

Oparure Quarry South-Western Pit: Ecological Betterment Plan

✦ Prepared for

Graymont (NZ) Limited

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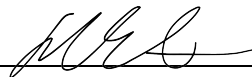
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1.0 Introduction

This plan presents the ecological betterment actions that will be undertaken by Graymont NZ Limited (Graymont) as part of its development of the Oparure Quarry South-Western Pit (the 'SW Pit').

The objective of this Ecological Betterment Plan (EcoBP) is to set out the measures and actions that the consent holder shall undertake to achieve a net ecological gain from the implementation of the betterment measures. This shall include setting out the measures that the consent holder shall implement to:

- a) Compensate for the loss of indigenous terrestrial, karst and any impacts on aquatic (freshwater) habitat as a consequence of the SW Pit's development and provide betterment in accordance with the Vision and Strategy for the Waikato River;
- b) Reduce the net contribution that the SW Pit makes to the contaminant (sediment and nutrient) load that is discharged to the downstream surface and groundwater resources; and
- c) Advance measures and initiatives to address the actual and potential cultural effects of the SW Pit.

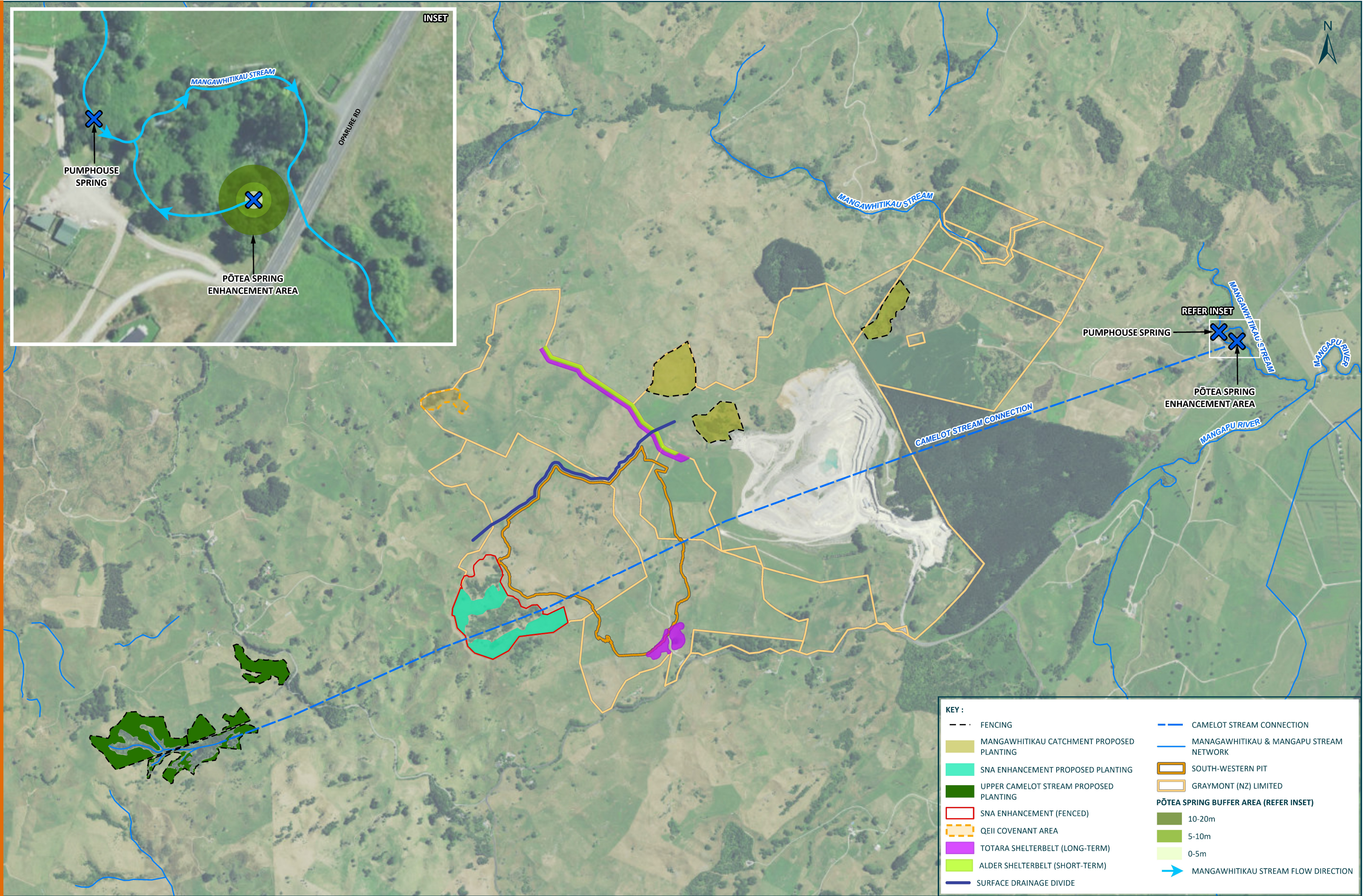
To achieve ecological betterment the following initiatives are proposed by Graymont:

