

Drury Quarry Sutton Block Extension

E9:9 Net Gain Delivery Plan: Riparian Planting

for: Stevenson Aggregates Limited



DOCUMENT CONTROL AND REVISION RECORD

Document title	Drury Quarry Sutton Block Extension E9:9 Net Gain Delivery Plan: Riparian Planting
Prepared for	Stevenson Aggregates Limited

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Version	Date	Author(s)	Reviewer
Draft 1	21 March 2024	CG	TJB
Draft 2	20 January 2025	CG	TJB

Job number	64827
Filename	E9.9_SuttonBlock_NGDPRP

Reference: Bioresearches (2025). E9:9 Net Gain Delivery Plan: Riparian Planting. Report for Stevenson Aggregates Limited pp 45.

DOCUMENT GUIDE

As part of the Sutton Block pit expansion, a full suite of ecology assessments, reports and plans have been developed (Table 1). A summary of each document, including its objectives and key findings are provided in this section. This table is provided at the start of each ecology document with the relevant document highlighted to improve navigation. This document is 9 of a series of 9 ecology documents (E9:9).

Table 1. Documents prepared as part of this project. Current document is highlighted.

Document name (abbreviated name)	Aspects covered
E1:9 Ecology Documents Guide and Summary	Summary of the whole project and guidance for navigating documents.
Ecological Impact and Management	
E2:9 Ecological Impact Assessment (EcIA)	Assessment of ecological values and impacts of the proposed Sutton Block on terrestrial and fresh-water ecosystems, including regenerating and mature forest fragments, water courses and wetlands. Fauna values include common native invertebrates and birds, At Risk pipit, copper skinks, longfin eel and (potentially) threatened long-tailed bats. Recommendations are provided for avoiding, managing, offsetting and compensating for significant residual adverse effects.
E3:9 Ecological Management Plan (EMP)	Management of ecological impacts in accordance with the effects management hierarchy, prior to and during and following construction. Specific impacts and values addressed in this Plan include: a) Management of Vegetation Removal b) Avifauna Management Plan c) Long-Tailed Bats Management Plan d) Native Lizard Management Plan e) Edge Effects Management Plan f) Native Freshwater Fauna Management Plan g) Sutton Block Riparian Planting Plan
Residual Effects Analysis Reports (REAR)	
E4:9 REAR: Terrestrial Ecology (REAR-TE)	Residual effects on terrestrial ecosystems and fauna
E5:9 REAR: Stream and Wetland Loss (REAR-SW)	Residual effects on freshwater ecosystems
Net Gain Delivery Plans (NGDP)	
E6:9 NGDP: Planting Plan (NGDP:PP)	Terrestrial offset planting
E7:9 NGDP: Pest and Weed Control (NGDP:PWC)	Terrestrial offset pest and weed control
E8:9 NGDP: Wetland Planting (NGDP:WP)	Freshwater offset planting of wetlands.
E9:9 NGDP: Riparian Planting (NGDP:RP)	Freshwater offset planting of streams.

EXECUTIVE SUMMARY

Background

Stevensons Aggregate Limited (SAL) is proposing a new quarry pit and associated facilities ('the Project') at its Drury Quarry site. The Project area is located in the northern sector of the quarry, referred to as the Sutton Block, which is predominately zoned 'Special Purpose Zone: Quarry' (SPQZ) under the Auckland Unitary Plan – Operative in Part (AUP), with smaller perimeter areas zoned Mixed Rural Zone. This Project site comprises some 87.7 ha of land which is predominantly grazing pasture, with streams, wetlands and fragments of indigenous and exotic vegetation.

Purpose and Scope

The purpose of the Net Gain Delivery Plan: Riparian Planting (NGDP:RP) is to offset the loss of stream habitat within the Sutton Block expansion area, as shown in the table below. In total, 3,341 m of stream length will be lost over the 50 year course of the pit expansion.

To offset this loss, 1,052 m of stream length has been proposed for riparian planting within Drury Quarry property. In addition, 2,289 m of stream length has been proposed for riparian planting at the Tuakau offset site.

Table 2: Stream loss and offset for Sutton Block expansion area

Stream Loss	Value	Length (m)	
Stages 1-4 Impact Area	Low to Moderate	3,341	
Stream Offset – Drury Quarry		Length to be restored (m)	Riparian Planting (m ²)
Tributary 1 (Peach Hill Rd)		148	2,960
Tributary 2 (Peach Hill Rd)		164	3,280
Tributary 3 (Peach Hill Rd)		290	5,800
Davies Road Tributary		451	7,980
Stream Offset - Tuakau		Length to be restored (m)	Riparian Planting (m ²)
Western Stream		740	14,800
Tutaenui Stream		1,549	30,980
Total Offset Riparian Planting:			65,800 m²

The restoration and enhancement of the degraded aquatic habitats will provide a positive aquatic ecological benefit, habitat creation, and biodiversity gains.

It is recommended that planting areas are covenanted to protect revegetated areas in perpetuity.

The purpose of this report is to set out the site-specific riparian planting plans, to achieve the quantum and type of planting required to provide the calculated offset for stream loss within the Sutton Block project area.

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1 INTRODUCTION

1.1 Purpose and Background

Bioresearches has been engaged by Stevensons Aggregates Limited (SAL) to provide a Net Gain Delivery Plan: Riparian Planting (NGDP:RP). The intent of this plan is to provide for the offset for the loss of watercourses within the proposed Sutton Block expansion area of Drury Quarry, based on the Ecological Compensation Ratios included in the Residual Effects Analysis Report - Stream and Wetland Loss (REAR-SW; Bioresearches, 2025). Details of the compensation for wetland habitat loss in relation to Sutton Block will be provided in a separate Net Gain Delivery Plan: Wetland Planting (E8:9 NGDP:WP) and should be read in conjunction with this plan.

The Sutton Block comprises approximately 88 hectares of predominantly grazing pasture, with fragments of indigenous and exotic vegetation, permanent and intermittent streams, and natural wetlands (Figure 1).

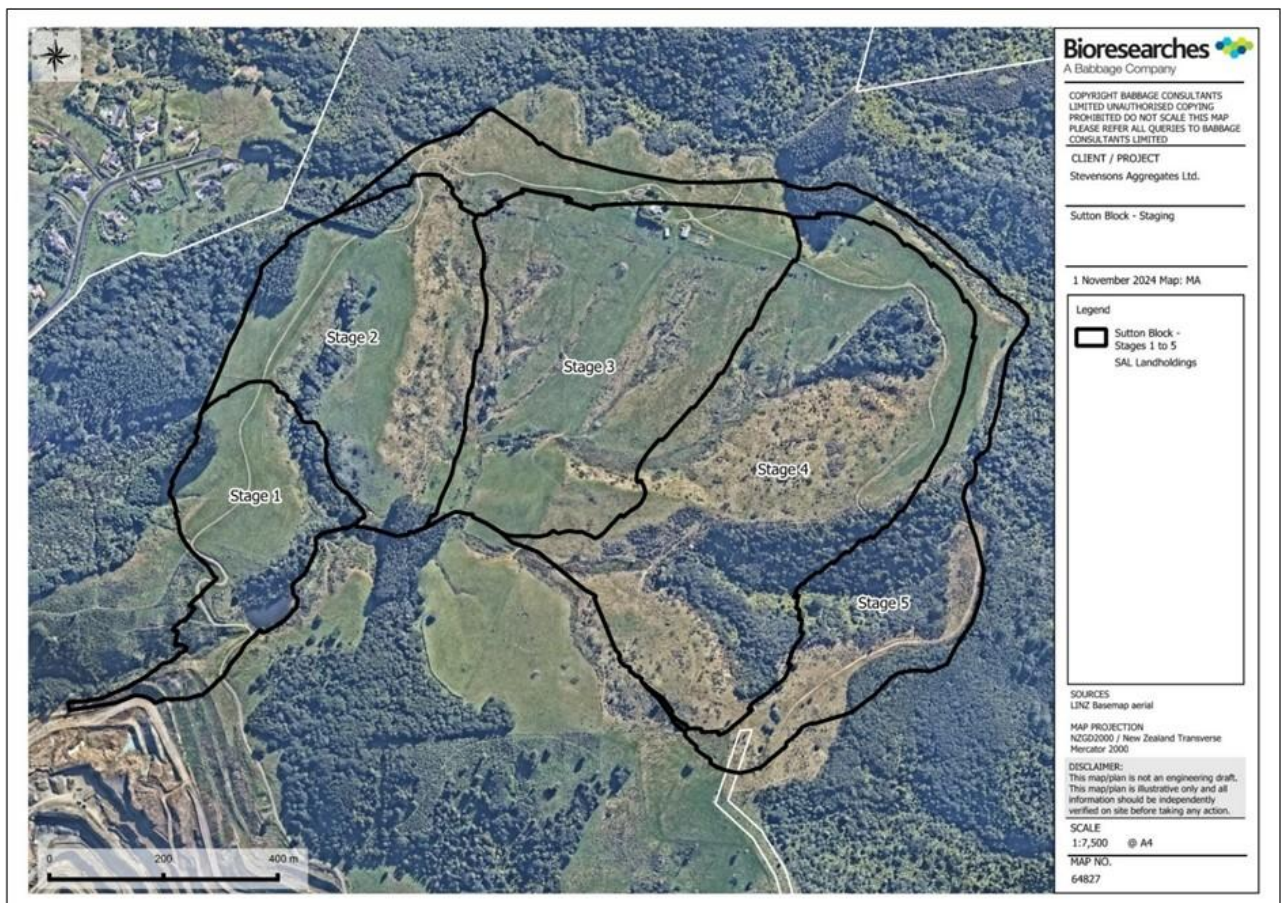


Figure 1: Map showing Drury Quarry property boundary in white, with the Sutton Block proposed pit stages in black.

