: Statement of Qualifications & Experience

I am a Senior Principal Ecologist at Boffa Miskell Limited. Boffa Miskell is a multi-disciplinary environmental consultancy specialising in planning, urban design, landscape design, ecology, biosecurity and engagement. I have been employed at Boffa Miskell since June 2014.

I hold the qualifications of BSc (Hons) Manchester University 1977), MSc Applied Hydrobiology (University of Wales, 1980) and DPhil (Waikato University, 1988). I am an appointed Fellow of both the Royal Society of Biology (FRSB) and the Environment Institute of Australia and New Zealand (FEIANZ), a life member of the New Zealand Freshwater Sciences Society, and a member of the Resource Management Law Association. I am a Certified Environmental Practitioner (CEnvP, Ecology).

I have 40 years of professional experience in the field of resource management, including roles as Manager Environmental Monitoring and Compliance (Hawke's Bay Regional Council), Research Director (NIWA), Senior Lecturer (University of Auckland, and as a consultant environmental practitioner for 25 years. I am also an experienced independent environmental commissioner and appointed as a Freshwater Commissioner by the New Zealand government. My experience includes environmental assessment and management and decision-making in

the New Zealand environment, and I am familiar with environmental protocols, criteria and performance standards. I have led multidisciplinary teams for large and often complex projects.

My experience extends to large land management and subdivision projects, designations, renewable energy, roading, mining, quarrying, water treatment, biodiversity management and offsets, multi-criteria assessments through to investigations and assessments, consent conditions, fast track applications and presentation of expert evidence at hearings, Environment Court and Boards of Inquiry.

I confirm that, in my capacity as author and reviewer of this report, I have read and abide by the Environment Court of New Zealand's Code of Conduct for Expert Witnesses Practice Note 2023.

Ian Boothroyd, March 2026

Appendix 2: Existing pest management methods/results

Existing pest animal management

Existing pest animal management targets and methods prescribed in the Hunua Quarry VMP (2010) are summarised in the following Table:

Species	Target	Monitor	Control
Goats	reduction to less than 1 goat per 48 ha	Either use indications of mob size and location by recording sign (e.g. browse, hoof marks) or radio-transmitter collars on one of more individuals (Judas goats). Triennial monitoring	Control using contract hunter
Deer	reduction to less than 1 deer per 48 ha	Independent verification of low numbers on a triennial basis.	Control using professional hunter
Possums	reduction to less than 3% RTC	Monitor every three years	Install a grid of poison-bait stations at approximately 100 m x 100 m spacing (i.e. 1/ ha) over the control area. Knock-down control using Feracol or other poison bait approved for the control of possums. Ongoing control using poison baits as for rat control (below).
Rats	Reduction to less than 5% tracking rate	Monitor bait take and adjust amount of bait used to ensure minimal bait wastage Monitor twice each year.	Install a grid of poison-bait stations at approximately 50 m x 100 m spacing (i.e. 4/ ha). For each control year, fill stations in early August, then fortnightly through to early September. Check and fill monthly thereafter through to March the following year. Remove bait from stations in April and leave empty until reactivating stations in early August
Mustelids	A reduction in the catch rate of these species	Monitor via RTC	Install up to 20 DOC 250 series kill-taps
Feral Cats		Monitor via RTC	Live capture cage trapping. Spring to Autumn.

Hunua Quarry - residual pest tracking index results (RTI%) since 2017:

Pest species	Nov 2017	April 2018	May 2018	July 2018	Oct 2018	Jan 2019	Aug 2019	Dec 2019	June 2020	Oct 2020	May 2021	June 2022	April 2023	Feb 2025	Nov 2025
Rat	7.14	44.29	27.14	20	4.29	7.14	10	4.29	22.54	8.57	14.29	1.67	15.00	15.71	1.7
Possum	4.29	5.71	1.43	1.43	4.29	4.29	2.86	1.43	2.82	1.43	4.29	5.00	1.67	5.71	21.7
Mouse	2.86	n/a	n/a	3	1	1	3	1	4	6	6	8	3	6	n/a

The following is a summary taken from Pest Management: Tracking Tunnel Data Analysis (Phylogeny, November 2025) of the overall activity and recommendations from the latest pest monitoring at Hunua Quarry:

Overall Activity: 68% of stations recorded footprints, indicating moderate animal presence across the site.