- ✧ Reduction of sediment loads entering Camelot Stream catchment by reducing overland runoff to ephemeral gully streams through riparian planting and existing native vegetation enhancement;
- ✧ Reduction of sediment loads entering Mangawhitikau Stream catchment by reducing runoff from steep slopes through native vegetation planting;
- ✧ Planting of cave entrances;
- ✧ Plant and animal pest management (including fencing) of significant forested areas, tomos and at entrances to caves;
- ✧ Restoration and enhancement of Significant Natural Areas (SNA); and,
- ✧ Pōtea Spring enhancement.

A visual representation of the betterment proposed in relation to the SW Pit is provided in Figure 1. Detail on the content of each betterment initiative is provided in the sections following.

The EcoBP sets out the various initiatives to achieve betterment. However, the details on each of the proposed initiatives are contained in the relevant management plans, which include:

- ∴ Plant and Animal Pest Management Plan (also referred to as 'Pest Management Plan')
- ∴ Karst and Riparian Management Plan



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A	FINAL	JUN 26	MS
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SOURCE:
1. AERIAL IMAGERY (FLOWN 2023-2024) SOURCED FROM NATIONAL INSTITUTE OF WATER AND ATMOSPHERIC RESEARCH
2. CADASTRAL/TOPOGRAPHICAL INFORMATION AND INSET DERIVED FROM LINZ DATA.
3. WATERWAYS SOURCED FROM LINZ
4. PROPERTY PARCELS SOURCED FROM LINZ.

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FIGURE

FIGURE 1: BETTERMENT PLAN OVERVIEW

PROJECT

OPARURE QUARRY SOUTH-WESTERN PIT: ECOLOGICAL BETTERMENT PLAN

2.0 Improved Sediment Control for Camelot Stream Inputs

Field surveys have shown that current land use near the Camelot Stream submergence site has resulted in high potential for sediment runoff during rainfall events through dolines and cave entrances. This is due to stock damage to ephemeral flow paths and the exposure of highly mobile sediment.

The identified ephemeral gullies west of Waipapa Road (location shown in Figure 1) are to be fenced and restored with native planting and/or sediment detention pits. Maps of the areas where proposed fencing and planting will be undertaken, as well as detail on the fence type and planting details (typical planting schemes, proposed planting schedules and required ongoing maintenance requirements) are provided in the Karst and Riparian Management Plan.

This will reduce overland runoff to the Camelot Cave Stream upgradient of the SW Pit, to reduce the cumulative sediment loads to this watercourse. If sediment detention pits are utilised, they will require ongoing maintenance to clean accumulated sediment in order to function effectively during rainfall events. Further detail is provided in the Karst and Riparian Management Plan.

In addition to the reduction in sediment load to the catchment during rainfall events, stock exclusion through fencing and the planting of native vegetation will improve the biodiversity values of these ephemeral/intermittent waterways.

3.0 Reduced Sediment Loads for Mangawhitikau Stream Catchment

Areas of steep land under predominantly pasture farming has elevated potential for sediment runoff which may then enter dolines and cave entrances.

Three areas of steep land within Graymont's property boundary (location shown in Figure 1) are to be fenced and planted with native species. Maps of the areas where proposed fencing and planting will be undertaken, as well as detail on the fence type and planting details (typical planting schemes, proposed planting schedules and required ongoing maintenance requirements) are provided in the Karst and Riparian Management Plan.

This will reduce overland runoff to the Mangawhitikau upgradient of Pōtea Spring and the Mangapu River compliance point, to reduce the cumulative sediment loads to these watercourses.

In addition to the reduction in sediment load to the catchment during rainfall events, stock exclusion through fencing and the planting of native vegetation will improve the biodiversity values of these areas.

4.0 Plant and Animal Pest Management

Plant and animal pest management is proposed to be undertaken in areas identified in this EcoBP for protection, restoration or enhancement. This includes the following locations:

- ✧ Camelot headwater streams;
- ✧ Identified Cave entrances;
- ✧ Rocky outcrops which support terrestrial fauna; and,
- ✧ Tomos which support terrestrial fauna and flora.

