Appendix D
Freshwater Features Maps

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Freshwater Features Map

Beachlands South Fast Track

Beachlands South LP

Legend

- Site - Field Verified
- Site - Non-field Verified
- Consented earthworks (Stg 1)
- Intermittent/permanent stream
- Modified natural stream
- Artificial drainage channel
- Piped/culverted section
- Natural inland wetlands
- Constructed wetland
- Incidental wetland

SOURCES

LINZ 2024/2025 aerial

DISCLAIMER:
This map/plan is not an engineering draft. This map/plan is illustrative only and all information should be independently verified on site before taking any action.

SCALE **1:9,500** @ A4

PROJECT NO.	10055
DRAWN BY:	B.P
DATE:	22 June 2026

VIRIDIS
Environmental Consultants

Wetland & Ponds map

Beachlands South Fast Track

Beachlands South LP

Legend

- Site - Field Verified
- Site - Non-field Verified
- Consented earthworks (Stg 1)
- Natural inland wetlands
- Constructed wetland
- Incidental wetland

SOURCES

Nearmaps 2025 aerial

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SCALE **1:9,500** @ A4

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Labelled watercourses

Beachlands South Fast Track

Beachlands South LP

Legend

- Site - Field Verified
- Site - Non-field Verified
- Consented earthworks (Stg 1)
- Intermittent/permanent stream
- Modified natural stream
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SOURCES

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SCALE **1:9,500** @ A4

PROJECT NO.	10055
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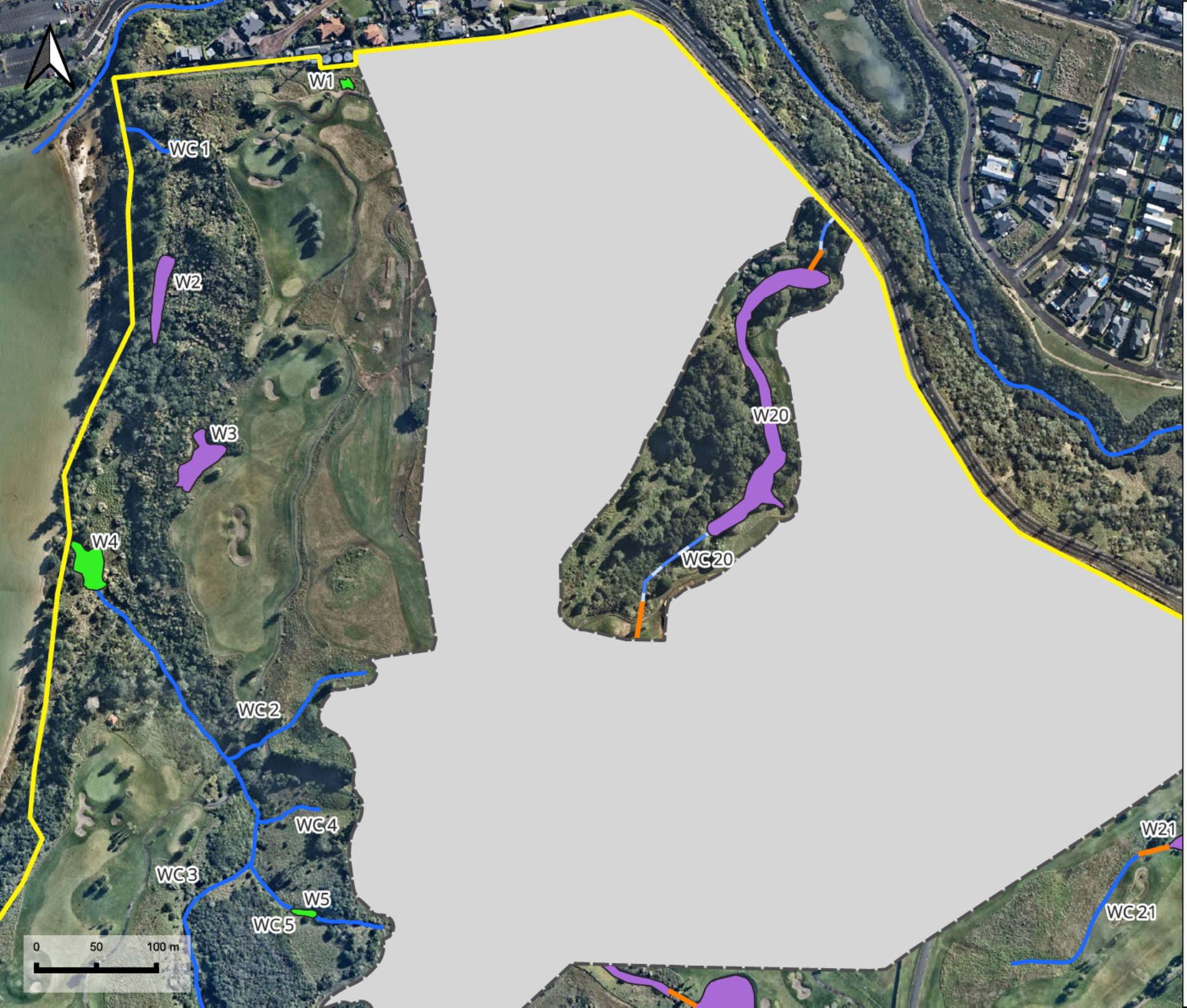

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Freshwater features

Northwestern site area

Beachlands South LP

Legend

- Site - Field Verified
- Consented earthworks (Stg 1)
- Intermittent/permanent stream
- Modified natural stream
- Piped/culverted section
- Artificial drainage channel
- Natural inland wetlands
- Constructed wetland
- Incidental wetland

SOURCES

Nearmaps 2025 aerial

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SCALE **1:4,000** @ A4

PROJECT NO.	10055
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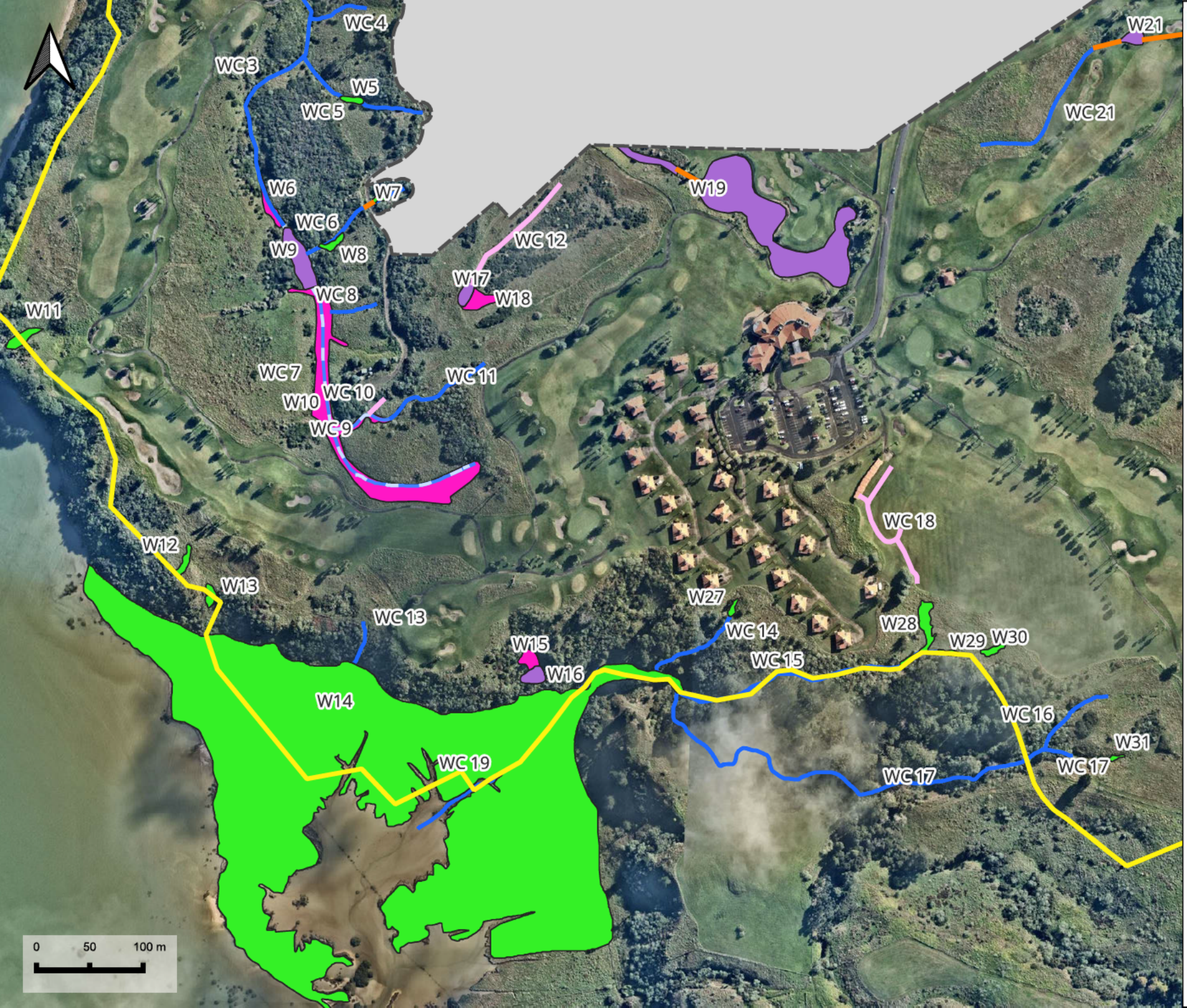

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Freshwater features

Southwestern site area

Beachlands South LP

Legend

- Site - Field Verified
- Consented earthworks (Stg 1)
- Intermittent/permanent stream
- Modified natural stream
- Piped/culverted section
- Artificial drainage channel
- Natural inland wetlands
- Constructed wetland
- Incidental wetland

SOURCES

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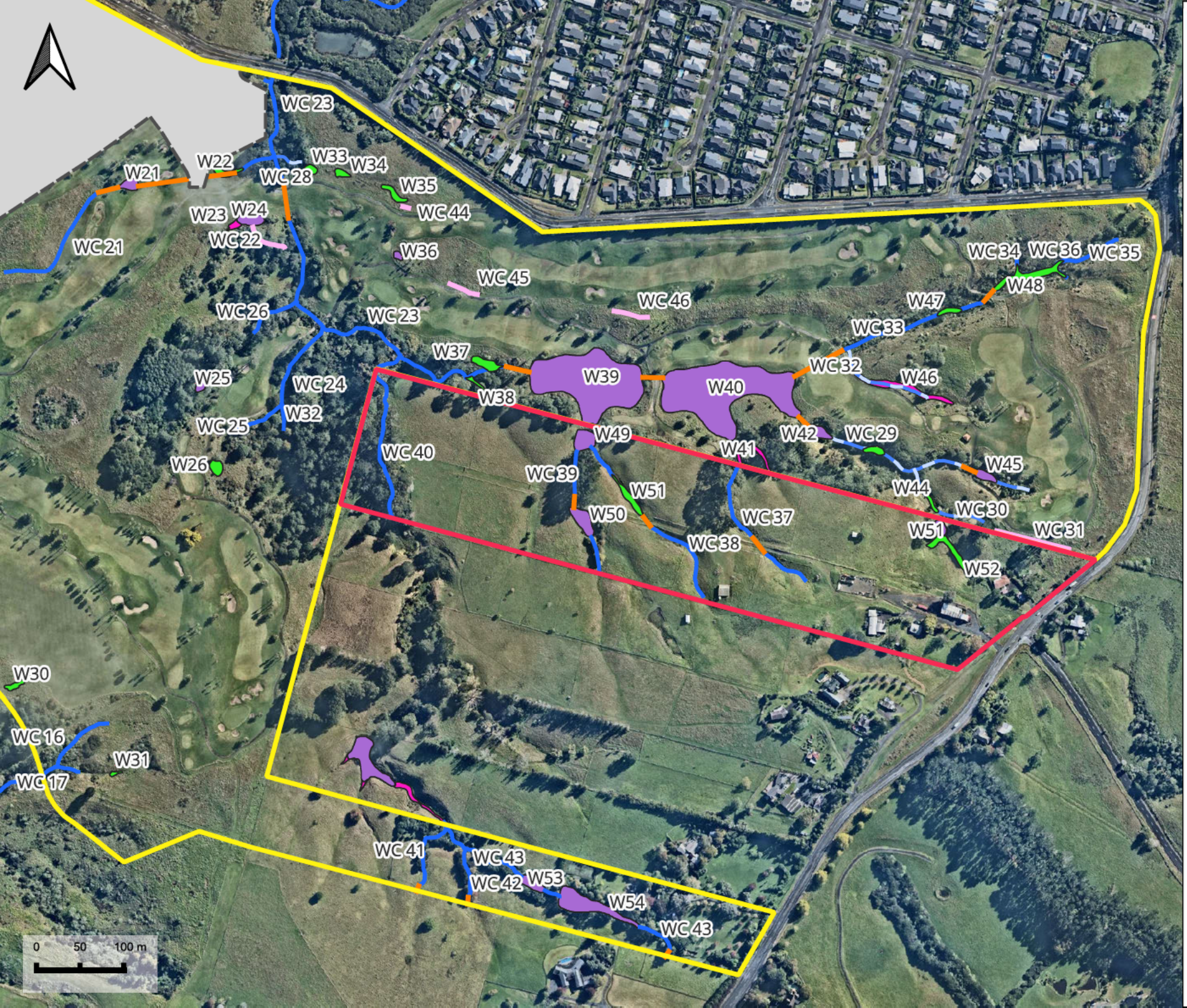

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Freshwater features

Eastern site area

Beachlands South LP

Legend

- Site - Field Verified
- Site - Non-field Verified
- Consented earthworks (Stg 1)
- Intermittent/permanent stream
- Modified natural stream
- Piped/culverted section
- Artificial drainage channel
- Natural inland wetlands
- Constructed wetland
- Incidental wetland

SOURCES

Nearmaps 2025 aerial

DISCLAIMER:
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SCALE **1:5,500** @ A4

PROJECT NO.	10055
DRAWN BY:	B.P
DATE:	22 June 2026

Appendix E
Freshwater Features Summary Table

Table E1. Summary of watercourse classifications within the development footprint, with consideration of AUP-OP intermittent stream criteria and evidence of artificial modification.

✓= Present ✗= Absent ? = Uncertain / not able to be assessed N/A = not applicable

Watercourse ID	Classification	Length (m)	Presence of natural pools	Presence of well-defined channel	Surface water more than 48 hours after rain	Rooted terrestrial vegetation NOT established across the entire cross-sectional width	Organic debris resulting from flooding can be seen on the floodplain	Evidence of substrate sorting, including scour and deposition	Comments
WC 1	Intermittent	59.8	?	✓	?	✓	✗	✓	Within EPAN. Dense riparian vegetation consisted of exotic scrub. Flows directly to the coast.
WC 2	Intermittent	143	✗	✓	?	✓	✗	✓	Tributary stream. Very top of reach being reclaimed. Remainder to be retained within EPAN. Exotic scrub vegetation within a large proportion of the riparian yard cleared in the past two years.
WC 3	Permanent	472.2	✓	✓	✓	✓	✗	✓	Permanent with several small tributaries. Within EPAN. Riparian margins largely vegetated with dense exotic scrub vegetation.
WC 4	Intermittent	54.9	✗	✓	?	✓	✗	✓	Small tributary stream within EPAN. Rank exotic grassland dominating riparian margin.
WC 5	Intermittent	97	✗	✓	?	✓	✗	✓	Small tributary stream within EPAN. Rank exotic grassland dominating riparian margin.
WC 6	Intermittent	99	✗	✓	?	✓	✗	✓	Tributary stream within EPAN. Top of reach to be reclaimed. Rank exotic grassland and pest plant scrub dominating riparian margin. Two small natural wetlands in association with channel.
WC 7	Modified natural	303	✗	✓	✓	✓	✗	✓	Historical aerial imagery indicates the presence of a natural stream channel at this location, the majority of

Watercourse ID	Classification	Length (m)	Presence of natural pools	Presence of well-defined channel	Surface water more than 48 hours after rain	Rooted terrestrial vegetation NOT established across the entire cross-sectional width	Organic debris resulting from flooding can be seen on the floodplain	Evidence of substrate sorting, including scour and deposition	Comments
									which lies within the EPAN. Subsequent modification of the downstream gully, including pond construction, has altered hydrological conditions and resulted in the establishment of an incidental exotic grass-dominated wetland around a stream channel. Despite these modifications, evidence of the original natural drainage pathway remains apparent. No aquatic habitat was observed within the upstream reach proposed for reclamation during site investigations.
WC 8	Intermittent	41.7	✗	✓	?	✓	✗	✓	Small tributary stream within EPAN. Rank exotic grassland dominating riparian margin.
WC 9	Modified natural	62.4	✗	✓	✓	✓	✗	✓	Located within the EPAN, this channel downstream of WC 11 has been assessed as modified natural, on the basis that modification of the downstream gully, including pond construction, has altered hydrological conditions and resulted in the establishment of an incidental exotic grass-dominated wetland around the stream channel. Despite these modifications, evidence of the original natural drainage pathway remains apparent.
WC 10	Artificial drain	16.3	N/A	N/A	N/A	N/A	N/A	N/A	Artificially straightened incised channel, no aquatic habitat observed during any site visits.
WC 11	Intermittent	105.9	✗	✓	✓	✓	✗	✓	Almost all of this intermittent channel (upstream of the more modified WC 9) will be reclaimed where it lies

Watercourse ID	Classification	Length (m)	Presence of natural pools	Presence of well-defined channel	Surface water more than 48 hours after rain	Rooted terrestrial vegetation NOT established across the entire cross-sectional width	Organic debris resulting from flooding can be seen on the floodplain	Evidence of substrate sorting, including scour and deposition	Comments
									outside the EPAN. Strongly incised and narrow channel. Riparian margins partially vegetated with exotic scrub.
WC 12	Artificial drain	123	N/A	N/A	N/A	N/A	N/A	N/A	Swale-like feature. Isolated and artificially straightened, draining to constructed pond. No aquatic habitat observed during any site visit.
WC 13	Intermittent	43.5	?	✓	?	?	?	✓	This watercourse drains directly to the coastal environment and is located predominantly within the coastal EPAN. Much of the reach was not accessible during site investigations due to steep terrain and dense scrub vegetation; however, the upper section contained a clearly defined channel and was conservatively classified as an intermittent stream. Aquatic habitat unlikely to be present throughout reach due to steepness. Only the uppermost approximately 4 m of the reach is proposed to be reclaimed.
WC 14	Intermittent	102.6	✓	✓	✓	✓	X	✓	The reach is located almost entirely within the EPAN, with only the uppermost approximately 4 m proposed for reclamation. A natural inland wetland occurs immediately upstream of the watercourse, and the feature drains directly to WC 15 and the associated inland arm of Wetland W14 upstream of the proposed compensation wetland. Riparian margins are

Watercourse ID	Classification	Length (m)	Presence of natural pools	Presence of well-defined channel	Surface water more than 48 hours after rain	Rooted terrestrial vegetation NOT established across the entire cross-sectional width	Organic debris resulting from flooding can be seen on the floodplain	Evidence of substrate sorting, including scour and deposition	Comments
									predominantly vegetated by exotic forest and exotic-dominated scrub.
WC 15	Intermittent	284	?	✓	✓	✓	X	✓	Located entirely within the EPAN. Largely inaccessible during site investigations due to dense scrub vegetation. Uppermost reach incised and associated with small exotic natural inland wetlands.
WC 16	Intermittent	83	✓	✓	✓	✓	X	✓	The uppermost approximately 66 m of the reach is proposed for reclamation. The watercourse is highly incised and the downstream portion is located within the EPAN, where it is largely shaded by adjacent exotic scrub vegetation. Tributary to WC 17.
WC 17	Intermittent / permanent	474	✓	✓	✓	✓	X	✓	Uppermost 7 m (intermittent) proposed for reclamation. Downstream reach transitions to permanent flow and is associated with dense exotic forest. Majority of the tributary is retained within the EPAN outside the Live Zoned area.
WC 18	Artificial drain	152.2	N/A	N/A	N/A	N/A	N/A	N/A	Strongly incised drainage feature within managed golf course/driving range area. Unnatural alignment. No freshwater connectivity.
WC 19	Permanent	266	✓	✓	✓	✓	X	✓	Drains directly to the coastal environment via an exotic coastal fringe wetland and forms the downstream receiving reach for WC14-WC17.

Watercourse ID	Classification	Length (m)	Presence of natural pools	Presence of well-defined channel	Surface water more than 48 hours after rain	Rooted terrestrial vegetation NOT established across the entire cross-sectional width	Organic debris resulting from flooding can be seen on the floodplain	Evidence of substrate sorting, including scour and deposition	Comments
WC 20	Modified natural	117	✓	✓	✓	✓	X	✓	Hydrology modified by a series of constructed online ponds, including a narrow pond within the reach. Several upstream ponds are proposed for reclamation or have been consented under Stage 1. Riparian margins dominated by exotic scrub and forest.
WC 21	Intermittent	156	X	✓	✓	✓	X	✓	Highly modified, artificially incised reach within the golf course area. Riparian margins comprise managed turf and rank grassland. Uppermost 18 m proposed for reclamation. Downstream reach includes two piped sections and a small constructed pond.
WC 22	Artificial drain	48.1	N/A	N/A	N/A	N/A	N/A	N/A	Within EPAN. Unnatural alignment, drains to constructed pond.
WC 23	Permanent	550	✓	✓	✓	✓	X	✓	Main gully system draining the eastern catchment, located within the EPAN. Downstream of two large constructed online ponds, with evidence of historical modification including riprap, culverts and stormwater outlets. Channel remains largely natural and is associated with established native and exotic canopy vegetation.
WC 24	Intermittent	130	X	✓	✓	✓	X	✓	Located in EPAN. Narrow channel with established kānuka scrub and exotic forest riparian vegetation. Shallow water was present during the February 2026

Watercourse ID	Classification	Length (m)	Presence of natural pools	Presence of well-defined channel	Surface water more than 48 hours after rain	Rooted terrestrial vegetation NOT established across the entire cross-sectional width	Organic debris resulting from flooding can be seen on the floodplain	Evidence of substrate sorting, including scour and deposition	Comments
									site assessment. A small constructed bund and pond occur along the reach.
WC 25	Intermittent	60	✗	✓	✓	✓	✗	✓	Located in EPAN. Tributary to WC 24. Reach transitions between intermittent and ephemeral conditions but has conservatively been classified as intermittent. Channel is highly incised and locally eroded. Very shallow surface water occasionally present during February 2026.
WC 26	Intermittent	65.4	✗	✓	✓	✓	✗	✓	Located within the EPAN and forms a tributary to WC 23. Riparian margins are dominated by exotic forest, providing shading but with a poorly developed understorey. Evidence of upstream modification includes a small constructed pond and culverts.
WC 27	Intermittent	40	✓	✓	✓	✓	✗	✓	Downstream of Wetland W22 and a piped section associated with WC 21, which discharges a few metres upstream. Native canopy provides shading and shallow flowing water was present during the February 2026 site assessment.
WC 28	Modified natural	31.9	✗	✓	?	✓	✗	✗	Evidence of historical modification, including riprap armouring and a piped outlet at top of reach. Conservatively classified as intermittent despite some sections lacking a clearly defined channel and no evidence of recent flows.

Watercourse ID	Classification	Length (m)	Presence of natural pools	Presence of well-defined channel	Surface water more than 48 hours after rain	Rooted terrestrial vegetation NOT established across the entire cross-sectional width	Organic debris resulting from flooding can be seen on the floodplain	Evidence of substrate sorting, including scour and deposition	Comments
WC 29	Modified natural	193	✓	✓	✓	✓	X	✓	Located largely within the EPAN. Hydrology modified by a series of constructed online ponds and culverts. Riparian margins support native planting and kānuka canopy, although the understorey is subject to substantial pest plant invasion. Small exotic natural wetland present associated with floodplain (W43).
WC 30	Modified natural	109	X	✓	✓	✓	X	✓	Located within the EPAN. Hydrology modified by a series of constructed online ponds downstream. Riparian margins are dominated by exotic rank grassland. Some sections appeared ephemeral during site investigations, although the reach was conservatively classified as intermittent throughout. A small exotic-dominated natural inland wetland (W44) occurs within the adjacent floodplain.
WC 31	Artificial drain	84.9	N/A	N/A	N/A	N/A	N/A	N/A	Swale-like feature. Artificially straightened along existing boundary fenceline.
WC 32	Modified natural	121	X	✓	?	X	X	X	Historical aerial imagery indicates a natural stream channel was previously present. Subsequent modification has resulted in a broad swale-like feature, with many typical intermittent stream characteristics now absent. Much of the reach supports mercer grass and thus has been classified as a modified natural channel with associated incidental wetland. Riparian

Watercourse ID	Classification	Length (m)	Presence of natural pools	Presence of well-defined channel	Surface water more than 48 hours after rain	Rooted terrestrial vegetation NOT established across the entire cross-sectional width	Organic debris resulting from flooding can be seen on the floodplain	Evidence of substrate sorting, including scour and deposition	Comments
									margins comprise a concrete golf course pathway, managed golf course and rank grassland.
WC 33	Intermittent	174	✓	✓	✓	✓	X	✓	The upper half of the reach and all upstream freshwater features, including intermittent streams and a natural inland wetland, are proposed for reclamation. A small *Carex*-dominated wetland is associated with the floodplain. The gully was cleared of mature planted pine in recent years and the riparian margins are now dominated by exotic scrub.
WC 34	Intermittent	21.7	X	✓	?	✓	X	✓	Reach to be reclaimed. Small intermittent tributary flowing to native *Carex*-dominated wetland (W48) within gully. The gully was cleared of mature planted pine in recent years and the riparian margins are now dominated by exotic scrub.
WC 35	Intermittent	68	X	✓	?	✓	X	✓	Reach to be reclaimed. Small intermittent tributary flowing to native *Carex*-dominated wetland (W48) within gully. Dry during February and May 2026. The gully was cleared of mature planted pine in recent years. Difficult to access and assess due to dense exotic scrub vegetation within riparian margin.
WC 36	Intermittent	12.5	X	✓	?	✓	X	✓	Reach to be reclaimed. Small intermittent tributary flowing to native *Carex*-dominated wetland (W48) within gully. The gully was cleared of mature planted

Watercourse ID	Classification	Length (m)	Presence of natural pools	Presence of well-defined channel	Surface water more than 48 hours after rain	Rooted terrestrial vegetation NOT established across the entire cross-sectional width	Organic debris resulting from flooding can be seen on the floodplain	Evidence of substrate sorting, including scour and deposition	Comments
									pine in recent years and the riparian margins are now dominated by exotic scrub.
WC 37	Intermittent	158	?	?	?	?	?	?	Not field verified – mapped via aerial imagery and available topographical information. Channel appears to be well-defined and a culvert/farm crossing present.
WC 38	Intermittent	154	?	?	?	?	?	?	Not field verified and mapped using aerial imagery and available topographic information. A well-defined channel and culvert/farm crossing are evident, with a narrow natural inland wetland (W51) located immediately downstream.
WC 39	Intermittent	93	?	?	?	?	?	?	Not field verified and mapped using aerial imagery and available topographic information. A well-defined channel and culvert/farm crossing are evident, with two constructed ponds (W49 & W50) present along reach.
WC 40	Intermittent	218	?	✓	✓	✓	✗	✓	Not fully field verified. Based on observations from the lower reach within the surveyed area, the feature is considered at least intermittent and may be permanent near its confluence with WC23. Entire section within the project site conservatively classified as a stream. Deep water and flow observed during February 2026.