The quarry expansion will be staged over approximately 50 years. In total, 3,341 m of stream length will be lost. In the Ecological Impact Assessment (EclA; Bioresearches and JS Ecology, 2025), the loss of aquatic habitat in the Sutton Block pit is considered a significant residual adverse effect under the AUP, and a Moderate to High level of effect under the EclA guidelines (Roper-Lindsay et al., 2018), thus requiring aquatic offset or aquatic compensation.

The location of aquatic offset activities for Sutton Block partially occur within Drury Quarry Property. Some of the offset actions had to be considered off-site, as much of the remaining habitat within Drury Quarry property has been set aside for other restoration projects or does not meet the requirements for stream length and wetland size.

The chosen off-site location for offsetting stream habitat occurs at the Tuakau Site, lying 16km south of Drury Quarry within the Waikato Region (Figure 2). Two stream habitats flow through the east and west boundaries of the site. Along the western boundary, an unnamed tributary flows until it reaches the Waikato River. Approximately 2.3 km of the Tutaenui Stream, which originates in the Auckland Region in Pukekohe, flows along the eastern boundary of the site; the lower 680 m of which has been straightened, prior to flowing to the Waikato River.

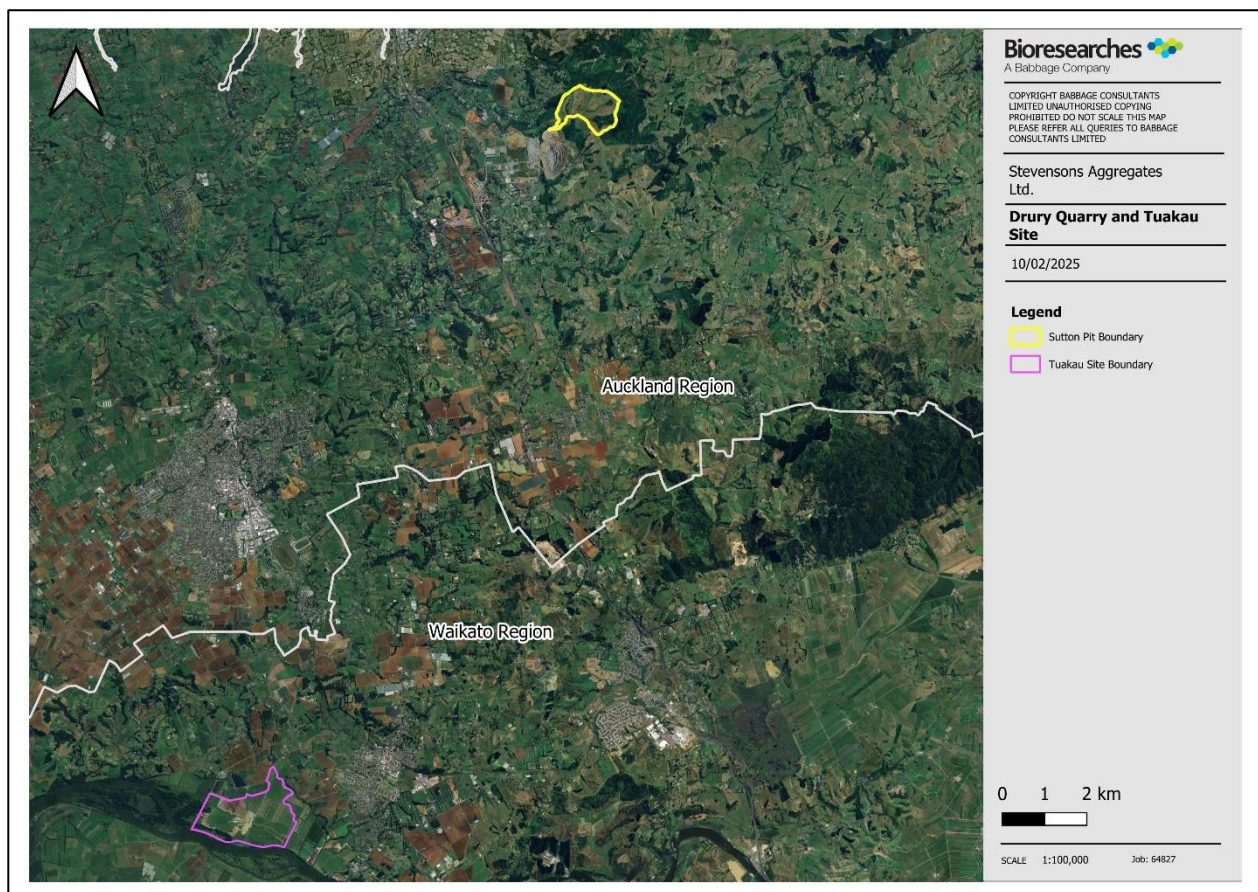


Figure 2: Sutton Block (pink polygon) and the Tuakau Offset Site (yellow polygon)

The background, justification and calculations for the quantum of offset required at both Drury Quarry and the Tuakau Site for the loss of the stream habitats was provided in the Stream and Wetland Offset and Compensation Report (Bioresearches, 2025).

At the Drury Quarry offset site, ten metres of riparian planting will be provided along four tributaries occurring in the southern limit of the property.

At the Tuakau offset site, ten metres of riparian planting will be provided on each bank of the eastern tributary, linking to the wetland planting occurring in the south-eastern corner of the Tuakau site. Twenty metres of riparian planting will be provided on the True Right Bank (western bank) of the Tutaenui Stream, as the other bank falls outside the property boundary.

This plan has been written based on several frameworks, including:

- Appendix 16 of the Auckland Unitary Plan (AUP): Guideline for native vegetation plantings.
- Te Haumanu Taiao (Auckland Council, 2023) guidelines on restoring natural environments in Auckland
- Department of Conservation planting guide for the Meremere Basin
- The Residual Effects Wetland Planting Plan, also forming part of the Tuakau offset/compensation for loss of aquatic habitats for the Drury Quarry Sutton Block.

It is recommended that planting areas are covenanted to protect the revegetated areas in perpetuity.

The planting and enhancement section of this plan addresses:

1. Weed removal and management;
2. Planting methodology, sourcing and schedules;
3. Physical Protection of plants required at the implementation stage;
4. Plant monitoring targets and maintenance; and
5. Plant disease and pest animal management.

The stream restoration section of this plan addresses instream enhancements.

1.2 Offset Site Descriptions

1.2.1 Drury Quarry

The loss of aquatic habitats within the Sutton Block pit expansion is to be partially offset along four tributaries within Drury Quarry property (Figure 3).

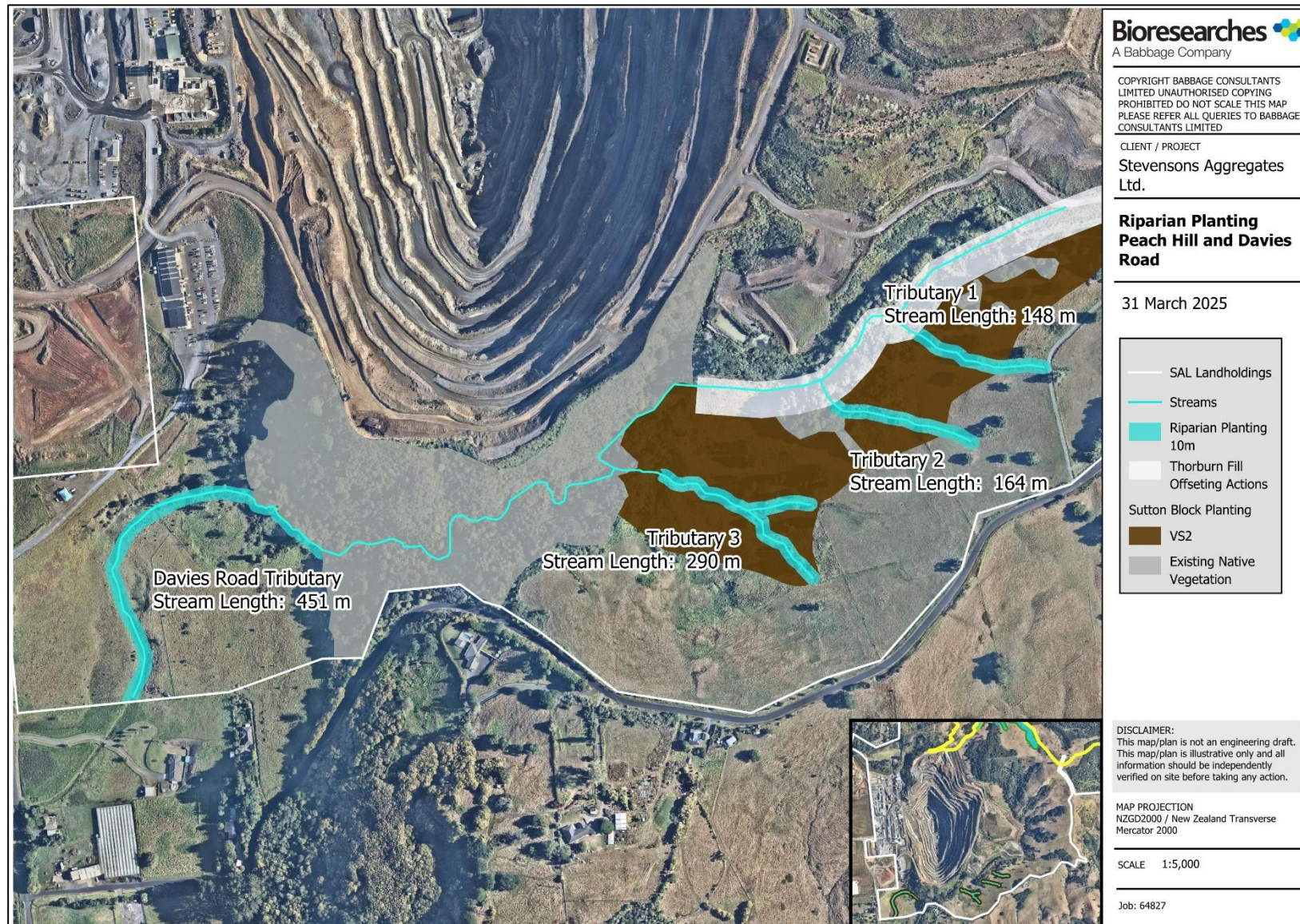


Figure 3: Locations of riparian planting within Drury Quarry, near Peach Hill (east) and Davies (west) Road

1.2.1.1 Peach Hill Road – 602m Stream Length to be Restored

The first three tributaries have been referred to as the Peach Hill Road offset site, and flow west to the mainstem tributary draining the catchment. The mainstem tributary has a riparian setback as part of the consent for the clean fill site located further up the catchment.