The controls include the installation of fencing, trapping and where relevant pest plant eradication. The Plant and Animal Pest Management Plan documents the sites and procedures, including timeframes for management works to be undertaken. This plan provides practical methodologies to reduce the impacts of introduced pest animals and plants on the ecological values retained on-site. For cave entrances, in particular in the upper Camelot Stream catchment, specialist ungulate control may be required to control wild populations known to occur (tracks observed).

5.0 Pōtea Spring Enhancement

To provide betterment for Pōtea Spring, enhancement of the current riparian planting around the spring head is to occur. Based upon ecological investigations at Pōtea Spring, the spring is fenced within the riparian margin, but riparian vegetation is predominantly exotic vegetation.

Planting of native vegetation suitable for spring margins (i.e. tolerant to wetted conditions) is to occur within a 20 m buffer of the springhead, with progressive removal of exotic species as the native vegetation establishes. This is proposed to be completed where access is possible, noting the proximity of the lower Mangawhitikau Stream mainstem to Oparure Road. The management actions are outlined in the Karst and Riparian Management Plan.

6.0 Karst Ecosystem Protection and Enhancement

A karst ecosystem is defined by landscape features such as: cave entrances, sinkholes/dolines, calcareous cliffs, scarps and tors. These features can support a wide range of flora and fauna.

Karst ecosystem protection will occur in two main areas. These being the area to the west of the SW Pit, where two significant natural areas (SNA) are located. This will include 2.5 ha of planting to link the two existing SNA areas. The second area is the Camelot source streams which contains karst features including cave entrances to be protected. These areas are shown in Figure 1 and summarised in Table 1.

Protection (and enhancement) of karst ecosystems will include a mix of the following actions:

- ✧ Cave entrance protection/planting (see Section 7.0).
- ✧ Karst features protection and enhancement.
- ✧ Reconstruction of rock piles to increase habitat for copper skinks, ornate skinks, and nest sites for NZ bush falcon (within the enhanced karst area linking the two SNA).
- ✧ Plant and animal pest control.
- ✧ Native planting.
- ✧ Appropriate fencing.

The Karst and Riparian Management Plan sets out the protection and enhancement of these areas. This will include karst enhancement required under the Lizard Management Plan, planting schemes, proposed planting schedules and ongoing maintenance requirements for these areas.

7.0 Cave Entrance Planting

The SW Pit will cause the loss of seven shallow caves. The Terrestrial and Subsurface Ecology Assessment (BlueGreen Ecology, 2026) recommends that seven neighbouring caves and cave entrances close to the SW Pit, especially those with some associated native forest remnants, to be a priority for protection and enhancement. Twenty-one small caves entrances in total are to be restored, which is over and above the minimum recommended by BlueGreen Ecology. These caves will be spread across the already identified betterment areas shown in Figure 1.

Focus on enhancement of cave entrances can be achieved through physical and legal mechanisms (removing stock and other uses), revegetation of the entrances including conservation-important species (and stock removal mitigating sediment incursion). This is further supported by lizard management and pest species management that is to be undertaken by Graymont.

8.0 Summary of Betterment Options

Table 1 presents a summary of the various betterment options that were considered by technical specialists to mitigate identified effects associated with the proposed activity. These are visually shown in Figure 1. Also included is a summary of the proposed commitments made by Graymont to achieve the required betterment.

Table 1: Betterment Plan Summary			
Source	Native planting in the Camelot and Mangawhitikau Stream catchments (streams/caves/steep slopes)	Pōtea Spring Enhancement	Plant and animal pest control of vegetation and/or cave entrances (including fencing)
Water Assessment Report	✓		
Aquatic Ecology Report	✓	✓	✓
Terrestrial and Subsurface Ecology Report	✓		✓
Summary of commitment	Riparian Planting, native planting and Pōtea Spring Improvements	Plant and animal pest control of vegetation and/or cave entrances (including fencing)	Create QEII covenants
	Upper Camelot Stream catchment (11.8 ha planting and fencing: Balls + Boddies) 9.4 ha of additional planting on Graymont owned land within the Mangawhitikau Stream catchment 21 cave entrances with 224 m ² floor area (cave Ecology) 6.7 ha of planting between and around existing SNA vegetated areas 14.4 ha of significant forest fencing and pest control within and around existing SNA vegetated areas 314 m ² Pōtea Spring vegetation restoration Implementation of the Karst and Riparian Management Plan and Pest Management Plan	Implementation of Pest Management Plan.	Guildford cave entrance