Watercourse ID	Classification	Length (m)	Presence of natural pools	Presence of well-defined channel	Surface water more than 48 hours after rain	Rooted terrestrial vegetation NOT established across the entire cross-sectional width	Organic debris resulting from flooding can be seen on the floodplain	Evidence of substrate sorting, including scour and deposition	Comments
WC 41	Intermittent	98.6	✗	✓	✓	✓	✗	✓	Largely located within the EPAN. Two thirds of reach being reclaimed for a raingarden and accessway. Much of reach shaded by exotic deciduous trees. Upper portion of channel degraded by recent stock access. No upstream habitat present.
WC 42	Intermittent	55	✗	✓	✓	✓	✗	✓	Largely located within the EPAN. Approximately one third of reach being reclaimed for construction of an accessway. Much of reach shaded by exotic deciduous trees. No upstream habitat present.
WC 43	Intermittent	175	✓	✓	✓	✓	✗	✓	Largely located within the EPAN. Modified due to presence of two constructed online ponds (W53 & W54). Established exotic treeland and native planting are present within riparian margins.
WC 44	Artificial drain	7	N/A	N/A	N/A	N/A	N/A	N/A	Narrow swale-like feature. Isolated within golf course area.
WC 45	Artificial drain	34	N/A	N/A	N/A	N/A	N/A	N/A	Narrow swale-like feature. Isolated within golf course area.
WC 46	Artificial drain	39.3	N/A	N/A	N/A	N/A	N/A	N/A	Narrow swale-like feature. Isolated within golf course area.

Note: While many streams within the site exhibit some degree of historical modification, the watercourses classified as modified natural have undergone more substantial alteration to their morphology, hydrology and ecological function.

Table E2. Summary of natural, incidental and constructed wetlands within the development footprint.

Wetland ID	Classification	Size (m^2)	Dominant vegetation type	Key hydrological indicator	Comments
W1	Natural inland wetland	87.9	Native sedge-dominant – purua grass	Saturated soils	Will be reclaimed. Appears to have been induced in recent years, potentially due to nearby wastewater infrastructure in the north. Low biodiversity. Buffer vegetation limited to rank grass. No freshwater connectivity.
W2	Constructed pond	744	N/A	Open water	Within EPAN. Unable to be accessed on site due to surrounding dense exotic scrub vegetation. Mapped via aerial imagery.
W3	Constructed pond	927	Exotic grass-dominant (mercer grass)	Saturated soils	Located within the EPAN. Surface largely vegetated, with strong underlying hydrology evident.
W4	Natural inland wetland	775	Native sedgeland – purua grass	Saturated soils	Located within the EPAN, will be retained. Connectivity to the coast and permanent WC 3. Low biodiversity. Buffer vegetation consists of exotic grassland and some scattered pōhutukawa trees.
W5	Natural inland wetland	115	Exotic rushes and native sedges (*Carex*)	Saturated soils	Will be retained within EPAN, but possibly adversely affected by surface catchment reduction.
W6	Incidental wetland	306	Exotic grass-dominant (mercer grass)	Saturated soils	To be retained within EPAN. Downstream of constructed pond and highly modified gully system.
W7	Natural inland wetland	44.8	Exotic rush-dominant (soft rush)	Saturated soils	Will be reclaimed. Likely induced by crossing/culvert downstream.
W8	Natural inland wetland	67.4	Exotic-grass dominant	Saturated soils	To be retained within EPAN, but possibly adversely affected by surface catchment reduction. Associated with WC 6.
W9	Constructed pond	886	Mixed native and exotic rushes and sedges	Saturated soils	Historical aerial imagery indicates the feature is of constructed origin for drainage purposes.

Wetland ID	Classification	Size (m^2)	Dominant vegetation type	Key hydrological indicator	Comments
W10	Incidental wetland	4,988	Exotic grass-dominant (mercer grass)	Saturated soils	Historical aerial imagery indicates the presence of a natural stream channel at this location, the majority of which lies within the EPAN. Subsequent modification of the downstream gully, including pond construction, has altered hydrological conditions and resulted in the establishment of an incidental exotic grass-dominated wetland around a stream channel. Despite these modifications, evidence of the original natural drainage pathway remains apparent. No aquatic habitat was observed within the upstream reach proposed for reclamation during site investigations.
W11	Natural inland wetland	290	Exotic rush-dominant (soft rush)	Saturated soils	To be retained within EPAN, but possibly adversely affected by surface catchment reduction. Buffer vegetation limited to exotic grasses. Suspected pig damage evident in this area. No freshwater connectivity or native biodiversity.
W12	Natural inland wetland	180.8	Exotic rush-dominant (soft rush)	Saturated soils	Partial reclamation will occur, the rest will be retained within the EPAN. Suspected pig damage evident in this area. No freshwater connectivity or native biodiversity.
W13	Natural inland wetland	151.1	Exotic rush-dominant (soft rush)	Saturated soils	To be retained within EPAN, but possibly adversely affected by surface catchment reduction. Suspected pig damage evident in this area. No freshwater connectivity or native biodiversity.
W14	Natural inland wetland	81,786	Exotic sedge-dominant (*Carex divisa*)	Saturated soils	Approximately 2.943 ha of this coastal fringe wetland is proposed to be protected and restored as part of the freshwater compensation package. Much of the mapped wetland extends beyond the site boundary. The compensation area has freshwater hydrology, and is dominated by the invasive sedge *Carex divisa*, with scattered native rushes and sedges (*Juncus sarophorus*, *J. edgariae* and *Eleocharis acuta*), providing substantial

Wetland ID	Classification	Size (m^2)	Dominant vegetation type	Key hydrological indicator	Comments
					opportunity for ecological enhancement through restoration and pest plant control.
W15	Incidental wetland	249.2	Raupō reedland	Saturated soils	Formed in association with a constructed pond. Within EPAN, will be retained.
W16	Constructed pond	283	N/A	Open water	Within EPAN, will be retained. Historical aerial imagery indicates the feature is of constructed origin.
W17	Constructed pond	225	Exotic grass-dominant (mercer grass)	Saturated soils	Historical aerial imagery indicates the feature is of constructed origin for drainage purposes. Will be reclaimed.
W18	Incidental wetland	390	Exotic grasses and rushes	Saturated soils	Formed in association with a constructed pond. Will be reclaimed.
W19	Constructed pond	6,098 + 466	N/A	Open water	Will be reclaimed. Gully extensively modified in the 1990s, resulting in the reclamation of streams and the formation of a series of constructed ponds. No upstream freshwater connectivity. Downstream ponds consented for removal under Stage 1 earthworks consent.
W20	Constructed pond	3,816	N/A	Open water	Constructed online along WC 20. Will be retained within EPAN. Some exotic wetland vegetation associated with margins.
W21	Constructed pond	226	N/A	Open water	Will be reclaimed. Historical aerial imagery indicates the feature is of constructed origin for drainage and likely amenity purposes. Completely dry during February site visit. Piped both up and downstream.
W22	Natural inland wetland	199	Exotic rush-dominant (soft rush)	Saturated soils	Piped stream section discharges within this area. Located partially within EPAN. Will be retained, but possibly adversely affected by surface catchment reduction.
W23	Incidental wetland	102	Exotic grass-dominant (mercer grass)	Saturated soils	Exotic wetland grasses associated with constructed wetland. Will be reclaimed.

Wetland ID	Classification	Size (m^2)	Dominant vegetation type	Key hydrological indicator	Comments
W24	Constructed pond	409	N/A	Open water	Historical aerial imagery indicates the feature is of constructed origin for drainage.
W25	Constructed pond	131.9	Exotic grass-dominant	Surface water/saturated soils	Historical aerial imagery indicates the feature is of constructed origin for drainage.
W26	Natural inland wetland	208.3	Exotic rush-dominant (soft rush)	Saturated soils	Will be entirely reclaimed. No freshwater connectivity, native biodiversity, or established vegetated buffer.
W27	Natural inland wetland	77.2	Exotic grass-dominant (mercer grass)	Saturated soils	Will be entirely reclaimed. No freshwater connectivity, native biodiversity, or established vegetated buffer.
W28	Natural inland wetland	504.7	Exotic rush-dominant (soft rush)	Saturated soils	Will be partially reclaimed, and possibly adversely affected by surface catchment reduction. No native biodiversity, or established vegetated buffer. Hydrologically connected to WC 15.
W29	Natural inland wetland	80.5	Exotic rush-dominant (soft rush)	Saturated soils	Will be retained within the EPAN. No freshwater connectivity or native biodiversity is present; a partial vegetated buffer is provided by exotic forest to the south.
W30	Natural inland wetland	131	Exotic rush-dominant (soft rush)	Saturated soils	Will be entirely reclaimed. No freshwater connectivity, native biodiversity, or established vegetated buffer.
W31	Natural inland wetland	48	Exotic rush-dominant (soft rush)	Saturated soils	Will be reclaimed. No freshwater connectivity, ephemeral flow path downstream between this wetland and WC 17. No native biodiversity and buffer vegetation limited to rank exotic grasses.
W32	Constructed pond	131	N/A	Surface water/saturated soils	Will be retained within EPAN. Scruffy dome present, indicating clear constructed nature.
W33	Natural inland wetland	123.9	Exotic rush-dominant (soft rush)	Saturated soils	Will be reclaimed. No native biodiversity or established vegetated buffer.

Wetland ID	Classification	Size (m^2)	Dominant vegetation type	Key hydrological indicator	Comments
W34	Natural inland wetland	121.5	Exotic rush-dominant (soft rush)	Saturated soils	Will be reclaimed. No freshwater connectivity, native biodiversity or established vegetated buffer.
W35	Natural inland wetland	207.1	Exotic rush-dominant (soft rush)	Saturated soils	Will be reclaimed. No freshwater connectivity, native biodiversity or established vegetated buffer.
W36	Constructed pond	80	Exotic grass-dominant	Saturated soils	Historical aerial imagery indicates the feature is of constructed origin for drainage.
W37	Natural inland wetland	317	Exotic grass-dominant (mercer grass)	Saturated soils	Will be retained within EPAN. Associated with margins of WC 23. Hydrology likely influenced by upstream constructed online pond.
W38	Natural inland wetland	98.4	Exotic grass-dominant (mercer grass)	Saturated soils	Will be retained within EPAN.
W39	Constructed pond	6,869	N/A	Open water	Large online pond within the site's eastern catchment. Exotic wetland vegetation associated with edges (incidental wetland). Flows to WC 23.
W40	Constructed pond	7,852	N/A	Open water	Large online pond within the site's eastern catchment. Exotic wetland vegetation associated with edges (incidental wetland). Flows to second large online pond (W39) via a piped section.
W41	Incidental wetland	296	Exotic grass-dominant (mercer grass)	Saturated soils	Will be retained within EPAN. Likely formed in association with downstream constructed pond (W40) which has dammed hydrology within this area.
W42	Constructed pond	296	Exotic grass-dominant (mercer grass)	Saturated soils	Will be retained within EPAN. Associated with the riparian margin of WC 29.
W43	Natural inland wetland	168.5	Exotic herbaceous-dominant (*Persicaria hydropiper*)	Saturated soils	Will be retained within EPAN. Associated with riparian margin/flat flood plain of modified WC 29.

Wetland ID	Classification	Size (m^2)	Dominant vegetation type	Key hydrological indicator	Comments
W44	Natural inland wetland	141.9	Exotic grass-dominant (mercer grass)	Saturated soils	Will be retained within EPAN. Associated with the riparian margins of modified WC 30.
W45	Constructed pond	228	N/A	Open water	Small constructed online pond associated with upper reach of WC 29.
W46	Incidental wetland	808	Exotic grass-dominant (mercer grass)	Saturated soils	Will be retained within golf course area. Historical aerial imagery indicates a natural stream channel was previously present. Subsequent modification has resulted in a broad swale-like feature, with many typical intermittent stream characteristics now absent. Much of the reach supports mercer grass and thus has been classified as a modified natural channel with associated incidental wetland.
W47	Natural inland wetland	146.6	Native sedge-dominant (*Carex*)	Saturated soils	Will be reclaimed. Associated with the riparian margins of WC 33/35 within the upper eastern catchment. Riparian vegetation consists of exotic scrub, dominated by Chinese privet. Large pines felled from this gully in recent years.
W48	Natural inland wetland	624.1	Native sedge-dominant (*Carex*)	Saturated soils/surface water	Will be reclaimed. Associated with the riparian margins of WC 33/35 within the upper eastern catchment. Riparian vegetation consists of exotic scrub, dominated by Chinese privet. Large pines felled from this gully in recent years.
W49	Constructed pond	496.5	N/A	Open water	Will be retained. Not field verified – mapped via aerial imagery and available topographical information, with visible surface water present.
W50	Constructed pond	511	N/A	Open water	Will be retained. Not field verified – mapped via aerial imagery and available topographical information, with visible surface water present.
W51	Natural inland wetland	306	Unknown, likely exotic-dominant	Saturated soils (expected)	Will be retained. Not field verified – mapped via aerial imagery and available topographical information.

Wetland ID	Classification	Size (m^2)	Dominant vegetation type	Key hydrological indicator	Comments
W52	Natural inland wetland	412	Unknown, likely exotic-dominant	Saturated soils (expected)	Will be retained. Not field verified – mapped via presence on aerial imagery, and indicators of soil saturation within shallow gully.
W53	Constructed pond	322	N/A	Open water	Will be retained within EPAN. Online pond associated with WC 43. Vegetated buffer contains established native revegetation planting.
W54	Constructed pond	1,279	N/A	Open water	Will be retained within EPAN. Online pond associated with WC 43. Vegetated buffer contains exotic-dominant amenity trees.

Appendix F
Stream Ecological Valuation (SEV) Results and Assumptions

Table F1. Stream Ecological Valuation (SEV) Current and Potential Scores and Assumptions.

Function category	Function	Variable	SEV 1		SEV 2		SEV 3		SEV 4		Assumptions used for Potential SEV Scores
			Current	Potential	Current	Potential	Current	Potential	Current	Potential	
Hydraulic		Vchann	0.250	0.250	0.500	0.500	0.700	0.700	0.360	0.360	No change assumed; no channel realignment, bed regrading or instream works are included in the potential scenario.
		Vlining	0.920	0.960	1.000	1.000	1.000	1.000	0.820	0.860	Potential improvement assumes reduced fine sediment inputs following riparian planting and retirement of stream margins from routine disturbance. Some existing fine sediment is expected to flush over time.
		Vpipe	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	No change assumed; existing piped or culverted sections remain unchanged.
	NFR	=	0.473	0.487	0.667	0.667	0.800	0.800	0.513	0.527	
		Vbank	0.500	0.500	0.000	0.000	0.200	0.200	0.640	0.640	No change assumed; no bank regrading or engineered bank naturalisation is included in the potential scenario.
		Vrough	0.445	0.520	0.565	0.520	0.590	0.520	0.580	0.520	Potential improvement reflects establishment of a 10 m native riparian buffer on both banks, including low-diversity restoration planting of grasses, sedges, shrubs and trees. Land outside the 10 m planted riparian buffer is conservatively assumed to remain in golf course land use.
	FLE	=	0.223	0.260	0.000	0.000	0.118	0.104	0.371	0.333	
		Vbarr	1.000	1.000	1.000	1.000	1.000	1.000	0.300	0.300	No change assumed; existing culverts and fish passage barriers remain unchanged.
	CSM	=	1.000	1.000	1.000	1.000	1.000	1.000	0.300	0.300	

Function category	Function	Variable	SEV 1		SEV 2		SEV 3		SEV 4		Assumptions used for Potential SEV Scores
			Current	Potential	Current	Potential	Current	Potential	Current	Potential	
		Vchanshape	0.550	0.550	0.600	0.600	0.950	0.950	0.860	0.860	Calculated from other variables; no separate assumption applied.
		Vlining	0.920	0.960	1.000	1.000	1.000	1.000	0.820	0.860	Potential improvement assumes reduced fine sediment inputs following riparian planting and retirement of stream margins from routine disturbance. Some existing fine sediment is expected to flush over time.
	CGW	=	0.797	0.823	0.867	0.867	0.983	0.983	0.833	0.860	No change assumed; no bank regrading or engineered bank naturalisation is included in the potential scenario.
Hydraulic function mean score			0.623	0.642	0.633	0.633	0.725	0.722	0.504	0.505	
Biogeochemical		Vshade	0.060	0.520	0.400	0.580	0.580	0.800	0.920	0.920	Potential improvement assumes increased shading from 10 m riparian planting once established. Short-term shade loss from pest plant removal is recognised, but the potential score reflects expected condition after planting establishment.
	WTC	=	0.060	0.520	0.400	0.580	0.580	0.800	0.920	0.920	
		Vdod	0.675	1.000	1.000	1.000	1.000	1.000	1.000	1.000	Potential improvement assumes reduced sediment and macrophyte growth as riparian shade increases.
	DOM	=	0.675	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
		Vripar	0.050	0.500	0.250	0.500	0.300	0.500	0.400	0.500	Potential improvement assumes establishment of a 10 m native riparian buffer on both banks where practicable.
		Vdecid	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	No change assumed.

Function category	Function	Variable	SEV 1		SEV 2		SEV 3		SEV 4		Assumptions used for Potential SEV Scores
			Current	Potential	Current	Potential	Current	Potential	Current	Potential	
	OMI	=	0.050	0.500	0.250	0.500	0.300	0.500	0.400	0.500	
		Vmacro	0.185	0.765	0.780	0.940	0.840	0.840	0.920	0.950	Potential improvement assumes reduced bankside and channel macrophyte cover in response to increased riparian shade, particularly in narrow reaches currently exposed to high light levels.
		Vretain	0.200	0.200	0.800	0.800	0.600	0.600	0.480	0.480	Calculated from other variables; no separate assumption applied.
	IPR	=	0.185	0.200	0.780	0.800	0.600	0.600	0.480	0.480	
		Vsurf	0.137	0.137	0.132	0.132	0.276	0.276	0.312	0.312	No change assumed.
		Vripfilt	0.800	0.600	0.800	0.600	0.800	0.600	0.800	0.600	Potential score reflects transition from rank grass to planted native riparian vegetation within the first 10 m. This is conservative because the remaining contributing margin is assumed to remain in golf course land use.
	DOP	=	0.468	0.368	0.466	0.366	0.538	0.438	0.556	0.456	Potential improvement assumes increased shading from 10 m riparian planting once established. Short-term shade loss from pest plant removal is recognised, but the potential score reflects expected condition after planting establishment.
Biogeochemical function mean score			0.288	0.518	0.579	0.649	0.604	0.668	0.671	0.671	
Habitat Provision		Vgalspwn	0.000	0.000	0.000	0.000	0.000	0.000	0.420	0.420	No change assumed.
		Vgalqual	0.000	0.000	0.000	0.000	0.000	0.000	0.750	0.750	No change assumed; spawning quality remains limited by local channel morphology and lack of suitable flat marginal habitat.

Function category	Function	Variable	SEV 1		SEV 2		SEV 3		SEV 4		Assumptions used for Potential SEV Scores
			Current	Potential	Current	Potential	Current	Potential	Current	Potential	
		Vgobspwn	0.100	0.100	0.100	0.100	0.100	0.100	0.800	0.800	Calculated from other variables; no separate assumption applied.
	FSH	=	0.050	0.050	0.050	0.050	0.050	0.050	0.558	0.558	
		Vphyshab	0.153	0.365	0.200	0.306	0.341	0.435	0.659	0.671	Potential improvement assumes increased shading and riparian integrity from planting. No instream habitat creation, channel naturalisation or hydrological enhancement is assumed.
		Vwatqual	0.054	0.310	0.250	0.340	0.340	0.450	0.560	0.560	Potential improvement assumes increased shading and riparian filtering in upper-catchment reaches that currently have little or no riparian shade.
		Vimperv	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	Conservative assumption that the upstream catchment remains broadly comparable with current golf course conditions for SEV purposes.
	HAF	=	0.340	0.510	0.412	0.488	0.506	0.580	0.719	0.725	No change assumed.
Habitat provision function mean score			0.195	0.280	0.231	0.269	0.278	0.315	0.639	0.641	
Biodiversity		Vfish	0.333	0.333	0.333	0.333	0.433	0.433	0.733	0.733	No change assumed because future fish community response is uncertain. Current Fish IBI inputs are based on T&T survey data and are considered conservative because some data were collected farther downstream where flow permanence and habitat diversity are greater.
	FFI	=	0.333	0.333	0.333	0.333	0.433	0.433	0.733	0.733	

Function category	Function	Variable	SEV 1		SEV 2		SEV 3		SEV 4		Assumptions used for Potential SEV Scores
			Current	Potential	Current	Potential	Current	Potential	Current	Potential	
		Vmci	0.193	0.193	0.193	0.193	0.435	0.435	0.624	0.624	No change assumed because future macroinvertebrate response is uncertain. Current MCI inputs are based on T&T survey data and are considered conservative because some data were collected farther downstream where flow permanence and habitat diversity are greater.
		Vept	0.000	0.000	0.000	0.000	0.000	0.000	0.167	0.167	Calculated from macroinvertebrate inputs; no separate assumption applied.
		Vinvert	0.233	0.233	0.233	0.233	0.233	0.233	0.466	0.466	Calculated from macroinvertebrate inputs; no separate assumption applied.
	IFI	=	0.142	0.142	0.142	0.142	0.223	0.223	0.419	0.419	
		Vripcond	0.210	0.330	0.300	0.330	0.320	0.330	0.280	0.330	Potential score reflects the riparian planting and management assumptions applied to riparian condition variables.
		Vripconn	0.500	0.500	0.900	0.900	0.800	0.800	0.900	0.900	No change assumed; existing culvert and connectivity constraints remain unchanged.
	RVI	=	0.105	0.165	0.270	0.297	0.256	0.264	0.252	0.297	No change assumed because future fish community response is uncertain. Current Fish IBI inputs are based on T&T survey data and are considered conservative because some data were collected farther downstream where flow permanence and habitat diversity are greater.
Biodiversity function mean score			0.193	0.213	0.248	0.257	0.304	0.307	0.468	0.483	
Overall mean SEV score (max value 1)			0.350	0.454	0.474	0.506	0.528	0.555	0.575	0.579	

Appendix G
Wetland Ecological Valuation (WEV) Results and Assumptions

Table G1. Wetland Ecological Valuation (WEV) Current and Potential Scores and Assumptions.

Component	Attribute	WEV Impact		WEV Compensation		Assumptions
		Current	Potential	Current	Potential	
Catchment	Land use affecting catchment hydrology	1.70	0.25	1.85	1.90	Potential impact wetland score conservatively reflects the planned urban/light industrial catchment. Potential compensation wetland score reflects a mixed future catchment with development and increased native planting/restoration.
	Diversion of flows	5.00	5.00	5.00	5.00	No change assumed; no adverse new flow diversions from the assessed wetlands are assumed in the potential scenario.
	Water quality in catchment	3.00	4.00	3.00	4.00	Potential improvement assumes reduced golf course chemical/fertiliser inputs and implementation of stormwater, riparian and wetland management measures.
	Mammalian predators in catchment	2.00	2.00	2.00	3.00	Impact wetland score unchanged. Compensation wetland score assumes regular pest animal control within the compensation area and wider EPAN/restoration context.
	Key undesirable plants in catchment	3.00	4.00	1.00	4.00	Potential improvement assumes ongoing pest plant control and establishment/maintenance of native planting within wetland, riparian and buffer areas.
	% impervious surfaces in catchment	5.00	1.00	4.00	2.00	Potential scores conservatively reflect increased impervious surface associated with the proposed development. This does not rely on groundwater inputs or residual pervious surface runoff.
	% catchment in vegetation of any sort	5.00	1.00	4.00	3.00	Potential scores reflect the future development layout and proposed restoration planting. Impact wetland catchments are conservatively assumed to have reduced vegetated catchment cover.
	Degree of runoff control – flood and first flush	0.00	5.00	0.00	2.00	Potential scores assume stormwater management measures provide improved runoff control appropriate to the future developed catchment, where applicable.

Component	Attribute	WEV Impact		WEV Compensation		Assumptions
		Current	Potential	Current	Potential	
	Wetland connections	4.00	4.00	5.00	5.00	No material change assumed; existing wetland connections are assumed to be retained or managed within the proposed freshwater network.
Wetland	Size and shape	0.50	0.50	3.50	3.50	No change assumed for impact wetlands. Compensation wetland remains a large contiguous wetland area with favourable size and shape relative to smaller impact wetlands.
	Change in hydrology	4.00	3.33	4.33	4.00	Potential impact wetland score conservatively reflects possible hydrological change associated with development and reduced surface water catchment area. Compensation wetland hydrology is assumed to remain functional, subject to restoration and management.
	Change in water/ soil quality or state (physico chemical parameters)	4.50	4.50	4.50	4.50	No material change assumed beyond the water quality and stormwater management assumptions applied at catchment scale.
	Change in ecosystem intactness	3.67	4.33	4.67	5.00	Potential improvement assumes protection, weed control, native planting and ongoing wetland management, particularly for the compensation wetland.
	Change in amount of animal damage and harvest by humans	3.67	3.67	3.33	4.33	Potential compensation score assumes reduced animal damage through pest animal management and protection of the wetland restoration area. Harvesting effects are assumed to remain negligible.
	Change in dominance of native plants	4.00	4.00	0.00	4.00	Potential compensation score assumes substantial weed control and native wetland planting resulting in increased indigenous vegetation dominance. Impact wetland score is conservatively unchanged.
Buffer	Animal damage	5.00	5.00	2.50	5.00	Potential compensation buffer score assumes pest animal control and management of the wetland edge/buffer area.

Component	Attribute	WEV Impact		WEV Compensation		Assumptions
		Current	Potential	Current	Potential	
	Weeds	0.00	5.00	0.00	5.00	Potential scores assume ongoing weed control and maintenance, with substantial reduction in pest plant cover within buffer areas.
	Canopy dieback	5.00	5.00	5.00	5.00	No material change assumed; no widespread canopy dieback is anticipated in the potential scenario.
	Buffer	0.00	2.50	2.50	5.00	Potential improvement assumes establishment and maintenance of native buffer planting around wetland margins where practicable.
	Drains	5.00	5.00	5.00	5.00	No change assumed; existing drains or hydrological constraints are not assumed to be removed unless specifically provided for in the restoration design.
Overall Mean Score (maximum value 5)		**3.202**	**3.454**	**3.059**	**4.012**	
Wetland Condition (WEV score)		**6.404**	**6.908**	**6.118**	**8.024**	

Appendix H
EcIAG Assessment Tables for Ecological Values

Table H1. Assessment of terrestrial vegetation types within the site against the EcIAG ecological value matters.

Vegetation values were assessed based on representativeness, rarity and distinctiveness, diversity and pattern, ecological context, and overall ecological value in accordance with the EcIAG guidelines.