• **Hotspots**: Line H (90%) and Lines F/G (70%) show the highest footprint activity, suggesting concentrated pest movement in these areas.

• **Target Pest Trends**:

  o **Possums** (13 detections) were most frequent on Lines F and H, indicating persistent mammal activity that can impact bird life and ecosystem balance.

  o **Rat detection** (1 occurrence) on Line G suggests localized rodent presence, meaning the previous bait pulse achieved good results.

• **Incidental Species**: Insects (24 detections) and skinks (3 detections) were common but are not considered pests in this context; their presence reflects normal ecosystem activity.

• **Low Activity Zones**: Line B (50%) recorded the lowest activity, suggesting reduced pest pressure in that area.

Recommendations

• **Targeted Control:**

  o Prioritize possum control on Lines F and H using traps.

  o Implement continued rodent control measures to keep pressure on rat population.

• **Maintain Current Strategy**:

  o Continue existing pest management in low-activity zones (e.g., Line B) while maintaining periodic checks.

• **Follow-Up Monitoring:** Schedule repeat tracking tunnel checks to confirm trends and evaluate effectiveness of interventions.

Existing pest plant management

Existing pest plant management methods prescribed in the Hunua Quarry VMP (2010) are summarised below:

Specific areas of weed infestation which require management prior to planting are (notes from I. Barton, Bioresearches 2000 and the author):

- Woolly nightshade:
  - Largely in wet areas in the Hay Paddock.
- Radiata pines
  - Four small blocks in the Hay Paddock. Remove these in the fifth year of the planting programme and replant with natives the same planting season.
- Willow and wattle
  - Throughout Symonds Stream riparian area. Tractor mulch, paste stumps with herbicide prior to planting.
- Pampas
  - Throughout Symonds Stream riparian area. Tractor mulch and spray regrowth prior to planting.
- Tradescantia
  - By creeks and in shady areas. Patchy distribution.
- Arum lily
  - Seen by riparian areas.
- Japanese honeysuckle
  - In low abundance, however may be currently controlled by browsing animals. Remove from all revegetation areas and adjoining forest areas prior to planting.
- Privet (Chinese and tree)
  - Mature stands of tree privet are present on adjoining non-Winstone Aggregates land across from Friedman Block. Seedlings of both species are throughout creek areas. Remove prior to planting and monitoring in young plantings
- Barberry

  - Uncommon on site.
- Blackberry
  - Uncommon. Where present gorse and native plantings will supplant it.
- Selaginella
  - Rare and found in similar sites to Tradescantia.

- Gorse and pasture grass species are two important nurse crop types currently present in the areas planned for revegetation. Except under the planned management of these areas for revegetation, these nurse crop areas will be excluded from broad-scale weed control programmes.

- Four small plantations of *Pinus radiata* exist in the Hay Paddock. These mature trees are not a weed threat to the plantings. They are proposed to be removed, either through harvesting or poisoning, during Year 5 of the planting programme and replaced with native forest trees and shrubs.

Weed control will follow the following guidelines:

- Weeds of ecological significance and those listed under the Auckland Regional Pest Management Strategy will be eradicated from the planned planting areas and areas of existing forest where at all possible;
- Removal of weeds will follow recommended best practice by the ARC and seek advice from qualified weed control experts;
- Weed control will be undertaken by qualified weed control experts using techniques that are appropriate for the scale of the weed infestation. For example, helicopter spraying may be appropriate for spraying large areas of gorse, hand-cutting and pasting for woolly nightshade and knapsack spray application for patches of honeysuckle;
- Weed control will be undertaken prior to planting areas in native species;
- Weed control will be informed by the monitoring programme (see Section 8) to ensure that weeds do not establish within the planted and restoration forest areas; and
- The success of the weed control programme and the results of the weed monitoring programme will comprise sections of the annual report to PDC as required under consent condition 22.

Together. Shaping Better Places.

Boffa Miskell is a leading New Zealand environmental consultancy with nine offices throughout Aotearoa. We work with a wide range of local, international private and public sector clients in the areas of planning, urban design, landscape architecture, landscape planning, ecology, biosecurity, Te Hīhiri (cultural advisory), engagement, transport advisory, climate change, graphics, and mapping. Over the past five decades we have built a reputation for creativity, professionalism, innovation, and excellence by understanding each project's interconnections with the wider environmental, social, cultural, and economic context.

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