Peach Hill Road tributaries 1, 2 and 3 drain a pastoral catchment, that runs stock. The streams are all intermittent with soft substrates and mostly very poor or no shading. The riparian vegetation is dominantly composed of pasture grasses with patches of exotic weed species (woolly nightshade – *Solanum mauritianum* and gorse – *Ulex europaeus*), with occasional scattered mature native trees (pūriri – *Vitex lucens*, tōtara – *Podocarpus totara*). SEV scores for these streams vary from 0.39 across Tributary 1, 3 and the upper reach of Tributary 2, and 0.59 for the lower reach of Tributary 2.



Photo 1: From left to right, Tributaries 1, 2 and 3 adjacent to Peach Hill Road within Drury Quarry property

1.2.1.2 Davies Road – 450m Stream Length to be Restored

The fourth tributary occurs adjacent to Davies Road, and is the lower reaches of the mainstem stream to which the Peach Hill Road streams flow. The stream is an unnamed tributary of the Maketu Stream and ultimately drains to the Hingaia Stream northwest of the Quarry. The stream bed generally grades from silt and intermittent gravel in the southern reach, with occasional boulders and larger gravels present in the upper reach. Riparian vegetation generally consists of pasture grasses, with mature kahikatea (*Dacrycarpus dacrydioides*), pūriri and willow (*Salix* sp.) present in the upper reach. Macrophyte abundance was highest in the lower reaches during surveying.

The SEV for the lower reach of this stream is currently 0.39, and the upper reach 0.44.



Photo 2: Left: Upper reach of Davies Road; Right: Lower reach of Davies Road

1.2.2 Tuakau

The remaining offset will be undertaken at the Tuakau Site (Figure 4). The current use of the site is for farming and sand mining, with extensive areas of wetted pasture (70 ha). An unnamed tributary flows along the western boundary of the site, while the Tutaenui Stream flows along the eastern property boundary (Figure 4). The bank/s of both of these streams are proposed to be planted with riparian vegetation to offset the loss of stream habitat within the Sutton Block pit extension.

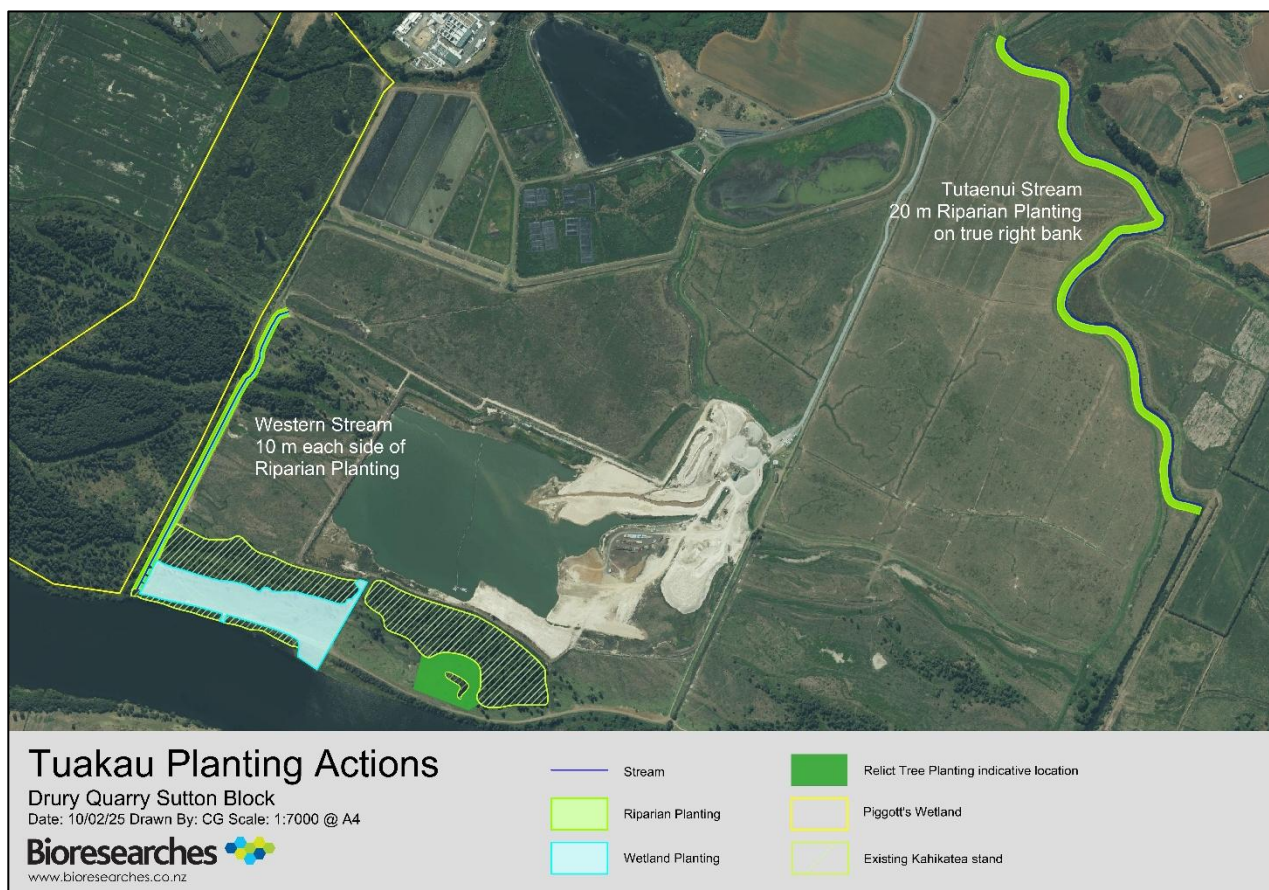


Figure 4: Map showing offset actions for Tuakau: Unnamed stream (west); Tutaenui Stream (east); wetland offset (south-west)

1.2.2.1 Unnamed Western Stream – 740m Stream Length to be Restored

The unnamed stream running near the western boundary of the Tuakau Site (Western Stream) averages 3.92m wide and forms a long run.

The true right bank (western bank) is raised, forming a stop bank, and the true left bank is comparatively flat, allowing full access to the floodplain with a small floodgate near the outlet of the stream to the Waikato River, which affects the stream flow.

The Western Stream forms a wide U-shaped channel with mainly soft substrates and limited hydrological heterogeneity. The riparian vegetation is depauperate, and is dominantly comprised of short pasture grasses with occasional poplar (*Populus* sp.) trees at the downstream end and two small kahikatea on the true left bank. The current Stream Ecological Valuation (SEV) score has been calculated to be 0.35, with the potential score calculated as 0.6 if 10m of riparian planting, fencing on each bank,

some remediation of the current partial barrier to fish passage and some habitat enhancements in the upper reaches were to be installed (Bioresearches, 2024).

The lower reach of this riparian planting would adjoin to the wetland offset planting (Figure 4).

740 metres of this stream occurs within the property and is proposed to be riparian planted. The planting would include 10 metres either side of the Western Stream, totalling to 14,800 m² of planting.

In addition, the stream is proposed to be enhanced with features such as rock armouring, boulders and gravel.



Photo 3: Left: Looking upstream of the western stream; Right: Looking downstream toward the Waikato River

1.2.2.2 Tutaenui Stream – 1,549 m Stream Length to be Restored

Tutaenui Stream originates in the Auckland Region, in Pukekohe, before flowing generally southwards into the Waikato Region and to the Waikato River. Within the Tuakau Site the stream forms a wide run, approximately 8.4m wide in the upper reaches and up to 22m wide in the lower reaches (average 11.3m).

The form and function is similar, albeit on a larger scale, to the Western Stream with mainly soft substrates, and depauperate riparian vegetation. Some hard substrate is present in the Tutaenui Stream with large wood (occasional logs) and riffle sections in the upper and middle of the stream under low flows. Common bullies and koi carp were both observed during the SEV assessments. Fish habitat quality and abundance is high, with aquatic macrophytes (mainly *Egeria densa*), undercut banks, deep pools and woody debris all common. The current SEV score has been calculated to be 0.40 with the potential score calculated as 0.58 with 20m of riparian planting and fencing on the true right bank (Bioresearches, 2024).

1,549 metres of this stream length is proposed to be riparian planted, using 20 metres on the True Right Bank (western side) of the stream, totalling 30,980 m² of planting.