Vegetation type / feature	Representativeness	Rarity / distinctiveness	Diversity and pattern	Ecological context	Overall ecological value
Kānuka-dominated regeneration (VS2)	Low-Moderate. Indigenous canopy dominated by kānuka and associated with gullies/riparian margins, but mixed origin, historical revegetation and variable understorey condition. Not a high-quality representative example of the predicted WF4/WF12 forest types.	Low-Moderate. Kānuka has been reclassified as Not Threatened, and no threatened flora are currently identified. However, indigenous regenerating vegetation is locally important in the modified golf-course landscape.	Moderate. Contains kānuka canopy with variable indigenous understorey including māhoe, karamū, mapou, tī kōuka, tree ferns and other indigenous shrubs, but diversity is constrained by pest plants and past disturbance.	Moderate. Provides the main indigenous vegetation cover on site, contributes to riparian/gully connectivity, fauna habitat and the EPAN. Values are constrained by fragmentation and weed invasion.	Moderate
Native planting (PL)	Low. Indigenous species are present, but planted areas are artificial in origin and established for amenity or riparian revegetation purposes. They do not reflect naturally occurring vegetation communities, structure or successional processes.	Low. Common indigenous species are listed; no threatened or At Risk flora values are identified.	Low-Moderate. Plantings comprise a mixture of common indigenous trees and shrubs and contribute to local habitat diversity; however, structural complexity and species composition are generally limited and influenced by planting design and management.	Low-Moderate. Riparian and EPAN-associated plantings contribute to local habitat connectivity and buffering around freshwater features. However, most planted areas are limited in extent, relatively young and provide lower ecological function than naturally regenerating indigenous vegetation communities.	Low
Exotic forest and treeland (EF)	Very Low-Low. Dominated by exotic canopy species, mainly mature radiata pine, with	Low. No rare vegetation type or threatened flora value identified. Contain	Low-Moderate. Some stands support indigenous regeneration, but others are	Low-Moderate. Provides local avifauna habitat and contributes to landscape connectivity,	Low

Vegetation type / feature	Representativeness	Rarity / distinctiveness	Diversity and pattern	Ecological context	Overall ecological value
	scattered eucalyptus and amenity trees. Not representative of indigenous ecosystem types.	mature tree structures, but these are exotic and common in the landscape.	open or dominated by pest plants. Structural diversity is present, compositional diversity is limited.	particularly within gullies. Mature trees may provide limited habitat opportunities for bats; however, ecological values are reduced by exotic dominance and weed invasion.	
Exotic-dominated scrub (ES)	Very Low-Low. Dominated by exotic pest plants such as gorse, woolly nightshade, privet and pampas; not representative of indigenous vegetation communities.	Low. No rare/distinctive vegetation values identified. Distinctiveness is mostly as restoration opportunity, not existing ecological value.	Low. Dense structure may provide refuge, but indigenous composition is limited and patch quality is variable.	Low. Provides some cover and local habitat opportunities for fauna, particularly where associated with gullies and riparian margins. However, ecological values are constrained by weed dominance and the limited indigenous composition of these communities.	Low
Exotic grassland and managed amenity vegetation	Very Low. Regularly maintained exotic turf/pasture grassland; not representative of indigenous vegetation.	Very Low-Low. No rare vegetation values identified. Rank grassland may provide local fauna habitat, but botanical rarity is low.	Very Low-Low. Low structural and compositional complexity in managed fairways; rank areas have slightly greater structure.	Low. Generally poor ecological context due to regular mowing and disturbance, although rank grassland margins adjacent to ponds and riparian areas may provide local habitat for indigenous birds and lizards.	Low

Table H2. Assessment of terrestrial fauna values within the site against the EcIAG ecological value matters.

Terrestrial fauna values were assessed separately from vegetation values, recognising that fauna may utilise habitats with relatively low botanical value. The assessment considered species records, targeted survey results, habitat suitability, conservation status and ecological context.

Fauna value	Survey / information basis	Conservation status / rarity-distinctiveness	Diversity and habitat use	Ecological context	Key limitations / uncertainty	Overall ecological value
Avifauna / birds	T&T 2020/2021 surveys, Viridis 5MBC surveys undertaken in April 2026, and opportunistic observations. A total of 34 bird species were recorded within the wider site and surrounding environment, including 20 indigenous species.	Several Threatened and At Risk species have been recorded within the wider site and surrounding coastal environment, or are considered likely to intermittently utilise habitats within the site. These include pāteke, weweia/New Zealand dabchick, pied shag, black shag, New Zealand pipit, long-tailed cuckoo, North Island kākā and several coastal and shorebird species.	The site supports a moderate diversity of common indigenous and exotic birds across modified grassland, vegetated gullies, constructed ponds, wetland margins and coastal-edge habitats. Habitat use is likely variable, with higher value associated with pond margins, wetlands, vegetated gullies, EPAN vegetation and nearby coastal/intertidal habitats.	The site forms part of a broader coastal-freshwater-terrestrial mosaic adjoining the Tāmaki Strait/Hauraki Gulf and contains habitats connected to the EPAN, freshwater features and coastal receiving environment. While the site itself provides moderate avifauna habitat, adjacent coastal and intertidal habitats support higher ecological values for several Threatened and At Risk coastal and shorebird species.	Some Threatened and At Risk species may utilise the site intermittently or locally rather than as core habitat. Potential nesting by pond-associated species, including pāteke and weweia, should be managed through implementation of the FMP (Appendix K).	Moderate
Herpetofauna / lizards	Targeted Bioresearches lizard surveys in March-April 2026, including artificial retreats, hand-searching and nocturnal spotlighting. Additional search and salvage works	Indigenous lizard records within 10 km include copper skink, ornate skink, elegant gecko, forest gecko and Pacific gecko. Several are At Risk - Declining. All indigenous reptiles are protected. Plague	Potential habitat is localised and mainly associated with vegetated gullies, EPAN areas, rank grassland, woody debris, leaf litter and unmanaged margins. Much of the site is regularly	The site is modified and fragmented, but some EPAN vegetation and unmanaged margins provide potential refuge or dispersal habitat. Terrestrial connectivity is limited compared with	Absence of detections reduces likelihood of a substantial population, but does not entirely rule out low-density or localised indigenous skink presence.	Low-Moderate

Fauna value	Survey / information basis	Conservation status / rarity-distinctiveness	Diversity and habitat use	Ecological context	Key limitations / uncertainty	Overall ecological value
	undertaken within the adjacent Stage 1 earthworks area also recorded no indigenous lizards.	skink was observed and is expected to be common.	mown golf course grassland and provides limited suitability.	higher-quality indigenous habitats in the wider landscape.		
Chiroptera / bats	No bats were detected during the 2021 or 2026 acoustic surveys, and no recent records are known from the immediate area.	Long-tailed bats are Threatened – Nationally Critical. Short-tailed bats are not known from mainland Auckland, with the nearest known population occurring on Te Hauturu-o-Toi / Little Barrier Island.	Mature exotic trees, shelterbelts, riparian margins and vegetation edges may provide limited foraging, commuting or roosting opportunities. However, on-site habitat is considered low value due to the exposed, isolated and highly modified nature of the landscape.	The site is within the potential movement range of long-tailed bats; however, repeated non-detections and the limited suitability of on-site habitat reduce the likelihood of regular use. More extensive indigenous vegetation within the wider landscape is likely to provide higher-quality habitat.	Occasional use cannot be entirely ruled out given the mobility of long-tailed bats. Potential effects associated with tree removal should be managed in accordance with the FMP and relevant DOC bat roost assessment protocols where suitable roost trees are affected.	Low

Table H3. Assessment of freshwater habitat types within the site against the EcIAG ecological value matters.

Freshwater values were assessed separately for each freshwater feature type, recognising that ecological value varies according to naturalness, hydrological function, habitat quality, connectivity, indigenous fauna use and historical modification. While some artificial or modified freshwater features have limited naturalness values, they may still provide habitat for indigenous fauna and contribute to the wider freshwater network.

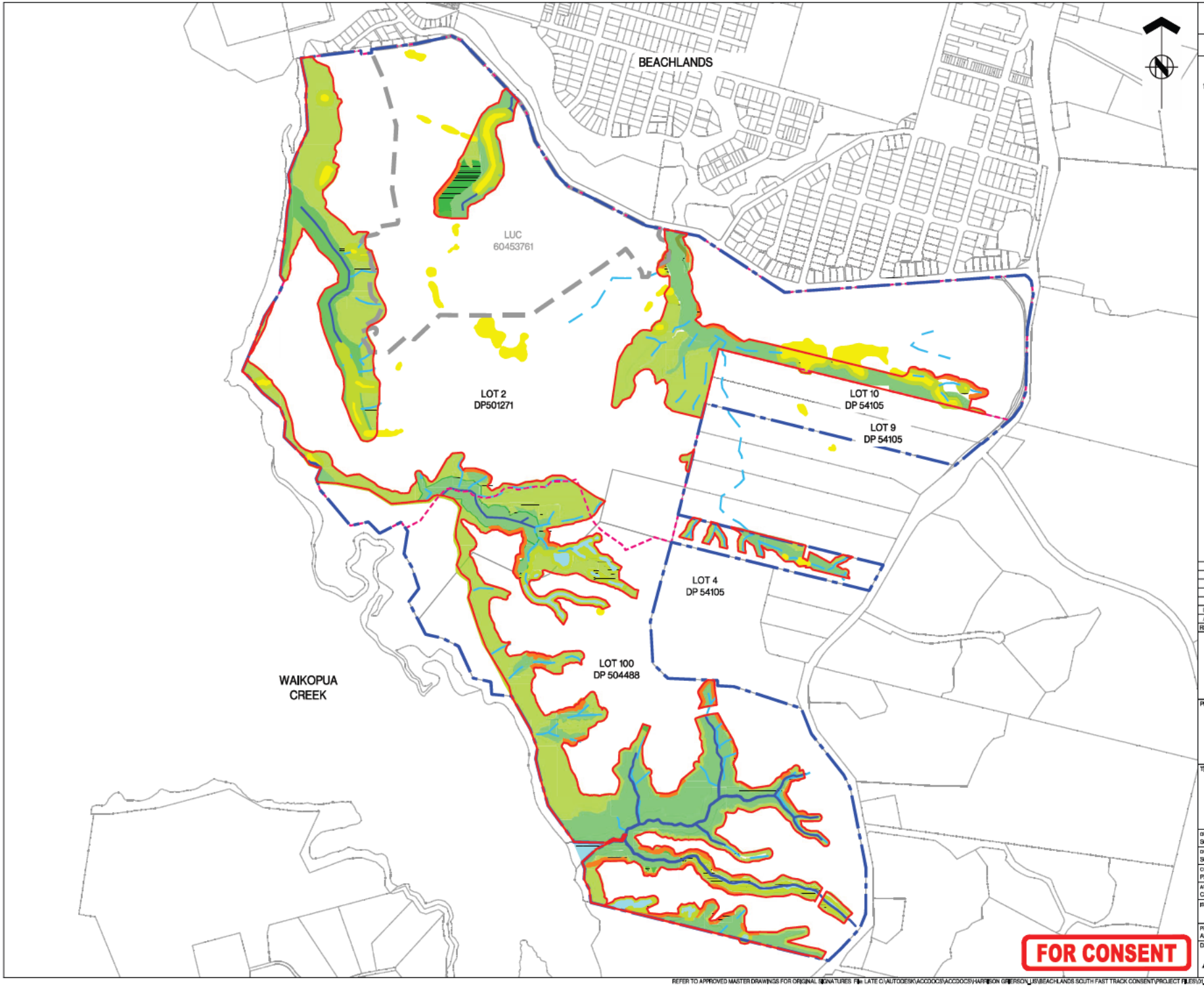
Freshwater habitat type	Naturalness / representativeness	Rarity / distinctiveness	Habitat quality, diversity and function	Connectivity and ecological context	Overall ecological value
Permanent and intermittent streams	Low-Moderate. These features retain natural stream characteristics, including defined channels, flow regimes and hydrological connectivity, although many have been historically modified. Permanent streams and intermittent streams associated with the EPAN generally exhibit greater natural character and riparian integrity. In contrast, some intermittent upper catchment reaches occur within open and highly modified parts of the Site, where values are reduced by historical landform modification, drainage alteration, golf course management and limited riparian vegetation.	Low-Moderate. Permanent streams and more connected intermittent streams provide habitat for indigenous freshwater fauna, including species recorded from the wider Beachlands South area. In contrast, some upper intermittent reaches provide more limited habitat availability and quality due to their small size, intermittent flow regime and modified catchment setting.	Low- Moderate. Habitat quality varies from shaded gully streams with more diverse instream habitat to modified, narrow, intermittent upper reaches. Values are reduced by channel modification, culverts, online ponds, altered hydrology and variable riparian cover.	Low-Moderate. Connectivity varies across the stream network. Permanent streams and intermittent streams associated with the EPAN provide linkages between riparian, wetland and downstream receiving environments. In contrast, some upper intermittent reaches located within the golf course and outside the EPAN have more limited ecological connectivity and are more strongly influenced by the surrounding modified landscape.	Low- Moderate
Modified natural streams	Low-Moderate. These are interpreted as natural-origin streams but have been substantially altered by drainage works, channel	Low-Moderate. These features continue to provide freshwater habitat and hydrological function but are not rare or highly	Low-Moderate. Habitat complexity and ecological function are constrained by modified morphology, reduced flow/habitat	Low-Moderate. They continue to provide local freshwater connectivity and may connect to ponds,	Low-Moderate

Freshwater habitat type	Naturalness / representativeness	Rarity / distinctiveness	Habitat quality, diversity and function	Connectivity and ecological context	Overall ecological value
	modification, pond construction and hydrological change.	representative examples of natural stream systems.	diversity and wetland-like altered channels in some places.	wetlands or retained stream systems.	
Artificial drainage channels	Negligible-Low. Artificial in origin and constructed for golf course drainage/stormwater conveyance.	Low. No rare habitat value identified, although some may support localised emergent vegetation or occasional aquatic fauna use.	Negligible-Low. Typically straightened, deepened, maintained and with limited riparian vegetation or habitat complexity.	Low. Some channels connect to ponds or drainage networks and may provide limited habitat for mobile species such as eels where wetted habitat persists.	Negligible-Low
Natural inland wetlands — small inland wetlands excluding coastal fringe wetland	Low. These wetlands meet the natural inland wetland definition under the NPS-FM but are mostly small, modified and associated with gully headwaters, seepages, drainage lines or low-lying modified areas.	Low-Moderate. Wetlands are a nationally threatened ecosystem type and are recognised as having elevated ecological importance. However, most wetlands within the Site are small, modified and dominated by common exotic wetland species and are not considered high-quality or rare examples.	Low. Most wetlands are dominated by soft rush, Mercer grass or other common exotic wetland species, with limited indigenous diversity and variable hydrological modification.	Low. These wetlands provide local hydrological function and habitat within the wider freshwater network, but their ecological role is constrained by their small size, modified condition and fragmented distribution.	Low, with some Low-Moderate individual wetlands
Coastal fringe wetland	Moderate. Larger wetland feature associated with the coastal margin and freshwater-coastal transition.	Moderate. Distinctive due to size, coastal context, connectivity and restoration potential, even if dominated by relatively	Moderate. Provides wetland habitat, hydrological function and restoration opportunity. Botanical values may be constrained by exotic dominance, but ecological	Moderate. Connected to coastal, freshwater and terrestrial environments and forms an important component of the site's ecological network.	Moderate

Freshwater habitat type	Naturalness / representativeness	Rarity / distinctiveness	Habitat quality, diversity and function	Connectivity and ecological context	Overall ecological value
		common wetland vegetation.	function/context is higher than smaller inland wetlands.		
Constructed ponds	Low. Artificial in origin and excluded from natural inland wetland status, but some are permanent open-water habitats.	Low-Moderate. Although artificial, some support indigenous fauna, including wetland-associated birds and potentially eels where connected.	Low-Moderate. Habitat value varies depending on size, permanence, marginal vegetation, water quality and connectivity. Larger online ponds have higher habitat function than small isolated/offline ponds.	Low-Moderate. Some ponds form part of the wider freshwater network and contribute to habitat diversity in the modified golf course landscape.	Low-Moderate
Incidental wetlands	Low. Wetland habitat formed in association with constructed ponds, artificial drainage channels or modified hydrology rather than remnant natural wetland systems.	Low. Generally not rare or distinctive and mostly dominated by common exotic wetland species.	Low. Small, modified, exotic-dominant and generally limited in indigenous vegetation composition and ecological function.	Low. Contribute local habitat diversity but are constrained by artificial origin and altered hydrology.	Low
Freshwater fish and kōura	Moderate. Permanent streams and connected freshwater habitats continue to support indigenous fish habitat despite modification.	Moderate-High. Indigenous fish recorded from the wider area include At Risk and Threatened species. While habitat quality is variable across the Site, the presence and potential	Moderate. Habitat quality is best in permanent, connected, shaded reaches and lower in modified, intermittent or disconnected habitats.	Moderate. Connectivity to downstream receiving environments contributes to fish habitat values, although connectivity is locally affected by culverts, online	Moderate

Freshwater habitat type	Naturalness / representativeness	Rarity / distinctiveness	Habitat quality, diversity and function	Connectivity and ecological context	Overall ecological value
		occurrence of species of conservation concern elevates the significance of this value.		ponds and other historical modifications.	
Macroinvertebrate habitat	Low-Moderate. Communities indicate modified freshwater systems.	Low. No rare macroinvertebrate assemblages identified.	Low–Moderate. MCI/qMCI results indicate generally Poor to Fair condition, with low EPT representation and habitat conditions influenced by historical modification. However, functioning macroinvertebrate communities remain present throughout the freshwater network.	Low-Moderate. Provides functioning aquatic communities, but values are constrained by sediment, habitat simplification and modified catchments.	Low-Moderate

Appendix I
EPAN Vegetation Removal and Mitigation Plan



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NOTES

1. INFORMATION OBTAINED FROM AUCKLAND UNITARY PLAN I458 BEACHLANDS SOUTH - PRECINCT PLAN 2

LEGEND:

- SITE BOUNDARY
- CONSENT BOUNDARY
- LIVE ZONE BOUNDARY
- EPAN BOUNDARY
- PERMANENT STREAM
- INTERMITTENT STREAM
- INDICATIVE NATIVE REGENERATION
- WETLAND MARGIN BUFFER PLANTING
- INDICATIVE CONSTRUCTED WETLAND
- ECOLOGICAL PROTECTED AREA NETWORK
- HIGH VALUE TERRESTRIAL PLANTING
- INDICATIVE NATURAL WETLAND

TOTAL EPAN AREA = 70.3292ha

REF	REVISIONS	BY	DATE
B	FOR CONSENT	CJM	05.2026
A	FOR CONSENT	CJM	02.2026

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PROJECT:

BEACHLANDS
FAST TRACK CONSENT APPLICATION
BEACHLANDS SOUTH, AUCKLAND

TITLE:

PROPOSED DEVELOPMENT CONTROLS PLAN
AUP I458 PRECINCT PLAN 2

ORIGINATOR: SCT	DATE: 04.2026	SIGNED:	PLOT BY: MNP
DRAWN: SCT	DATE: 11.2025	SIGNED:	PLOT DATE: 12.05.26
CHECKED: PZS	DATE: 05.2026	SIGNED:	SURVEY BY: SURVEYED BY
APPROVED: CJM	DATE: 05.2026	SIGNED:	SURVEY DATE: SURVEYED DATE

ISSUE STATUS: FAST TRACK CONSENT

PROJECT No: A2515591.00	SCALES: 1:5000 A1 1:10000 A3	A1
DRAWING No: A2515591.00-0010		REV B

REFER TO APPROVED MASTER DRAWINGS FOR ORIGINAL SIGNATURES File: C:\AUTODESK\ACCDOCS\ACCDOCS\HARRISON GRIERSON_LIB\BEACHLANDS SOUTH FAST TRACK CONSENT\PROJECT FILES\01_DESIGN\02_CIVIL\04_SHEETS\A2515591.00-0010 NATURAL FEATURES - AUP.DWG

Appendix J
Biodiversity Management Plan

VIRIDIS
Environmental Consultants

Beachlands South Fast Track

Biodiversity Management Plan

Prepared for: Beachlands South Limited Partnership

June 2026

DOCUMENT CONTROL AND REVISION HISTORY

Document title	Beachlands South Fast Track
	Biodiversity Management Plan
Prepared for	Beachlands South Limited Partnership
Version	Final 1
Date	23 June 2026
Document number	10055-010-1

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Final 1	23 June 2026	10055-010-a

Author(s)	
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Reference: Viridis 2026. Beachlands South Fast Track Biodiversity Management Plan. A report prepared for Beachlands South Limited Partnership by Viridis Limited. June 2026.

Cover photo: Photo overlooking the south-western EPAN and wetland areas towards the south-east (May 2026).

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1 INTRODUCTION

This report has been prepared in support of a substantive application submitted by Beachlands South Limited Partnership ('BSLP') under the Fast-track Approvals Act ('FTAA'). The Project name is 'Beachlands South' and is included in Schedule 2 of the FTAA as a Listed Project with significant regional or national benefits. The Site is located at 110 Jack Lachlan Drive and 620, 712, 758 and 770 Whitford-Maraetai Road, Beachlands (the "Site" or the "project area"). Part of the Site is already consented for earthworks (Stage 1). Figure 1 shows the location and extent of the Site, and the area on Site already consented for earthworks under Stage 1.

Figure 1. Current aerial imagery of the development Site. Aerial source: Nearmaps, 2025.

Ecological field investigations undertaken to inform this Biodiversity Management Plan (BMP) were completed prior to inclusion of the 758 and 770 Whitford-Maraetai Road properties within the broader project area. These properties are not subject to the ecological restoration and management measures contained within this BMP and have therefore not been included within the areas addressed by this document.

The Beachlands South Precinct provisions under the Auckland Unitary Plan Operative in Part (AUP-OP) identify an Ecological Protected Area Network (EPAN), which has been applied over the highest value terrestrial, wetland and stream habitats within the precinct to ensure their long-term protection and to improve ecological values through a range of habitat restoration and enhancement measures. The EPAN generally follows vegetated gullies and coastal margins (Figure 2). Much of the EPAN is comprised of exotic forest, exotic-dominated scrub, and fragmented regenerating native vegetation communities of varying ecological condition. Pest plant invasion is abundant throughout parts of the network, and many areas have been historically modified through agricultural activities, golf course development and associated earthworks. Approximately 36 ha of land within the development Site is identified as EPAN.

This BMP has been prepared to support the FTAA application and to provide a practical framework for implementing biodiversity restoration, enhancement, maintenance and monitoring within the EPAN and other ecological management areas. These include the freshwater compensation wetland, riparian margins outside the EPAN, and additional planting areas required to manage ecological effects associated with the proposal.

The freshwater compensation wetland forms part of the effects management package for wetland reclamation associated with the Site. The compensation rationale, compensation quantum, residual effects assessment and target ecological outcomes are addressed in Ecological Impact Assessment (EcIA; Viridis 2026). This BMP sets out the practical restoration, weed control, planting, maintenance, monitoring and adaptive management methods for implementing the freshwater compensation wetland restoration works. The extent of land subject to the BMP is shown in Figure 1 and Figure 2.

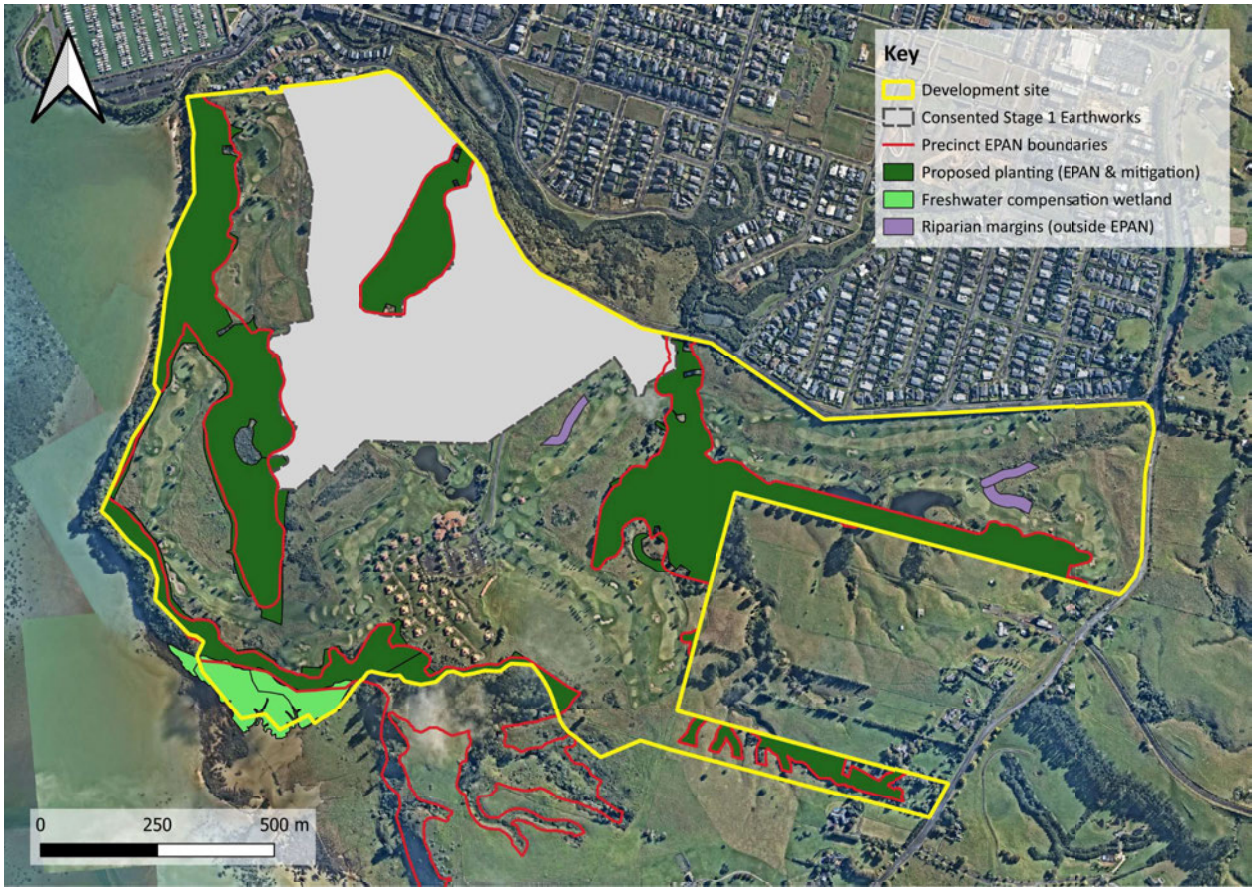

Figure 2. The areas of the development Site subject to this BMP. Aerial source: Nearmaps, 2025.

The final legal protection mechanism for the EPAN, riparian margins and freshwater compensation wetland is to be confirmed through the consent and subdivision process. The mechanism should ensure protection and management obligations in perpetuity, including weed and pest animal control, maintenance access and restrictions on incompatible activities.

This BMP is required under the Beachlands South Precinct I458.9 Special Information Requirements, which states:

> *(2) Biodiversity Management Plan*
>
> *Any application for subdivision in the precinct involving the Ecological Protected Area Network (EPAN) as identified on Precinct Plan 2 must be accompanied by a Biodiversity Management Plan for the EPAN addressing staged implementation of the following:*

- *Native revegetation strategy and plant details including:*
- *Riparian planting to restore and enhance existing streams*
- *Terrestrial vegetation to enhance habitats and create additional habitats for terrestrial biodiversity*
- *Wetland buffer planting*
- *Wetland revegetation*
- *Invasive weed and mammalian pest control management measures;*
- *Ongoing maintenance and enhancement measures; and*
- *Vegetation clearance constraints during bird nesting seasons.*

Note that vegetation clearance constraints during bird nesting seasons are covered by the Fauna Management Plan (FMP; Viridis 2026).