In addition, the stream is proposed to be enhanced using features such as logs, embedded boulders, and root wads. As this stream is deeper and wider than the Western Stream, enhancement activities are required to be larger in size and more infrequent.



Photo 4: Left: Upper reach of the Tutaenui Stream; Right: Lower reach of the Tutaenui becomes wider

1.3 Biodiversity Enhancement Actions

Biodiversity gains at the offset sites would be achieved through the following enhancement measures of the stream habitats (Bioresearches, 2024):

- The enhancement of the existing habitat to improve its condition;
- Fencing the area from stock;
- The reinstatement of some of the rock within and adjacent to the watercourse;
- The removal or modification of structures providing total and partial barriers to fish passage; and
- Ongoing weed control of the restoration plantings.

Combined with these enhancement activities, habitat creation is proposed. This involves:

- Restoration planting, of species that form the early stages in a succession towards a native forest habitat.
- Addition of in-stream enhancements to increase the hydrological heterogeneity of stream habitat.

The restoration planting provides aquatic ecological benefits, by:

- Replacing pasture grass and/or weed species with native shrubs and trees in the riparian zone;
- Providing temperature control and reduction of nuisance growth of aquatic vegetation through shading;
- Providing woody debris in the stream, and increasing habitat and refuges for invertebrates and fish;
- Stabilisation of channel banks and channel shape; and
- Reduction of nutrient and sediment inputs into the streams.

2 PLANTING AND ENHANCEMENT IMPLEMENTATION PLAN

2.1 Staged Planting and Maintenance

A multi-staged approach is adopted by the following plan to ensure the survival and establishment of plantings and successful revegetation.

This section includes details of:

- Fence construction;
- Weed removal and management;
- Pest animal management;
- Planting installation; and
- Maintenance.

Stage 1 – Pre-Planting

- Perimeter fence construction – fence all areas to be planted that stock would have access to, to ensure segregation from stock
- Weed control - prior to the winter restoration planting, site preparation involves removal of any major weeds within the enhancement and revegetation sites.
- Animal Pest Control – Begin baiting, trapping and shooting programmes to reduce animal pest indices.

Stage 2 – Planting

- Prepare enhancement area and plant pioneer species according to the planting schedule.

Stage 3 – Ongoing Maintenance

- Replace unsuccessful plantings.
- Maintain plants with weed control.
- Once the pioneer plants have reached sufficient size to shelter enrichment species (approximately three years), under-planting of canopy and enrichment species can commence within the revegetation site. Releasing or removal of pioneer plantings may be required to make room for the new plantings.

2.2 Stage 1 – Pre-Planting

Prior to planting, fence construction, and plant and animal pest control, should be undertaken. This increases the chance of planting success at the time of installation.

2.2.1 Perimeter Fence Construction

Fencing should be installed, where applicable, surrounding the outer boundary of the riparian planting areas, adjoining and surrounding the wetland enhancement area. This is to protect from stock, and is to be of a stock-proof standard – timber post and wire design.

Fencing should surround both banks of the Western Stream, and the western bank only of the Tutaenui Stream.

Where practical, fencing should:

- Consist of a minimum 5 horizontal wires, preferably 7;
- Be built with timber round or half round posts, spaced at 3 to 5 m apart;
- Potentially with battens running vertically on the wires;

Fencing should be inspected annually and maintained to a stock-proof standard should damage be observed.

2.2.2 Weed Removal and Management

Weed removal is required before planting, both along the riparian margins and within the stream channel. Weeds and pest plants can smother the existing indigenous flora and inhibit growth of any new plantings. Some weed species will need continued maintenance, as their seeds or rhizomes can persist in the ground. Weed removal success is improved when carried out in the warmer months (October to March) and should be completed prior to planting activities commencing.

Native and Exotic Species On-Site

Weed species are currently present on site, both within the riparian margins and the stream channel in the form of aquatic macrophytes. The weeds vary in size, and thus will require different methods of removal. Native vegetation should be retained where possible. A list of common weed species and their suggested removal methods can be found in the section below.

Weed control must be undertaken by or under guidance of a suitably qualified contractor/ecologist. Natives on-site should be marked with flagging tape or similar prior to weed control, to ensure they are not removed or damaged. Native seedlings should also be retained to allow the natural regeneration of the enhancement areas.

Weed Removal Methods

The weed removal methods described below detail methodologies recommended to foster natural regeneration and prevent the loss of native species.

It is recommended that weeds are removed entirely, by hand or using small machinery, wherever possible.

The use of herbicides should be avoided or minimised wherever it is practical to do so, and completely avoided within 3 m of the wetted edge of streams. Blanket chemical weed control over the ground would also result in the loss of regenerating natives. Given the large size of the revegetation area, it is acknowledged that some chemical weed control may be necessary.

This section provides guidelines and restrictions regarding the application of chemical control substances which are to be followed where chemical control is required.

The following are options for the removal of weeds of varying size and difficulty (Forest and Bird, 2024; Waikato Regional Council, 2012):

1. Rake, roll up, dig out or pull out entire plant (including root system) and dispose at a refuse/green waste station (woody weeds below 4 m in height).
2. Kikuyu and pasture weeds:
 - a. Spray with glyphosate during extended dry periods and with a minimum 3 m distance from watercourses – to be applied for initial removal and during ongoing control activities post-planting completion only.
 - b. Where kikuyu occurs along stream bank edges, blanket chemical control may not be appropriate. Planting may occur into kikuyu grass and low-growing pasture weeds, provided the grass is initially cleared by hand/mowed, and plants continue to be released from kikuyu regrowth.
3. Large woody weeds that cannot be removed entirely or dug out (below 4m in height):
 - a. Drill and inject: Drill 18mm holes angled downwards in spiral up tree trunk. For 50mm stems, drill one hole. For 100mm stems, two holes. For larger stems, holes 150mm apart. Inject glyphosate (500 ml / L) into stem.
 - b. Cut across trunk and immediately paste the stump with metsulfuron or glyphosate gel.
4. Large trees (above 4 m in height) to be removed by a qualified arborist.
5. Aquatic macrophytes – to be removed by hand, with no chemical control used within 3 m of the stream edges.

Special note should be made of large pest tree species that may occur within or overhanging watercourses. Some species, such as poplar, will regrow from stumps and therefore cutting the tree across the trunk is not an appropriate weed control method. However, removing the tree entirely may reduce bank stability. The logs and roots in the stream also provide good aquatic habitat. It is recommended that pest species such as this are controlled according to number 3 above: either cut and paste with gel, or drilled and injected, but leaving much of the base of the trunk in-ground.



Photo 5: Example of weed species growing in waterway that are provisioning in-stream habitat. Removal should involve leaving the stump and parts of branches in place, and cut and pasting branches or injecting with glyphosate

Table 3: List of common pest plant species, some of which have been recorded at the planting sites or are likely to occur, and their suggested chemical removal methods should hand removal not be possible

Botanic Name	Common Name	Weed Control Method
<i>Alnus glutinosa</i>	black alder	Slice through the lower part of the trunk of large shrubs/small trees (below 4 m in height) and inject glyphosate into stem, or paste the stump with metsulfuron gel (see number 3 in methods above). Remove entire tree via qualified arborist
<i>Crataegus monogyna</i>	hawthorn	Slice through the lower part of the trunk of large shrubs/small trees (below 4 m in height) and inject glyphosate into stem, or paste the stump with metsulfuron gel.
<i>Berberis glaucocarpa</i>	barberry	Cut across trunk and immediately paste the stump with metsulfuron gel Spray with glyphosate during extended dry periods and with a minimum 3 m distance from watercourses
<i>Pinus radiata</i>	monterey pine	Slice through the lower part of the trunk of large shrubs/small trees (below 4 m in height) and inject glyphosate into stem, or paste the stump with metsulfuron gel (see number 3 in methods above). Remove entire tree via qualified arborist

<i>Zantedeschia aethiopica</i>	arum lily	Cut across base of stem and immediately paste the stump with metsulfuron gel
<i>Populus alba</i>	poplar	Slice through the lower part of the trunk of large shrubs/small trees (below 4 m in height) and inject glyphosate into stem, or paste the stump with metsulfuron gel (see number 3 in methods above). Remove entire tree via qualified arborist
<i>Salix</i> spp.	willow	Slice through the lower part of the trunk of large shrubs/small trees (below 4 m in height) and inject glyphosate into stem, or paste the stump with metsulfuron gel (see number 3 in methods above). Remove entire tree via qualified arborist <i>Note: Willow of all species can regrow from stem and branch fragments. Any willow debris must be disposed of offsite.</i>
<i>Ulex europaeus</i>	gorse	Cut across trunk and immediately paste the stump with metsulfuron or glyphosate gel
<i>Pennisetum clandestinum</i>	kikuyu	Spray with glyphosate during extended dry periods and with a minimum 3 m distance from watercourses Where kikuyu occurs along stream bank edges, blanket chemical control may not be appropriate. Planting may occur into kikuyu grass and low-growing pasture weeds, provided the grass is initially cleared by hand/mowed, and plants continue to be released from kikuyu regrowth.
<i>Hedychium gardnerianum</i>	ginger	Cut across base of stem and immediately paste the stump with metsulfuron gel
<i>Cortaderia</i> spp.	pampas	Spray with glyphosate during extended dry periods and with a minimum 3 m distance from watercourses Cut foliage back to base and immediately paste the stump with glyphosate gel
<i>Solanum mauritianum</i>	woolly nightshade	Spray with glyphosate during extended dry periods and with a minimum 3 m distance from watercourses Cut across trunk and immediately paste the stump with glyphosate gel

Herbicides should only be applied following a minimum of three (3) days without rainfall, and when rainfall is not forecast within 24 hours. This prevents run-off into watercourses, and the herbicide rapidly draining into groundwater. In addition, the following general guidelines apply when using herbicide control methods:

- Identify plants that will need to be retained prior to commencing weed removal activities;
- Keep a minimum of 1 m away from any native plants when applying glyphosate (and 3 m away when using herbicides with residual activity such as Metsulfuron); and
- Refrain from spraying directly next to watercourses – remain a minimum of 3 m distance from the wetted edge at all times.