Table 1. Location of Beachlands South Precinct biodiversity management requirements within this BMP.

Beachlands South Precinct BMP requirement	Where addressed in this BMP
Riparian planting to restore and enhance existing streams	Section 2.2, including "Planting objectives", "Planting location and extent", and the lower and upper riparian planting schedules
Terrestrial vegetation to enhance habitats and create additional habitats for terrestrial biodiversity	Section 2.2, including the WF4 and WF12 planting schedules
Wetland buffer planting	Section 2.2, including the wetland, lower riparian and upper riparian planting schedules
Wetland revegetation	Section 2.2, including the EPAN wetland planting schedule and the south-western wetland planting schedule
Invasive weed control management measures	Section 3
Mammalian pest control management measures	Section 4
Ongoing maintenance and enhancement measures	Sections 2.6 and 2.7, with supporting weed and pest animal control requirements in Sections 3 and 4
Vegetation clearance constraints during bird nesting seasons	Addressed in the FMP (Viridis 2026); in which this BMP should be read in conjunction with

2 PLANTING

2.1 Pre-planting assessment

2.1.1 Environmental conditions

The Site is situated within the Hunua Ecological District (ED) of the Auckland Region. The Site is bounded along its western side by coastal esplanade reserve and the Hauraki Gulf. Along the Site's northern edge is the coastal suburb of Beachlands and the land to the south and east is currently in rural land uses, and zoned Future Urban Zone. The Site contains several streams and some small wetlands associated with the stream systems. A large coastal fringe wetland is located adjacent to the coast in the south-western corner of the Site and extending into neighbouring properties; part of this area forms the freshwater compensation wetland.

The EPAN areas are predominantly associated with stream gullies and the coastal fringe and comprise moderately to steeply sloping land with a variety of aspects. Existing vegetation provides some shade and shelter in some areas. Much of the planting will be done in gully areas, so will have some protection from the surrounding landform. It is expected that the Site would be exposed to wind, sun and some salt spray, but given its coastal location is unlikely to experience frosts.

The coastal fringe wetland is flat in nature, rising slightly to the north-east, with a stream channel passing through the central area. While the Site occurs within a coastal wetland context, the area proposed for restoration does not exhibit the hydrological or vegetation characteristics typical of intact saline saltmarsh systems. In particular, the area appears to experience negligible saline inundation, with vegetation instead reflecting a modified freshwater-to-brackish wetland transition. The conditions underfoot during the Site visit in May 2026 were mainly firm and only mildly saturated, with little evidence of prolonged inundation (except where channels were present).

The underlying geology of the Site is East Coastal Bays Formation of Warkworth Subgroup (Waitemata Group) (1:1 000 000 Geological Map of New Zealand, 2014). Soils on the Site are likely yellow ultic (Manaaki Whenua Landcare Research, Soils Map Viewer).

As the proposed planting is located within wetland, riparian and gully environments, soil moisture conditions will vary across the Site. Areas adjacent to streams and wetlands are expected to remain seasonally or permanently moist, while drier conditions are anticipated on upper slopes and in areas further from freshwater margins.

2.1.2 Existing vegetation within the planting areas

EPAN and riparian areas

Currently the terrestrial vegetation within the EPAN areas comprises four broad vegetation types: kānuka-dominated regeneration (VS2), exotic forest and treeland (EF), exotic-dominated scrub (ES), and small areas of native planting (PL). Pōhutukawa treeland (CL1) was also noted along the coast, outside of the Site but directly adjacent to the western property boundary.

ES is the most common vegetation type within the EPAN and riparian areas, particularly within the western and southern areas. This vegetation type is generally characterised by dense exotic shrubland, dominated by listed pest plants[1] including gorse (*Ulex europaeus*), woolly nightshade (*Solanum mauritianum*), Chinese privet (*Ligustrum sinense*) and pampas (*Cortaderia selloana*). Localised

[1] As per the Auckland Regional Pest Management Plan 2020-2030.

indigenous regeneration comprising common species such as karamū and māhoe is occasionally present amongst pest plant vegetation.

EF is dominant in the EPAN areas in the eastern portion of the Site and is commonly characterised by a canopy of mature radiata pine (*Pinus radiata*). Scattered eucalyptus (*Eucalyptus* spp.) and other exotic and deciduous amenity species are also occasionally present.

VS2 is characterised by a canopy dominated by kānuka (*Kunzea robusta*). Understorey composition is variable and commonly includes indigenous species such as māhoe (*Melicytus ramiflorus*), karamū (*Coprosma robusta*), mapou (*Myrsine australis*), tī kōuka / cabbage tree (*Cordyline australis*), tree ferns and other indigenous shrub species. However, listed pest plant[2] invasion is common, with woolly nightshade, privet (*Ligustrum* spp.), and pampas locally dominant.

A small area of PL is located in the south-eastern portion of the EPAN and contains a mixture of common indigenous species such as tī kōuka, māhoe, mānuka (*Leptospermum scoparium*), kānuka, tōtara (*Podocarpus totara*) and kāpuka (*Griselinia littoralis*).

Historically (pre-human), the Site would have likely supported the ecosystem types Pōhutukawa, pūriri, broadleaved forest (WF4) and Kauri, podocarp, broadleaved, beech forest (WF12). Native flora characteristic of the WF4 ecosystem type would have most commonly included pōhutukawa (*Metrosideros excelsa*), pūriri (*Vitex lucens*) and kohekohe (*Dysoxylum spectabile*), together with other broadleaved tree species such as karaka (*Corynocarpus laevigatus*), tawa (*Beilschmiedia tawa*), taraire (*B. tarairi*), and tawāpou (*Planchonella costata*). Native flora characteristic of the WF12 ecosystem type would have included podocarp-dominated ridges containing hard beech (*Fuscospora truncata*), tānekaha (*Phyllocladus trichomanoides*), thin-barked tōtara (*Podocarpus laetus*) and kauri (*Agathis australis*), with species such as rimu (*Dacrydium cupressinum*), miro (*Prumnopitys ferruginea*), tawa, hīnau (*Elaeocarpus dentatus*), northern rātā (*Metrosideros robusta*), and rewarewa (*Knightia excelsa*) more common within gullies and lower slopes (Singers et al. 2017).

Most wetlands within the EPAN areas are highly modified and support vegetation communities dominated by common exotic wetland species, particularly soft rush (*Juncus effusus* – FACW) and mercer grass (*Paspalum distichum*).

Coastal fringe wetland

The coastal fringe wetland is located in the south-western corner of the Site, contiguous with the wider EPAN. It forms part of a broader wetland and coastal margin sequence that provides ecological connectivity between wetland, riparian, terrestrial and coastal habitats.

The wetland is highly modified and currently dominated by exotic wetland and pasture species. Dense *Carex divisa* is widespread through the central wetland, with Yorkshire fog (*Holcus lanatus*), mercer grass, creeping buttercup (*Ranunculus repens*), scattered pampas and other exotic species also present. Indigenous vegetation occurs mainly in the western and north-eastern areas, including tī kōuka, harakeke / flax (*Phormium tenax*), pōhuehue (*Muehlenbeckia complexa*) and other wetland or wetland-margin species.

Although the wetland is located near the coast, the proposed compensation area does not appear to function as intact saline saltmarsh. Vegetation and site conditions indicate a modified freshwater wetland, with wetter depressions, seasonally moist areas and slightly elevated wetland margins that

[2] As per the Auckland Regional Pest Management Plan 2020-2030.

transitions to a brackish wetland. During the May 2026 Site assessment, ground conditions were generally firm to mildly saturated, with wetter areas associated with channels and lower-lying parts of the wetland.

The main restoration constraint is dense *Carex divisa*, an invasive sedge listed as a pest plant[3] which suppresses indigenous wetland regeneration and limits native plant diversity. Restoration will therefore focus on staged weed control, indigenous wetland planting, improved wetland buffer condition and enhanced connectivity with the adjacent EPAN, stream, terrestrial and coastal habitats.

2.2 Planting Plan Assessment

2.2.1 Planting objectives

Indigenous revegetation planting and protection is proposed to buffer the wetland and stream environments present, improve ecological corridors and improve the botanical and habitat values of the EPAN areas. The proposed planting and existing native vegetation within the Site will be afforded long-term legal protection.

For the freshwater compensation wetland, the planting objective is to establish a resilient indigenous wetland vegetation community that reflects the Site's freshwater to brackish transition setting and supports the ecological outcomes relied on in the EcIA (Viridis 2026). Planting and associated weed and pest control are intended to increase indigenous vegetation dominance, improve wetland structure and habitat diversity, strengthen wetland buffers, improve ecological connectivity and provide a measurable trajectory toward the potential WEV condition assumed for the compensation wetland.

The proposed planting is intended to restore and enhance terrestrial, wetland and freshwater ecological values within the EPAN and freshwater compensation wetland, and to contribute to the effects management outcomes relied on for the Project, including:

- Revegetation of the stream and wetland riparian areas with native vegetation, which is currently minimal;
- Increasing biodiversity;
- Improving filtration of runoff, including nutrients, sediment and other contaminants;
- Increasing the degree of stream shading;
- Increasing terrestrial habitat and resources for indigenous fauna; and
- Improving ecological connectivity within the Site and improve linkages with the coastal and terrestrial environments adjacent to the Site.

2.2.2 Planting location and extent

Approximately 361,200 m^2 of land is proposed to be planted in the EPAN areas, and 29,430 m^2 within the freshwater compensation wetland. The indicative extents of the proposed planting areas are shown in Figure 3. Note that these extents do not take into account existing vegetation, accessways and walkways. Native vegetation is to be retained within the planting areas. Large exotic species not listed as pest plants should also be retained.

[3] Identified as a plant pest in the Auckland Regional Pest Management Plan 2020-2030 (Auckland Council, 2020).

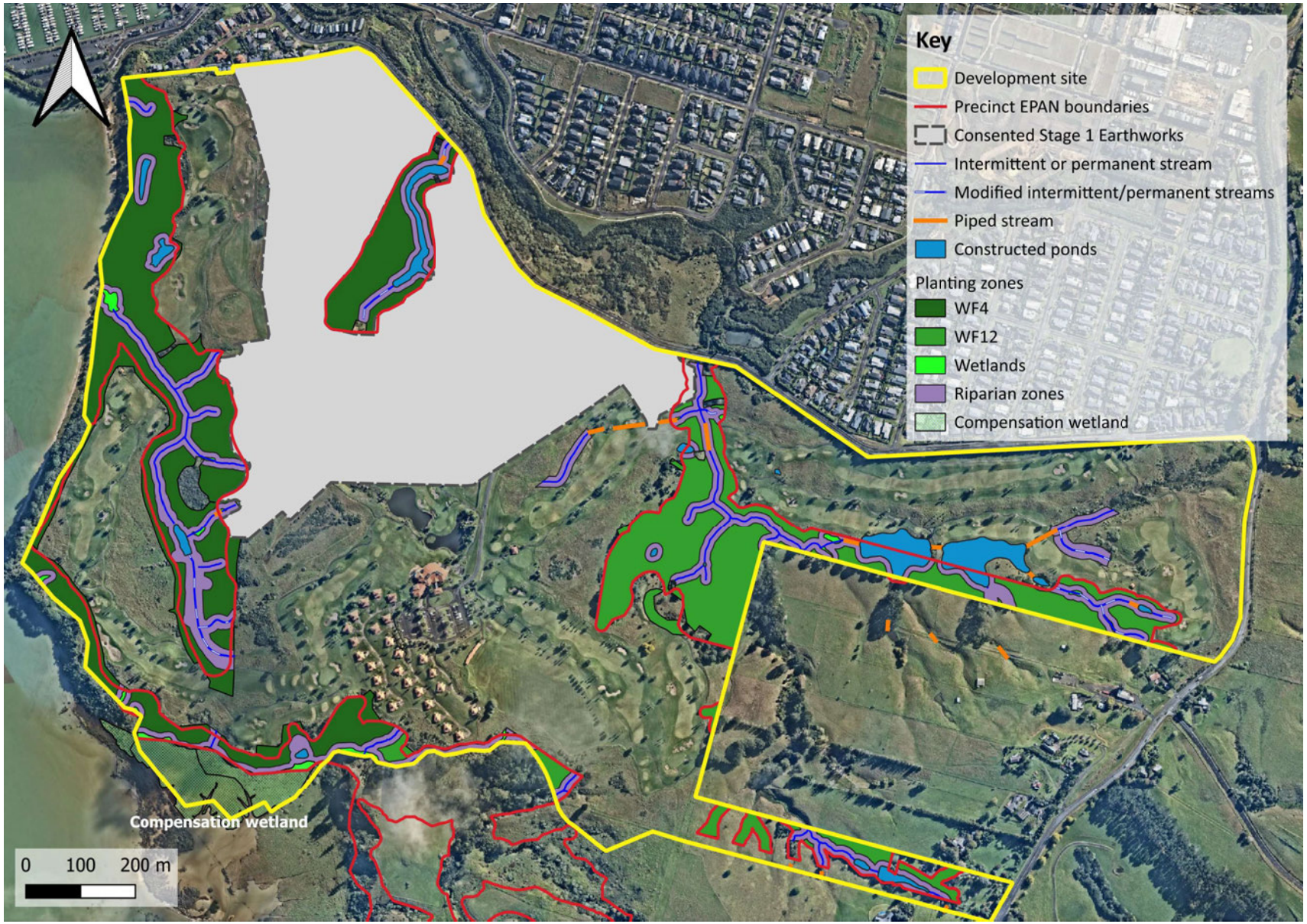

Figure 3. Proposed planting zones. Aerial source: Nearmaps, 2025.

2.2.3 Site preparation

Fencing / demarcation

The areas to be planted must be fenced with a stock proof fence or protected by a stock-free covenant to exclude stock. If fences are not required due to no stock covenants, then the covenanted areas should be marked with demarcation and/or other suitable measures where practicable. Any fences need to be maintained in the long term to prevent stock entering the area so that trampling and browsing is avoided and undergrowth regeneration can occur, allowing for a diversity of species to establish. Likewise, demarcation posts must be maintained in the long term so that the protected area is clear.

Initial weed and pest control

Pest plants will require removal in the summer months prior to the revegetation planting season. Regular follow ups will be required in the early phases following planting, as reinvasion by weed species is expected while native planting is establishing. Pest control of browsers such as rabbits, possums and goats is important so that plantings are not severely affected. After the planting is established, it is important that animal pest control continues to ensure the long-term survival of the plants and so that undergrowth can regenerate. Weed and pest control methodologies and timeframes are provided in Sections 3 and 4.

Carex divisa is abundant and growing densely throughout large portions of the freshwater compensation wetland and is likely to require a targeted and adaptive management approach. It is recommended that control be undertaken in stages (refer Section 3.2.5). As a consequence, restoration planting is also likely to be staged and undertaken over multiple planting seasons, allowing planting to follow successful weed control and site preparation within each management area.

2.2.4 Planting schedule

EPAN and riparian areas

The plant schedules in Tables 1 to 5 relate to the EPAN and riparian areas on the Site. Plant species have been selected based on the riparian nature of the planting areas and the potential ecosystem type for the area (Pōhutukawa, pūriri, broadleaved forest (WF4) and Kauri, podocarp, broadleaved, beech forest (WF12)) in line with the planting schedules recommended in Auckland Council (2024), as well as observations of the species that are naturally present on the Site.

Plant numbers have not been provided, because there is some indigenous vegetation already present within parts of the planting areas. Instead, guidance on the density of plants and the proportion of different species is provided. The numbers of plants will be determined prior to planting by the extent of existing vegetation and gaps opened up through weed control. Recommended plant densities are 0.6-1m spacing in wetlands and stream / wetland edges, and 1.4 m spacings on average in upper riparian margins and forest areas. Canopy trees should be planted at least 5 m away from each other but can be planted within 1-1.4 m of shrub species.

The total proposed planting area has been split into several planting zones (Figure 3):

- Pōhutukawa, pūriri, broadleaved forest (WF4) in the coastal areas;
- Kauri, podocarp, broadleaved, beech forest (WF12) in the more inland areas;
- Wetlands;
- Lower riparian zone (within 2m of stream and wetland edges).
- Upper riparian zone (2 – 10 m from stream and wetland edges).

Table 2. Proposed revegetation planting, WF4 forest.

Species name	Common name	Pint bags (PB)	Indicative spacing (m)[1]	% abundance within zone[2]
Kunzea robusta	Kānuka	1	1.4	10
Leptospermum scoparium	Mānuka	0.75-1	1.4	10
Coprosma robusta	Karamū	1	1.4	10
Cordyline australis	Tī kōuka	1	1.4	10
Pseudopanax lessonii	Houpara	1	1.4	10
Pittosporum crassifolium	Karo	1	1.4	5
Melicytus ramiflorus	Māhoe	1	1.4	5
Coprosma repens	Taupata	1	1.4	5
Hoheria populnea	Lacebark, houhere	1	1.4	5
Hebe stricta	Koromiko	1	1.4	5
Corynocarpus laevigatus	Karaka	2	6	3
Myoporum laetum	Ngaio	1	1.4	3
Metrosideros excelsa	Pōhutukawa	2	6	5
Vitex lucens	Pūriri	2	6	3
Rhopalostylis sapida	Nīkau	2	1.4	3
Piper excelsum	Kawakawa	1	1.4	5
Entelea arborescens	Whau	1	1.4	3

Table 3. Proposed revegetation planting, WF12 forest

Species name	Common name	Pint bags (PB)	Indicative spacing (m)[1]	% abundance within zone[2]
Kunzea robusta	Kānuka	1	1.4	15
Leptospermum scoparium	Mānuka	0.75-1	1.4	15
Coprosma robusta	Karamū	1	1.4	13
Cordyline australis	Tī kōuka	1	1.4	10
Melicytus ramiflorus	Māhoe	1	1.4	10
Hoheria populnea	Lacebark, houhere	1	1.4	5
Hebe stricta	Koromiko	1	1.4	5
Myrsine australis	Māpou	1	1.4	8
Phormium tenax	Harakeke	1	1.4	5
Dacrycarpus dacrydioides	Kahikatea	2	6	3
Pittosporum tenuifolium	Kōhūhū	1	1.4	5

Species name	Common name	Pint bags (PB)	Indicative spacing (m)[1]	% abundance within zone[2]
Vitex lucens	Pūriri	2	6	3
Podocarpus totara	Tōtara	2	6	3

Table 4. Proposed revegetation planting, EPAN wetland.

Species name	Common name	Pint bags (PB)	Indicative spacing (m)[1]	% abundance within zone[2]
Machaerina articulata	Jointed twig rush	1	0.5	5
Carex secta	Pūrei	1	1	5
Schoenoplectus tabernaemontani	Lake club rush	1	0.75	5
Cyperus ustulatus	Giant umbrella sedge	1	1	13
Carex lessoniana	Rautahi	1	1	12
Carex virgata	Pūkio	1	1	10
Cordyline australis	Tī kōuka	1	1	10
Leptospermum scoparium	Mānuka	1	1	10
Phormium tenax	Harakeke	1	1	5
Machaerina rubiginosa	Baumea	1	0.75	5
Eleocharis sphacelata	Kuta	1	0.75	5
Dacrycarpus dacrydioides	Kahikatea	2	5	5
Coprosma robusta	Karamū	1	1	5
Carpodetus serratus	Putaputaweta	1	1	5

Table 5. Proposed revegetation planting, lower riparian zone.

Species name	Common name	Pint bags (PB)	Indicative spacing (m)[1]	% abundance within zone[2]
Carex lessoniana	Rautahi	1	0.75	25
Carex virgata	Pūkio	1	0.75	20
Cordyline australis	Tī kōuka	1	1	15
Carex dissita	Flat leaved sedge	1	0.75	8
Austroderia fulvida	North island toetoe	1	1	8
Parablechnum novae-zelandiae	Kiokio	1	1	8
Hebe stricta	Koromiko	1	1	8
Carpodetus serratus	Putaputaweta	1	1	8

Table 6. Proposed revegetation planting, upper riparian zone.

Species name	Common name	Pint bags (PB)	Indicative spacing (m)[1]	% abundance within zone[2]
Cordyline australis	Tī kōuka	1	1.4	10
Hebe stricta	Koromiko	1	1.4	5
Carpodetus serratus	Putaputaweta	1	1.4	5
Phormium tenax	Harakeke	1	1.4	5
Leptospermum scoparium	Mānuka	0.75-1	1.4	11
Dacrycarpus dacrydioides	Kahikatea	2	6	3
Laurelia novaezelandiae	Pukatea	2	6	3
Syzygium maire	swamp maire, maire tawake	2	6	3
Schefflera digitata	Pate, Seven finger	1	1.4	5
Sophora microphylla	Kōwhai	1-2	1.4	6
Melicytus ramiflorus	Māhoe	1	1.4	5
Corynocarpus laevigatus	Karaka	2	6	3
Kunzea robusta	Kānuka	1	1.4	10
Coprosma robusta	Karamū	1	1.4	10
Hedycarya arborea	Pigeonwood	1	1.4	5
Pseudopanax lessonii	Houpara	1	1.4	5
Vitex lucens	Pūriri	2	6	3
Podocarpus totara	Tōtara	2	6	3

Freshwater compensation wetland

The freshwater compensation wetland restoration area forms part of the wetland effects management package for the Site, as described in the EcIA (Viridis 2026). The planting schedules provided in Table 7 relate to the area of wetland in the south-western corner of the Site proposed to be restored and planted to implement that effects management outcome.

The plant species selections recommended for the freshwater compensation wetland area have not been developed to rigidly replicate a single mapped ecosystem type from Singers et al. (2017), or Auckland Council's Te Haumanu Taiao guidance documents or the historic vegetation cover. Rather, the species selection has focused on establishing a resilient indigenous wetland assemblage suited to the Site's observed moisture gradients, existing vegetation composition, periodic saturation regime and coastal influence. The selected species comprise indigenous wetland and coastal margin taxa known to occur within modified upper estuarine, seepage wetland, and freshwater-brackish transition environments in the Auckland region. Species have been selected to:

- Tolerate fluctuating wetness and seasonal moisture variability;
- Establish successfully within a highly modified exotic-dominant wetland system;

- Provide strong long-term indigenous vegetation cover and weed suppression capacity;
- Contribute to structural and ecological diversity across differing microtopographic and hydrological conditions; and
- Support restoration of indigenous wetland function and habitat values over time.

Planting will also respond adaptively to localised Site conditions, with wetter depressions supporting species associated with more saturated conditions, while slightly elevated or seasonally drier areas will incorporate species tolerant of reduced soil moisture and transitional wetland margin environments.

The total proposed planting area for the freshwater compensation wetland has been split into three planting zones based on the existing vegetation types and topography (Figure 4):

- **Western zone** – dense existing native vegetation including pōhuehue, tī kōuka, harakeke and weed species such as pampas and Japanese honeysuckle (*Lonicera japonica*). Limited supplementary planting is required following weed control to fill any gaps. The required density of supplementary planting has been estimated at one per 25m^2;
- **Central zone** – current vegetation is mainly dense *C. divisa* and dense planting of native species will be required throughout following weed control. The required density of planting is approximately 1 per 0.6 m^2;
- **North-eastern zone** – current vegetation is a mix of Yorkshire fog, mercer grass, creeping buttercup, *C. divisa*, spiked sedge (*Eleocharis acuta*), broom rush (*Juncus sarophorus*). Planting here will supplement the existing native vegetation. The required density of supplementary planting has been estimated at approximately one per 1.4 m^2.

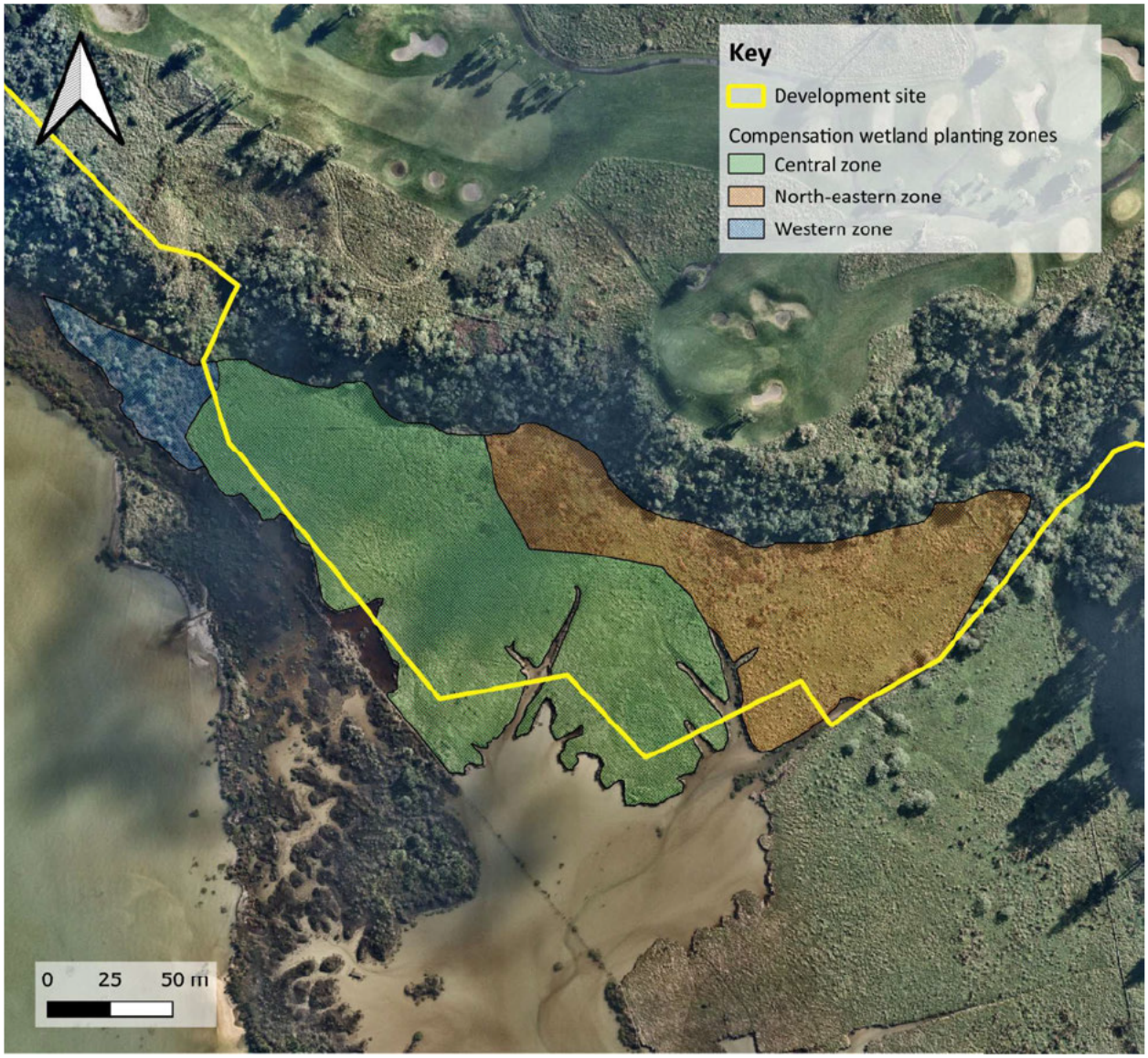

Figure 4. Proposed freshwater compensation wetland planting zones. Aerial source: Nearmaps, 2025.

The plant numbers in Table 7 have been calculated by applying the specified species abundance percentages to the total planting area and using a triangular planting density equation (1.146 ÷ spacing^2) to convert the allocated area for each species into plant numbers. Plant numbers will need to be adjusted on the ground to account for naturally established native vegetation and will contribute to an overall estimated density of 0.6 - 1 m spacings in the western and north-eastern zones, and 0.6 m in the central area. The plant numbers listed are indicative only and have been rounded to the nearest 10 to ensure practicality when ordering.

Table 7. Proposed revegetation planting within the freshwater compensation wetland.

Species name	Common name	Pint bags (PB)	Indicative spacing (m)[1]	% abundance within zone[2]	No. of plants required[3, 4]
Western planting zone (1,750 m^2) – supplementary planting[4]					
Plagianthus divaricatus	Saltmarsh ribbonwood	1	5	25	20
Coprosma propinqua	Mingimingi	1	5	25	20
Cordyline australis	Tī kōuka	1	5	25	20

Species name	Common name	Pint bags (PB)	Indicative spacing (m)[1]	% abundance within zone[2]	No. of plants required[3, 4]
Leptospermum scoparium	Mānuka	0.75-1	5	25	20
Central planting zone (17,316 m²) – dense staged planting[5]					
Apodasmia similis	Oioi	1	0.75	2.5	880
Machaerina juncea	Tussock swamp twig rush	1	0.75	2.5	880
Juncus edgariae	Wiwi	1	0.75	2.5	880
Carex virgata	Pūkio	1	0.75	2.5	880
Phormium tenax	Flax / harakeke	1	1	13	2580
Cordyline australis	Tī kōuka	1	1	13	2580
Leptospermum scoparium	Mānuka	0.75-1	0.75	14	4940
Plagianthus divaricatus	Saltmarsh ribbonwood	1	0.75	14	4940
Coprosma propinqua	Mingimingi	1	0.75	14	4940
Bolboschoenus fluviatilis[6]	Riri-waka, kukuraho	1	0.75	13	4590
Machaerina articulata[6]	Jointed twig rush	1	1	3	600
Eleocharis acuta[6]	Sharp spike sedge	1	1	3	590
Carex secta[6]	Pūrei	1	1	3	590
North-eastern planting zone (10,370 m²) – planting					
Plagianthus divaricatus	Saltmarsh ribbonwood	1	1.4	15	910
Coprosma propinqua	Mingimingi	1	1.4	12	730
Cordyline australis	Tī kōuka	1	1.4	15	910
Leptospermum scoparium	Mānuka	0.75-1	1.4	15	910
Phormium tenax	Flax / harakeke	1	1.4	18	1090
Apodasmia similis	Oioi	1	1	9	1070
Juncus edgariae	Wiwi	1	1	8	950
Carex virgata	Pūkio	1	1	8	950
TOTAL					**37,470**

1. Indicative spacing reflects the target density of the revegetated area and includes both retained indigenous vegetation and supplementary planting
2. Percent abundance has been rounded to the nearest whole number.
3. Supplementary planting numbers have been calculated at an average density of one additional plant per 25 m² for the western planting area to achieve the target overall vegetation density when combined with retained vegetation. Actual numbers required may differ depending on the existing density of native vegetation.
4. Where greater than 20, the number of plants has been rounded to the nearest ten.
5. As discussed in 2.2.3 above, a staged planting approach of this area over several planting seasons is recommended to address the current dense coverage of *C. divisa.*
6. These species are suitable for planting in the wettest areas.

2.2.5 Plant sourcing

The Site is located within the Hunua Ecological District. The plants to be established should be eco-sourced from this ecological district to maintain the local genetic lineage of plants in the area and ensure plants will be adapted to the environmental conditions.

Kānuka and mānuka, which are both Myrtaceae species potentially susceptible to the myrtle rust fungal pathogen *Austropuccinia psidii*, should be sourced from a Plant Pass accredited nursery where possible (see plantpass.org.nz for a list of nurseries).

2.2.6 Planting methods

The planting should be undertaken in general accordance with the following guidelines:

- Planting is to be undertaken during the planting season (late April to early September) to establish root systems during the seasons which typically have higher rainfall.
- Prior to planting, plants should be thoroughly watered and allowed to drain, out of direct sunlight.
- The amount of time between layout and planting should be minimised to avoid the root ball from drying out or becoming damaged.
- Plants should be laid out according to the spacing recommended, in a natural pattern (i.e., not in straight rows). Plants should be established in small groups or clusters of the same species rather than as an even distribution across the planting area. This approach will better reflect natural vegetation patterns and can enhance habitat diversity and structural complexity.
- A hole twice the size of the root ball or plant container should be dug for each plant. Soil on the sides and bottom of the hole should be loosened to allow the plant's roots to penetrate the soil more easily.
- Fertiliser is not initially recommended for this Site, as nutrient levels are likely more than sufficient for indigenous species, and nurseries often add slow-release fertiliser to their potting mixes.
- Plants should be carefully removed from the pot/bag, retaining as much of the soil as possible. The roots may need to be loosened/untangled at the base of the root mass prior to planting to stimulate growth and in-soil establishment.
- Soil should then be gradually filled around the plant, firming the soil well.
- Organic or synthetic mulches may be used around the plants to protect roots, reduce moisture loss, stabilise soil temperatures and prevent weed growth during establishment of the new seedlings.
- Staking plants, while not required, can be useful for locating plants for maintenance purposes.
- If pūkeko become an issue on Site with pulling out new plantings, protect new plantings with biodegradable plant guards (e.g., EmGuard™ or SustainaGrow) or use bird scaring devices until plants become well-established.

2.2.7 Maintenance of planting

On-going maintenance is required during the first five years following planting to ensure successful establishment of the native plantings. A lack of, or inconsistent maintenance is often the reason restoration projects fail. Plant maintenance may include the following:

- Plant releasing – by hand (recommended where possible) or via herbicide spraying to prevent grasses/annual weeds from smothering young plantings.

- Plant replacement – infill planting (during planting season only) of the same species assemblage where more than 10% of plant loss has occurred, or if concentrated plant loss has occurred across a gap of <10 m.
- Pest plant control where these may be invading the planting areas (Section 3).
- Checking for animal browse or damage – possums, hares, rabbits and feral goats and deer should be controlled as soon as detected.
- Fertilisation if plants are not performing well, although care needs to be taken with applying surface fertiliser near streams or wetlands, particularly if rain is expected, as the additional nutrients may be washed into the waterway.
- Watering if any areas are particularly dry.

Table 8 recommends the frequency of plant maintenance checks during the months specified. Maintenance checks will be required more frequently during the first 2-3 years when young plants are most susceptible to competition and abiotic influences. Maintenance frequency can then be reduced as 90% canopy cover is achieved.

Table 8. Recommended maintenance schedule for native plants.

Year	Activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Initial weed control	✓	✓	✓									
	Initial planting				✓	✓	✓	✓	✓	✓			
	Plant maintenance							✓		✓		✓	
2	Plant maintenance	✓		✓		✓		✓			✓		
3	Plant maintenance	✓			✓			✓			✓		
4	Plant maintenance			✓						✓			
5	Plant maintenance			✓						✓			

2.2.8 Plant monitoring

Ongoing monitoring of the planted areas should be undertaken to identify issues with plant survival and the need for replacement planting, fertilisation, weed and pest management.

A planting completion report should be submitted to Auckland Council following completion of the planting works to confirm that planting has been undertaken in accordance with the approved restoration plans and specifications. Thereafter, annual monitoring reports should be provided to Auckland Council for the duration of the five-year maintenance period. These reports should document plant survival and establishment, weed and pest management undertaken, replacement planting, and any other maintenance activities carried out.

3 PEST PLANT CONTROL

3.1 Overview

The management of weeds is recommended within the EPAN, riparian areas and freshwater compensation wetland to prevent pest plants and other exotic weeds from outcompeting native plantings and naturally regenerating natives.

Initial weed control should occur prior to any planting being undertaken and regular follow up inspections and subsequent control undertaken **in perpetuity**.

3.2 Weed Control Methodology

3.2.1 General weed control guidance

Table 9 outlines all pest plants / weeds observed within the Site. It provides best practice methodologies for removal of each species listed.

Manual (by hand) or mechanical removal of pest plants is recommended where possible. If chemical control is required, control methods such as 'cut and paste' or 'drill and fill' using gels are preferred over foliar spraying to minimise chemical usage and non-target effects, especially given the proximity to wetlands and streams and the coastal environment.

3.2.2 Herbicide use

The use of any chemical controls should be applied in accordance with the Agrichemical Users' Code of Practice, NZS 8409 2004: "The Management of Agrichemicals" and should be undertaken in a way that avoids damage to new plantings or established native vegetation. The manufacturer's instructions should be followed carefully, along with any recommended safety precautions to protect the user and the environment. General guidance notes for using herbicides:

- Care should be taken when using herbicide around/under valuable native trees and near water.
- Avoid spraying on windy days to minimise potential non-target damage.
- A marker dye (e.g., Envirodye) should be mixed in when using herbicide spraying or gels to avoid spray drift and to show where control has been undertaken.
- No single herbicide will be effective for all species, active ingredients should be considered and chosen carefully.
- Some herbicides require the user to have a Growsafe certificate.
- If chemical controls are used within areas prior to planting, planting efforts may need to be delayed, ensuring the new plantings are not adversely affected by residual chemicals in the soil.

Usage of the following chemicals should be avoided or minimised as far as practicable due to their potential adverse effects when entering surface water. Toxins in the following chemicals may bioaccumulate and cause damage to the environment:

- 2, 4-D ester (for broadleaf weeds)
- Metsulfuron-methyl (e.g., Eradicate 600)
- Tordon rush-killer
- Clopyralid (for broadleaf weeds)
- Asulam
- Fluroxypyr
- Saflufencil
- Haloxyfop-p-methyl (e.g., Gallant)

3.2.3 Weed waste disposal

To prevent pest plants from spreading, reinvading, or dispersing to nearby sites, it is essential that seeds, seed pods, seed heads and roots are disposed of safely. Once pest plant material has been controlled/removed, green waste should be removed off-site and disposed of at an approved disposal site, such as an approved refuse transfer site or a community weed waste bin.

For on-site disposal of soft (non-woody), seed-free weed materials, a composting weed bag may be used which aims to break down waste within 6 to 12 months.

Table 9 identifies the pest plant species recorded on Site and outlines recommended best-practice control methods for each. Final control methods will be selected on an area-by-area basis, taking into account plant size, density, and the surrounding habitat. Note that manual techniques are generally preferred over herbicide usage on this site as far as practicable given the proximity to stream and wetland environments.

3.2.4 Site specific control recommendations

The Tiaki Tāmaki Makaurau Conservation Auckland website[4] provides useful control recommendations including appropriate agrichemical concentrations to be used and details for control of pest plants not included in the table that may establish.

Table 9. Recommended weed removal methodologies for pest plants on the Site.

Common name	Species name	Removal method
Acacia species	*Acacia longifolia*[4] *Acacia melanoxylon*	• Dig out plant manually including root system and dispose of safely; or • Cut and paste stems with high strength glyphosate gel, or drill and fill large trees.
Arum lily[4]	*Zantedeschia aethiopica*	• Dig out manually and dispose of rhizomes safely; or • Cut stump and paste with metsulfuron gel (away from surface water)
Banana passionfruit[4]	*Passiflora tripartita* var. *mollissima, P. mixta and P. tarminiana*	• Cut vines and leave upper stems to die in trees or dig out. • Cut stump and paste with metsulfuron gel (away from surface water).
Blackberry[4]	*Rubus fruticosus*	• Dig out manually and dispose of all parts safely; or

[4] https://www.tiakitamakimakaurau.nz/protect-and-restore-our-environment/pests-in-auckland/pest-search/

Common name	Species name	Removal method
		• Cut stump and paste with metsulfuron gel (away from surface water)
Brush wattle[4]	*Paraserianthes lophantha*	• Dig out plant manually including root system and dispose of safely; or • Cut and paste stems with high strength glyphosate gel, or drill and fill large trees.
Chinese fan palm[4]	*Trachycarpus fortunei*	• Dig out manually and dispose of all parts safely (including seeds); or • Cut stump and paste freshly cut base of stems with glyphosate gel. Foliar spray seedlings with glyphosate green.
Chinese privet[5]	*Ligustrum sinense*	• Pull out entire plant including roots and dispose of safely; or • Cut plant short and inject the centre with metsulfuron gel[6] (away from surface water), or high strength glyphosate gel.
Divided sedge	*Carex divisa*[4]	• Dig out manually and dispose of all parts safely; or • Foliar spray with 150ml glyphosate green per 10L of water. • Follow up treated areas 3 times per year.
Gorse[4]	*Ulex europaeus*	• Dig out manually and dispose of seeds safely; or • Cut stump and paste with metsulfuron gel[6] (away from surface water)
Ivy	*Hedera helix*	• Dig out manually and dispose of all parts safely; or • Cut stump and paste with metsulfuron gel[6] (away from surface water).
Japanese honeysuckle[4]	*Lonicera japonica*	• Dig out and dispose of roots, or cut vines and leave upper stems hanging in trees to die; or • Cut stump and paste with metsulfuron gel[6] or high strength glyphosate gel
Pampas[4]	*Cortaderia jubata, C. selloana*	• Dig out and dispose of seed heads carefully; or • Foliar spray with glyphosate green, or if amongst native broadleaved species, foliar spray with haloxyfop.

[5] Identified as a plant pest in the Auckland Regional Pest Management Plan 2020-2030 (Auckland Council, 2020).

[6] Metsulfuron should be avoided within and near waterways and wetlands due to its toxicity and the potential for mobilisation, and its use should be avoided immediately prior to planting as it has a long-lasting residual effect in the soil.

Common name	Species name	Removal method
Pine[7]	*Pinus radiata*	• Dig or pull out seedlings; or • Cut stump close to the ground below lowest branches; or • Ringbark below lowest branches making sure the cambium layer is completely cut through if safe to do so; or • Drill and inject trees with glyphosate green and penetrant. Drill 18mm holes (tangentially angled downwards) in a spiral up the trunk. For 50mm stems drill one hole. For 100mm stems drill two holes. For larger stems drill holes 150mm apart. • Retain large trees.
Phoenix palm[4]	*Phoenix canariensis*	• Dig out manually and dispose of all parts safely, with care to avoid any spines; • Cut stump and paste freshly cut base of stems with double strength glyphosate gel. • Foliar spray seedlings with glyphosate green. • Recommend all palms beyond seedling stage are controlled by a qualified arborist due to the severe injuries Phoenix palms can cause.
She-oak[8]	*Casuarina cunninghamiana* *Casuarina glauca*	• Dig or pull out seedlings; or • Cut stump of juvenile trees and paste freshly cut base of stems with metsulfuron gel[5].
Taiwan cherry[4]	*Prunus campanulata*	• Dig out manually, dispose of seeds safely in refuse/green waste station; or • Cut stump and paste with metsulfuron gel[6] (away from surface water).
Tuber ladder fern[4]	*Nephrolepis cordifolia*	• Pull out entire plant including roots and dispose of safely; or • Foliar spray with 1g metsulfuron-methyl per 10L of water.

[7] Note that pine is not a listed plant species, and on this Site mature pines are the dominant canopy tree species in places, providing ecological services such as shelter, fauna habitat and structural diversity. Accordingly, mature pine trees are proposed to be retained. However, juvenile pine trees should be controlled to prevent ongoing recruitment and spread, and to avoid the progressive encroachment of pine into the EPAN and coastal areas.

[8] Note that she-oak is not a listed plant pest species, however juvenile wilding specimens were noted within part of the Site, and removal of juveniles is recommended where they occur.

Common name	Species name	Removal method
Tree privet[4]	*Ligustrum lucidum*	• Pull out entire plant including roots and dispose of safely; or • Cut plant short and inject the centre with metsulfuron gel[6] (away from surface water), or high strength glyphosate gel
Water primrose	*Ludwigia peploides*	• Dig out plant manually and dispose of safely; • Foliar spray of 100 ml glyphosate green per 10 L of water (certified/experienced handler)
Willow species	*Salix fragilis* *Salix cinerea*	• For small trees dig out manually and dispose of all parts safely. • For small-medium trees cut stump and paste freshly cut base of stems with glyphosate gel or spray freshly cut base with 250ml glyphosate green per 1L of water. • Cut material must be removed or it will regrow. • For large trees drill and inject trees with 500 ml glyphosate per 1 L of water (Growsafe certificate required). Drill 18 mm holes (tangentially angled downwards) in a spiral up the trunk. For 50 mm stems drill one hole. For 100 mm stems drill two holes. For larger stems drill holes 150 mm apart.
Woolly nightshade[4]	*Solanum mauritianum*	• Dig out plant manually including root system and dispose of safely; or • Small plants, trim near ground and paste with high strength glyphosate. • Large trees – drill and fill stem with triclopyr or glyphosate gel into stem.

3.2.5 Timing and follow-up control

General

Initial weed control efforts should be completed in the summer immediately prior to native revegetation planting being undertaken.

Follow-up treatments are generally recommended every **three** months until each species is successfully eradicated[9]. This allows for targeting weeds at different germination times throughout the year. Ideally, weed control should be undertaken prior to or during active growth periods, or before each species

[9] Note that pest plant eradication means that there are no fruiting and / or flowering individuals of pest plant species present within the specified area and any mature pest plant species present are dead. In addition, there must be no areas where pest plant species are smothering and / or out-competing native vegetation including suppressing the natural regeneration processes.

produces seeds, as herbicide is most effective when weeds are actively growing (after germination and before flowering). Once initial control is achieved, less frequent treatments may be needed to maintain minimal weed presence as the desired plants establish and outcompete the weeds.

Carex divisa

There is extensive dense coverage of this plant within the freshwater compensation wetland and it is recommended that an adaptive management approach be undertaken for its control prior to and following planting.

The central planting zone of the freshwater compensation wetland should be divided into a number of management areas that are treated sequentially. The staged approach will minimise the ecological disturbance associated with large-scale weed removal, allow restoration methods to be refined through adaptive management, reduce the risk of large-scale weed reinfestation, and ensure available resources are focused on achieving successful plant establishment.

Initial control should be focused on the outer margins of the infestation, adjacent to the EPAN and the western and north-eastern planting zones, to establish a buffer strip to reduce invasion into planted areas. This buffer strip should be planted following 2-3 weed control treatments to establish dense ground cover and minimise reinvasion.

Subsequent stages should only be initiated once monitoring confirms that treated areas have low *C. divisa* regrowth, indigenous plants are establishing successfully, and any required infill planting or follow-up weed control has been completed. Restoration should proceed from the outer margins of the infestation towards the coast, progressively expanding planted areas from existing native vegetation and lower-density weed infestations. This approach will maximise connectivity between restored habitats and facilitate the gradual replacement of *C. divisa* with indigenous wetland vegetation.

Weed control within treated stages should continue through regular monitoring and maintenance, including spot treatment of regrowth and replacement planting where required.

3.2.6 Documentation of control efforts

It is recommended that regular documentation of physical and chemical weed control efforts is kept. Maintaining up to date records of agrichemical usage is a legal requirement for the management of agrichemicals under the Hazardous Substances and New Organisms (HSNO) Act and specified in the Code of Practice (NZS 8409:2004). Auckland Council may require submission of regular reports outlining the weed control undertaken through consent conditions.

Weed control records should include the following details:

- Date and location of weed control/herbicide application
- Weed species targeted, and any new species that have established in the area
- Herbicide type and quantity used, and control method (e.g., cut and paste, foliar spraying)
- Details of any follow up work anticipated

An example table is provided below.

Table 10. Example table for keeping weed control records.

Location/Area	Date of Weed Control	Species targeted	Control type (e.g. manual, chemical type & concentration)	Method of application	Follow up required?

4 PEST MAMMAL MANAGEMENT

4.1 Overview

This section outlines control of pest mammals within the areas indicated on Figure 2. Pest mammal control should be undertaken **in perpetuity.** Reducing numbers of mammalian pests such as rats and possums will assist with native regeneration, successful establishment of the revegetation planting and improve habitat values for indigenous avifauna, herpetofauna and invertebrates.

No stock are proposed to be kept on the Site. If stock are kept on adjacent sites then stock proof fences and/or other measures such as cattle stops will be required to exclude stock from the Site.

A combination of trapping, poisoning and occasional shooting is proposed to control mammal pests on the Site. This will require the establishment and upkeep of trapping tracks and bait lines within the EPAN and freshwater compensation wetland areas. Tracks and bait lines may utilise proposed walking tracks for access where appropriate; however, traps and bait stations should be located so that they are not readily visible from public tracks and any public safety considerations are appropriately addressed through trap and bait station selection, placement and management. Figure 5 shows indicative pest animal control line locations.

Figure 5. Indicative pest control line locations. Aerial source: Nearmaps, 2025.

For traps, it is important that:

- The manufacturer's instructions are followed carefully when setting and operating traps to minimise the risk of operator injury and ensure they are effective; and
- Regular servicing and maintenance of traps is undertaken to ensure they continue to operate well.

If toxins are used, the following requirements and precautions must be observed:

- There is a legal requirement for baits to be distributed in bait stations and not spread on the ground;
- Appropriate signage identifying the toxin and the treatment period must be installed at all usual entry points for the required duration;
- Always read the toxin's label and Safety Data Sheet before use; and
- Be familiar with the relevant antidote and, if poisoning of a non-target animal or a person is suspected, seek veterinary or medical assistance immediately.

Note: Always wear gloves when handling dead mammals for protection against leptospirosis.

4.2 Possums

Possums can be controlled with either traps or toxins. There are no lockable bait stations available for possums, and therefore poison should only be used on private land where there is a low risk of them being encountered by the public.

To attract possums to traps or bait stations, make up some 'blaze' and throw a handful of this outside the trap. 'Blaze' can be made from mixing one part icing sugar to four parts white flour, with a good dash of spice such as cinnamon. This will help to attract animals by sight, smell and taste. This is best used during dry weather.

4.2.1 Toxins

If toxins are utilised, they must be contained within bait stations such as the Philproof mini. Brodifacoum, cholecalciferol and pindone are the only possum baits that do not need a Controlled Substances License (CSL), as long as they are contained within bait stations (Auckland Council, 2022). There are other toxins available, such as cyanide, which require a CSL.

Bait stations should be placed 1.5 m off the ground attached to a tree, a minimum of 10 m back from track edges and out of sight, and spaced every 100 m along a pest animal control line.

Possum poisoning is best undertaken just before and during the bird breeding season, pulsed twice a year in June and October. Pulsing involves filling the bait stations several times over a period of four weeks. Detailed guidance on undertaking pulsing is provided in Auckland Council (2022).

Note that prolonged use of brodifacoum should be avoided due to its persistence in the environment and potential secondary poisoning effects on other fauna.

4.2.2 Traps

Flipping Timmy traps or Trapinator traps are recommended for simple and humane control of possums. Alternatively, automated traps such as the AT220 (discussed in Section 4.4 below) can be considered. Traps should be installed at least 1.5 m off the ground and attached firmly to a wooden surface (e.g., a

large tree trunk) so they remain sturdy when sprung. They should be spaced every 100 m along a pest animal control line and at least 10 m from a path edge.

The trap/s should be baited with a food source that is not common in the area, such as a piece of freshly cut apple sprinkled with cinnamon in a Flipping Timmy trap or peanut butter in a Trapinator. Other possum lures may include citrus peel, carrots, vegemite, or commercially prepared formulations. Regularly alternating bait types may increase success rates as possums may learn to avoid certain lures over time.

Trapping can also be pulsed to target control prior and over the bird breeding season, with two pulses in June and October. Each pulse should be at least two weeks in length, with traps checked twice in the first week and once in the second week at minimum.

4.3 Rats

Rats should be targeted using a combination of traps and toxins. The DOC 200 traps recommended for mustelids will also catch rats.

Rat bait must be contained within bait stations. Lockable bait stations which require a key to access are recommended where the public may be present. Open faced stations with a pin fixture to prevent rats removing bait (e.g. Philproof stations) are an option elsewhere. Bait in the form of Contrac (Bromadilone, a second-generation anticoagulant) and Ditrac (Diphacinone, a first-generation anticoagulant) are recommended for use in these stations.

Alternatively, single-use biodegradable bait stations such as Strikers can be used. These contain Ratabate (Diphacinone). Strikers do not require a permanent or semi-permanent setup and do not need to be removed as they are biodegradable, making them suitable for temporary deployments.

Bait stations should be placed near reliable food sources, such as fruiting trees, to increase effectiveness. They should be spaced every 25 – 50 m along a pest animal control line.

Baiting should occur four times annually during January, April, August, and November to align with key ecological events, including rodent breeding, pre-flowering and fruiting of trees, and the breeding seasons of native birds. Pulsing involves filling the bait stations several times over a period of four weeks. Detailed guidance on undertaking pulsing is provided in Auckland Council (2022).

4.4 Mustelids

Traps for catching mustelids include the DOC 200, DOC 250, Goodnature A24 and AT220 (refer Section 4.4 for discussion of the automatic traps). DOC 200s are designed specifically to catch weasels and stoats. A DOC 250 is needed to trap ferrets. DOC 200s will also catch rodents and small hedgehogs.

DOC 200 traps are recommended to be placed every 200 m along a pest animal control line for control of stoats.

Ensure the entrance and inside of the wooden tunnel is kept free of debris and cobwebs so it looks like other animals have used the tunnel. The tunnel should be embedded so the base is level with the ground surface.

Placing the trap under existing tree canopy is recommended wherever possible. Placing the DOC trap near a possum trap may attract mustelids when a possum is caught.

DOC 200/250 traps require regular maintenance checks and servicing to ensure the trap is firing well.

It is recommended traps are baited with fresh rabbit meat. Alternatively, salted or freeze-dried rabbit, or egg may be used, however these may be less effective.

4.5 Automatic traps

Automatic resetting traps such as the Goodnature A24 and NZ AutoTraps AT220 can provide highly effective predator control for multiple mammal species while substantially reducing servicing requirements compared to conventional traps. The Goodnature A24 is designed primarily for rats, mice and mustelids and automatically resets up to 24 times per CO_2 canister, while the NZ AutoTraps AT220 is a multi-species trap capable of controlling possums, rats, mice, mustelids and other pest mammals, with automatic resetting and reluring functionality that can provide up to 100 strikes before servicing is required. As these traps remain active following each capture, they are more likely to intercept multiple animals during periods of high pest activity than traditional traps that require manual resetting after every trigger.

Both systems utilise long-life non-toxic lures and require periodic maintenance to replenish lure supplies, replace consumables and verify correct operation. Remote monitoring technology is available for both trap types, allowing trap status, servicing requirements and capture data to be monitored more efficiently and reducing unnecessary site visits. While not required, the use of automated traps alongside conventional kill traps and bait stations can improve the overall effectiveness of a pest control programme by providing multiple control methods that target different pest behaviours. The periodic rotation of lure types may also help maintain lure attractiveness and maximise trap encounter rates for long-term predator control.

4.6 Rabbits

The EPAN areas, riparian margins and wetland are unlikely to support high densities of rabbits as the type of habitat they prefer (such as open grasslands with nearby cover) will be limited on the Site following development. If rabbit control is necessary, suitable methodologies include poisoning with Pindone pellets (in bait stations at 150 m intervals in good habitat areas during winter over five consecutive nights) and / or burrow fumigation carried out by a professional pest control contractor.