It is recommended the use of the following chemical control substances is **avoided** due to their ability to accumulate in the environment:

- 2,4-D ester, MCPA and/or MCPB (often contained in herbicides marketed as ‘broadleaf killers’, e.g. ‘Pasture-Kleen’, ‘Ken-ester Relay’ or ‘Pasture Guard’)
- Picloram (often contained in herbicides marketed as ‘brushkillers’, e.g., ‘Eliminate Brushkiller’ or ‘Tordon Brushkiller’)
- Asulam (e.g., ‘Asulan’)
- Fluroxypyr (e.g., ‘Tandus XL’ or ‘Starane’)
- Saflufencil (e.g., ‘Sharpen’)

Always follow the manufacturer’s instructions carefully and use the recommended safety precautions to protect the user and water health. A wetting agent, such as Boost™, should be used to better adhere the spray adhere to the plant, allowing an increased efficacy of kill. Avoid spraying herbicide on windy days, when the droplets are likely to drift beyond the target area. The user should be suitably qualified in applying chemicals, such as in possession of a GROWSAFE certificate.

Maintaining up-to-date records of agrichemical usage is a legal requirement for the management of agrichemicals as set under the Hazardous Substances and New Organisms (HSNO) Act and specified in the New Zealand Standard for Management of Agrichemicals (NZS 8409:2021). Risks associated with the use of agrichemicals are required to be managed as indicated on the label and other product information so that adverse environmental effects are avoided.

A diary should be kept of all weed control, planting, and pest control work carried out.

2.2.3 Pest Animal Management

Pest animal control should be implemented at the pre-planting stage, to increase the success of new planting. Full details regarding pest control can be found in Section 5 of this report.

2.3 Stage 2 – Planting and Schedules

This section outlines a description of the planting zones, and a plant list including pioneer and enrichment species. The plants have been chosen based on information on indigenous Auckland vegetation (Singers *et al.*, 2017), Auckland Council (2023) riparian planting guides, Department of Conservation guidelines on planting within the Meremere Ecological District (DOC, 2024), as well as with respect to the vegetation at the offset site.

Additional weed control may be required prior to planting. Chemical weed control prior to planting should be undertaken not less than three weeks prior to planting.

2.3.1 Planting Zones and Descriptions

Peach Hill and Davies Road Streams (Drury Quarry)

The riparian planting at Drury Quarry adjoins the terrestrial VS2/Kānuka offset revegetation planting. Therefore, planting has been selected to reflect a VS2 forest ecosystem in the pioneer phase, with podocarps and broadleaved species introduced in the enrichment planting.

Planting across the four tributaries (Peach Hill Road and Davies Road) totals to **20,002 m²**.

Western and Tutaenui Streams (Tuakau)

The riparian planting area at the Western Stream consists of a three-metre stream edge zone on each bank, followed by a seven-metre upper riparian zone on each bank. Both zones total to 10 m of planting either side of the stream edge. The planting overall equates to **14,800 m²**.

The riparian planting area at the Tutaenui Stream consists of a three-metre stream edge zone on the true right bank (TRB) only, followed by a 17-metre upper riparian zone on the TRB. Both zones total to 20 m of planting on the TRB of the stream edge. The planting equates to **30,980 m²**.

Plants incorporated reflect a transition from pioneer species, to a kahikatea swamp/riparian WL18 secondary forest.

Overall, the planting reflects a variety of flowering and fruiting times across all four seasons, to ensure an ecologically diverse and supportive community of native flora and fauna resources.

2.3.2 Planting Lists – Pioneer and Enrichment Staging

The planting will occur in two stages–

1. Planting of plants within the stream edge zone; and pioneer species within the upper riparian zone
2. An enrichment planting of future canopy/late successional species within the upper riparian zones (Stage 2). The enrichment planting can occur from 3 years after the initial planting.

Pioneer planting (Stage 1) includes fast-growing plant species that provide natural protection for later successional canopy vegetation, that may otherwise have difficulty thriving in exposed environments. Pioneer plants establish quickly and create a canopy cover that will reduce exposure and shade out weeds.

Enrichment planting (Stage 2) of climax/canopy trees can be undertaken at 3 years following pioneer planting. Canopy/climax trees are late successional species and are usually slower growing and longer living. It may be necessary to first release or remove some of the pioneer plants to create space for enrichment species.

The tables below provide species lists for the planting plans. The tables include total plant numbers, accounting for 10% die-off during the initial period following planting. The location of the planting and total area coverage can be found in Figures 3 and 4.

Table 4: Plant list for the stream edge (3m) of the Peach Hill and Davies Road streams (Drury Quarry)

Zone	Botanical Name	Common Name	Grade (L)	Spacing (m)	Composition (%)	# Plants	# Plants + 10%
Stream Edge 6,012 m ²	<i>Austroderia fulvida</i>	toe toe	0.5L	1	5	301	331
	<i>Carex dissita</i>	flat leaved sedge	0.5L	1	10	601	661
	<i>Carex geminata</i>	rautahi	0.5L	1	15	902	992
	<i>Carex secta</i>	pūrei	0.5L	1	10	601	661
	<i>Carex virgata</i>	pūkio	0.5L	1	20	1202	1323
	<i>Carpodetus serratus</i>	putaputawētā	0.5L	1	10	601	661
	<i>Cordyline australis</i>	tī kōuka	1L	1	15	902	992
	<i>Cyperus ustulatus</i>	giant umbrella sedge	0.5L	1	10	601	661
	<i>Dacrycarpus dacrydioides</i>	kahikatea, white pine	1L	3	5	100	110
					100	5811	6393

Table 5: Plant list for the upper riparian zone (7m) of the Peach Hill and Davies Road Streams - pioneer and enrichment

Zone	Botanical Name	Common Name	Grade (L)	Spacing (m)	Composition (%)	# Plants	# Plants + 10%
Upper Riparian Pioneer 14,008 m ²	<i>Aristotelia serrata</i>	makomako	1	1	5	700	770
	<i>Coprosma arborea</i>	mamangi	1	1	10	1401	1541
	<i>Coprosma robusta</i>	karamū	1	1	15	2101	2311
	<i>Cordyline australis</i>	tī kōuka	1	1	5	700	770
	<i>Kunzea robusta</i>	kānuka	1	1	20	2802	3082
	<i>Leptospermum scoparium</i>	mānuka	1	1	10	1401	1541
	<i>Melicytus ramiflorus</i>	māhoe	1	1	10	1401	1541
	<i>Pittosporum tenuifolium</i>	kohūhū	1	1	5	700	770
	<i>Pseudopanax crassifolius</i>	horoeka	1	1	5	700	770
	<i>Knightia excelsa</i>	rewarewa	1	3	5	233	257
	<i>Podocarpus totara</i>	tōtara	1	3	5	233	257
	<i>Sophora microphylla</i>	kōwhai	1	3	5	233	257
					100	12606	13867
Upper Riparian Enrichment 14,008 m ²	<i>Carpodetus serratus</i>	putaputawētā	1	1	10	1401	1541
	<i>Dacrydium cupressinum</i>	rimu	1-2	1	10	1401	1541
	<i>Elaeocarpus dentatus</i>	hinau	1-2	3	5	233	257
	<i>Laurelia novae-zelandiae</i>	pukatea	1-2	3	10	466	513
	<i>Piper excelsum</i> var. <i>excelsum</i>	kawakawa	1	1	15	2101	2311
	<i>Schefflera digitata</i>	patē	1	1	15	2101	2311
					65	7704	8474

Table 6: Plant list for stream edge (3m) of the Western and Tutaenui Streams

Zone	Botanical Name	Common Name	Grade (L)	Spacing (m)	Composition (%)	# Plants	# Plants + 10%
Stream Edge 9,087 m ²	<i>Aristotelia serrata</i>	wineberry	1	1	10	909	1000
	<i>Astellia grandis</i>	swamp astelia	0.5	1	10	909	1000
	<i>Carex secta</i>	pūrei	0.5	1	15	1363	1500
	<i>Carex virgata</i>	swamp sedge	0.5	0.5	15	2726	3000
	<i>Coprosma propinqua</i>	mingimingi	1	1	10	909	1000
	<i>Coprosma tenuicaulis</i>	swamp coprosma	1	1	10	909	1000
	<i>Cordyline australis</i>	cabbage tree	1	1	10	909	1000
	<i>Laurelia novae-zelandiae</i>	pukatea	1	1	10	909	1000
	<i>Leptospermum scoparium</i>	mānuka	1	1	5	454	499
	<i>Parablechnum novae-zelandiae</i>	kiokio	0.5	0.5	5	909	1000
				Total:	100	10,906	11,999

Table 7: Plant list for the upper riparian zone of the Western and Tutaenui Stream - pioneer and enrichment

Zone	Botanical Name	Common Name	Grade (L)	Spacing (m)	Composition (%)	# Plants	# Plants + 10%
Upper Riparian Pioneer 36,693 m ²	<i>Alectryon excelsus</i>	tītoki	1	5	10	734	807
	<i>Coprosma rhamnoides</i>	twiggy coprosma	1	1	10	3669	4036
	<i>Coprosma repens</i>	taupata	1	1	10	3669	4036
	<i>Hoheria populnea</i>	lacebark	1	3	10	1211	1332
	<i>Kunzea robusta</i>	kānuka	1	1	10	3669	4036
	<i>Melicytus ramiflorus</i>	māhoe	1	1	10	3669	4036
	<i>Myrsine australis</i>	māpou	1	1	10	3669	4036
	<i>Pittosporum eugenioides</i>	tarata	1	1	10	3669	4036
	<i>Pittosporum tenuifolium</i>	kōhūhū	1	1	10	3669	4036
	<i>Sophora microphylla</i>	kōwhai	1	3	10	1211	1332
				Total:	100	28841	31725
Upper Riparian Enrichment 36,693 m ²	<i>Carpodetus serratus</i>	putaputawētā	1	1	10	3669	1709
	<i>Dacrycarpus dacrydioides</i>	kahikatea	1-2	3	15	1816	342
	<i>Piper excelsum</i> var. <i>excelsum</i>	kawakawa	1	1	15	5504	1709
	<i>Schefflera digitata</i>	patē	1	1	15	5504	1709
	<i>Vitex lucens</i>	pūriri	1-2	5	10	734	228
				Total:	65	17227	5697

2.3.3 Planting Procedure

The planting season runs from April through to August.

During planting, the following procedures should be followed to ensure maximum survival of plants and optimal growth and health.

- Prior to planting, ensure all plants are thoroughly watered and have been allowed to drain out of direct sunlight.
- Set the plants out on site according to the recommended spacing. Aim to follow a randomised planting layout rather than straight lines, to achieve a “natural” rather than uniform look. Plant species should be mixed to avoid large single-species groupings.
- Dig a hole 1.5 – 2 times wider than the plants’ root ball. Ensure the edges of the hole are roughened, especially in clay soil, to avoid a “pot effect” and the drowning of plants. Back-fill with a small amount of soil to cover the base.
- Carefully remove the plant from the bag. If the plant is root bound/has circling roots, untangle the roots carefully.
- Back-fill the hole with part new soil and part existing soil. Break up clumps of existing soil with a shovel as much as possible. As you fill, avoid stomping firmly on the soil, as this may over-compact the ground and restrict root growth. Some moderate tapping with the shovel or by hand once planted is adequate.
- Fill the planting hole until the top of the root ball sits just above the soil level; cover the root ball with soil. The final position should be in a slight mound to account for compaction of soil over time and prevent drowning.

2.3.4 Plant Sourcing

All new plants should be eco-sourced from within the Hunua Ecological District for the Drury Quarry planting, and the Meremere Ecological District for the Tuakau planting. Eco-sourcing protects the genetic lineage of plants in the area, and ensures plants are adapted to their specific regional climatic conditions.

All plantings from the Myrtaceae family of species shall be sourced from a nursery that is a signatory to the Myrtle Rust Nursery Management Declaration V6, 11 October 2017, certifying that the plant producer has implemented the New Zealand Plant Producers Incorporated Myrtle Rust Nursery Management Protocol (Myrtle Rust Nursery Management Protocol – V6, 11 October 2017).

2.3.5 Physical Protection – Plant Guards

New seedlings are susceptible to grazing by pests such as possums and rabbits, and therefore adequate measures need to be taken to ensure plants are protected.

Rabbits and pūkeko can compromise restoration efforts by consuming the young foliage on new plantings. To protect vegetation during the first two-to-three years of establishment, it is recommended that environmentally-friendly plant guards are installed. See Figure 5 below for an example of bio-degradable plant guards.



Figure 5: Left: Example of biodegradable plant guards; Right: Installation using timber or bamboo stakes

3 STREAM RESTORATION PLAN

This section describes stream-related activities (fish passage, protecting habitat, and instream enhancements) that are to occur at both streams.

3.1 Stream Restoration Activities

Streams and rivers provide habitat for indigenous plants, invertebrates and fish species. Streams with poor quality habitat can be enhanced and habitat functions restored by a combination of activities, such as:

- 1) Riparian planting (refer to section 2 of this report)
 - a) Which provides water quality improvements through shading the water course, providing temperature control, filtration of contaminants, bank stability and reducing the quantity of macrophyte and periphyton growth, thereby moderating the dissolved oxygen concentrations; and
 - b) Provision of habitat for native fauna and food for macroinvertebrates by the natural addition of wood substrate and leaf litter.
- 2) Fish passage – allowing passage of native fish through the site. (n.b. on this site, fish passage will be improved through in-stream enhancements).
- 3) Protecting habitat, through the installation of stock-proof fencing (see section 2.2.1 of this report).
- 4) In-stream enhancements – creating habitat and improving the quality of stream habitat through the provisioning of:
 - a. Boulders – providing variation in hydrology, habitat and resting areas in the eddies behind the boulders for aquatic fauna.
 - b. Root wads or large wood – providing habitat for fish and macroinvertebrates, as well as hydrologic variation.
 - c. Large cobble in patches - creating riffle habitat for native fish such as bullies and hard bottomed species of macroinvertebrates.
 - d. Rock for scour protection for areas prone to erosion.

This section details additional stream restoration activities relevant to the Western and Tutaenui Streams, including protecting habitat and in-stream enhancements.

3.2 Fish Passage

In order to improve fish passage in the Western Stream, the partial barrier to fish passage provided by the flood gate will be modified. The flood gate will be either be relocated upstream to the upstream edge of the proposed wetland offset planting (Figure 6) or modified to a 'self-regulating tide gate' in general accordance with the New Zealand Fish Passage Guidelines (Franklin *et al*, 2018).

At the Drury Quarry Peach Hill Road streams, culvert removal is required in order to restore fish passage.

3.3 Instream Enhancements

The streams will be enhanced differently, according to the variation seen between their form and function. The Western stream is typically shallower and more linear. The Tutaenui Stream in its upper reaches is shallow and sinuous, becoming deeper and wider towards the Waikato River.

3.3.1 Western Stream

The Western Stream averages 3.92 m in width. The true right bank (western bank) is raised, forming a stop bank. The true left bank is comparatively flat. The Western Stream forms a wide U-shaped channel with mainly soft substrates and limited hydrological heterogeneity.

Within the Western Stream, three enhancement activities are proposed:

1. Riffle Runs;
2. Rock armouring; and
3. Boulders.

Habitat additions should occur approximately every 7 metres along the stream channel. The locations of these can be found in Figure 6.

1. Riffle Runs

Gravel added to the stream creates riffle habitat for native fish (specifically bullies) and macroinvertebrates. On areas prone to erosion such as flood plains, larger sized gravel/pebble can be placed to reduce scour.

Gravel should be placed both within and to the side of the stream channel, particularly where the channel margin is low-lying. Smaller gravel, approximately GAP40-sized, should be placed first. Larger gravel, such as GAP65, or small rocks, should be placed directly behind the smaller gravel riffle runs downstream, to prevent the loss of the gravel in high-flow conditions.

2. Rock Armouring

Rock armouring is used to provide an area of stable large rock habitat, with gaps between rocks and interstitial spaces for macroinvertebrates and fish. Similarly to the riffles, rock would be placed both within and to the side of the stream channel.

1. Boulders

In high-flow conditions, boulders help to create hydrologic variation within a stream, producing eddies and resting areas for aquatic fauna. Boulders slow down the flow of water and create sinuosity within the channel.

Boulders should be approximately 500mm in diameter, placed as individual rocks or several together, and should be embedded within the side of the stream channel to prevent loss.



Figure 6: Map of in-stream enhancements for the Western Stream

3.3.2 Tutaenui Stream

Within the Tuakau Site the stream forms a wide run, approximately 8.4m wide in the upper reaches and up to 22m wide in the lower reaches (average 11.3m). The form and function is similar, albeit on a larger scale, to the Western Stream with mainly soft substrates.

Some hard substrate is present in the Tutaenui Stream with large wood (occasional logs) and riffle sections in the upper and middle of the stream under low flows. Common bullies and koi carp were both observed during the SEV assessments. Fish habitat quality and abundance is high, with aquatic macrophytes (mainly *Egeria densa*), undercut banks, deep pools and woody debris all common.

In the **upper reaches** of the stream channel, as the stream is shallower and already contains some in-stream habitat, proposed activities include:

1. Riffle runs;
2. Rock armouring; and
3. Boulders.

An enhancement should be placed approximately every 7 - 10 metres.

In the **lower reaches**, as the stream becomes much wider and deeper, larger enhancement activities are proposed, such as:

1. Root wads and logs; and
2. Boulders.

These in-stream enhancements should be placed infrequently, approximately every 15-20 metres.

Locations of both the upper and lower Tutaenui Stream enhancements can be found in Figure 8.

Details regarding the upper stream enhancements are the same as those of the Western Stream, and can be found in Section 3.3.1. Details of the enhancement activities of the lower reach are described below.

1. Root Wads and Logs

Root wads and logs can be placed within a stream to create variation in the stream channel and provide shelter and habitat for aquatic organisms. Root wads and logs should be placed partially into the stream channel and slightly embedded into the stream bank where possible to prevent washout. The root wads and logs should be angled upstream, to create eddies and pooling habitat as the current flows towards the logs. Boulders may be used to stabilise logs within the stream.



Figure 7: Root wads dug into stream bank and stabilised with boulders

1. Boulders

Boulders in this stream will act as a similar function to the boulders in the Western Stream and upper reaches of the Tutaenui Stream. However, in the lower reaches of the Tutaenui Stream, as the width is up to 22m, the size of the boulders can be greatly increased to up to 1.5 m wide.