4.7 Cats

Feral cats and free-ranging domestic cats are known predators of indigenous fauna, and therefore control of cats should be undertaken within the EPAN and freshwater compensation wetland areas. As restrictions on cat ownership are not proposed as part of the subdivision, control methods should minimise the risk of capturing or harming owned domestic cats.

Cat control is likely to be most effective during winter, when natural food resources are reduced and cats are more likely to investigate baited traps. Cat control should be undertaken using a minimum density of approximately one trap per 10 ha of habitat, or at 100 – 200 m intervals along a pest control line, with traps preferentially located along habitat edges, tracks, wetland margins, and other features likely to be used as travel corridors by cats. Trap density and locations should be reviewed and adjusted based on monitoring results and capture success.

The options available for cat control that minimises the risk to domestic cats are:

- Live trapping of cats (i.e. with baited cage traps), with domestic cats identified through microchips, collars or owner identification, and feral cats being euthanised humanely;

- Use of automated traps such as the NZAutoTraps AT230, which has a microchip sensor that deactivates the trap when a microchipped pet interacts with the trap.

If live cage traps are used, the requirements set out in Section 36 of the Animal Welfare Act 1999 must be followed. The requirements include:

- Manually inspect the trap, or cause a competent person to manually inspect the trap, within 12 hours after sunrise on each day the trap remains set, beginning on the day immediately after the day on which the trap is set;
- Removing any live animal found in that trap and either attending properly to the care of the animal and/or, where the animal is a target pest species, humanely euthanising it without unnecessary delay.

Live trapped pest animals must be killed as humanely as possible. Appropriate guidance on humane euthanasia techniques is available from the Department of Conservation[10].

It is recommended that traps are baited with fresh rabbit meat, or alternatively, possum or mutton fat. Strong smelling lures such as sardines can also be very effective, however these will need replacement more frequently.

4.8 Ungulates (goats, deer and pigs)

Control of ungulates will be necessary if any evidence of these species are found on the Site as they can cause serious damage to native forest ecosystems.

Shooting is recommended as the primary control method. It is recommended that a professional contractor undertakes control biennially (every two years) if signs of wild ungulates are observed on Site. If hunting dogs are used, they should be equipped with GPS collars to monitor both the coverage of the property and the locations of kills. Detailed records of all kills should be maintained.

Records in the form of cull numbers and notes each time a hunter takes an animal should be kept and supplied to the council on an annual basis.

Table 11. Example of table record keeping for ungulate control.

Pest species	Date	Number culled	Sex	Approximate weight (kg)	Location
Goat					
Deer					
Pigs					

Notes: Records of hunting efforts (i.e. date & location) should still be kept where no successful kills occurred.

4.9 Summary of pest animal control

4.9.1 Pulsing

'Pulsing' refers to intermittent baiting and trapping efforts for predator control, as opposed to undertaking control year-round.

[10] https://www.doc.govt.nz/contentassets/e47221f310af42fd8133c2127c35ce9f/humane-killing-small-pests-guide.pdf

Pulsing is considered effective for kill rates and reducing the risk of target mammals becoming 'bait-shy'. Pulses are used target the most vulnerable months of the year for indigenous fauna (e.g. breeding season), and is more efficient for the property owner through reducing labour involved as opposed to undertaking control year-round for all target species.

4.9.2 Summary of pest mammal control methods, spacing and timing

Table 12 summarises the recommended pest mammal control methods, indicative trap or bait station spacing, control timing and servicing requirements for each target species. Table 13 provides an annual calendar for recommended pest control operations.

Table 12. Recommended pest mammal control methods, spacing, timing and servicing requirements.

Pest species	Indicative spacing / density	Control timing	Pulse length	Trap/station checks
Possums - traps	100 m intervals along pest animal control lines	Pulse in June & October (but can occur more frequently if kill rates are high)	Two weeks	Once set, check twice during the first week and once during second week. Replace lure with each check and remove remaining lure after two weeks.
Possums - toxins	100 m intervals along pest animal control lines	Pulse in June & October	Four weeks	Depends on toxin selected – refer to Auckland Council (2022) for details
Rats	25–50 m intervals along pest animal control lines	Pulse in January, April, August, November	Four weeks	Depends on toxin selected – refer to Auckland Council (2022) for details
Mustelids	Approximately 200 m intervals along pest animal control lines	Fortnightly trap checks from October – April, and monthly from May – September	N/A	Check trap and replace bait with each check.
Feral cats	Approximately one trap per 10 ha, or 100–200 m intervals along likely travel routes	Pulse between May and August each year, checking fortnightly.	Four months	Check live traps within 12 hours after sunrise on each day the trap remains set.

Table 13. Annual calendar for recommended pest control operations.

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Possum						■				■		
Rat	■			■				■			■	
Mustelid	◆	◆	◆	◆	⬟	⬟	⬟	⬟	⬟	◆	◆	◆
Cat					◆	◆	◆	◆				

■ = Pulse, ◆ = Check Fortnightly, ⬟ = Check Monthly

4.10 Monitoring of Trapping/Baiting Control Efforts

A record of pest control efforts and catches for each target species should be maintained. It is recommended that this be done using online pest control recording and data analysis software such as Trap.NZ[11] or CatchIT[12], which are free, nationally used platforms and mobile phone applications that can be used for recording trapping, baiting, monitoring, and biodiversity outcomes. A map can be created that shows each control station's location and available tracks. These platforms simplify data collection and reporting, and offer offline access via mobile devices when working in areas without coverage. Data entered on these platforms can be easily exported and used for reporting of results.

Alternatively, manual records can be kept as per the following example in Table 14. A template is also available in Auckland Council's pest control guide[13].

Table 14. Example of table recording implementation of pest control methods.

Trap/station location	Date of initial control	Date of checks and/or rebaits	Trap catch rate/Bait uptake rate

[11] https://trap.nz/

[12] https://catchit.co.nz/

[13] Auckland Council's Pest animal control guidelines is available here: Pest animal control guidelines

5 MONITORING AND ADAPTIVE MANAGEMENT

5.1 Monitoring

The success of biodiversity management works will be assessed through regular monitoring against the performance standards set out in Table 15. Monitoring is intended to confirm that planting, weed control and pest mammal control are being implemented effectively, and to identify whether corrective actions are required.

Monitoring should be undertaken by a suitably qualified and experienced ecologist, restoration specialist or pest management contractor, as relevant to the activity being monitored. Monitoring should occur at least annually for the first five years following completion of each stage of planting, with additional inspections undertaken where plant failure, pest plant reinvasion, animal browse, erosion, vandalism or other implementation issues are identified.

The results of monitoring should be documented in annual monitoring reports provided to Auckland Council for the duration of the five-year maintenance period. The reports should summarise planting survival and establishment, infill planting requirements, pest plant control undertaken, pest mammal control effort and results, any failures or implementation issues, and the corrective actions completed or recommended.

5.2 Adaptive Management

Where the performance standards in Table 15 are not met, adaptive management actions must be implemented as soon as practicable. Corrective actions may include infill planting, increased plant releasing, additional weed control, changes to weed control methodology, increased pest animal control effort, plant protection measures, replacement of unsuitable species, or changes to maintenance frequency.

Table 15. Biodiversity management performance standards, monitoring requirements and adaptive management triggers.

Management component	Performance standard	Monitoring requirement	Adaptive management trigger	Corrective action
Planting completion	Planting is completed generally in accordance with the approved BMP, final planting plans, confirmed planting areas and approved plant schedules	Planting completion inspection following each planting stage	Planting areas, species, densities or layout materially differ from the approved BMP or final planting plans	Prepare planting completion record and undertake remedial planting or layout correction where required
Plant survival	At least 90% survival of planted specimens within each planting stage, unless otherwise confirmed through final consent conditions	Annual survival assessment during the five-year maintenance period	More than 10% plant loss within a planting stage, or concentrated plant loss creating a gap of greater than 10 m	Replace failed plants during the next suitable planting season using the same or ecologically appropriate substitute species
Plant establishment	Indigenous plants are healthy and showing evidence of establishment, including new growth and increasing cover	Annual monitoring, with additional checks during drought, browse or weed reinvasion events	Poor plant vigour, widespread dieback, drought stress, browse damage or repeated failure of particular species	Investigate cause and implement remedial actions, such as watering, plant guards, species substitution, pest control or altered maintenance
Canopy / vegetation cover	Progressive increase in indigenous vegetation cover over the five-year maintenance period	Annual photo points and qualitative assessment of vegetation cover	Limited increase in indigenous cover, persistent open gaps, or failure to achieve sufficient cover to suppress weeds	Increase infill planting, plant releasing, weed control or maintenance frequency
Plant releasing	Planted specimens are not being smothered by rank grass, vines, pest plants or other competing vegetation	Maintenance inspections in accordance with the maintenance schedule, and at least annually for reporting	Competing vegetation is suppressing, overtopping or likely to cause failure of planted specimens	Undertake hand releasing, careful herbicide release spraying or other suitable control methods
Pest plant control	Pest plants are progressively controlled so they do not dominate, smother or outcompete indigenous planting or natural regeneration	Weed inspection at least every three months during establishment, then as required once control is achieved	Pest plants are flowering, seeding, reinvading treated areas, smothering indigenous vegetation, or preventing planting establishment	Undertake follow-up weed control, increase inspection frequency, amend control methods or stage works differently

Management component	Performance standard	Monitoring requirement	Adaptive management trigger	Corrective action
***Carex divisa* control in freshwater compensation wetland**	*C. divisa* control is undertaken progressively and does not result in large untreated reinvasion areas or prolonged bare ground	Monitoring following each control stage and before further staged control proceeds	Treated areas show substantial *C. divisa* regrowth, poor indigenous plant establishment, erosion, excessive bare ground or reinvasion by other weeds	Pause expansion into new control stages, complete follow-up control, infill plant, review methodology and adjust staging
Pest mammal control effort	Pest mammal control is implemented in accordance with the BMP timing, spacing and servicing requirements	Review of trap/bait records at least annually	Trap checks, bait station servicing or control pulses are not completed as specified, or records are incomplete	Reinstate control programme, update control schedule, improve record keeping and increase contractor oversight
Pest mammal impacts	Animal browse, digging, predation pressure or other pest mammal damage does not compromise planting establishment or habitat values	Annual monitoring and incidental checks during maintenance	Evidence of browse, plant pull-out, digging, repeated plant failure, high bait uptake or high trap catch rates	Increase pest control intensity, add control devices, alter bait/lure type, repair fencing or install plant protection
Stock exclusion	Stock are excluded from planted and protected areas	Fence / boundary inspection at least annually and following storm or damage events	Stock access, damaged fencing, failed gates, inadequate demarcation or browsing/trampling evidence	Repair fencing, gates or demarcation; remove stock; remediate damaged planting
Reporting	Annual monitoring reports are prepared for the five-year maintenance period and provided to Auckland Council	Annual report review	Monitoring data, maintenance records or corrective actions are incomplete or not reported	Complete missing monitoring, update records and include outstanding corrective actions in the next reporting period
Long-term maintenance	Weed and pest mammal control continue beyond the five-year planting maintenance period where required to maintain ecological outcomes	Review at the end of Year 5 and then as required by the final legal / consent mechanism	Pest plants or pest mammals are likely to compromise established indigenous vegetation or restoration outcomes	Confirm long-term maintenance responsibilities, control frequency and funding mechanism

5.3 Implementation Responsibilities

The indicative responsibilities for implementing this BMP are summarised in Table 16. These responsibilities should be confirmed in the final BMP once consent conditions, land ownership, maintenance access arrangements and the long-term legal protection mechanism are confirmed.

Table 16. Indicative responsibilities for BMP implementation.

BMP component	Primary responsibility	Supporting roles / reporting
Finalising the BMP, confirming restoration extents and securing legal protection	BSLP / consent holder	Project ecologist, planner and legal advisor; submit to Auckland Council if required by consent conditions
Pre-planting assessment, final plant schedules and planting layout	Project ecologist	Restoration / landscape contractor; record any changes in the final planting plans or completion report
Site preparation, fencing, demarcation and access	BSLP / consent holder	Civil, fencing and restoration contractors; complete before planting where required
Plant supply, planting, maintenance and infill planting	Restoration / landscape contractor	Project ecologist to provide oversight; report through planting completion and annual monitoring reports
Initial and follow-up pest plant control, including Carex divisa control	Weed control / restoration contractor	Project ecologist to review methods, staging and results; keep weed control records and summarise in annual reports
Pest mammal control, monitoring and adaptive management	Pest animal control contractor	Project ecologist / BSLP to review results; keep trap, bait and control records and summarise in annual reports
Annual monitoring and reporting during the establishment period	Project ecologist	BSLP / consent holder and contractors to provide implementation records; submit reports to Auckland Council if required
Corrective actions where performance standards are not met	BSLP / consent holder	Project ecologist to recommend actions; relevant contractor to implement
Long-term management after the initial maintenance period	Future landowner / body corporate / residents' society / other confirmed management entity	Weed, pest animal or restoration contractor as required; responsibilities to be secured through the final legal / consent mechanism
Council certification, compliance monitoring or review	Auckland Council	As required by consent conditions

6 SUMMARY AND RECOMMENDATIONS

To conclude, the EPAN areas and stream and wetland riparian margins and a wetland in the south-west of the Site are proposed to be protected and restored with native revegetation planting, weed control and pest mammal control.

Implementation of the recommendations in this BMP is expected to result in canopy cover within a five-year period following completion of planting, as well as the long-term development of established native bush and wetlands that are appropriate to the Site's current ecological conditions and capable of developing into self-sustaining indigenous habitat over time, subject to the following:

- A consent condition is applied requiring finalisation of the BMP;
- Stock are excluded from the areas to be planted prior to planting through a mix of stock proof fencing, cattle stops, gates and/or stock free covenants as required;
- Planting methodology and maintenance occurs as per section 2;
- Infill planting occurs to replace dead plants or gaps in the planting until canopy cover is achieved;
- The recommended weed and pest animal management is undertaken in perpetuity as per Sections 3 and 4, particularly while plantings are establishing;
- Ongoing monitoring for weeds occurs and any infestations are removed; and
- A suitable legal mechanism is placed over the EPAN areas, riparian margins and the freshwater compensation wetland to provide protection in perpetuity.

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Appendix K
Fauna Management Plan

VIRIDIS
Environmental Consultants

Beachlands South Fast Track

Fauna Management Plan

Prepared for: Beachlands South Limited Partnership

June 2026

DOCUMENT CONTROL AND REVISION HISTORY

Document title	Beachlands South Fast Track
	Fauna Management Plan
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We understand and agree that BSLP will submit this report as part of an application under the Fast-track Approvals Act 2024 and that an Expert Panel will use this report for the purpose of assessing that application. We understand and agree that this report will be used by the Expert Panel in undertaking its regulatory functions.

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1 INTRODUCTION

This report has been prepared in support of a substantive application submitted by Beachlands South Limited Partnership (BSLP) under the Fast-track Approvals Act (FTAA). The project name is 'Beachlands South' and is included in Schedule 2 of the FTAA as a Listed Project with significant regional or national benefits. The project location is 110 Jack Lachlan Drive and 620, 712, 758 and 770 Whitford-Maraetai Road, Beachlands (the 'Site'; Figure 1). Figure 1 shows the location and extent of the Site, and the area on Site already consented for earthworks under Stage 1.

Figure 1. Current aerial imagery of the development site (showing field verified and non-field verified properties). Aerial source: Nearmaps, 2025.

Ecological field investigations undertaken to inform the Ecological Impact Assessment (EcIA, Vidisis, 2026a) and this Fauna Management Plan (FMP) were completed prior to inclusion of the 758 and 770 Whitford-Maraetai Road properties within the project area. Accordingly, these properties were not subject to ecological field verification and ecological features within these areas have been identified based on aerial imagery, desktop assessment and interpretation of available ecological information. Field-verified and non-field-verified areas are shown in Figure 1.

The EcIA, which forms part of the Beachlands South FTAA application, identifies the actual and potential adverse effects of the proposed works on terrestrial fauna. The purpose of this FMP is to set out practical procedures and management measures to avoid, minimise and mitigate adverse effects on indigenous lizards, bats and birds during vegetation clearance and associated enabling, earthworks and construction activities within the Site outside of Stage 1.

This FMP is required under the Auckland Unitary Plan Operative in Part (AUP-OP)'s Beachlands South Precinct I458.9 Special Information Requirements, which states:

(6) Lizard and Bat Management Plan

(a) An application for bulk earthworks in the precinct requiring land use consent under Chapter E11 Land disturbance – Regional must be accompanied by a Lizard and Bat Management Plan. This management plan must specify measures to salvage and relocate lizards, bats and associated habitat features from the earthworks areas to appropriate habitats within the Ecological Protected Area Network.

This FMP also addresses the proposed mitigation for effects on birds during development as required by I458.9 Special Information Requirement:

(2) Biodiversity Management Plan…

…. Vegetation clearance constraints during bird nesting seasons.

A full description of the proposed works as well as the Site's ecological context and values as they pertain to indigenous fauna are provided in the EcIA. The terrestrial ecological values of the Site were largely associated with managed and rank grass, exotic scrub and treeland, small areas of indigenous vegetation and amenity plantings. Although botanical values were assessed as low to moderate, some vegetation and habitat features provide potential habitat for At Risk indigenous skinks, Threatened bats and Threatened bird species.

2 PROPOSED WORKS

2.1 Existing Habitat and Vegetation Types

The Site comprises a highly modified coastal and urban-fringe landscape that has been subject to historical vegetation clearance, agricultural land use and subsequent development and operation of the Formosa Golf Resort. Existing terrestrial habitat within the Site is dominated by managed exotic grassland associated with golf course fairways, roughs and landscaped areas. These areas generally provide low-quality terrestrial fauna habitat due to regular mowing, limited indigenous vegetation cover and low structural complexity.

Higher-value fauna habitat is associated with vegetated gullies, riparian margins, constructed pond margins, wetland vegetation, rank grassland margins and areas within the Ecological Protected Area Network (EPAN). Vegetation within these areas includes a mosaic of kānuka-dominated regenerating vegetation, native revegetation planting, exotic forest and treeland, exotic-dominated scrub, isolated amenity trees and wetland or pond-margin vegetation. The highest-quality terrestrial fauna habitat within the Site is generally associated with the EPAN, remnant and planted tree vegetation, vegetated freshwater margins and areas where rank grassland, woody debris, leaf litter or denser ground cover provide refuge opportunities.

The Site supports habitats suitable for a range of common indigenous and introduced bird species. Potential indigenous lizard habitat is generally localised and associated with vegetated gullies, rank grassland, woody debris and unmanaged vegetation margins. Mature trees, including some large exotic trees, may provide potential low-value roosting habitat for bats, although previous acoustic surveys did not detect bats and the Site is considered to provide low ecological value for bats.

2.2 Description of Proposed Works

BSLP proposes to develop the Site into a comprehensively planned urban community. The proposal includes residential development, commercial and community activities, education facilities, open space areas, roading and transport upgrades, walking and cycling connections, stormwater and wastewater infrastructure, water supply, telecommunications and power infrastructure, and associated earthworks and construction activities.

Works relevant to terrestrial fauna management include vegetation removal, clearance of rank grass and unmanaged vegetation, removal or pruning of trees, bulk earthworks, works near riparian, wetland and pond margins, construction of roads and stormwater infrastructure, and movement and operation of machinery. These activities have the potential to disturb, injure or displace terrestrial fauna if not appropriately managed, particularly nesting birds, any indigenous lizards that may be present in suitable habitat, and any bats that may occasionally use mature trees.

The proposal also includes substantial ecological protection, restoration and enhancement works. These include the establishment and management of the EPAN, protection and enhancement of streams and their margins, revegetation of riparian and wetland areas, pest plant management, habitat enhancement and long-term ecological management. Approximately 36 ha of land within the live-zoned area is proposed to be protected as part of the EPAN and riparian margins, with protection, replanting, restoration and maintenance proposed in these areas. These works are expected to improve indigenous vegetation cover, habitat connectivity and terrestrial fauna habitat values over time.

This FMP applies to vegetation clearance and associated earthworks and construction activities that could affect terrestrial fauna. The purpose of the FMP is to set out practical procedures to avoid or minimise adverse effects on indigenous birds, lizards and bats during the proposed works.

2.3 Fauna Management Implementation Summary

This FMP is to be implemented prior to and during vegetation clearance and associated enabling, earthworks and construction activities that could affect indigenous terrestrial fauna. Detailed species-specific methods are provided in Sections 3 to 5. Key implementation steps are summarised in Table 1.

Table 1. Fauna management implementation summary.

Project stage / activity	Fauna group	Key requirement	Responsible person
Pre-start planning	Lizards, bats and birds	Confirm works areas, staging, and appointment of the project herpetologist, competent bat worker and project ecologist before vegetation clearance begins.	Landholder / contractor / project ecologist
Works footprint demarcation	Lizards, bats and birds	Clearly demarcate clearance and earthworks areas, including areas to be avoided, before fauna surveys or clearance occur.	Surveyor / contractor
Lizard salvage	Lizards	Lizard salvage surveys and searches are to be undertaken between October and April inclusive, during fine, calm and dry weather. Undertake trapping, habitat searches, and destructive or machine-assisted searches in suitable lizard habitat before and during clearance. Clearance of suitable habitat must be directed by the project herpetologist.	Project herpetologist / contractor
Lizard capture trigger	Lizards	If more than 20 native lizards are captured, DOC will be contacted and the project herpetologist will determine whether salvage and clearance can safely continue while advice is sought.	Project herpetologist
Bat roost assessment and pre-felling checks	Bats	Tree roost assessments can be undertaken at any time prior to clearance. Pre-felling checks for potential roost trees should be undertaken between 1 October and 30 April, immediately prior to felling and during suitable weather conditions. Potential roost trees must not be felled until required pre-felling checks are complete and clearance is confirmed.	Competent bat worker / contractor
Bat detection or accidental discovery	Bats	If bats are detected or discovered, affected trees must not be felled until the competent bat worker confirms bats are absent or further management has been agreed with DOC and Council, as required.	Competent bat worker
Nesting bird survey	Birds	Where required, vegetation may only be cleared within 24 hours of a survey confirming no native bird nesting activity, or once the project ecologist confirms any active nest is no longer in use.	Project ecologist / contractor
Accidental injury or mortality	Lizards, bats and birds	Stop works in the immediate area if safe to do so and follow the relevant accidental discovery, injury or mortality procedures in Sections 3 to 5.	Contractor / relevant fauna specialist
Completion reporting	Lizards, bats and birds	Prepare and submit completion reporting as required, including fauna captures, release locations, injury or mortality records, and any monitoring recommendations.	Relevant fauna specialist

3 HERPETOFAUNA MANAGEMENT

3.1 Introduction

3.1.1 Objectives

The purpose of the proposed lizard management is to identify and address actual and potential adverse effects on indigenous lizard values associated with the proposed vegetation clearance and earthworks. It specifies the management measures required to minimise and mitigate anticipated adverse impacts, which will be achieved through the following objectives:

1) Minimise adverse effects on lizards associated with vegetation clearance or earthworks activities;
2) Use current best practice methodologies to capture indigenous lizards from vegetation in the project footprint immediately prior to and during vegetation clearance and earthworks; and
3) Relocate captured individuals to suitable habitats (avoid and minimise mortality of wildlife protected by the Wildlife Act).

3.1.2 Statutory Context

Herpetofauna (reptiles and amphibians) comprise a significant component of New Zealand's terrestrial fauna. There are currently 163 endemic herpetofauna taxa recognised in New Zealand (Hitchmough et al., 2026; Burns et al., 2025), 87% of which are considered 'Threatened' or 'At Risk'.

Wildlife Act (1953)
All indigenous lizards are legally protected under the Wildlife Act (and subsequent amendments). A Wildlife Act Authority (WAA) is required to capture, handle, and relocate native wildlife.

Resource Management Act 1991
Landscape features that provide significant habitat for indigenous species are protected under the RMA (Section 6(c)). This includes ostensibly low value exotic vegetation that can support populations of native lizards.

3.1.3 Project Herpetologist

A suitably qualified herpetologist or ecologist ('project herpetologist') is required to implement all herpetofauna management, and a WAA to capture and relocate indigenous lizards is required.

3.2 Herpetofauna Values Potentially Affected

3.2.1 Species potentially present

Lizard surveys of the Site utilising a network of 37 Artificial Cover Objects (ACOs) checked on five occasions, hand searches of potential habitat alongside the ACO checks and eight person hours of nocturnal spotlight searches for geckos over two nights, were undertaken by Bioresearches over March – April 2026 (Bioresearches, 2026c). These surveys detected no native lizards. Trapping and machine-assisted destructive searches undertaken of rough exotic grasses within Stage 1 over early 2026 (refer Bioresearches 2026 a & b) also found no native lizards. These combined results indicate that that native lizards are likely to be absent or present only in low numbers within the Site where similar vegetation cover occurs.

A desktop review of lizard data contained within the Department of Conservation's (DOC's) herpetofauna database (accessed 12/05/2026) found the following lizard species within 15 km of the Site (excluding off-shore islands as their herpetofauna differs from mainland Auckland). The results are

summarised in Table 2. The most commonly recorded species were the introduced plague skink (*Lampropholis delicata*) and the copper skink (*Oligosoma aeneum* – At Risk, declining).

Table 2. Terrestrial herpetofauna species recorded within 15 km of the Site (excluding offshore islands).

Common name	Species name	Conservation status	Suitable habitat present within project footprint?
Copper skink[1]	*Oligosoma aeneum*	At Risk - Declining	✓
Ornate skink[2]	*Oligosoma ornatum*	At Risk - Declining	✓
Plague skink	*Lampropholis delicata*	Introduced and Naturalised	✓
Forest gecko[3]	*Mokopirirakau granulatus*	At Risk - Declining	
Pacific gecko[4]	*Dactylocnemis pacificus*	Not threatened	
Moko skink[5]	*Oligosoma moco*	At Risk - Uncommon	
Shore skink[6]	*Oligosoma smithi*	At Risk - Declining	

Notes:

1. Nearest records 6 - 7 km east and west of the Site
2. Single record 14 km west of the Site
3. Nearest records 3.3 km north-east of the Site
4. Single record 9 km to the south of the Site
5. Single record 14 km west of the Site
6. Closest record 6.6 km to the south-east of the Site

In summary, while no native lizards have been recorded within the Site to date during surveys or salvage works, the available records within 15 km of the Site indicate that low numbers of herpetofauna such as copper or ornate skinks or forest gecko may be present on the Site. Plague skinks (*Lampropholis delicata*), an introduced species, were observed during site visits and are expected to be common, particularly in areas with rank grass, garden waste, or woody debris.

3.2.2 Lizard habitat

The highest-quality potential indigenous lizard habitat within the Site is associated with vegetated gullies and EPAN areas containing indigenous scrub, rank grassland, woody debris and leaf litter. However, these habitats are generally fragmented, highly modified, and lack a well-developed indigenous understorey and strong terrestrial connectivity typically associated with higher-quality arboreal gecko habitat. The wider Site is dominated by regularly maintained exotic grassland associated with golfing activities, which generally limits habitat suitability for indigenous lizards due to frequent mowing and disturbance. Nevertheless, unmanaged areas of rank grassland, garden waste, leaf litter and woody debris may provide localised refuge opportunities for small numbers of indigenous skinks, particularly copper skink and ornate skink. Figure 2 shows the nature of the potential lizard habitat in the Site and Figure 3 shows the location of that habitat.

Figure 2. Examples of potential lizard habitat within the Site that will be removed during the proposed works.