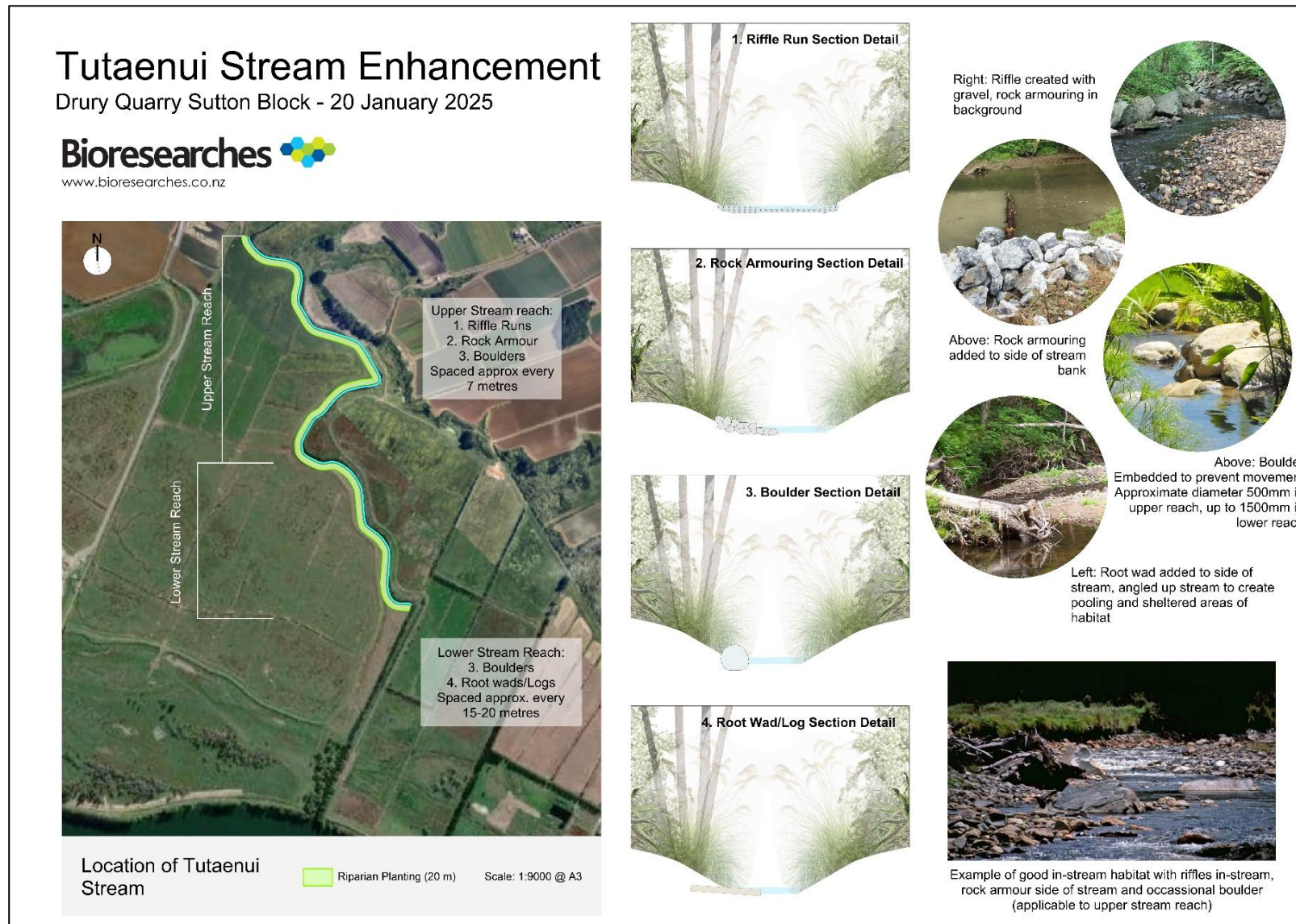


Figure 8: Locations of in-stream enhancements at the Tutaenui Stream, noting the different enhancement activities between the upper and lower reaches

4 MAINTENANCE PLAN

The maintenance plan of this report details the required plant aftercare, including replacement plants and weed control. It includes activities which should be undertaken for a minimum of **5 years** following planting, or until 80% canopy cover is achieved. Over this period, plants that fail to establish should be replaced. Maintenance must continue until 80% canopy closure targets are met.

In the instance that planting targets are not being met (i.e., plants continue to fail despite replacement planting), a substitute species may be used subject to the approval of a consulting ecologist. Replacement plants should be at least of the same size (relative to surrounding plants).

An annual report should be provided to the Client and project ecologist to ensure that planting targets are reached, detailing:

- Weed control including species targeted;
- General health of new plantings;
- Survival rates of new plants;
- Replacement planting undertaken/required; and
- Progress towards planting target of 80% canopy closure.

4.1 General Activities

Maintenance should occur for a minimum period of 5 years.

Maintenance will include:

- Manually removing weed species should they re-establish, with focus on releasing new plants from encroaching weeds;
- Fertilising and watering new plants if considered essential; and
- Replacing any plants that do not survive

Plant maintenance should occur bi-monthly for the first year (or for 12 months after planting/initial weed control).

Thereafter, the planting areas shall be maintained quarterly for at least 3 years after initial planting, and bi-annually in years 4-5.

Chemical weed control may be used, but should be avoided within 1 m of planted or existing natives. The use of chemical weed control should follow the guidelines outlined in the weed control section of this plan. This includes the use of chemicals around waterways (no closer than 3 m of the wetted edge), and when rain is likely (must follow three days without rainfall and not within 24 hours of expected rain).

Where weeds are re-establishing, it should be ensured that removal includes hand-releasing the stems of new or existing natives, particularly from kikuyu grass.

Targets of success include at least an **80% canopy closure**, and a minimum of **90%** of the original density of plants specified has survived.

A sample schedule of the plant maintenance and management activities required are presented in the tables below.

Table 8: Sample Planting and Maintenance Activity Schedule for the riparian planting areas

Time	Activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year One	Initial weed control												
	Initial planting												
	Fence and pest control												
	Plant maintenance												
Year two	Plant maintenance												
Year three	Plant maintenance												
Year 4/5	Plant maintenance												

4.1.1 Summer Activities

Summer (late November - late March) activities should include weeding, and watering plants if necessary during periods of drought.

4.1.2 Autumn and Winter Activities

Autumn and winter activities should include continued weeding (spraying may become inappropriate due to rain and wind), and the replacement of any dead plants within the planting season. Plant replacement should be of the same species. Should a particular species continue to fail, a substitute species may be used subject to the approval of a consulting ecologist. Replacement plants should be at least of the same size (relative to surrounding plants).

4.1.3 Spring Activities

In spring, continued weeding is required.

5 PEST ANIMAL MANAGEMENT

Rodents (rats, *Rattus* spp., mice, *Mus musculus*), possums (*Trichosurus vulpecula*) and mustelids (*Mustela* spp.) are major ecological pests that prey on native birds, their chicks and eggs; lizards and invertebrates and compete with native wildlife for fruits and seeds. In addition, rabbits (*Oryctolagus cuniculus*) and the native pūkeko (*Porphyrio melanotus*) are known to hinder restoration efforts and impede on the natural regeneration of indigenous plant communities.

Pest animal management plan should be in accordance with the pest animal control guidelines for the Auckland Region (Auckland Council, 2023), as well as the nationally-relevant Predator Free NZ guidelines. Some general guidelines regarding rodent and mustelid/possum control have been detailed below.

All pest control would be undertaken by a registered and experienced pest control provider that holds a licence for controlled substances (pest control toxins).

A map showing the location of pest control actions across the Tuakau offset sites can be found in Figure 9.