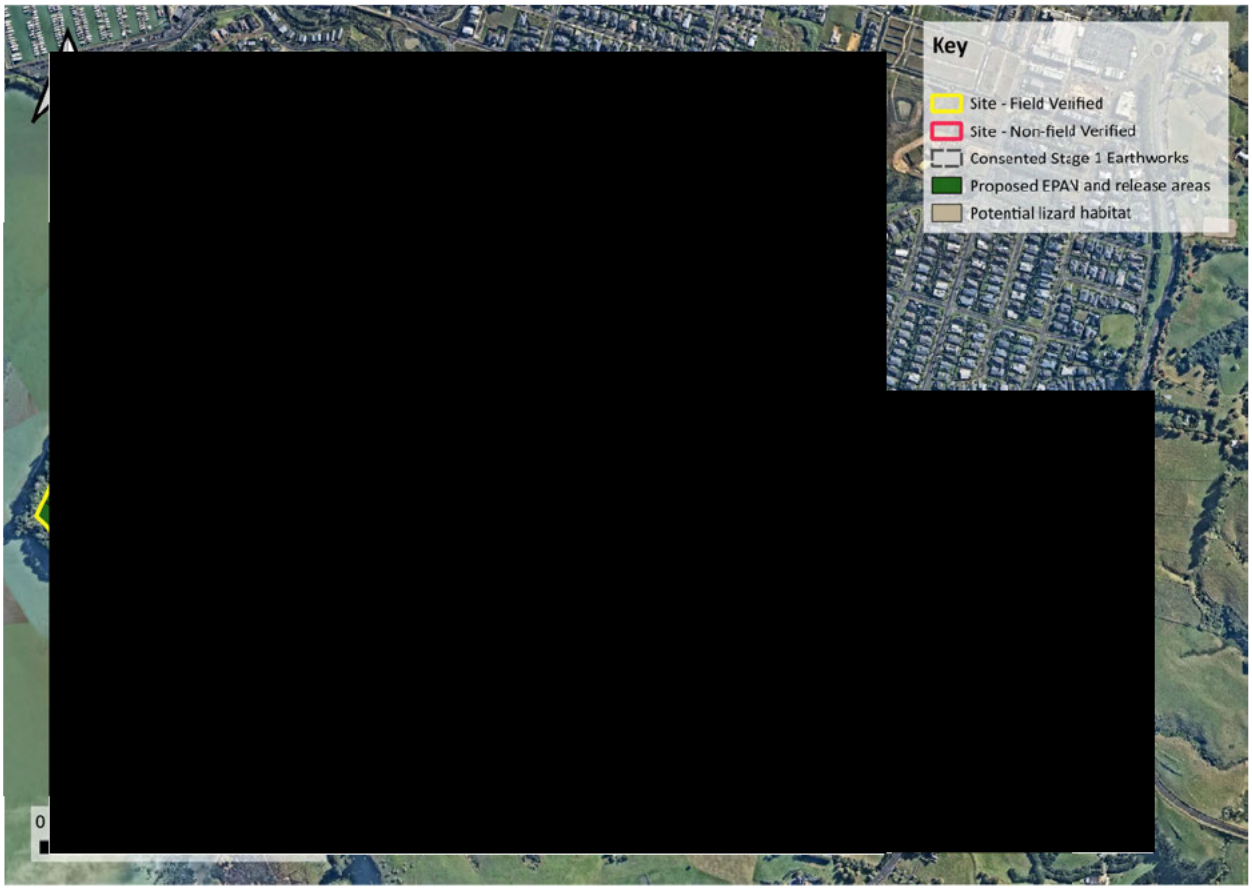

Figure 3. Potential lizard habitat proposed for removal within the Site and proposed lizard release sites.

3.2.3 Potential adverse effects on lizards

The project requires earthworks and vegetation clearance. If indigenous lizards are present within the affected area, potential adverse effects on lizards may include:

Direct effects:

- Lizard mortality during physical clearance/construction works
- Injury during physical clearance/construction works

Indirect effects:

- Temporary loss of habitat
- Temporary noise and dust disturbance

Site development cannot be achieved without vegetation removal, and therefore potential adverse effects on indigenous herpetofauna cannot be avoided. Managing the effects on lizards requires mitigation through a salvage and relocation programme and potential release site habitat enhancement.

3.3 Lizard Search and Capture Methodology

Lizard capture and relocation will be associated with proposed vegetation clearance and earthworks activities through the methods outlined in this section. Note that as arboreal lizards have not been identified during previous surveys and are not expected to be present within the works area, night searches are not considered necessary.

3.3.1 Timing of activities

Vegetation clearance should occur between October and April (inclusive); lizard salvage activities are confined to warmer months when lizards are the most active and likely to be detected if present.

All lizard management activities are required to be undertaken during fine, calm, and dry weather.

Trapping and habitat searches are to be undertaken in the week leading up to vegetation removal, and destructive searches immediately prior to and during vegetation clearance.

3.3.2 Trapping and habitat searches

A minimum three-day intensive trapping period using a combination of ACOs and baited pitfall traps and/or funnel traps (Figure 4), will be undertaken prior to vegetation removal within areas of appropriate habitat as directed by the project herpetologist.

Key points for trapping include:

- ACOs and pitfall/funnel traps shall be installed a minimum of four weeks prior to the commencement of trapping to allow them to ‘bed in’ to the environment.
- Each trap will be baited with fruit (e.g., banana or canned pear) and will contain a wetted sponge to reduce the risk of desiccation.
- Traps are to be placed in shaded areas away from potential inundation with water and checked at least once every 24 hours while active to limit adverse effects on lizards (e.g., stress, desiccation, drowning).
- All traps shall be embedded in and furnished with vegetation to protect any captured lizards from heat and exposure during confinement.
- When not in use, all pitfall traps shall be deactivated (sealed/closed or furnished with vegetation/debris to the upper rim so that lizards may escape).
- Captured lizards will be held temporarily (approximately one hour) to allow traps to be cleared either in their entirety or in sections. Lizards will be stored as described in Section 3.3.5 below.
- All native lizards shall be released at the designated release site following capture.

During trap checks, all vegetation, logs, and debris should be hand searched to capture lizards and identify important areas that should be targeted for destructive searching.

a)

b)

Figure 4. a) A funnel trap, b) an ACO out in the field.

3.3.3 Destructive and machinery-assisted searches

After trapping and active searches are complete, destructive habitat searches will be carried out in conjunction with the vegetation clearance or works contractor. This will involve systematic manual searches of suitable habitat (e.g. rank grass) and destruction of habitat where practicable. Leaf litter, ground cover vegetation, and small debris may be hand-raked where practicable, and larger debris overturned to search for refuging lizards.

Where vegetation growth means an area cannot practically be searched by hand, machine-assisted searches will be undertaken. This involves the project herpetologist working alongside an excavator operator as the top layer of vegetation is scraped away to reveal bare soil underneath and expose concealed lizards. If possible, a toothed bucket will be used to improve scraping and lift habitat such as non-woody vegetation, logs, and debris piles.

Machine-assisted searches will follow and continue until all habitat for lizards has been removed and there is no suitable habitat for native lizards remaining within the affected area, as assessed by the project herpetologist.

3.3.4 Post-clearance search

At the conclusion of the machine-assisted searches and vegetation clearance, the suitably qualified ecologist would undertake a final site walk over to detect any remaining lizards.

3.3.5 Lizard handling and containment

All lizards will be handled under a WAA and as specified by the methodologies within the New Zealand Lizard Conservation Toolkit (Anderson et al., 2012).

All indigenous lizards found during the destructive searches, machine-assisted searches and post-clearance search, will only be captured and handled by, or under supervision of, the DOC-authorised herpetologist/ecologist. Hands should be sterilised before and after handling lizards, along with all field equipment that indigenous lizards may encounter.

All captured lizards will be placed in holding container(s) with adequate ventilation and kept at ambient temperature. Vegetation, soil and leaf litter from the capture site will be placed in the container to provide shelter and protection during containment/transport. Lizards would only be held temporarily

for the period of the active searches or trap inspections, before being released at the approved relocation site (Section 3.4).

It is not anticipated that lizard taxa with conservation statuses higher than 'At Risk' would be encountered on-site. However, if 'Threatened' lizard species were encountered, the individual(s) would be captured and temporarily contained, and the local DOC office contacted for further instruction.

3.3.6 Accidental lizard injury or death

The following steps will be implemented should any injured or dead indigenous lizards be found during the vegetation clearance activities:

- The project herpetologist would notify DOC as soon as possible (within 24 hours);
- Any lizard death of 'Threatened', 'At Risk' or 'Data Deficient' species shall be sent to Massey University Wildlife post-mortem service for necropsy. The body should be chilled if it can be delivered within 24 hours, or frozen if delivery will take longer than 24 hours;
- Appropriate measures shall be undertaken to reduce the risk of further lizard deaths;
- Injured lizards found during salvage will be taken to a suitably qualified vet as soon as possible for assessment and treatment. Injured lizards will be kept in an appropriate portable enclosure (i.e., a clean, well-ventilated plastic container) under the direction of the project herpetologist to ensure the lizard is handled appropriately until it can be treated;
- Lizards assessed by the vet or alternative specialist as uninjured, or otherwise in suitable condition for release, would be transported to the relocation site in the portable enclosure and released; and
- Euthanasia of an injured lizard is only to be undertaken under direction from DOC.

3.4 Release Site

3.4.1 Selection of release site

Factors that should be considered when selecting a release site for salvaged lizards include ecological appropriateness, long-term security, habitat suitability, and protection from predators and future human disturbance (DOC Lizard Technical Advisory Group, 2019). Key considerations include, but are not limited to, the following:

- It is important that the release site is an appropriate distance from the project footprint to prevent the lizards from re-entering the works area. However, the release site should be located as close as possible to the salvage site to help retain similar microhabitats and environmental conditions.
- The habitat within the release site should be representative of, or of higher ecological value than the salvage site.
- Areas with long-term protection should be favoured, such as reserves managed by DOC or Auckland Council, vegetation covenants or areas protected by AUP-OP provisions (e.g., Significant Ecological Area (SEA) overlay, riparian habitat).
- Potential existing species composition and density at the release site should be considered as far as practicable, to limit potential adverse effects of intra- and inter-species competition at the release site.

3.4.2 Proposed release sites

It is preferred that lizards are relocated within or adjacent to the project footprint as far as practicable, to maintain local biodiversity and reduce the risk of adverse effects that may occur with longer distance relocations. A key consideration of relocation is ensuring the habitat suitability (quantity and quality) is present to support relocated lizards. Final release sites will be at the discretion of the project herpetologist.

Several areas of EPAN are located on the Site and outside of the proposed earthworks and vegetation clearance areas (Figure 3). The nature of the habitat in these areas is:

- Area 1 (within Stage 1 Site) - exotic forest, with pines forming much of the canopy, (EF) and native planting (PL) which was planted during the early 2000's (Singers et al. 2017; Viridis 2025; Tonkin & Taylor 2022). The EPAN provides suitable release habitat for indigenous skinks, with habitat such as leaf litter, woody debris, and ground cover vegetation present.
- Area 2 (west and south of the works area) - dense ground cover and scrub vegetation, including exotic forest / treeland (EF), exotic scrub (ES), pōhutukawa treeland (CL1) and a large area of wetland.
- Area 3 (east of the works area) – mainly exotic forest / treeland (EF) and some exotic scrub (ES).

These EPAN areas contain a range of suitable release habitat for indigenous skinks, with habitat such as leaf litter, woody debris and ground cover vegetation present.

Prior to lizard salvage, the project herpetologist will inspect the proposed release area(s) and confirm final release locations based on habitat structure, refuge availability, predator control, distance from active works, land security and the species/number of lizards salvaged. Final release locations will be recorded by GPS and included in the completion report.

3.4.3 Habitat enhancement

The EPAN areas are to be enhanced with extensive planting of indigenous species and weed and pest control and will be protected in perpetuity with covenants.

Introducing new individuals into an already occupied environment could lead to competition and/or resource availability issues. Displaced lizards have a lower likelihood of survival where the carrying capacity of adjacent habitats is stressed through increased competition for fewer resources. Further, displaced animals have a higher risk of predation and a rapid increase in lizard numbers at the release site/s may result in a corresponding increase in mammalian predators. Although previous surveys and salvage works indicate that indigenous lizards are likely to be absent or present only in very low numbers within the works area, the following supplementary refuge requirements will apply as a precaution if ten or more indigenous lizards are salvaged.

Supplementary Refuge Structures

If **ten or more** indigenous lizards are captured for relocation, supplementary refuge structures (e.g., felled logs, rocks, branches) will be installed within the release site/ prior to lizard release. The provision of permanent refuges, including but not limited to log piles, natural debris (e.g. decaying vegetation), artificial cover objects (i.e., Onduline sheets) and rock piles should be installed to supplement the natural refuges already present. Salvaged skinks will be released beneath these refuge structures to provide immediate protection.

Mammalian Predator Control

Control of pest mammals is already proposed within the release sites in perpetuity (refer the Biodiversity Management Plan (Viridis, 2026b)), therefore additional predator control is not required.

3.5 Capture Trigger

If more than twenty native lizards are captured, DOC will be contacted as soon as practicable to discuss next steps. These may include continuation of the current salvage programme, additional habitat enhancement and/or protection, or the requirement for additional permits or approvals. The project herpetologist will determine whether lizard salvage and associated vegetation clearance can continue safely while DOC advice is sought, having regard to the number and species of lizards captured, the extent of remaining habitat to be cleared, release site suitability and whether additional habitat enhancement or management measures are required.

3.6 Post Release Monitoring

Low numbers of released lizards (i.e., < 15) are unlikely to provide adequate information to determine the success/ failure of a relocation, nor provide sufficient information to determine lizard responses to pest control. As such, if ≥15 At Risk indigenous lizards are relocated, a post-release monitoring protocol will be prepared by the project herpetologist and submitted to Auckland Council and DOC. The protocol will specify the monitoring method, timing, frequency, duration, performance measures and reporting requirements, having regard to the species and number of lizards relocated and the final release site(s).

3.7 Completion Reporting

A completion report will be prepared by the project herpetologist and submitted to Auckland Council within **one month** of the completion of all vegetation removal. The report should detail the number of lizards captured, the locations they were captured from and the release site. The report will also detail whether any post-release monitoring (and timing) is recommended based on the number of lizards salvaged. An Amphibian/Reptile Distribution Scheme (ARDS) Card will be sent to Auckland Council and DOC.

3.8 Checklist

Table 3 contains a checklist summarising the responsibilities for lizard management at the Site.

Table 3. Lizard Management Checklist.

Task	Required of:	Completed
Project start-up		
Appointment of project herpetologist	Landholder	
Finalisation of lizard management techniques and FMP and submission to Council	Project herpetologist	
Approval of LMP	Auckland Council	
Demarcation of works footprint	Surveyor/ vegetation clearance contractor	
Pre-works management prior to vegetation clearance		
Deployment of ACOs, pitfall traps and / or funnel traps	Project herpetologist	
Pre-works lizard capture	Project herpetologist	
Works lizard management		
Machine assisted lizard capture	Project herpetologist, clearance contractor	
Post works		
Works completion report to client, Council and DOC	Project herpetologist	
Post completion monitoring (where required)	Project herpetologist	

4 BAT MANAGEMENT

4.1 Introduction

4.1.1 Objectives

The aim of the proposed bat management is to avoid or minimise potential adverse effects on bats that could potentially use the tree vegetation proposed to be cleared.

Key objectives are to:

- Avoid/minimise the risk of disturbing or harming bats that may occasionally roost within mature trees on Site and avoid felling trees containing active bat roosts; and
- Where bats are found utilising the Site, implement habitat enhancement features within the Site and/or surrounding environment.

To support these outcomes:

- Best practice techniques will be used to identify bat roost features before works commence, to prevent harm to bats;
- Identification of potential roost habitat and subsequent pre-felling surveys will follow recognised standards, such as DOC's *Protocols for minimising the risk of felling bat roosts'* guideline document prepared by the New Zealand Bat Recovery Group (DOC, 2024), or superseding guidance documents; and
- All activities will meet the requirements of the Wildlife Act and RMA.

4.1.2 Statutory context

Wildlife Act (1953)

New Zealand bats are absolutely protected species under the Wildlife Act. It is an offence to catch alive or kill, hunt, possess, molest, or disturb bats under the Act. Where tree or vegetation removal overlaps with the occurrence of bats, there is a risk of killing or injuring any bats that may be present.

Resource Management Act 1991

Landscape features that provide significant habitat for indigenous species are protected under the RMA (Section 6(c)). This includes ostensibly low value exotic vegetation that can support populations of native bats.

4.1.3 Competent bat worker

The New Zealand Bat Recovery Group has developed a set of competencies to ensure that anyone working with bats is competent to do so. Any work undertaken to implement this bat management plan should be supervised by an appropriately authorised "competent bat worker"[1] (CBW).

4.2 Bat Values Potentially Affected

4.2.1 Species potentially present

New Zealand has two species of endemic bats on the mainland. The most widespread is the long-tailed bat (*Chalinolobus tuberculatus*, Threatened – Nationally Critical), which occurs in the Auckland Region.

[1] A person who has been certified by DOC's Bat Recovery Group as 'competent' to undertake a particular bat management activity

The lesser short-tailed bat (*Mystacina* spp.) does not occur on the mainland in the Auckland Region, and is not expected to be present.

Acoustic surveys using automatic bat monitors (ABMs) undertaken by Viridis in March 2026 (Viridis 2026a) and T&T in February 2021 detected no bats (Tonkin & Taylor 2022). ABMs were deployed in areas where bat activity was considered most likely, including mature trees, near watercourses and wetlands, and along vegetated edges. Although no detections were recorded, this does not entirely rule out the occasional use of the Site by long-tailed bats but suggests these habitats are unlikely to be frequently used.

The nearest records of long-tailed bat activity are approximately 6.3 km south-west of the Site at Mangemangeroa Reserve, Howick and 9.5 km to the south, at the southern end of Clevedon Scenic Reserve (DOC database accessed June 2026; Tonkin & Taylor 2022).

4.2.2 Bat habitat

Bats typically roost in tree features such as hollows, under split or flaking bark, or within dense epiphytes, and may also use rocky overhangs. Mature trees within the Site, such as the large pines within the EPAN and isolated trees within golf course areas, may provide roosting opportunities for bats. However, based on their exposed and isolated nature, the absence of bat detections during previous monitoring, and the availability of higher-quality native bush fragments to the south and east, these trees are expected to provide relatively low-value roosting habitat.

4.2.3 Potential adverse effects

The Project requires the removal of some trees on the Site that may provide potential roosting habitat for indigenous bats. If bats are present within trees proposed for removal, potential adverse effects may include:

Direct effects

- Mortality during tree felling works
- Injury or disturbance to bats occupying roosts or refugia

Indirect effects

- Temporary loss of potential roosting habitat
- Disturbance from noise, vibration, lighting, dust, and increased human activity.

Tree felling when bats are utilising them for roosts or refugia has the potential to result in mortality and/or injury to any bats present.

The proposed tree clearance will not result in significant habitat loss or population displacement of a potential bat population, as the affected habitat within the Site is of low quality and has poor terrestrial connectivity. Disturbance effects are expected to be low due to the likely limited use of the Site by bats as indicated by previous bat monitoring on the Site.

4.3 Identification of Potential Roost Habitat

All trees to be removed within the Site should be visually assessed prior to vegetation clearance by a CBW with Competency 3.3 (DOC, 2024). Each tree should be classified as either high risk or a ‘potential roost tree’ (PRT) or low risk in relation to potential roost habitat.

PRTs typically have a diameter at breast height (DBH) of ≥ 150 mm, and exhibit one or more of the following features that could potentially support roosting bat/s:

- Holes, cavities, crevices, cracks and/or fractured limbs
- Hollow trunks and/or branches
- Loose, flaking bark, or deep incised bark crevices
- Deadwood (including debris caught in tree forks) or dense epiphyte communities in the canopy or on the trunk
- Evidence of bat droppings, grease marks and/or urine staining around cavities.

All low-risk trees can be felled at any time, subject to requirements of other management measures (e.g., for nesting birds). The only exception is where low risk trees have evidence of bat droppings, grease marks and/or urine staining around cavities, in which case they will be treated as high-risk trees.

All PRTs should be clearly marked during the roost habitat assessment (e.g. using brightly coloured spray paint or flagging tape) and the locations recorded using a GPS device.

PRTs will be subject to a pre-felling assessment. Pre-felling assessments will be undertaken by a CBW accredited in Competency 3.1.

4.4 Pre-felling Assessment for PRTs

PRTs should only be cleared between 1 October and 30 April to align with the warmer season when bats are most active. A CBW certified in Competency 3.1 will be present to supervise the clearance of all PRTs. They must be available during the vegetation removal stages to respond immediately to any incidental discoveries of bats during felling.

During tree clearance the following procedures must be adhered to:

- All PRTs will be acoustically monitored using ABMs for two consecutive nights during optimal weather conditions (Table 4) immediately prior to vegetation removal. Results will be analysed by the CBW the following morning as early as possible.
- Where a night does not meet optimum conditions (Table 4), monitoring must continue to take place until a total of two consecutive nights of optimum conditions have been monitored.

Table 4. Optimal weather conditions required for bat surveys derived from DOC (2024) guidelines.

Component	Conditions
Timing	Begin one hour before sunset and end one hour after official sunrise
Temperature	Temperatures of 8°C or higher for the first four hours after official sunset
Wind	Little to no wind of ≤ 20 km/hour for the first four hours after official sunset
Precipitation	Little to no precipitation (≤ 2.5mm) in the first four hours after official sunset

If bats are **not** recorded:

- The CBW will notify the Site manager immediately after data is reviewed, and permission will be given to clear the monitored vegetation on the same day. If vegetation removal does not take place on the day that the ABM data is checked, monitoring will continue until clearance occurs and the CBW confirms no bats are present.

If bats **are** recorded:

- The Site manager shall be notified immediately after reviewing the data and the affected PRTs cannot be cleared until additional investigations have been completed, as follows:
    - The ABM survey will continue until no bat activity has been recorded for two consecutive nights;

      OR

    - The suspected roost(s) will be visually inspected by a climbing arborist with an endoscope who can undertake roost checks under the guidance of the CBW. The arborist will take photos of any signs of bat (or roost) presence observed. At the time of visual inspections, the CBW may also use a thermal camera to inspect potential roost features from the ground;

      OR

    - At least two consecutive emergence and re-entry watches at dusk and dawn will be undertaken immediately prior to the felling, to confirm bats have not entered (or have vacated) the tree/s. Roost watches will be led by a CBW accredited in Competency 3.2.
- The PRT/s containing potential roosts will be clearly marked and a 10 m radius exclusion zone established whilst assessments are ongoing. The zone will be identified with fencing or other appropriate materials. All relevant site workers will be notified that the area must be left undisturbed.
- Representatives from DOC and Auckland Council will be informed via email of the relevant information, including photos if available.
- If bats are still known to be roosting in the PRTs after seven nights, a meeting will be held between the CBW, site manager, DOC and Council (as required) to determine an appropriate way forward.
- Immediately following clearance of PRTs, felled trees will be inspected for bats and evidence of bat roosts by the CBW.

4.5 Accidental Discovery, Bat Injury or Mortality

If a bat is found during tree removal, felling of the tree must stop immediately if safe to do so, and an approved bat ecologist at Competency Level 2.1 must be consulted.

If any live bat found during or after vegetation clearance is unable to fly away, it will be placed immediately in a clean, dark cotton bag kept at ambient or slightly warmer temperature. No more than two bats will be housed in a single bag, which will be secured for safe transportation (e.g. within a labelled cardboard box). Handling will be kept to a minimum to reduce stress, and noise levels during transportation will be minimised.

The bat will be taken without delay to a veterinarian for assessment. The site manager and relevant representatives from DOC and Council will be notified as soon as practicable, and within 24 hours of the bat being found. Any bat that is found dead or euthanised by the veterinarian will be sent to DOC. If the veterinarian confirms the bat is uninjured, it will be transported back to the Site in the cotton bag and released into a temporary artificial roost box. The roost box will be suspended within a tree outside, but as close as possible to, the location where the bat was found. The box will be installed prior to dusk on the same day to allow the bat to leave at its own discretion.

4.6 Mitigation

If bats are detected on the Site during the initial comprehensive survey and/or pre-felling surveys, mitigation in the form of habitat enhancement will be required if vegetation to be cleared is identified as suitable for bat roosting.

To replace roosting habitat following vegetation clearance, artificial bat roost boxes will be installed in an area suitable for roosting, as directed by the CBW. Emphasis should be placed on the EPAN areas where large trees are present, or within SEAs in the wider Plan Change 88 Site or immediate surrounding environment.

The number of roost boxes will be installed at a rate of one per every 10 high risk bat roost tree/s removed. The boxes should be installed at a minimum height of 4 m, with no clutter within 2 m of the box opening. 'Possum bands' will be wrapped around each tree where a box is installed to deter mammalian predators. Any bat box installed must be checked annually to remove any nesting materials that have been brought in by birds. In recent years, several bat box designs have been installed in New Zealand that may be suitable for use within the Site, including:

- A timber 'Kent' bat box design (Auckland Council);
- A timber 'Microbat box' design (Auckland Council);
- A bespoke timber design similar to the 'Kent' (Waikato Regional Council); and
- Four Schwegler 'woodcrete' designs (models 2F, 2FN, 1FF and 1FD; DOC, South Canterbury).

5 AVIFAUNA MANAGEMENT

5.1 Introduction

5.1.1 Objectives

The purpose of the proposed avifauna (bird) management is to identify and address actual and potential adverse effects on avifauna values associated with the proposed vegetation clearance and earthworks. It specifies the management measures required to minimise and mitigate anticipated adverse impacts, which will be achieved through undertaking nesting bird surveys prior to works to minimise disturbance.

5.1.2 Statutory Context

Wildlife Act (1953)
Most indigenous birds are legally protected under the Wildlife Act (and subsequent amendments). A WAA is required to capture, handle, and relocate native wildlife.

Resource Management Act 1991
Landscape features that provide significant habitat for indigenous species, including birds, are protected under the RMA (Section 6(c)). This includes ostensibly low value exotic vegetation that can support populations of native birds.

5.1.3 Project ecologist

A suitably qualified ecologist is required to implement all avifauna management.

5.2 Avifauna Values Potentially Affected

Bird eggs, chicks and nesting adults are vulnerable to vegetation clearance and disturbance during the breeding period. Consequently, clearance of tree vegetation during the main terrestrial bird breeding season has the potential to result in direct mortality of birds, eggs and chicks. Further, the clearance of rank grasses and edge vegetation associated with areas of open water during the bird breeding season has the potential to result in direct mortality of birds, eggs and chicks of 'Threatened' species. Dabchicks/weweia (*Poliocephalus rufopectus*) are known to nest year-round in association with freshwater ponds, utilising floating aquatic vegetation or overhanging vegetation on pond edges. Pāteke (*Anas chlorotis*) typically breed July to October and typically build their nests at the bases of clumps of vegetation such as rushes, sedges, grasses and ferns on the edges of freshwater ponds.

The Project requires earthworks and vegetation clearance. If indigenous birds are nesting within the affected area, potential adverse effects on birds may include:

Direct effects:

- Adult and chick mortality during physical clearance/construction works
- Injury during physical clearance/construction works

Indirect effects:

- Temporary loss of habitat
- Temporary noise and dust disturbance
- Disruption to nesting and breeding behaviour

Site development cannot be achieved without vegetation removal, and therefore potential adverse effects on native birds cannot be entirely avoided. Adult birds are highly mobile and expected to move

to nearby unaffected habitat once disturbance commences. Nesting birds and chicks that have not fledged are unable to move away. Therefore, managing effects on birds requires mitigation through monitoring for nests, signs of nesting activity and displays of breeding behaviour.

To mitigate the effects of direct mortality and indirect disturbance on breeding and nesting birds and their eggs, the following protocol will apply to tree and shrub clearance and any vegetation clearance within 10 m of ponds or wetlands.

5.3 Bird Survey and Management

5.3.1 Timing

In the first instance, vegetation clearance between 1 September and 28 February (or 29 February in a leap year) should be avoided where practicable. This is the main bird breeding season for most species, although some species (such as dabchick) will nest outside of this period.

If vegetation clearance is required within the main bird nesting season, a native nesting bird survey will be undertaken to identify if and/or where native bird nesting behaviour (including courtship, nest building, and active nesting) is occurring.

If vegetation is to be cleared within 10 m of the edges of constructed ponds at any time of year, a native nesting bird survey will be undertaken to identify if and/or where native bird nesting behaviour (including courtship, nest building, and active nesting) is occurring.

5.3.2 Native nesting bird survey requirements

- The surveys will be completed by an appropriately qualified ecologist.
- The surveys will include inspections for tree cavities, tree nests and ground nesting species such as pūkeko.
- Where no nesting behaviour or activity is observed, the vegetation may be cleared within 24 hours of the survey being completed. If clearance does not occur within 24 hours, the area must be surveyed again to verify the absence of nesting behaviour prior to clearance.
- If nesting behaviour, or an active nest is located, an exclusion area with a minimum diameter of 10 m will be demarcated around the tree (or nest if it is a ground nest) for non-threatened species, and a minimum 20 m buffer for At Risk or Threatened species, and works shall be avoided within this cordon until it has been confirmed by the appropriately qualified ecologist that all nestlings have fledged. Following this confirmation, the vegetation may be cleared.

5.4 Inadvertent Bird Injury or Death

If a native bird is found injured or dead during vegetation clearance, the following steps will be taken:

- Injured native birds will be placed in an appropriate carrying box/cloth bag and immediately transported to a veterinarian for assessment.
- If the species has a conservation status of At Risk or Threatened (Robertson et al. 2021), the local DOC office will be contacted as soon as practicable, but within 24 hours.
- All deceased birds (including those found dead on site, or any that are ultimately euthanised by a veterinarian) will be transported to the local DOC office as soon as practicable.
- All injuries or mortalities will be accurately recorded and reported to DOC on request.

Native bird management is required in all areas where vegetation clearance will occur, including the grassed paddock areas and fence lines on the Site.

5.5 Management of Dotterels

The Site does not currently provide extensive habitat suitable for nesting New Zealand dotterels (*Charadrius obscurus*; Threatened – Nationally Increasing), which typically favour open, sparsely vegetated areas and bare ground for nesting. However, New Zealand dotterels are known from the wider coastal environment and have been recorded utilising a range of modified habitats, including urban and construction environments where suitable nesting conditions are present.

As earthworks progress, areas of exposed soil and sparsely vegetated ground will be created within parts of the Site. These areas may provide temporary nesting habitat for New Zealand dotterels, particularly during the breeding season. New Zealand dotterels are known to establish nests within active construction sites where habitat conditions are suitable. Accordingly, management measures are required to minimise the risk of nesting occurring within active works areas and to ensure any nests identified during construction are appropriately managed.

5.5.1 Dotterel deterrence

From July onwards, dotterels begin looking for breeding territory. Weekly inspections of the works area should occur to determine if dotterels are present. Breeding dotterels are territorial and will show defensive behaviour to anything that they think is a threat (including people). Defensive behaviour includes alarm calls, running in front of potential threats to distract and lure them away ('rat run'), and pretending to be injured ('broken wing'). It is this behaviour that should be looked for during weekly site inspections.

The easiest method to manage dotterels on a site is to deter them from establishing nests in the first place. From early July onwards, one or more of the methods in Table 5 should be employed to discourage dotterel presence within the Site.

Table 5. Dotterel deterrence options (adapted from NZTA, 2012[2]).

Method	Description	Likelihood of success	Comments
Long grass	Allow grass to grow long so it is not considered a good place for dotterels to lay eggs	High	Leave grass to grow from at least April to ensure it is long
Machinery*	Park large machinery close to where dotterels are showing an interest. Start the engine from time to time	Moderate	Machinery cannot be left for long periods, or the birds may get used to it
Silt fences	Erect shade cloth at knee height. Place in rows. Space at 5-10 m	High	These fences obscure dotterel vision from nesting sites as they actively seek areas with good sight lines
Metallic or reflective tape	Streamers attached to posts that flutter when there is wind	Moderate	Works for a short time (up to three weeks) and then birds habituate

*To be used in early to mid-July only. If nests establish, movement of machinery increases the risk of nest damage.

The likelihood of success column used in Table 5 has been developed based on known dotterel behaviours. However, they are known to become used to works activities, such as machinery, if left stationary for a prolonged period, and reflective tape can become ineffective within a few weeks.

[2] NZTA. 2012. Guidance in Relation to New Zealand Dotterels on NZTA Land. NZ Transport Agency, Wellington.

Actions that alter the Site to make it less attractive for nesting are considered to be the most effective options over a long period of time.

5.5.2 Eggs found within the construction zone

If, despite deterrence options being in place, dotterel eggs are still found within the construction zone, the following measures should be followed.

- If eggs are found on the ground within the construction zone, works within 50 m of the nest are to halt immediately and people are to leave the area.
- Contact the project ecologist.
- If the nest's location needs to be marked, the markers should be at least 10 m away from the nest. If necessary, use two on either side of the nest set back at least 10 m.
- The project ecologist will monitor the nest on a weekly basis to confirm when chicks have fledged (usually 6-7 weeks after hatching). Once this has occurred, the ecologist will confirm when works in the area can recommence.

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Appendix L
Wildlife Approval Checklist and Information Requirements

Wildlife Approval Checklist and Information Requirements

Introduction

This appendix identifies the Wildlife Act approval requirements for the Beachlands South Fast Track application and summarises how the application addresses the information requirements for a Wildlife Approval under clause 2 of Schedule 7 of the Fast Track Approvals Act 2024 (FTAA).

This Wildlife Approval application is for the capture, handling, temporary holding and relocation of indigenous lizards that may be present within suitable habitat affected by the proposed works. It also seeks approval for any incidental injury or mortality of indigenous lizards that may occur despite implementation of authorised lizard salvage, destructive searches, vegetation clearance controls and associated habitat removal procedures undertaken in accordance with the Fauna Management Plan (FMP).

For the avoidance of doubt, a Wildlife Approval is not sought for indigenous birds or bats. The Ecological Impact Assessment (EcIA) and FMP accompanying the Beachlands South Fast Track application set out avoidance and management procedures for birds and bats, including nesting bird checks, bat roost assessment, pre-felling protocols and accidental discovery procedures. These measures are intended to avoid direct handling, injury or mortality of indigenous birds and bats.

Documents referred to in this appendix

Table L1 identifies the key technical documents relied on in preparing the checklist.

Table L1. Documents referred to in this appendix.

Document	Acronym
Beachlands South Fast Track Ecological Impact Assessment	EcIA
Beachlands South Fast Track Fauna Management Plan	FMP
Beachlands South Fast Track Biodiversity Management Plan	BMP
Lizard Survey: 110 Jack Lachlan Drive, Beachlands South, Bioresearches, 2026	Lizard Survey Memo
Beachlands South Fast Track Assessment of Environmental Effects	AEE

Wildlife Approval information checklist

The information requirements for a Wildlife Approval under clause 2 of Schedule 7 of the FTAA are addressed in Table L2. The checklist is intended to be read alongside the EcIA, FMP and BMP, which provide the detailed assessment, management procedures and implementation measures relevant to indigenous lizards, birds and bats. References to indigenous birds and bats in this checklist are included only to identify the avoidance, pre-works assessment and accidental discovery measures proposed for those taxa, and do not expand the Wildlife Approval sought beyond indigenous lizards.

Table L2. Wildlife Approval information checklist.

Schedule 7 clause	Wildlife Approval information requirement	Application reference and response
2(1)(a)	Specify the purpose of the proposed activity.	**FMP:** Sections 1, 2 and 3.1. The purpose of the wildlife-related activity is to minimise injury and mortality to indigenous lizards by salvaging and relocating any individuals present within suitable habitat before and during vegetation clearance, earthworks and associated habitat removal.
2(1)(b)	Identify the actions the applicant wishes to carry out involving protected wildlife and where they will be carried out, whether on or off public conservation land.	**FMP:** Sections 3.3 and 3.4; Figure 3. The applicant seeks approval to capture, handle, temporarily hold and relocate indigenous lizards, and to provide for incidental injury or mortality that may occur during authorised lizard salvage and habitat clearance. Actions will occur within suitable lizard habitat affected by the proposed works, with relocated lizards released into suitable Ecological Protected Area Network (EPAN) release areas within or adjacent to the project area. Activities will occur on land associated with the Beachlands South project and not on public conservation land.
2(1)(c)	Include an assessment of the activity and its impacts against the purpose of the Wildlife Act 1953.	**EcIA:** Sections 4.2, 7.3 and 7.5. **FMP:** Section 3. The Wildlife Act protects indigenous wildlife and controls interactions with protected wildlife. The proposed activity is consistent with that purpose because it provides a controlled and ecologist-led process to minimise injury and mortality to indigenous lizards that may otherwise be affected by vegetation clearance and earthworks. The FMP requires lizard salvage, humane handling, release to suitable habitat, completion reporting and additional response measures if unexpected captures, injury or mortality occur.
2(1)(d)	List protected wildlife species known or predicted to be in the area and, where possible, the numbers of wildlife present and numbers likely to be impacted.	**EcIA:** Sections 4.2 and 6. **FMP:** Section 3.2. No indigenous lizards were detected during targeted surveys or Stage 1 salvage works. However, low numbers of indigenous lizards may be present in suitable habitat. Species potentially present include copper skink (*Oligosoma aeneum*), ornate skink (*Oligosoma ornatum*) and forest gecko (*Mokopirirakau granulatus*). Numbers likely to be present and affected are expected to be low.
2(1)(e)	Outline impacts on Threatened, Data Deficient and At Risk wildlife species, as	**EcIA:** Sections 4.2, 7.3 and 7.5. **FMP**: Section 3.2. Copper skink, ornate skink and forest gecko are classified as At Risk. If present within affected habitat, potential effects include injury or mortality during vegetation clearance and

Schedule 7 clause	Wildlife Approval information requirement	Application reference and response
	defined in the New Zealand Threat Classification System.	earthworks, temporary habitat loss, disturbance and displacement. Following implementation of the FMP, residual effects on lizards are expected to be very low for the reasons set out in the EcIA.
2(1)(f)	State how the methods proposed to conduct the actions involving protected wildlife will ensure best practice standards are met.	**FMP**: Sections 3.1, 3.3, 3.4, 3.6 and 3.7. Lizard management will be implemented by a suitably qualified project herpetologist. Methods include works-area demarcation, seasonal timing, artificial cover objects, pitfall and/or funnel trapping, active searches, destructive or machine-assisted searches, humane temporary containment, release-site assessment, completion reporting and post-release monitoring if required. The FMP references relevant DOC lizard salvage and transfer guidance.
2(1)(g)	Describe the methods to safely, efficiently and humanely catch, hold or kill the animals and identify relevant animal ethics processes.	**FMP:** Sections 3.3 and 3.4. Lizards will be captured using accepted lizard salvage methods, including trapping, active searches and machine-assisted searches under the direction of the project herpetologist. Captured lizards will be temporarily contained in clean, ventilated containers for the period necessary to complete search or trap inspections, then released at confirmed release locations. Injured lizards will be taken to a suitably qualified veterinarian. Euthanasia of an injured lizard will only occur where directed by DOC or a suitably qualified veterinarian, as appropriate.
2(1)(h)	State the location or locations in which the activity will be carried out, including a map and GPS coordinates if available.	**FMP:** Figure 3 and Sections 3.3 and 3.4. The lizard salvage activity will be carried out within suitable lizard habitat proposed for vegetation clearance or earthworks. Proposed release areas are identified in Figure 3 of the FMP and comprise EPAN areas within or adjacent to the project area. Final release locations will be confirmed by the project herpetologist, recorded by GPS and included in the completion report.
2(1)(i)	State whether authorisation is sought to temporarily hold or relocate wildlife.	**FMP:** Sections 3.3 and 3.4. Authorisation is sought to temporarily hold and relocate indigenous lizards. Temporary holding will be limited to the period required for active searches or trap inspections and transport to the confirmed release site.
2(1)(j)	List all actual and potential wildlife effects,	**EcIA:** Sections 4.2, 7.3 and 7.5. **FMP:** Sections 3 to 5. **BMP:** Sections 2 to 5.

Schedule 7 clause	Wildlife Approval information requirement	Application reference and response
	adverse or positive, of the proposed activity, including effects on target species, other indigenous species and ecosystems at the site.	Potential adverse effects on lizards include injury or mortality during vegetation clearance and earthworks, temporary habitat loss and disturbance. Positive effects include relocation of any salvaged lizards to suitable habitat and long-term habitat improvement through EPAN restoration, planting, weed control and pest mammal control. Potential effects on birds and bats are managed through the FMP using avoidance and accidental discovery procedures; Wildlife Approval is not sought for birds or bats.
2(1)(k)	Where adverse effects are identified, state what methods will be used to avoid and minimise those effects, and any offsetting or compensation proposed to address unmitigated adverse effects, including steps taken before the project begins such as surveying, salvaging and relocating protected wildlife.	**EcIA:** Sections 7.3 and 7.5. **FMP:** Sections 2.3 and 3. **BMP:** Sections 2 to 5. Effects on lizards will be managed through pre-clearance planning, works-area demarcation, lizard salvage, ecologist-directed clearance of suitable habitat, relocation to suitable EPAN habitat, completion reporting and post-release monitoring if required. Release habitats will be supported by EPAN restoration, indigenous planting, weed control, pest mammal control and long-term management under the BMP. No separate lizard offset or compensation is proposed because residual effects on lizards are expected to be very low following FMP implementation.
2(1)(l)	State whether the applicant or any company director, trustee, partner or anyone else involved with the application has been convicted of any offence under the Wildlife Act 1953.	This matter relates to applicant declarations and is outside the scope of the ecological assessment.
2(1)(m)	State whether the applicant or any company director, trustee, partner or anyone else involved with the application has any current criminal charges under the	This matter relates to applicant declarations and is outside the scope of the ecological assessment.

Schedule 7 clause	Wildlife Approval information requirement	Application reference and response
	Wildlife Act 1953 pending before a court.	
2(1)(n)	Provide proof and details of all consultation, including with hapū or iwi, on the application specific to wildlife impacts.	Consultation is addressed in the application consultation material. Any consultation specific to wildlife impacts is to be confirmed by the applicant/project planner.
2(1)(o)	Provide any additional written expert views, advice or opinions the applicant has obtained concerning the proposal.	Relevant ecological expert material includes the EcIA, FMP, BMP and the Lizard Survey Memo. No external peer reviews have been sought.

Appendix M
Freshwater Features Reclamation Plan and Tables

VIRIDIS
Environmental Consultants

Features to reclaim

Beachlands South Fast Track

Beachlands South LP

Legend

- Site - Field Verified
- Site - Non-field Verified
- Consented earthworks (Stg 1)
- Approx. reclaim areas
- Natural wetlands to reclaim
- Intermittent streams to reclaim
- Modified streams to reclaim

SOURCES

Nearmaps 2025 aerial

DISCLAIMER:
This map/plan is not an engineering draft. This map/plan is illustrative only and all information should be independently verified on site before taking any action.

SCALE **1:9,500** **@ A4**

PROJECT NO.	10055
DRAWN BY:	B.P
DATE:	22 June 2026

Table M1. Summary of natural inland wetland reclamation proposed through direct effects of earthworks.

Wetland ID	Vegetation Type	Area affected (m^2)	Perimeter (m)	Perimeter:Area Ratio	Impact type
W7	Exotic rush-dominant	44.8	31.3	0.70	Full reclamation
W31	Exotic rush-dominant	48	36	0.75	Full reclamation
W27	Exotic grass-dominant	77.2	44	0.57	Full reclamation
W1	Native sedge-dominant	87.9	42.2	0.48	Full reclamation
W34	Exotic rush-dominant	121.5	48.5	0.40	Full reclamation
W33	Exotic rush-dominant	123.9	41.3	0.33	Full reclamation
W30	Exotic rush-dominant	131	59.7	0.46	Full reclamation
W47	Native sedge-dominant	146.6	64.9	0.44	Full reclamation
W13	Exotic rush-dominant	60.9	34.7	0.57	Partial reclamation
W12	Exotic rush-dominant	180.8	76	0.42	Full reclamation
W35	Exotic rush-dominant	207.1	83	0.40	Full reclamation
W28	Exotic rush-dominant	275.8	79.4	0.29	Partial reclamation
W48	Native sedge-dominant	624.1	229.4	0.37	Full reclamation
W26	Exotic rush-dominant	208.3	54.3	0.26	Full reclamation
Total		**2,337.9**	**924.7**		

Table M2. Summary of stream reclamation proposed through direct effects of earthworks.

Watercourse ID	Classification	Length to reclaim (m)	Representative width (m)	Representative SEV	Rep. SEV Score	Streambed affected ($m^{2)}$
WC 21	Intermittent	18	0.64	SEV 1	0.37	11.52
WC 2	Intermittent	36	0.64	SEV 1	0.37	23.04
WC 6	Intermittent	9	0.49	SEV 2	0.51	4.41
WC 6	Intermittent	19	0.49	SEV 2	0.51	9.31
WC 11	Intermittent	95	0.49	SEV 2	0.51	46.55
WC7	Modified natural	129	0.49	SEV 2	0.51	63.21
WC 14	Intermittent	4	0.37	SEV 3	0.55	1.48
WC 13	Intermittent	4	0.37	SEV 3	0.55	1.48
WC 17	Intermittent	8	0.37	SEV 3	0.55	2.96
WC 16	Intermittent	66	0.37	SEV 3	0.55	24.42
WC 41	Intermittent	56	0.37	SEV 3	0.55	20.72
WC 36	Intermittent	12	0.6	SEV 4	0.59	7.2
WC 42	Intermittent	16	0.6	SEV 4	0.59	9.6
WC 34	Intermittent	22	0.6	SEV 4	0.59	13.2
WC 33	Intermittent	26	0.6	SEV 4	0.59	15.6
WC 33	Intermittent	28	0.6	SEV 4	0.59	16.8
WC 43	Intermittent	30	0.6	SEV 4	0.59	18
WC 35	Intermittent	68	0.6	SEV 4	0.59	40.8
Total		**645**				**330.3**

Note: Some watercourses are listed more than once where multiple discrete reaches are proposed to be reclaimed.

Appendix N
BCM Inputs/Outputs and Assumptions

Table N1. BCM model setup components.

Model descriptor	Input data	Assumptions / justification
Project / reference name	Beachlands	BCM prepared for the Beachlands South Fast Track freshwater compensation assessment.
Biodiversity type	Streams and wetlands	Biodiversity types comprise residual freshwater effects associated with stream reclamation, direct wetland reclamation and conservatively assessed wetland hydrological loss.
Technical expert input(s)	Mark Delaney and Brittany Pearce	Inputs have been developed using site investigations, SEV results, WEV results, freshwater reclamation data, stormwater catchment information and professional ecological judgement.
Benchmark	5	The BCM benchmark is fixed at 5. This represents a hypothetical but realistic high-quality reference condition and aligns with the EcIAG 1 to 5 ecological value scale.
Number of habitat types or sites impacted	5	The model separates the impact values into five impact inputs: one wetland impact input and four stream impact inputs represented by SEV 1, SEV 2, SEV 3 and SEV 4. This allows the different stream value scores and impact areas to be accounted for transparently.
Number of compensation actions	1	A single compensation action is modelled, comprising restoration and enhancement of the proposed compensation wetland. Different restoration measures, including weed control, native wetland planting, buffer enhancement and ongoing management, have been treated as one integrated compensation package at the same site.
Net gain target	10%	A 10% net gain target has been applied. This aligns with the BCM User Guide, which identifies 10% as generally appropriate for compensation, subject to case-specific justification.

Table N2. BCM impact inputs.

Input descriptor	Input data	Assumptions / justification
Habitat / site impact: Wetlands	Wetland impact	Represents direct reclamation of natural inland wetlands and conservatively assessed loss of retained wetland extent from reduced surface water catchments.
Impact risk contingency: Wetlands	1	A low risk contingency has been applied. This reflects the generally modified condition, low complexity and low EcIAG ecological value of the impacted wetland. The affected wetlands are not considered irreplaceable, and the residual effects are considered suitable for aquatic compensation..
Impact uncertainty contingency: Wetlands	2	Moderate uncertainty has conservatively been applied to recognise uncertainty around hydrological response, wetland condition, and the use of representative wetland values. This is partly addressed by

Input descriptor	Input data	Assumptions / justification
		conservative impact assumptions, including use of potential WEV scores and conservative hydrological loss assumptions.
Areal extent of wetland impact	0.290684 ha	Includes 0.26574 ha of direct natural inland wetland reclamation and 0.05689 ha of conservatively assessed partial wetland loss from reduced surface water catchments.
Value prior to wetland impact	3.454	Based on the potential WEV score for the representative impact wetland, converted for use in the BCM. Using potential rather than current condition is conservative because it assumes the affected wetlands could improve under best-practice management.
Value after wetland impact	0.001	The BCM does not accept a value of 0. A value of 0.001 has therefore been used to represent effective total loss of the wetland values within the affected areas.
Habitat / site impact: SEV 1 stream group	SEV 1 stream impact	Represents affected stream sections assigned to representative SEV 1.
Impact risk contingency: SEV 1	1	A low risk contingency has been applied, reflecting the intermittent upper-catchment nature of the affected reaches, their limited riparian shading, historical landform modification, and ongoing influence from golf course management, which together support a low EcIAG ecological value.
Impact uncertainty contingency: SEV 1	2	Moderate uncertainty has conservatively been applied to recognise uncertainty associated with representative reach assignment and prediction of potential stream value.
Areal extent of SEV 1 stream impact	0.003456 ha	Based on 34.56 m² of affected streambed area represented by SEV 1.
Value prior to SEV 1 impact	2.45	Based on the potential SEV 1 score of 0.490 converted to a value out of 5.
Value after SEV 1 impact	0.001	The affected streambed is assumed to be fully reclaimed. A value of 0.001 represents effective total loss while allowing the BCM to calculate.
Habitat / site impact: SEV 2 stream group	SEV 2 stream impact	Represents affected stream sections assigned to representative SEV 2.
Impact risk contingency: SEV 2	1	A low risk contingency has been applied, reflecting the intermittent upper-catchment nature of the affected reaches, their limited riparian shading, historical landform modification, and ongoing influence from golf course management, which together support a low EcIAG ecological value.
Impact uncertainty contingency: SEV 2	2	Moderate uncertainty has conservatively been applied to recognise uncertainty associated with representative reach assignment and prediction of potential stream value.
Areal extent of SEV 2 stream impact	0.012348 ha	Based on 123.48 m² of affected streambed area represented by SEV 2.

Input descriptor	Input data	Assumptions / justification
Value prior to SEV 2 impact	2.755	Based on the potential SEV 2 score of 0.551 converted to a value out of 5.
Value after SEV 2 impact	0.001	The affected streambed is assumed to be fully reclaimed. A value of 0.001 represents effective total loss while allowing the BCM to calculate.
Habitat / site impact: SEV 3 stream group	SEV 3 stream impact	Represents affected stream sections assigned to representative SEV 3.
Impact risk contingency: SEV 3	1	A low risk contingency has been applied, reflecting the intermittent upper-catchment nature of the affected reaches, their limited riparian shading, historical landform modification, and ongoing influence from golf course management, which together support a low EcIAG ecological value.
Impact uncertainty contingency: SEV 3	2	Moderate uncertainty has conservatively been applied to recognise uncertainty associated with representative reach assignment and prediction of potential stream value.
Areal extent of SEV 3 stream impact	0.005106 ha	Based on 51.06 m² of affected streambed area represented by SEV 3.
Value prior to SEV 3 impact	2.905	Based on the potential SEV 3 score of 0.581 converted to a value out of 5.
Value after SEV 3 impact	0.001	The affected streambed is assumed to be fully reclaimed. A value of 0.001 represents effective total loss while allowing the BCM to calculate.
Habitat / site impact: SEV 4 stream group	SEV 4 stream impact	Represents affected stream sections assigned to representative SEV 4.
Impact risk contingency: SEV 4	1	A low risk contingency has been applied, reflecting the intermittent upper-catchment nature of the affected reaches, their limited riparian shading, historical landform modification, and ongoing influence from golf course management, which together support a low EcIAG ecological value.
Impact uncertainty contingency: SEV 4	2	Moderate uncertainty has conservatively been applied to recognise uncertainty associated with representative reach assignment and prediction of potential stream value.
Areal extent of SEV 4 stream impact	0.012120 ha	Based on 121.20 m² of affected streambed area represented by SEV 4.
Value prior to SEV 4 impact	2.955	Based on the potential SEV 4 score of 0.591 converted to a value out of 5.
Value after SEV 4 impact	0.001	The affected streambed is assumed to be fully reclaimed. A value of 0.001 represents effective total loss while allowing the BCM to calculate.

Table N3. BCM compensation inputs.

Input descriptor	Input data	Assumptions / justification
Compensation action	Compensation wetland restoration and enhancement	The compensation action comprises restoration and enhancement of the proposed compensation wetland, including weed control, native wetland planting, buffer enhancement, pest animal management where required, monitoring, maintenance and adaptive management. These measures are treated as one integrated compensation package.
Discount rate	3%	A 3% discount rate has been applied to account for the time lag between impact and predicted compensation gains. This is the rate recommended in the BCM User Guide.
Finite end-point	10 years	A 10-year end-point has been applied to reflect the expected timeframe for wetland restoration and planting outcomes to establish sufficiently to generate measurable ecological gain. Monitoring and adaptive management should be aligned with this timeframe.
Compensation confidence contingency	2	High confidence has been applied. The proposed compensation measures are standard ecological restoration actions, but successful delivery remains dependent on implementation, maintenance, weed control and plant establishment.
Areal extent of compensation action	2.943 ha	Represents the proposed wetland compensation area. The compensation site is a large, contiguous wetland restoration opportunity within the site and wider Waikōpua Creek catchment.
Value prior to compensation action	3.059	Based on the current WEV score for the compensation wetland, converted for use in the BCM.
Value after compensation action	4.012	Based on the potential WEV score for the compensation wetland, converted for use in the BCM. The predicted uplift reflects weed control, native wetland planting, improved indigenous dominance, improved buffer condition and long-term management.

Table N4. BCM Model Outputs.

Output descriptor	Total	WEV	SEV1	SEV2	SEV3	SEV4
Impact Scores	-0.22939	-0.21084	-0.00165	-0.00656	-0.00297	-0.00737
Total compensation score	0.34326					
Net Present Biodiversity Value	0.11387					
Modelled compensation outcome	49.6%					

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