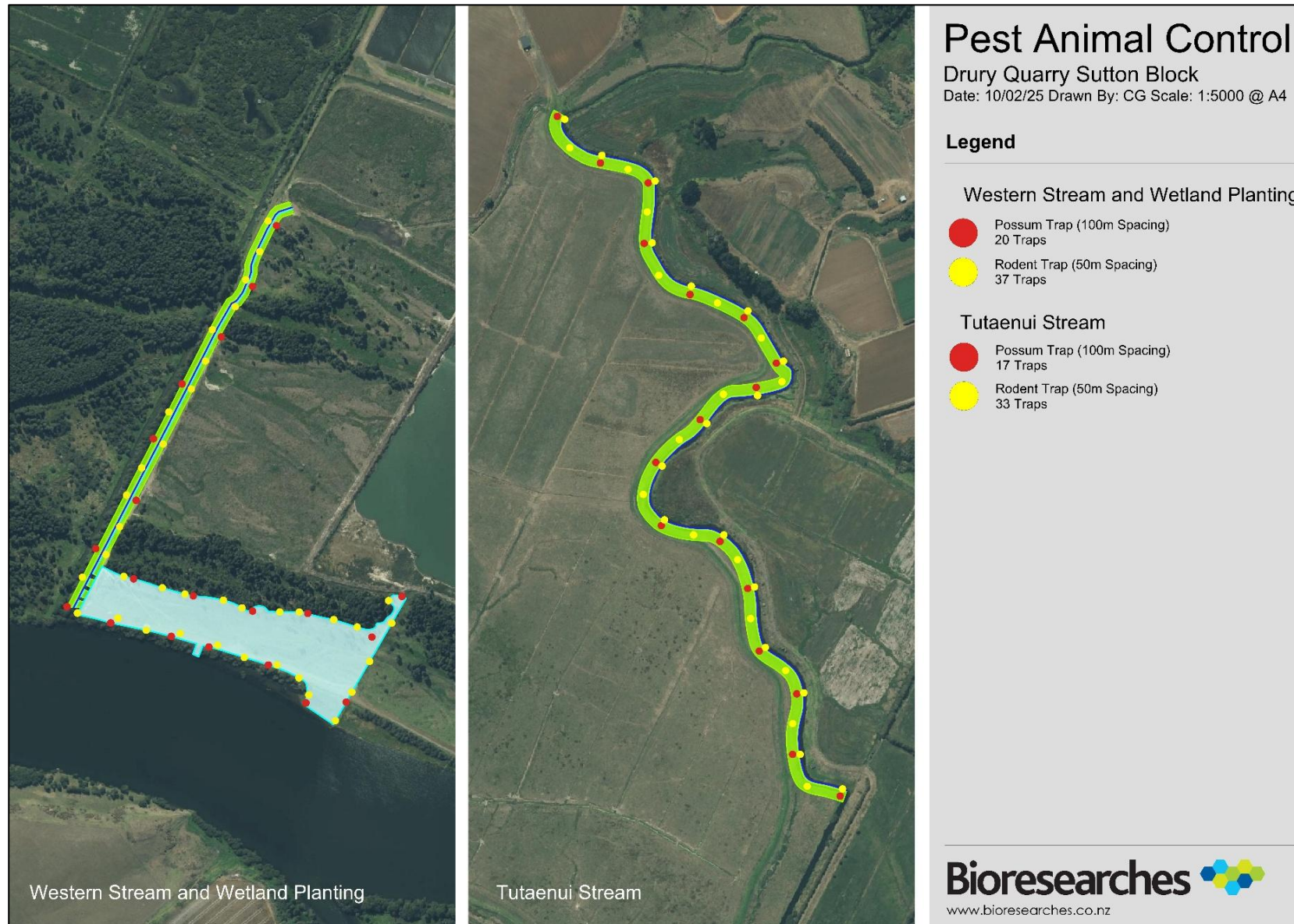


Figure 9: Map showing location of pest animal control actions across the Tuakau offset sites

5.1 Rodent Control Methods

Rodents will be controlled using **bait delivery or self-resetting instant kill** trapping methods. Rodent stations should be installed at approximately **50 m** spacing through the restoration planting area. Specific details for the bait or trap stations are provided below.

- Rodent Bait Stations

Stations would be stocked with Diphacinone, Cholecalciferol or Pindone baits, and interchanged periodically to maintain control. Where bait take remains high, the control operator may use an alternative toxin, such as brodifacoum. Brodifacoum should be used sparingly, as it has a longer persistence in the environment and can bioaccumulate. Bait stations must shield bait from rain and interference from non-target species (livestock).



Figure 10: Examples of rodent bait stations: a) Tamper-proof Protecta Sidekick, ideal for high-traffic areas; b) Philproof bait station, offering good weatherproofing for bait

- Rodent Self-Resetting Kill Traps

Trap types would be humane and specific to rat control (e.g., Goodnature A24 rodent and stoat trap) and provide a counter to monitor trap triggers. Place traps along the inside of fence line away from stock, 20 cm above the ground. Traps should be checked twice per week for the first two weeks and then as needed over the following four weeks, depending on the number of times triggered and carcasses that require removal.

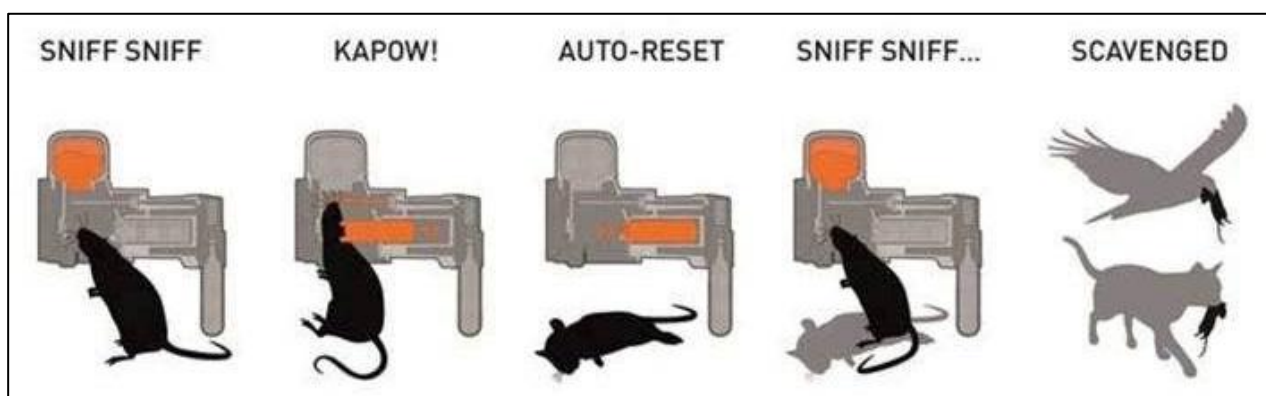


Figure 11: Operational process diagram of Goodnature A24 rodent and mustelid trap

5.2 Possum Control Methods

Possums will be controlled using **bait delivery or instant kill** trapping methods. Possum stations should be installed at approximately **100 m** spacing through the restoration planting areas. The specific placement of possum control stations shall be decided upon on site, considering accessibility for maintenance and for targeting of pests.

- Possum and Mustelid Bait Stations

Bait delivery stations for possums include the Possum Bait Safe (Baitsafe.co.nz) or the Philproof Possum Bait Station. Stations would be stocked with Cholecalciferol, Pindone, or Potassium Cyanide (Controlled substance Licence required) baits and interchanged periodically to limit risk of bait shyness. Effective baiting may require pre-feeding. Where bait take remains high, the control operator may use an alternative toxin, such as brodifacoum. Brodifacoum should be used sparingly, as it has a longer persistence in the environment and can bioaccumulate.



Figure 12: a) Possum Bait Safe station; b) Philproof bait station

- Possum Humane Instant Kill Traps

Trap types must be humane (passed NAWAC testing) and specific to possum control (e.g., Trapinator). Traps should be checked weekly and rebaited/ cleared as needed. Appropriate bait types for possums include peanut butter, fresh apple, or solid possum lures, ideally used in tandem with blaze around the trap to lure possums from a distance.

These traps are ideally mounted to a timber stake or existing tree.



Figure 13: a) Side view of a Trapinator possum trap with setting instructions; b) Trapinator possum trap mounted on tree

5.3 Pest Control Monitoring and Triggers

Efficacy of pest control would be monitored via records of percentage bait take for bait stations and number of triggers and carcasses removed for instant kill traps.

- Bait replacement should be maintained weekly throughout a pulse period where bait take is more than 50% at any station. If bait take remains over 50% for more than three consecutive weeks, bait toxin type should be changed.
- Traps should be checked twice per week for the first two weeks and then weekly if traps are triggered more than 50% of their reset life. If more than 50% remains, traps may be checked less than weekly as determined by the pest control provider.

5.4 Timing of Pulsed Control

The pest management programme would be pulsed four times per year. Each pulse would consist of a 4-week period (Auckland Council, 2023).

During each pulse period, bait stations would be maintained with fresh cereal baits or paste, and checked weekly until bait take ceases. For instant kill varieties, traps requiring manual clearing would be checked weekly during this 4-week period to ensure proper functioning and clearance of any carcasses. Self-resetting traps that don't require frequent rebaiting (e.g. A24) may be checked less frequently, as determined by the pest control provider.

Table 9: Pulsed control programme for pest animal management

Time	Activity	Jan	Feb-Mar	Apr	May-Jun	Jul	Aug-Sep	Oct	Nov-Dec
Four times per year	Pulse period								
	Bait stations	Bait refill		Bait refill		Bait refill		Bait refill	
	Instant Kill Traps	Check, clear, rebait		Check, clear, rebait		Check, clear, rebait		Check, clear, rebait	

5.5 Record Keeping

Accurate recording of results from the pest control programmes is important for providing information on the status of predator populations on the properties over time. Annual reports summarising the results of the pest control should be prepared and made available to Council compliance for review. The pest control operator would be responsible for collecting data on trap catches, maintaining the pest control devices, and preparation of summary reports.

At a minimum, the following set of information should be collected:

- Location of the traps;
- Number of kills;
- Number of traps nights; and
- Lure/bait (i.e., apple) used.

Baiting records:

- Placement of bait stations
- Bait type
- Timing of placement
- Quantity used during each re-baiting
- Quantity of bait take each check (i.e., percentage bait-take)

The use of a software such as TrapNZ is recommended to record trap outcomes.

5.6 Health and Safety

When using toxin-based baits, always follow the manufacturers' instructions, and ensure the baits are stored in a dry safe area locked away from pets and children. If bait is consumed by a person, call the poison hotline (**0800 764 766**) immediately. If a pet consumes brodifacoum, take them to a vet immediately to receive Vitamin K1, an effective antidote to the anticoagulant.

6 REFERENCES

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APPLICABILITY AND LIMITATIONS

Restrictions of Intended Purpose

This report has been prepared solely for the benefit of Stevenson Aggregates Limited as our client with respect to the brief. The reliance by other parties on the information or opinions contained in the report shall, without our prior review and agreement in writing, be at such party's sole risk.

Legal Interpretation

Opinions and judgements expressed herein are based on our understanding and interpretation of current regulatory standards and should not be construed as legal opinions. Where opinions or judgements are to be relied on, they should be independently verified with appropriate legal advice.

Maps and Images

All maps, plans, and figures included in this report are indicative only and are not to be used or interpreted as engineering drafts. Do not scale any of the maps, plans or figures in this report. Any information shown here on maps, plans and figures should be independently verified on site before taking any action. Sources for map and plan compositions include LINZ Data and Map Services and local council GIS services. For further details regarding any maps, plans or figures in this report, please contact Bioresearches.

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